USE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN TEACHING PRIMARY SCHOOL LEARNERS EXPERIENCING BARRIERS TO LEARNING IN EKURHULENI NORTH DISTRICT

by

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ABSTRACT

The objective of this study was to investigate the use of Information and Communication Technology (ICT) in the teaching and learning of learners experiencing barriers to learning in ordinary primary school classrooms in Ekurhuleni North district in Gauteng Province. The study sought to establish the role and use of ICT and how it enhances teaching and learning of learners experiencing barriers to learning. Data were collected using in-depth interviews and non-participant observation and this allowed the researcher to ask open-ended questions and also to observe participants using ICT. Six teachers from three primary schools in Ekurhuleni North district were used and purposive sampling was used to select these participants. Thematic content analysis was used to analyse data. The study revealed that ICT increases learners' motivation and concentration span, helps learners to participate effectively, assists in the grasping of concepts and minimises barriers to learning. The study recommends that teachers should be trained on the use of ICT and it should also be incorporated as an important pedagogical method to facilitate teaching and learning of learners experiencing barriers to learning.

Key terms: Information and Communication Technology (ICT); barriers to learning; teaching; primary school; enhancement; teacher training, Qualitative study.

DECLARATION

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Exact wording of the title of the dissertation as appearing on the electronic copy submitted for examination:

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I declare that the above dissertation 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.

I further declare that I submitted the dissertation to originality checking software and that it falls within the accepted requirements for originality.

I further declare that I have not previously submitted this work, or part of it, for examination at Unisa for another qualification or at any other higher education institution.

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DEDICATION

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LIST OF ABBREVIATIONS

CHAT	Cultural Historical Activity Theory
DoE	Department of Education
EFA	Education For All
ICT	Information and Communication Technology
ISTE	International Society of Technology in Education
UNESCO	United Nations Educational, Scientific and Cultural Organization
USA	United States of America

CHAPTER ONE: ORIENTATION TO STUDY

1.1 Introduction

The purpose of this study was to establish the use of Information and Communication Technology (ICT) in teaching learners experiencing barriers to learning. This chapter, which is the orientation to the study, covers the background to the study, statement of the problem, research questions, purpose of the study, research objectives, significance of the study, limitations and delimitations of the study, definition of key concepts and chapter outlines.

1.2 Background to the study

Research has shown that the world is making meaningful reforms in its provision for access to basic education for all children and that technology is a vital tool to this reform. Most countries are working on improving the way knowledge is being imparted to learners in schools (Nkula & Krauss, 2014:45). Many researchers have presented new insights into the effects of ICT on education. This research explored the use of ICT in the teaching and learning of learners who experience barriers to learning.

The 21st century is dominated by technology (Williams, 2010:67). The young generation deals comfortably with the internet, e-readers, computers and mobile devices. The education systems in primary, secondary and tertiary institutions use technology to enhance the understanding of different subjects. In addition, the resources made available by the internet have given people a dynamic learning environment in both formal and informal education. This requires well-equipped technologically proficient teachers. From primary school level, teachers need ICT knowledge and capabilities to ensure the achievement of desired educational goals therefore teacher development is needed to equip teachers with ICT skills.

Literature has shown that the development of ICT has enhanced the quality of human life in many aspects, including education. In Canada, the use of ICT by teachers

enhances professional development and makes learning inclusive (William, 2010:67). Brush, Glazewski, Ottenbreit and Baker (2014:65) highlight the need for innovative classroom practices, which include incorporating new technology, to support all learners. According to Williams (2010:67), studies done in the UK show that the internet has changed ways in which young people communicate, interact socially and access information. Research in education in the United States of America (USA) shows that the use of technology can help students with their learning, improve learners' self-confidence and motivation (Brush et al, 2014:45).

Governments around the world have developed programs for the consolidation of ICT in their schools which includes $7,87 billion that was spent on technology equipment by school districts in the USA in the 2003 to 2004 school year. In Singapore, the first master plan of ICT in education was introduced in April 1999. Brush et al (2014:107) examined the influence of computer technology on mathematics education in K-12 classrooms through a systematic review of literature. They assessed 46 primary studies and found statistically significant positive effects of computer technology in mathematics achievement. They also found positive effects when learners used a mode of acquiring new ways of learning with computers. In Singapore, all schools include ICT in the curriculum in order to develop in learners a culture of thinking, lifelong learning and social responsibility. A case study done in Nigeria showed that ICT infrastructure is still being developed in Africa but it is facing challenges, especially in the rural areas, due to the lack of electricity, computer literacy and access to computers, and the high capital costs of implementing ICT (Williams, 2010:89). ICT allows learners to become autonomous in their learning processes and changes the way that teaching and learning is conducted. The ICT policy of Basic Education (United Republic of Tanzania, 2007:47) recognises that ICT devices, such as personal computers, digital cameras, scanners, projectors, telecommunication equipment, internet resources, radio and television, have the potential to improve quality and effectiveness of teaching and learning.

The South African Department of Basic Education, through the ICT in Education policy, the White Paper on e-education (Department of Education [DoE], 2004) and the

guidelines for Teacher and Professional Development in ICT (DoE, 2007), has developed recommendations for the distribution and use of ICT devices in schools to ensure achievement of equity and quality education. In South Africa, the Department of Basic Education (DBE) confirmed the importance of ICT use in education by suggesting that all learners should be knowledgeable about computer usage. While computers are not a solution for educational problems, they offer the potential to advance learner knowledge and skills to foster cooperative and autonomous learning (United Nations Educational, Scientific, and Cultural Organization [UNESCO], 2008:78). ICT skills enable and prepare learners for a workplace where they will be required to collaborate with peers across the world to produce a new intellectual work that will add value to society and communicate new knowledge (UNESCO, 2011:67).

South African learners in schools with limited resources have continuously underachieved in subjects like Mathematics and Science. The government has resolved to introduce modern technology to strengthen teaching and learning. This intervention has made little or no progress despite the availability of ICT in these schools (Pan African Research Agenda [PanAf], 2008:50) because ICT was only used to transmit subject content instead of for the enhancement of learning (PanAf, 2008:50). The ICT in Education policy (DoE, 2004:40) advocates that the integration of ICT promotes the development of higher-order thinking skills. Teachers in schools need to be competent and innovative to maximise the potential of digital devices to enhance learner performance. In South Africa, a survey of 50 teachers showed that teachers lack skills to use ICT in the classroom (Chigona, Chigona & Davids, and 2014:67). Fifty-two per cent of teachers surveyed lacked proper training to implement the integration of technology, i.e. computers, software and online resources, to teach learners experiencing barriers to learning.

1.3 Statement of the problem

While studies have been done on the use of ICT, it is not clear how ICT is used when teaching learners experiencing barriers to learning. These include a variety of barriers to

learning such as visual, auditory, intellectual and physical impairments. . Some learners do experience concentration problems which can be related to attention deficit hyper-activity disorder. The use of ICT in teaching primary school learners experiencing barriers to learning is therefore crucial as a means to accommodate the diverse learners in the teaching and learning situation. This has created a gap in the knowledge base that this study aimed to fill.

1.4 Main research question

This study sought to answer the following main research question:

How is Information and Communication Technology used in teaching learners experiencing barriers to learning in primary schools?

1.4.1 Sub-Research Questions

1.4.1.1 How do teachers use Information and Communication Technology to teach learners experiencing barriers to learning in primary schools?

1.4.1.2 What is the role of Information and Communication Technology in the teaching and learning of learners experiencing barriers to learning in primary schools?

1.4.1.3 How can Information and Communication Technology be used to enhance teaching and learning of learners experiencing barriers to learning in primary schools?

1.5 Objectives of the study

In light of the sub-research questions above, this study sought to:

1.5.1 explore the teachers' use of Information and Communication Technology when teaching primary school learners experiencing barriers to learning;

1.5.2 describe the role of Information and Communication Technology when teaching

primary school learners who experience barriers to learning;

1.5.3 establish how Information and Communication Technology enhances teaching and learning of learners in primary schools who experience barriers to learning.

1.6 Significance of the study

The study explored the use of ICT in teaching learners experiencing barriers to learning in primary schools. Various stakeholders, such as learners, teachers and curriculum planners, will benefit from this study. The learners experiencing barriers to learning would be more effectively supported in ordinary primary schools through the use of ICT. The study will increase the awareness of utilising ICT in educational settings to support all learners in schools including learners experiencing barriers to learning for example those learners experiencing concentration problems and the visually impaired. The study will also benefit teachers and professionals in education to provide support to all learners thus promoting academic, social and emotional excellence in their teaching environments. It will assist teachers to become knowledgeable about ICT in order to assist learners experiencing barriers to learning. The study will show that ICT provides a strong learning environment that changes the teaching-learning process to enable learners to learn in a constructive way. Through this study, education stakeholders will acquire knowledge about the importance of ICT as an advanced tool to support new ways of teaching and learning especially the use of videos and screen magnifiers for the visually impaired learners. Teachers will be able to use ICT to develop learner's skills for cooperation, communication, problem solving and lifelong learning. Researchers will be able to use the outcomes of this study to validate their findings on the same subject of inquiry and for further investigation.

1.7 Rationale for the study

My personal interest in this subject commenced when I was part of a teaching and learning workshop on dealing with learners experiencing barriers to learning. This made

me consider how information and communication technology could be used to teach learners who are experiencing barriers to learning. I believe that ICT improves the teaching-learning process of learners experiencing barriers to learning which was the rationale for undertaking this study.

1.8 Theoretical framework

The Cultural Historical Activity Theory (CHAT) as developed by Vygotsky(1978) and refined by Engeström (2015:200) guided this study to draw inferences from data collected on the use of ICT as a teaching tool to teach learners experiencing barriers to learning in ordinary primary school classrooms. The principles of CHAT allowed the researcher to explore the role of ICT in on-going learning activities (Nardi, 2012:8). Wilson (2006:30) argues that CHAT helps the teacher to examine problems from different perspectives. CHAT is used to address the question of whether learners experiencing barriers to learning can use ICT to enable them to improve their learning experiences and knowledge. Activity theorists believe that collective control increases an individual's control over his or her own learning and that a diverse learner population promotes the "cogenerative dialogue" (Ritchie, 2012:10). Prenkert (2010:643) postulates that the main principle of CHAT is that mediation is the epitome of human consciousness and actions. CHAT requires that learning activities adopt a user-friendly, careful approach when considering the role of technology (Amory, 2012:2).

1.9 Literature review

1.9.1 Introduction

The aim of this study was to explore the use of Information and Communication Technology (ICT) in teaching and learning of learners experiencing barriers to learning in primary schools. The literature review is presented under the following subheadings: teachers' use of ICT to teach learners experiencing barriers to learning; the role of ICT in teaching learners experiencing barriers to learning; and the use of ICT to enhance teaching and learning.

1.9.2 Teachers' use of ICT to teach learners experiencing barriers to learning

ICT, which is also known as Educational Technology, can be described as a tool that can be used to help promote learning including calculators, tablets such as IPads, smart boards, video cameras, digital cameras, computers the Internet, broadcasting technologies and telephones that can facilitate the delivery of instruction and learning processes (Lund, 2012:78; Watson & Watson, 2011:39). For the purpose of this study, ICT refers to making use of computers, laptops, tablets, interactive smart boards, overhead projectors and any other form of technology that can be used in the classroom for educational purposes.

UNESCO (2010) highlights that the selection of ICT devices must suit the learners' learning goals. Mooketsi and Chigona (2014:12) assert that using ICT for teaching and learning improves the quality of education and curriculum delivery. ICT affords learners a chance to access learning materials. ICT has played a significant role in providing a positive learning experience for learners experiencing barriers to learning.

1.9.3 The role of ICT in the teaching and learning of learners experiencing barriers to learning

ICT increases the learner's ability to learn and access the curriculum. According to Mittler (2016), the use of ICT is an additional support remediation which may minimise learners' barriers to learning.

Technology should be used as a tool to support educational objectives. It can provide skills for searching and assessing information, cooperation, communication and problem solving (Padayachee, 2017:60). Teachers manage the teaching-learning process therefore they must be able to prepare the learners for digital learning (Hennessy, Harrison & Wamakote, and 2010:44). The introduction of ICT in South African schools makes education accessible to all. Learners must learn to interact with the information, manipulate and use it to develop strategies to address problems. The advantages and disadvantages of ICT are further explained in detail in Chapter two

under Literature review.

1.9.4 Use of ICT to enhance teaching and learning

The awareness of what teachers are actively doing, the support they are given, what tools they have access to, the challenges in providing support and the use of ICT effectively in teaching learners who are experiencing barriers to learning are prerequisites for the enhancement of teaching and learning. This could enhance teachers' professional growth and development in using ICT in the classroom to help learners acquire concepts easily. Teachers require training programmes on the use of ICT in the classroom (Du Plessis & Webb, 2012:49) to focus on the learner as the centre of inclusion and leverage the technologies which exist to provide different methods of learning and support, particularly for learners with barriers to learning. Teachers need ICT skills to provide flexible, responsive forms of support for learners with wide differences in their abilities, allowing them to participate fully and to encourage cooperative learning. Inspiring Education highlights the many ways that ICT, in the mainstream setting, can be used to meet the different learning needs of learners and stresses the need for intentional planning and careful implementation (Alberta Education, 2010).

To successfully transform teaching and learning experiences, teachers need to know which ICT tools to use when teaching learners experiencing barriers to learning. The Dakar Framework for Action (World Education Forum, Dakar, Senegal, April 2000) emphasised the application of ICT for achieving "Education For All" (EFA) goals at an affordable cost. The International Society of Technology in Education (ISTE) emphasises that teachers should be trained to provide ICT-based learning opportunities for their learners including those learners experiencing barriers to learning (Hamid, Meshkat, Rezaee & Jafari, and 2011:231).

1.10 Research methodologies

1.10.1 Introduction

Methodology in research refers to the strategy or plan of action that links methods to outcomes and governs the choice of method (McMillan & Schumacher, 2014:18). Below are descriptions of the methodological aspects. These include the research paradigm, research approach, research design, population, sample and sampling procedures, data collection instruments, data analysis, issues of trustworthiness and ethical considerations.

1.10.2 Research paradigm

This study was guided by the interpretive paradigm which is concerned with understanding the meaning that participants make of a situation or phenomenon (Maree, 2007:14). It has the intention of understanding "the world of human experience" suggesting that reality is socially constructed. The interpretive researcher tends to rely upon views of the situation studied (Creswell, 2013:45) and recognises the impact of his/her own background and experience on the research.

1.10.3 Research approach

The research approach used in the present study was qualitative in nature on the strength that it keeps the investigator close to the required data and facilitates understanding of the phenomenon being studied.

1.10.4 Research design

McMillan and Schumacher (2014:31) assert that research design is a plan of an investigation in order to obtain evidence to answer research questions. They add that research design describes the way the data is collected, highlighting the aspects of when, from whom and the conditions under which the data will be obtained. The present study employed a phenomenological qualitative research design in order to gain an in-depth account of teachers' roles and use of ICT in the teaching and learning of learners

experiencing barriers to learning.

1.11 Population and sampling

1.11.1 Population

A population is a comprehensive group of individuals that we are interested in studying (Babbie, 2012:200). The target population, according to McMillan and Schumacher (2014:352), constitute the entire group in which the research is interested and which the study seeks to draw conclusions from. For the purpose of this research, the primary school learners experiencing barriers to learning and teachers made up the targeted population.

1.11.2 Sampling

Sampling is conceptualised as the process of choosing a few participants from a larger population to become the basis of determining the prevalence of an unknown piece of information or situation regarding a larger group (Henning, Van Rensburg & Smit, and 2010:72). Purposive sampling was employed in selecting participants to be involved in the study. Thus a sample is a representation of the population from which generalisations of the study will be made.

1.12 Instrumentation

Two research instruments were used during the field investigation, namely, in-depth semi-structured interviews and observations.

1.12.1 In-depth semi-structured interviews

The study made use of semi-structured interviews. A semi-structured interview schedule was used as the research instrument for this study. Leedy and Ormrod (2013:201) postulate that a semi-structured interview consists of a list of questions that guide the researcher when carrying out the interview. Interviews also assist the interviewer to

remain in alignment with questions that answer the study's objectives. The semi-structured interviews were held with teachers to solicit teachers' levels of understanding, opinions, motivations, strategies and challenges in relation to the use of ICT when teaching learners who experience barriers to learning (see Appendix J).

1.12.2 Observation

Observations were the second technique the researcher used to collect data so that the researcher could corroborate what participants actually did (McMillan & Schumacher, 2014: 376). Observation is a way for the researcher to see and hear what is happening naturally in the research field. The researcher was a non-participant observer of the teacher and the learners using ICT in the classroom and made use of the observation sheet which to write down what transpired during the observation period (see Appendix K).

1.13 Data analysis

An interview guide was designed to give the research participants an overview of the study's objectives so that they could make reference to ICT. The interviews were recorded using a digital recorder and, upon completion, the recordings were transcribed for analysis. The researcher put the responses from participants into categories and then coding was done from selected themes. Coding techniques included grouping similar kinds of information in categories and then relating different ideas and themes to one another (McMillan & Schumacher, 2014:399).

1.14 Trustworthiness

Johnson (2011:360) highlights that research seeks to systematically, deliberately and critically understand a phenomenon and make evidence-based decisions. Consequently, research of any kind must be of high quality standards if results are to be regarded as credible and trustworthy. Credibility, transferability, dependability and confirmability reflect the trustworthiness of qualitative research (Connelly, 2016).

Trustworthiness is measured according to the following:

1.14.1 Credibility

Credibility seeks to clarify that the research was conducted. Triangulation of data collection methods was used to ensure credibility (interviews, observation and peer debriefing).

1.14.2 Transferability

Transferability refers to how the outcome of the research can be applied to similar studies and situations.

1.14.3 Dependability

This ensures that gathered data is trustworthy by continuously checking the questioning and the interpretations of the findings (Korster & Moser, 2018).

1.14.4 Confirmability

Confirmability of the qualitative research refers To ensure confirmability, the researcher ensures that the research findings are the results of the ideas and experiences of the informants rather than the researcher.

1.15 Ethical considerations

Cohen, Van Rensburg and Smit (2018:362) describe ethics as a matter of principled sensitivity to the right of others. The necessary procedures were adhered to, which protected the physical and mental well-being of the participants in the research (Nijhawan, Janodia, Muddukrishna, Bhat, Bairy & Udupa, 2013). An ethical consideration in the research focused on the acquisition of informed consent, confidentiality, anonymity, avoiding harm to participants and permission.

1.15.1 Informed consent

The researcher shared with the participants what the research was about and their informed consent was sought before the research was conducted. The learners who were below 18 years had their parents or guardians sign the consent form.

1.15.2 Confidentiality

Polit and Beck (2012:363) describe confidentiality as an assurance to the participants that their identities will not be linked to the information that they provide. In the present study, the researcher assured the participants that data collected will be protected.

1.15.3 Anonymity

This is closely related to the aspect of confidentiality, but empathises privacy. McMillan and Schumacher (2014:363) assert that all participants have the right to privacy, anonymity and confidentiality. The information that each participant shares with the researcher should not be passed on to others in any form, unless specific consent has been given. To ensure this consideration, no real and actual names were used in both data collection and data analysis processes. Instead, fictitious names and codes were employed. No names were indicated on the interview guides.

1.15.4 Avoiding harm to participants

Atkins and Wallace (2012) observe that the data collection method of face-to-face interviews may result in potential problems for the participants. They further explain that a research interview may provide the only opportunity to discuss the topic. Although it may not be anticipated, the interview may provoke strong emotional feelings. In light of this observation, participation in this study was voluntary and the participants were able to withdraw if they wanted to without victimisation.

1.15.5 Permission

The researcher got clearance from the Faculty of Research Ethics Committee and Institutional Research Ethics Committee of the University of South Africa. Also,

permission was sought from the Department of Education, Circuit Office and the principals of the schools to carry out the study in their schools. Letters to seek permission were written to these offices.

1.16 Limitations of the study

The limitations to the study included constraints of time because the interviews were done after working hours and some of the participants were not keen to take part. Financial constraints, such as transport costs when moving from one school to another, were a burden to the researcher.

1.16.1 Overcoming limitations

For financial constraints, the researcher looked for donors to sponsor the study. On the issue of time, time schedules were made and the researcher knew what needed to be done and when it would be done. The researcher explained the importance of the study to the participants and, in that way, human resources constraints were reduced.

1.16.2 Delimitation of the study

The research focused on gaining in-depth understanding of the use of ICT in three ordinary primary schools in Benoni in the Gauteng Province. Secondary schools were excluded because the researcher is more familiar with the primary schools and their operational territory.

1.17 Definition of key concepts

1.17.1 Information and Communication Technology (ICT)

ICT can be defined as any tool that can be used to help promote learning, including calculators, tablets, such as IPads, smart boards, video cameras, digital cameras, computers the Internet, broadcasting technologies and telephones that can facilitate the delivery of instruction and learning processes (Lund, 2012:78; Watson & Watson,

2011:39). For the purpose of this study ICT refers to making use of computers, laptops, tablets, interactive smart boards, overhead projectors, speech to text software and screen magnifiers to help learners experiencing barriers to learning in the classroom to allow them reach their maximum potential.

1.17.2 Barriers to learning

Naicker (2018) refers to barriers to learning as any factor that is a hindrance to a learner's ability to learn. Barriers to learning also refer to any difficulties that arise within the education system which prevent both the system and the learner needs from being met (DoE, 2006). In this study, barriers to learning imply aspects which block understanding of concepts to learners during the teaching and learning process.

1.17.3 Teaching

Thornton and Raihani (2010) define teaching is a process of transmission of knowledge to individuals for the purpose of helping them to learn. Thorndike (1906 cited by Hemmi & Ryve, 2014:4) views teaching as methods used to assist learners to achieve the learning goals which are valued by society. In this study, teaching implies imparting knowledge to learners about certain concepts, causing them to learn.

1.18 Chapter outline

There will be five chapters in this study.

Chapter 1 covers the background general view of the study.

Chapter 2 provides the review of related literature.

Chapter 3 focuses on research methodology.

Chapter 4 deals with data presentation, analysis and discussion of the findings.

Chapter 5 presents the summary of findings, conclusions and recommendations.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents a literature review on the role and use of Information and Communication Technology (ICT) in teaching and learning of learners experiencing barriers to learning in ordinary primary school classrooms. It also highlights the theoretical framework that equally informed the framing of this study, namely, Cultural Historical Activity Theory (CHAT) and how this theory applies to the use of ICT in teaching and learning of learners experiencing barriers to learning.

2.2 Teachers' use of ICT to teach learners experiencing barriers to learning

Information and Communication Technology (ICT) as an Educational Technology, has been used for a variety of reasons including in schools.

ICT can be defined as any tool that can be used to help promote learning, including calculators, tablets, such as IPads, smart boards, video cameras, digital cameras, computers the Internet, broadcasting technologies and telephones that can facilitate the delivery of instruction and learning processes (Lund, 2012:78; Watson & Watson, 2011:39). For the purpose of this study ICT refers to making use of computers, laptops, tablets, interactive smart boards, overhead projectors and any other form of technology that can be used in the classroom for educational purposes.

Masino (2013) carried out a research on the use of ICT in teaching and e-learning in the Caribbean. The findings of Masino's research showed that, used correctly, ICT can enhance learning but that there was lack of training in the utilisation of ICT. A study done in Sweden found that, although Swedish teachers used ICT in the classroom, most teachers wanted to have a better understanding and skills to improve their application of ICT in the teaching and learning process (Mashile, 2016:24).

Findings made in Jordan by Noor-Ul-Amin (2013) showed that ICT can improve the quality of education by increasing learner interest and commitment, by promoting the

acquisition of basic skills and by enhancing teacher training. Computers and internet technology require new ways of teaching and learning. ICT provides the motivation to learn through devices, such as video, television and multimedia and computer software that combines text, sound and colourful moving images, that can capture the learners' interest in the learning process. Studies done in Malaysia by Mirzajani, Mahmud, Ayub and Wong (2016:26) identified factors that prevent teachers using ICT in their classrooms. The findings revealed that assistance from administrators; instructions to teachers in the use of ICT as well as enough resources were essential factors that influenced the utilisation of ICT in the classroom. Studies done in Ghana by Dadzie-Bonney and Hayford (2017:34) point out that ICT, especially computers and the internet, can enhance quality of life of learners experiencing barriers to learning by intensifying their engagement and minimising their social exclusion. In other African countries, such as Tanzania, learners' performance in Science and Maths is a major concern for the educational authorities and the government (Kafyulilo, Fisser, Pieters & Voogt, 2015). The utilisation of ICT in these subjects can assist learners to master their concepts and the processes required (Shin, Sutherland, Norris & Soloway, 2012:551).

Pitchford, Kamchedzer, Hubber and Chigeda (2018) conducted research in Malawi to determine if technology was effective in raising the attainment of learners with disabilities. The quantitative analysis demonstrated that interactive apps raised learning standards in pupils with special educational needs and disabilities but had limited success with learners with severe difficulties. Mafuraga and Moremi (2017:234) did a study in Botswana about whether ICT can be consolidated into the teaching of English in junior secondary schools. The findings from the study revealed that most teachers were well informed about the use of ICT in the enhancement of English teaching and learning and were prepared to attend ICT training to improve their teaching methods. Bester and Brand (2013:14) carried out an investigation to determine the effect of technology on attention and achievement within a classroom context in Centurion in the Gauteng Province. The results of the investigation showed that learners' achievements improved when technology was used in a lesson to capture their attention.

UNESCO (2010) advises caution in the process of choosing ICT to ensure that it suits the learners' learning goals. Mooketsi and Chigona (2014:12) postulate that using ICT for teaching and learning enhances the standard of education and curriculum delivery. It also affords learners opportunities to access learning materials. ICT plays a significant role in providing support for learners experiencing barriers to learning but additional care is required to ensure that a positive learning experience is created.

Montrieux, Vanderlinde, Schellens and De Marez (2015) did a study on the use of ICT in mainstream schools. They deduced that the inclusion of ICT devices into educational practices provided instant benefits for their use in day-to-day school activities without affecting their social participation. The mainstream use of ICT permits every learner to be incorporated academically by acquiring and engaging with the curriculum as well as preventing exclusion from mainstream schools. Technology can be an equaliser in a classroom with diverse learners. Rowlands (2015) points out that ICT can be the channel by which teachers can individualise lessons, adjust presentation methods to fit unique learning styles, give enrichment and strengthen skills which favour the different learning needs of learners. For example, a learner with a physical barrier may be issued with technology, such as an E-reader, to read the digital textbook as there will be no need to turn pages and the learner will therefore not be excluded from the rest of the class (SETN cited by Rowlands, 2015). The teacher education textbook, Educating Exceptional Children, has a special section in each chapter that concentrates on assistive technology, describing the way it is utilised with exceptionalities ranging from giftedness to autism which also enhances inclusion in the classroom.

Oyaid (2010 cited by Umar & Yusoff, 2014) postulates that ICT increases enthusiasm and concentration during lessons and gives learners the chance to have individualised learning experiences according to their needs and abilities. The use of ICT in the teaching-learning process can help in transmitting the curriculum by making use of real life problems and allows scaffolds and tools for the enhancement of learning.

ICT is internationally recognised as a valuable tool for learners experiencing barriers to

learning and can enhance their standard of life, reduce social exclusion and increase participation as (Andersen & Sorensen, 2017:7). Chigona et al (2014:3), in their study conducted in Cape Town, attest that ICT is widely regarded to be significant in curriculum delivery and reconstructing of traditional learning worldwide. Several governments have invested greatly in ICT resources and training of teachers for the improvement of teaching and learning.

The correct application of technology can successfully refine the curriculum delivery and learners' proficiency to comprehend lessons, thus improving the learners' performance (Chigona et al, 2014:3). The inclusion of ICT in teaching and learning activities promotes productive learning and thinking as learners acquire skills such as reasoning, understanding and creativity (Bester & Brand, 2013:15). Also, capabilities like comprehension and problem solving are easier learnt through interactive media (DoE, 2004). All school leaders should be responsible for ensuring that teachers continue with their professional growth, particularly with ICT that positively influences learners' learning (Ghavifekr & Rosdy, 2015).

2.3 The role of ICT in teaching and learning of learners experiencing barriers to learning

ICT increases a learner's ability to function and learn, to access the curriculum and to grow and develop as a lifelong learner. According to Lund (2016), the use of ICT is an additional support and a strategy which can be utilised in tandem with differentiation and remediation to minimise learner's barriers to learning or add enrichment and expand their learning experiences. ICT might be used by a learner experiencing barriers to learning to perform a task, to engage with education or the workplace and to enhance their social interactions. The Salamanca Statement (UNESCO, 2001) explains that learning institutions must accommodate all children, irrespective of abilities, barriers to learning, socio-economic standing, culture and religion. Learner support is not a "one size fits all" approach, because as each learner is different so is the support they need.

Rowland (2015) stipulates that learners, who have been diagnosed with dyslexia,

dysgraphia or apraxia and who have a scribe for written activities, can be taught the necessary skills through ICT which includes the keyboard, typing and using a pointing device for a floating key board programme. The use of ICT has permitted learners to become independent and autonomous in their learning, instead of relying on the helpers. Learners with writing barriers can be allowed to present their work in word processing and will benefit in supporting their style of learning and retention. Research done by Mittler (2016) said that it is apparent that interaction of ICT should not only focus on the aim of educational enhancement of all learners and inclusion but should also help learners on their independence, self-drive building and success.

The awareness of what teachers are engaged in, the support they receive, the ICT devices they have access to, the obstacles they experience in assisting learners and the use of ICT in effectively teaching learners who are experiencing barriers to learning could enhance teachers' professional growth and development. This will make learning more equitable and accessible for all learners. ICT has turned out to be an effective educational technology that has the potential to transform the nature of education.

DoE (2000 cited by Chigona et al, 2014:3) points out that an obstacle to the use of technology is that, for learners to be able to utilise ICT for learning, they need to have basic skills on how to use computers. Those learners without prior experience of technology need to acquire these skills and teachers require training on how to include ICT in their teaching. Within the domain of their classrooms, teachers, while moving through the psychological processes associated with the change, can create a learning environment in which all learners can reach their full potential (Taole, 2013:17).

ICT supports collaborative learning and creativity, and promotes higher order learning (Fu, 2013:118). ICT has a valuable role in providing opportunities for teachers to teach learners experiencing barriers to learning and for these learners to be able to engage fully in education (Copriady, 2014:121). Technology is a tool to assist learners to achieve educational objectives, such as skills for searching and assessing information, cooperation, communication and problem solving (Padayachee, 2017:60).

Teachers are in charge of the teaching-learning process. Teachers must be competent to prepare learners for the digital world in which they utilise ICT to access and process information (Hennessy et al, 2010:44). The introduction of ICT in South African schools has been driven by the need to make education accessible to all. This is normally misconceived by teachers and learners as having access to information from the internet, and utilising it to formulate educational tasks (PanAf, 2008). Learners must interact with the information so that they are able to utilise ICT to address individual challenges. The teacher needs to set up a learning environment that fosters and equips learners with advanced thinking skills and abilities through the effective use of digital devices.

The teachers' use of ICT in the classroom depends on their knowledge on how to integrate ICT as a tool for teaching learners experiencing barriers to learning. Teachers can transform the classroom environment into one that is interesting and cooperative, stimulate the advancement of learner thinking process and draw the best out of learners. Learners must be able to search, analyse and synthesise information independently to help them solve authentic problems using available technology.

The challenges of ICT include the teacher not having skills to adjust learning activities or to achieve educational goals when using the new teaching equipment (DoE, 2007:6). Teachers' attitudes and their lack of expertise to evaluate the use and role of ICT in teaching hinder teachers' readiness and confidence in using ICT (Hennessy et al, 2010:47). Teachers in most South African public schools have gone for ICT training on basic computer skills but the training was not enough to equip teachers with the skills necessary for the inclusion of ICT into their subject teaching (PanAf, 2008).

Research carried out on 10 South African schools by PanAf (2008) showed that most of the teachers cannot go beyond using ICT to type lesson plans, tasks and tests for their learners. Teachers do not take advantage of the potential of computers to enhance the teaching and learning of their subjects particularly when teaching learners experiencing barriers to learning. Mooketsi and Chigona (2014:22) argue that the role of ICT is

twofold it acts “as a facilitator for the transmission of the curriculum and as a factor for formulating the curriculum”. Equating ICT with facilitation is prompted by ideas that connect the role of ICT as that which contributes, allows or helps dissemination of the curriculum content.

The role of ICT for learners experiencing barriers to learning is to ensure the learners’ interaction with knowledge to enhance their understanding of subject content. Capan (2012:233) is of the opinion that the use of digital technology requires new approaches to the curriculum which advocate for a humanistic model of ICT inclusion where technology is viewed as a tool which empowers learners with subject knowledge, thinking skills and problem solving. The learner is viewed as a “constructor of knowledge” who is being exposed to technological devices to perform at a higher level.

Learners assimilate knowledge in various ways and the presentation and manipulation of knowledge gives an ideal platform for a learning environment. The characteristics of ICT accommodate different learning styles and types and can be consolidated into various teaching methods through the use of different forms of text, images, sound and movement (Capan, 2012:233). The use of ICT initiates an effective learning environment and it changes the learning-teaching process so that learners deal with knowledge in an active, self-directed and constructive way. ICT is not just seen as a tool that can be utilised as a substitution of existing teaching strategies but is viewed as an essential instrument to support new strategies of teaching and learning. ICT should be used to develop learners’ skills for cooperation, communication, problem solving and lifelong learning (Capan, 2012:233).

Studies done in Australia investigated the influence of ICT in educating learners experiencing barriers to learning and show that technology can play a vital and useful role (Adam & Tatnal, 2017). ICT gives learners the ability to create their own learning experiences and their investigation suggests that ICT plays a major role in improving the learning of learners experiencing barriers to learning. ICT has become an important educational technology which encourages adjustments in teaching and learning process

of learners experiencing barriers to learning. ICT has the ability to change the nature of education and digital media and technologies (computers, mobile devices, etc.) can lengthen instruction and give options of ways to teach.

The use of ICT in ordinary schools started in the 1970s but, only recently, the South African government, through the development of Inclusive Education, has acknowledged the significance of ICT as a teaching tool for special educational needs. The introduction and utilisation of ICT included the recognition that schools needed to initiate an inclusive culture (DoE, 2008:8). The use of ICT in the delivery of teaching and learning is part of the teaching and learning design process. Almalki and Williams (2012) assert that ICT must not only be an “add-on” activity in the classroom, but should add value to the teaching and learning process.

The Department of Education (DoE, 2004:17) explains that the intention of ICT is to provide accessibility to better learning opportunities, redress inequalities, improve the quality of teaching and learning and deliver lifelong learning. ICT has the ability to integrate differences in learning styles and minimise barriers to learning. This is possible through the provision of increased opportunities and individualised learning experiences. As a result, ICT can be vehicle for inclusive education for the learners experiencing barriers to learning (DoE, 2004:17).

2.4 Use of ICT to enhance teaching and learning

The use of ICT as a teaching strategy to teach learners experiencing barriers to learning also enhances teachers’ professional growth (Du Plessis & Webb, 2012:49). Most teachers regard ICT as a personal advantage and training is done in their spare time and at their own cost. Teachers can improve inclusion and give assistance to all learners in their classrooms and schools but teachers need skills to build capacity that can provide flexible, responsive forms of support that learners may need. ICT can also provide professional growth for teachers and improve teachers’ capacity, proficiency and self-confidence to deliver focused targeted ICT interventions to support the learning

of individual learners. ICT supports learners with a variety of barriers in their abilities, permitting them to take part and engage, not only with the curriculum, but also with their peers in the classroom. Inspiring Education points out the many ways that ICT, in the mainstream setting, can be used to meet the diverse learning needs teachers are faced with and stresses the need for well-prepared selection, intentional planning and careful implementation.

To effectively modify teaching and learning experiences, teachers need the ability to know which (ICT) devices to use when teaching learners experiencing barriers to learning. The Dakar Framework for Action (World Education Forum, Dakar, Senegal, April 2000) points out the value of ICT usage in attaining “Education for All” (EFA) objectives and suggests that ICT should reinforce EFA objectives at an affordable cost. The International Society of Technology in Education (ISTE) stresses that teachers need to formulate ICT-based learning opportunities for their learners including those learners experiencing barriers to learning (Hamid et al, 2011).

For teachers to effectively utilise ICT, they need to be trained on how to include ICT in their teaching. This allows them an opportunity to move through the psychological processes associated with the change (Taole, 2013:14). Once teachers have understood the ICT principles and have been prepared (trained) to promote ICT initiatives, they will be capable of employing numerous effective strategies for its success. Within the domain of their classrooms, teachers can create a learning environment in which all learners can reach their full potential.

The duty of forming child-friendly school environments can be demanding for experts as well as novice teachers. It calls for them to be receptive to current demands and changing needs in the teaching-learning process (Copriady, 2014:119). Thompson, Andreae, Bell and Robins (2013:205) suggest that implementation or promotion of ICT educational initiatives in school systems requires changes to curricula and standards. Teachers explain that the amount of work needed by education authorities in connection with ICT implementation had a tendency to overwhelm them. Teachers felt it would be

impossible for them to form a “perfect” classroom where each learner’s needs was taken into consideration (Williams, 2010:210). The main factor in the successful implementation of ICT is having well trained, motivated and committed teachers to deliver new initiatives regarding the use of ICT. Extra time was needed for focusing on the developmental skills of ICT inclusion in the teaching-learning of learners experiencing barriers to learning.

Khan, Hasan and Clement (2012:63) conducted a study examining the factors in relation to the use of ICT in the teaching-learning process. The results revealed that teachers, who were already using ICT, had abilities and confidence in utilising ICT. These teachers perceived ICT as important for their individual work, and for their teaching and planning for the future. They believed that ICT makes lessons more enjoyable, less challenging, and more exciting for them and their learners, more diverse and more distinctive. Sherman and Howard (2012:340) postulate that teachers have to be willing to consider inadequacies in the learning content, process and environment. Teachers have a responsibility to use ICT educational initiatives and therefore they need a thorough comprehension of the use of ICT (Taole, 2013:14). The studies conducted by Buabeng-Andoh (2012:142) in Singapore and Deng, Chai, Tsa and Lee (2014:247) in China found that ICT use in classrooms entails trained teachers interpreting curriculum documents, adopting modern teaching methodologies and giving learners a wider choice of learning experiences.

The level of understanding determines the success or failure of the ICT initiative. In some cases, ICT has clashed with teachers’ existing conceptions and beliefs regarding school environments (Williams, 2010:205). Teo, Fan and Du (2015:240) note that, in some countries, teachers have a sound knowledge of ICT when teaching learners experiencing barriers to learning and that teachers maintain that they have adopted and promoted the principles of the use of ICT and are ready to share ideas with their colleagues. On the other hand, there are teachers who do not welcome ICT in schools.

Copriady (2014) states that teachers should be well informed, knowledgeable and

experienced in the use of technology for transmitting knowledge. The teacher's role within an ICT environment is to modify the learning and teaching methods to cater for learners who experience barriers to learning (Albugami & Ahmed, 2015). The White paper on e-Education (DoE, 2004:16) states that ICT encourages the classroom environment to recognise that learners operate at different levels during lessons. ICT embraces inclusive education by providing added opportunities, alternative methods of instruction and flexible assessments for learners who experience barriers to learning.

The present study focused on how ICT is used in the teaching-learning process for learners experiencing barriers to learning in ordinary schools. In order for ICT projects to succeed during teaching and learning, ICT's role is considered together with how teachers integrate teaching methods that support the curriculum. This can only be possible when teachers are properly trained on the use of ICT (Albugami & Ahmed, 2015). Blackberry and Woods (2014:139) carried out a study on integrating technology into learning and teaching practices. According to their findings, teachers lacked computer skills hence they recommend that teachers receive training on the application of ICT.

According to Nkula and Krauss (2014:45), the use of ICT and e-learning has brought a number of changes to supplementary resources, for instance, Interactive White Boards (IWBs), in the teaching of learners experiencing barriers to learning. Teo et al (2015:338) investigated educational practices around the IWBs in British primary schools. The results of the investigation reflect that IWBs facilitate speedy and smooth presentations of learning content for learners experiencing barriers to learning. In terms of educational activity, IWBs provide more interactive and non-authoritative dialogue between teachers and learners experiencing barriers to learning. ICT facilitates better communication between teachers and learners, provides accessibility to information and greater access to learning.

There are two important factors in the use of ICT for both individualised learning and the integration of learners experiencing barriers to learning in ordinary primary school

environments. One of these factors is the current emphasis on inclusive education (DoE, 2001), whilst the other emphasis is on the 21st century as an “ICT century” where technological developments are changing people’s lives including the lives of the learners experiencing barriers to learning (Chigona et al, 2014:6).

Du Plessis and Webb (2012:49) confirm that, for teachers to be able to use the supportive nature of ICT, they should first understand the uniqueness and learning needs of learners experiencing barriers to learning. They must be able to plan and carry out daily activities that would help learners experiencing barriers to learning so that they gain as much information as possible. This includes having special competences and skills in ICT to meet the needs of learners experiencing barriers to learning.

The Department of Education has to provide infrastructure for ICT systems. The teacher’s role within an ICT-rich environment must change to support learners experiencing barriers to learning by recognising the different needs of these learners. ICT roles need to be considered together with how the teachers use teaching strategies that support each role within the curriculum (Albugami & Ahmed, 2015). Teachers’ commitment to inclusive education helps them to consolidate the application of varied methods, techniques and strategies based on the use of ICT tools (Fernandez, Reyes, Pinero & Japon, 2013 cited by Palomino, 2017:146). Current research (Teo et al, 2015:243) says that teacher attitudes towards ICT play an important role in its successful implementation and effectiveness in the classroom.

2.5 Theoretical framework

The Theoretical Framework that framed the present study was the Cultural Historical Activity Theory (CHAT) which is a useful tool to analyse technology integration using a socio-cultural historical lens for analysis (Koszalka & Wu, 2005). CHAT was developed by Vygotsky (1978) and refined by Leont’ve (1978) and was further refined by Engeström (1999). CHAT suggests that the issues of culture, such as values, pass down from one generation to another by social connections, mainly through the

involvement of a knowledgeable community of family members. CHAT is mainly concerned with the process of mediation and how hands-on activity shapes, and is shaped, by cognitive functioning. This, in turn, helps learners to learn behaviours considered important and specific to their culture or society. The transformation of growth that learners experience because of these social interactions differs between cultures and this allows learners to become well versed about tasks seen as powerful or vital in their particular society or culture (Vygotsky, 1981:163). CHAT is a theory that deals with human activities as they relate to artefacts, shared practices and institutions. As learners study, work and play, they disclose multiple set of habits and values that shows that learning is not a unique act but is situated in a time and a place, influenced by the surrounding resources and subject to the reciprocal influence of learners themselves in that context (Vygotsky, 1978:40).

Prenkert (2010:643) explains that the main idea of CHAT is the idea of mediation that is the epitome of human consciousness and actions. Vygotsky (1978:40 cited by Prenkert, 2010:643) asserts that, for human activity to occur, there needs to be an established structure in which mediation tools are utilised. Amory (2012:2) postulates that CHAT calls for learning tasks to adopt a user-friendly approach when working on the object and careful thinking about the role of ICT, especially when teaching learners experiencing barriers to learning. Roth (2007 cited by Ngubane-Mokiwa, 2013) advises that no mediation process is one-sided, but rather that all the actors play a vital and active role. Vygotsky (1978) suggests that human activity is mediated by cultural, psychological or technological tools that depend on the actual need, knowledge and skills which will be applied to learners experiencing barriers to learning. Vygotsky (1978) views mediation artefacts as existing in the environment, for example, tools, subjects and objects, and believes that the interaction between these lead to a learning outcome.

In the present study, the teachers using ICT as a mediation tool kept track of how they worked towards giving the learners experiencing barriers to learning positive learning experiences. This theory frames the way ICT is used to facilitate learning for learners experiencing barriers to learning. In this study, CHAT was used to understand how

learners experiencing barriers to learning use ICT and to analyse the rules which guide their learning activities. It also addresses how the object mediates through ICT to achieve positive learning experiences. It was suitable for this study because it allowed for easy and recordable tracing of processes involved in facilitating learning of learners with barriers to learning through the use of ICT. The main focus was on how teachers make appropriate and maximum use of ICT to provide positive learning experiences for learners experiencing barriers to learning. Learning, through the use of ICT, should encourage a fruitful engagement between learners experiencing barriers to learning and their learning materials. The use of ICT tools should facilitate or mediate the achievement of the desired goal of affording the learners experiencing barriers to learning's access to learning.

A study done by Rowlands (2015:59) used the CHAT framework to analyse the utilisation of assistive technology for the enhancement of educational support for learners experiencing barriers to learning in mainstream schools. The study explains that CHAT addresses the central tenet of ICT in that learners experiencing barriers can increase their interactions with technological devices leading to the building of knowledge. It also maintains that learning is not an entity on its own due to the environment in which it takes place and that learning media in the environment support or hinder the acquisition of new skills or knowledge. The flexibility of ICT allows a teacher to build tools and materials that address learners' strengths as well as their weaknesses. When ICT is appropriately integrated into the classroom, learners are provided with multiple means of completing their work and focus on achieving academic standards. For learners experiencing barriers to learning that interfere with their communication, learning, social relationships or active participation, ICT supports their participation in learning experiences in the least restrictive environment (Ghavifekr & Rosdy, 2015). ICT can increase a learner's opportunities for education, social interactions and meaningful employment. The barriers which learners experience can be minimised and, in some cases, removed through effective use of ICT, coupled with teacher training and support. This ensures that ICT is able to achieve longevity and

promote lifelong learning. Learners engage with learning tools, such as ICT, along with the curriculum, to best suit their learning styles and learning profiles and thus gain new knowledge and build new schemata and connections with society and the wider world. CHAT encourages learners to support and be active participants when choosing their means of participation in classroom activities and the curriculum, thus promoting engagement and interest. When ICT is used as a mediation tool to bridge the gap between the knowledge and the learner or to make sense of abstract ideas, the learners' ability to improve understanding is reached even in intricate tasks (Ndlovu & Lawrence, 2012). Quality ICT use therefore entails engagement with the tool that empowers the learner with developmental abilities (Vygotsky, 1978).

There is scarcity of literature on the topic about ICT use among learners experiencing barriers to learning in South Africa. This study aimed to contribute to the body of knowledge on the use of ICT among learners experiencing barriers to learning.

2.6 Summary

This chapter has presented the different concepts that are related to this study, which include a discussion on what ICT is and how it benefits the learners experiencing barriers to learning. The challenges in using ICT when teaching learners experiencing barriers to learning, ICT resources that are necessary when teaching learners experiencing barriers to learning, the effect of ICT on the curriculum and attitude towards ICT were discussed. The theoretical framework that underpinned this study, which is CHAT, and how this theory frames the use of ICT in the teaching and learning of learners experiencing barriers to learning was also discussed in this chapter. The following chapter addresses the research methodology used for this study.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter gives an account of the research methodology that was used in this research study about the role and use of ICT in teaching and learning of learners experiencing barriers to learning in ordinary primary school classrooms. It outlines the research paradigm, research approach, study population and sampling procedures. It describes the data collection tools and explains data analysis and ethical considerations which were applied in the study.

3.2 Research paradigm

A paradigm is essentially a worldview, a whole framework of beliefs, values and methods within which research takes place (Creswell, 2015). A research paradigm is a plan that shows the way things are done, especially when doing research (Rehman & Alharthi, 2016:51). In this study, an interpretive paradigm was used as it emphasises meaningful participation of people or subjects under study (Creswell, 2013:8). The paradigm was suitable for this study since it used the meanings that teachers gave to the use of ICT during lessons to learners experiencing barriers to learning as data.

3.3 Research approach

The research approach comprises skills, assumptions and practices that the researcher uses as he or she moves from paradigm to the empirical world (Mphahlele, 2018). For the purpose of this study, a qualitative approach was preferred since it gave the researcher an opportunity to acquire first-hand information and understanding on the use of ICT when teaching learners experiencing barriers to learning. The other reasons that account for this choice of research approach were that it is an approach which pertains to more than one perspective about the subject under study and visually aimed at describing and interpreting interactions in terms of meanings attached by the teachers who took part in this research. It is a type of formative research approach that

requires specialised skills for acquiring in-depth responses about the role and use of ICT by educators in ordinary primary schools when teaching learners experiencing barriers to learning.

The study used the phenomenological qualitative approach to explore the role and use of ICT in the teaching and learning of learners experiencing barriers to learning. Vygotsky's CHAT theory was the theoretical framework adopted to support the qualitative approach of this study in exploring the role and use of ICT because CHAT provides a holistic and contextual method for the qualitative research and interpretation. It is a framework for qualitative analysis which examines human activity and, in this study, explained the interaction between teachers and ICT (tools) with regards to the role and use of ICT in the teaching and learning of learners experiencing barriers to learning. It sees the integration of technology as tools which mediate social action. It was therefore appropriate for this study to support various aspects of the research including analysis.

A qualitative approach is viewed as inquiry in which researchers collect data by interacting with chosen participants in their setting (McMillan & Schumacher, 2014:315). Creswell (2014:56) describes a qualitative approach as a process of understanding in which the researcher analyses words and reports on detailed views of informants in a natural setting of the study. A qualitative approach in the present study helped the researcher to inquire and discuss the role and use of ICT in the teaching and learning of learners experiencing barriers to learning.

3.4 Research design

Babbie (2012:112) states that research design involves a set of decisions regarding the topic under study that includes the population and the research methods. In addition, Monette, Sullivan and Dejong (2013) define a research design as a plan outlining how observations are to be made and how the researcher will carry out the project while Saunders and Lewis (2012:90) define a research design as an approach to answering

defined questions. In using a qualitative research design, the researcher seeks to gain an understanding of the social world through the direct personal experiences of the participants in a real world setting. The present study employed a phenomenological qualitative research design in order to gain an in-depth account of teachers' roles and use of ICT in the teaching and learning of learners experiencing barriers to learning.

Phenomenology provides an in-depth understanding of the lived experiences of participants. Lindegger (2010:463) points out that phenomenology is related to human experiences and the relationship within. Sokolowski (2018) views phenomenology as a way of capturing descriptions of phenomena and their setting. According to Welman, Kruger and Mitchell (2011:191), the researcher's concern is the understanding of social and psychological aspects of participants' perspectives. Nieuwenhuis (2016:59) believes that phenomenology leads to a greater opportunity to understand participants' perceptions. Creswell (2015:13) views phenomenological qualitative design as a strategy of inquiry in which the researcher identifies the essence of human experiences about a phenomenon as described by participants. The main objective for choosing a phenomenological qualitative design for this study was because the researcher was concerned about how teachers use ICT to teach learners experiencing barriers to learning. The researcher's intention was to get more information about the phenomenon under study.

3.5 Population and sampling

3.5.1 Population

Atkins and Wallace (2012) define a population as a class of individuals that have characteristics which are the same and of interest to the researcher. Saunders and Lewis (2012) view a population as the complete set of group members from which a sample will be selected. The population for this research was the teachers in ordinary primary school classrooms in the Ekurhuleni North district.

3.5.2 Sampling

Sampling refers to a process used to select a representative group from the main population (Nieuwenhuis, 2016:79). Selecting a sample allowed the researcher to get data from a smaller group that was most applicable to the study. Purposive sampling is defined by McMillan and Schumacher (2014:5) as a type of sampling that allows choosing individuals who are knowledgeable and informative about the phenomenon under study. In the present study, purposive sampling was applicable for the sample chosen. Only teachers in the ordinary primary school classrooms who have knowledge about inclusive education and who are involved in the teaching of learners experiencing barriers to learning through the use of ICT were chosen to participate in this study. Six teachers from three ordinary primary schools were selected due to the fact that their schools are well resourced with ICT and these schools were all situated in an urban area. The teachers who were interviewed were of various ages ranging between twenty-seven to forty-five years old. No one interviewed had less than ten years teaching experience. Four female and two male teachers were interviewed.

3.6 Instrumentation

The following subsection describes the in-depth interviews and field observations that were applied to collect data in this study.

3.6.1 In-depth semi-structured interviews

In-depth interviews are the most commonly used source of data collection instruments for interpretive research and are used to find out how people really feel about or experience a particular phenomenon (King, Horrocks & Brooks, 2019). Nieuwenhuis (2016:87) defines an interview as a dialogue in which the researcher collects information about the ideas, beliefs, views, opinions and behaviour of participants. Babbie (2012:289) also defines a qualitative in-depth interview as an interaction between the interviewer and interviewee in which there is a general plan of interest.

In this study, in-depth semi-structured interviews were used to obtain a detailed view of participants' beliefs, perceptions or accounts of the role and use of ICT. Interviews were used to collect empirical data about the meaning of teachers' views of using ICT in the teaching and learning of learners experiencing barriers to learning. The researcher encouraged participants to share important ideas by asking open-ended or probing questions and avoiding questions that might require "yes" or "no" answers (Nieuwenhuis, 2016:88). An interview guide consisting of thirteen questions was used for interviewing the participants. The interviews were conducted after working hours and the duration of the interviews ranged from fifteen to twenty minutes per session. The researcher used an audio recorder to record the interviews. For the interview guide refer to Appendix J.

3.6.2 Observation

Nieuwenhuis (2016:84) views observation as a process of recording the behavioural patterns of participants, objects and occurrences without questioning them. In this study, the researcher opted to be a non-participant observer to gain a deeper understanding of the phenomenon under study. Non-participant observation entails a person watching other people as an observer without taking part in the activities (Myers, 2010:138). In this study, the researcher observed how teachers use ICT in the teaching and learning process. Data from observations were recorded on an observation checklist. Field notes were kept and reflections were made on the observations as the events took place (Nieuwenhuis, 2016:88). (See Appendix K for the observation sheet)

3.7 Trustworthiness

Trustworthiness of a study refers to the degree of confidence in data collection and interpretation to ensure the quality of the study (Polit & Beck, 2014 cited by Connelly, 2016:435). The experience and the belief of the researcher can have an effect on the way in which data will be interpreted and this may affect the trustworthiness of the study (Connelly, 2016). Trustworthiness reveals how reliable the gathered qualitative data is

(Nieuwenhuis, 2016:113). Trustworthiness is noted when gathered data is not changed to fit the researcher's interest. Lincoln and Guba (1985:290) propose strategies which ensure the trustworthiness of the findings of qualitative research which are: credibility, transferability of the findings, and dependability of the findings.

The present study addressed the following trustworthiness issues:

3.7.1 Credibility

Credibility shows that the subject has been correctly outlined and that the research was carried out and is accessible to the public (Yin, 2011:19). For credibility, the triangulation of data collection methods was used. The researcher conducted interviews with teachers from ordinary primary schools and observed them teaching using ICT in inclusive teaching and learning environments. The transcripts were given to someone familiar with the research for peer debriefing and to ensure credibility.

3.7.2 Transferability

Transferability points out that the findings of the researcher can be generalised from one certain situation to another (De Vos, Strydom, Fouche & Delport, 2011:370). The researcher must provide the interested parties of the study with enough research information, especially about the context, so that generalisations can be made to similar contexts**.** The researcher attempted to provide a full description of the research data. To ensure that no preconceived emotions or beliefs of the researcher were used, the researcher ensured that the collected data and the research findings were precisely recorded and well reported without falsification. An effort was made to accurately report research findings, dictated by the verbatim accounts of participants.

3.7.3 Dependability

Dependability relates to the extent to which the findings of the study might be found

again (Korster & Moser, 2018). The researcher described the context and circumstances in detail for dependability of the findings (De Vos et al, 2011:346). The researcher provided a detailed explanation of the decisions, methods and procedures which might have influenced the study (Korster & Moser, 2018).

3.7.4 Confirmability

Confirmability is a way of ensuring whether the study's findings are the results of the experiences and ideas of the informants, rather than the characteristics and preferences of the researcher (Shenton, 2003:72 cited in Malahlela, 2017:70). In order to minimise researcher's bias, the researcher created an audit trail to ensure that the experiences and views of participants were not of the researcher's own making.

3.8 DATA ANALYSIS

The collected data were analysed using thematic content analysis. De Vos et al (2011:397) describe data analysis as a process of bringing order to the data collected so that the interpretation of the data is done through the use of analytical and logical reasoning to determine patterns or relationships. Lichtman (2013) views qualitative data analysis as a way of converting collected data into something meaningful to the researcher and other stakeholders. The researcher listened to the recorded interviews several times in order to become immersed in the data. The audios were transcribed verbatim. As part of inductive content analysis, the researcher read the transcripts several times and began to code line by line, identifying codes. These codes were combined to form themes based on knowledge from literature and objectives of the study.

Data analysis for the present study was grounded in the interpretive paradigm which examines the meaningful and symbolic content of qualitative data (Nieuwenhuis, 2016:99). The researcher analysed participants' collected data about their perceptions, attitudes, knowledge, values, feelings and experiences in teaching learners experiencing barriers to learning through ICT. The researcher focused on the analysis

of significant statements and the generation of meaningful units such as themes or categories (Creswell, 2013:184).

3.9 Ethical considerations

This study discussed the following ethical issues which were taken into consideration during data collection:

3.9.1 Informed consent

Gray (2018) states that the significance should be clearly stated and explained before conducting the interview. It creates transparency and shows honesty about the research and the interview by the researcher. The participants were informed that they were free to withdraw from the study without prejudice. The interviewees were provided with an informed consent form to sign before the date and time of the interview was set.

3.9.2 Confidentiality

Ethical considerations require that all information will be treated in a confidential manner. Confidentiality is an act of not disclosing information provided by a participant. The researcher gave a guarantee to the participants that no information provided would be disclosed (Cohen et al, 2018:92; McMillan & Schumacher, 2014:334). This undertaking ensured that readers of the research will not be able to determine the participants' identities. In this study, the interviews took place in privacy on a one-to-one basis between the participants and the researcher. The raw data gathered will be kept safely and will be destroyed after five years in accordance with the university regulations.

3.9.3 Anonymity

Participants will remain anonymous because the researcher made use of pseudonyms

throughout the study instead of the participants' real names therefore no one will be able to associate the participants with the information in the research.

3.9.4 Avoiding harm to participants

The concept of harm is quite subjective (Atkins & Wallace, 2012) as this includes other matters such as distress, embarrassment or anxiety. These are aspects that cannot be predicted since participants are unique and have different experiences. Inconvenience, time lost or being made to feel uncomfortable or awkward are some of the aspects of harm. A participant may feel harmed if he or she is deceived or perceive that his/her morals, values, actions or opinions have been judged.

3.9.5 Permission

The researcher got ethical clearance from the Research Ethics Committee of the institution of higher learning under whose umbrella this study is being conducted and, upon approval, the researcher then sought permission to conduct research from the Gauteng Department of Education and the Circuit manager. The researcher further sought permission from the principals of the selected ordinary primary schools in Ekurhuleni North district of Gauteng Province, in South Africa.

3.10 SUMMARY

The above chapter gave an account of the methodology that was used for this study. It outlined the research paradigm, research approach, the study's population and sampling procedures, data collection procedures, data analysis and ethical considerations. The subsequent chapter will discuss data presentation, analysis and discussion of findings.

CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter will highlight the utilisation of Information and Communication Technology (ICT) in the teaching-learning process particularly with learners experiencing barriers to learning in primary schools around Ekurhuleni North in Gauteng Province. This chapter presents the research data and the findings.

4.2 Presentation and analysis of data

This chapter addresses the study's sub-research questions and objectives, which include exploring teachers' application of ICT when imparting knowledge to learners experiencing barriers to learning, describing the role of ICT in teaching primary school learners experiencing barriers and establishing the use of ICT to enhance effective learning.

The following sub-section presents and analyses the data derived from the interview transcripts and observation sheets. A thematic content analysis method was used to analyse data in this category.

4.2.1 Teachers' use of ICT to teach learners experiencing barriers to learning

4.2.1.1 The use of ICT in the teaching-learning process

When asked how they used ICT to teach learners experiencing barriers to learning, the teachers spoke of various ways in which they use ICT as a way to improve methodologies. The responses were:

> *I sometimes challenge learners to use ICT medium creatively in a manner that influences their daily lives, for example, making birthday cards* ***(Participant 1).***
>
> *I can use a smart board so that the learners experiencing barriers to learning can*

enjoy learning by seeing colourful objects and being involved in the learning process ***(Participant 2).***

I use videos, do slide show presentations, also use smart boards to explain concepts being taught ***(Participant 3).***

Learners with learning difficulties can replay recorded lessons. These with attention deficit use videos and sound to maintain interest. Those with visual impairments, I use large charts which are shown on the smart board for them to see clearly ***(Participant 4).***

I use a smart board to help me to explain a diagram. I give activities on the smart board and all learners will be able to see ***(Participant 5).***

I use videos that capture their attention so that they will be eager or motivated to learn and also playing and recording videos and audios ***(Participant 6).***

Teachers pointed out that they normally use different ICT devices, for example, smart boards as well as videos to deliver lessons to learners experiencing barriers to learning. Slide show presentations are used to explain the concepts being taught. Large Charts, which are shown on the smart boards, are also used when teaching learners with visual impairments. Sometimes teachers use videos and sound to capture the learners' attention and interest and, in that way, they are motivated to learn. Recorded lessons may also be replayed by learners with learning difficulties.

From the above discussion, one can conclude that ICT has become a vital tool in terms of increasing learner motivation and raising the standards of teaching and learning in the classroom for learners experiencing barriers to learning. In addition, through the use of ICT, such as smart boards, tablets and computers in the lesson, it is possible that the class engagement increases, the lessons become more productive and fun, the learning becomes more effective and learners become more motivated.

4.2.1.2 Improvement of learners' performance through ICT use

The teachers had positive experiences to share on learner performance when using ICT as they relate in their responses below.

> *Most learners who are focused and determined have improved greatly in their academic performance. They seem to enjoy school and their confidence in learning has increased* ***(Participant 1).***
>
> *ICT helps to motivate learners, increases their participation during lessons, grasp concepts easily and improve. Learners learn at their own pace and learners' concentration span. They perform better when computers are used* ***(Participant 2).***
>
> *Moderate learners gained confidence and they are eager to participate in the lesson. The lessons become more enjoyable and thereby make the learners grasp concepts. Teachers also get time to work individually with learners experiencing barriers to learning* ***(Participant 3).***
>
> *It catches the attention of learners. Classroom activities are more interesting. Slow learners enjoy being at par with others and become motivated in their learning* ***(Participant 4).***
>
> *ICT motivates learners to be interested to learn. It helps learners to concentrate and pay attention. It is a very effective tool especially to learners experiencing barriers to learning* ***(Participant 5).***
>
> *They are motivated; they become eager to learn. It appeals to different senses. It helps to cater for learners with individual differences* ***(Participant 6).***

Most teachers pointed out that they have a positive experience of ICT when teaching learners experiencing barriers to learning. Teachers pointed out that they saw an improvement in the academic performance of learners who were motivated and their concentration span improved because of the use of ICT. The learners experiencing barriers to learning were able to learn at their own pace and their level of participation had improved. Furthermore, teachers got the opportunity to give individual attention to

learners experiencing barriers to learning through effective utilisation of ICT.

ICT can have positive effects on learner performance if used appropriately to complement the teacher's prior knowledge. Teachers felt that the use of ICT significantly improved learners' desire for learning and also contributed to better school performance of learners experiencing barriers to learning.

4.2.1.3 Challenges with the use of ICT

The teachers indicated that the use of ICT has challenges especially when teaching learners experiencing barriers to learning. Direct verbal quotes that show the teachers' views are reflected below:

> *Other learners are even dropping in their academic performance because of ICT distractors, for example, instead of researching on their school work or concentrating in class, they are tempted to play video games … that may not be related to the lesson being taught. Lack of internet connection and electricity is a big challenge* ***(Participant 1).***
>
> *There are problems of slow internet connection, resistance from learners because they lack computer skills, load shedding, shortage of devices, misuse of devices such that uneducative programs can be downloaded by learners* ***(Participant 2).***
>
> *The challenges I face include inadequate computers in the classroom, poor administrative support, lack of proper training skills. Another problem is some learners, when you leave them alone, they get carried away and go to other sites instead of concentrating on given work* ***(Participant 3).***
>
> *The breaking down of ICT equipment, inadequate training in the use of all available resources. Limited time to complete tasks as activities with ICT take up more time to set up and complete* ***(Participant 4).***
>
> *Electricity load shedding, if there is no electricity, I can't use the Smart board. Modern gargets can also crash, also learners have a tendency of not searching for the work given by the teacher; they might end up researching on things that are not*

relevant to the subject matter that we are discussing ***(Participant 5).***

Challenges I face when using ICT are learners' attention may be diverted to other things that are not educational ***(Participant 6).***

Most of the teachers reiterated that load shedding, a lack of adequate ICT equipment, so that learners have to share one device as a group, inadequate training to use the resources and slow internet connections are challenges. Teachers also pointed out that some learners do not concentrate on the lesson being taught because they go onto other sites that are not related to the lesson. In addition, computers are out dated, go off-line or get damaged while the teacher is giving a lesson. Some of these challenges depend on the location of the school.

A lack of proficiency in the application of ICT is a major hindrance to using ICT tools in the classroom during lessons because the use of ICT depends on the teacher's knowledge and skills. The teachers also talked about not having enough time to make use of ICT in their classrooms as setting up these tools takes time and this affects their ability to complete tasks.

4.2.2 The role of ICT in teaching-learning of learners experiencing barriers to learning

Following sub-sections or categories are drafted from the interview transcripts. As a way to verify the validity and authenticity of the themes, direct quotes are applied.

4.2.2.1 Minimising barriers to learning through the use of ICT

The following question about ICT was asked: *"In what way can ICT minimise barriers to learning?"* The following quotes support the findings below:

It can change the mind set of learners to be more positive and reduces boredom by making it interesting through videos and music ***(Participant 1).***

ICT helps to motivate learners and it also increases their participation in the learning

*process (**Participant 2).***

*By increasing learner motivation and engagement and lessons will be more learner centred (**Participant 3).***

*ICT can eliminate barriers to learning by making the learning activities more interesting, clear and related to everyday life (**Participant 4).***

*It eliminates by motivating the learners so that they are eager to learn and to participate when they are learning **(Participant 5).***

*ICT can help to eliminate barriers to learning because it motivates learners; it also helps learners to concentrate more. Also it can increase their listening capacity **(Participant 6).***

The majority of teachers believed that, if used effectively, ICT can minimise barriers to learning. Teachers suggested the use of various interesting ways of teaching, which include educational videos, to make the learning process fulfilling and meaningful. This will change the mind-set of learners experiencing barriers to learning to be more positive, it will reduce boredom and make the learning process more interesting. They believed that ICT motivates learners and improves their listening capacity.

4.2.2.2 Learner's ICT skills and experience in the use of ICT

When teachers were asked if learners experiencing barriers to learning have skills to make effective use of ICT, they had mixed views. The following quotes prove this response:

*To a greater extent, they may not have skills. They still need training so that they can use ICT effectively and also need ICT special equipment **(Participant 1).***

*They don't have skills; they rely on the teacher to guide them on how to use ICT **(Participant 2).***

*They do not have the skills; they rely on the teacher to guide them **(Participant 3).***

Children are exposed to computers and electronic devices in the home so, yes, they have skills ***(Participant 4).***

If you look at technology nowadays, these children are exposed to different technological devices from home ***(Participant 5).***

Yes, they have skills because they are exposed to these technological devices from a younger age at home ***(Participant 6).***

Four teachers held the view that learners experiencing barriers to learning have skills to use technological devices because they are exposed to technology at home from an early age. Most learners of the present generation are used to technology in everyday activities therefore ICT can be successfully integrated into day-to-day classroom activities as a way to maximise performance. Furthermore, ICT captures learners' attention and improves their concentration during lessons. Two teachers stated that the learners do not have the skills to use ICT hence they rely on the teacher to guide them and this shows that learners also need to be trained in using these ICT devices.

4.2.2.3 ICT Policy

Most teachers, when asked about the ICT policy or guideline at their respective schools, responded that the policy exists with a few stating that there is no policy, as mentioned in the quotes below:

Yes, in my school there is a policy that guides teachers to use ICT effectively during lessons. The ICT Policy, as you know, is there to control the use of the resources ***(Participant 1).***

There is no ICT Policy ***(Participant 2).***

No, there is no policy or guideline for teachers; we apply what we gain from workshops ***(Participant 3).***

*Yes, the policy is there for learners to use technology but not for teachers to use it for teaching learners experiencing barriers to learning (****Participant 4).***

At the school, we do not have our own ICT policy; we are using the Provincial ICT policy ***(Participant 5).***

*Yes, there are guidelines and a policy which helps the teachers to use ICT properly for the benefit of learners experiencing barriers (****Participant 6).***

Four teachers pointed out that they have ICT policies at their respective schools to control the use of ICT resources at the school. Another teacher interviewed said that the ICT policy that they have at their school lacks clarity on how ICT must be used in the classroom when teaching learners experiencing barriers to learning. Some teachers mentioned that they do not have an ICT policy at their schools hence it was difficult for them since there is nothing to guide them.

4.2.2.4 ICT's effectiveness in teaching learners experiencing barriers to learning

When asked about ICT's effectiveness in teaching learners experiencing barriers, the teachers' quotes below show the positive responses from participants.

Yes, because when children use computers, they are motivated to learn. They enjoy using computers because they will see colourful pictures on the computers ***(Participant 2).***

Yes, it does make teaching easy and interesting. Presenting/introducing a lesson through MS Power point – showing videos to the learner with a concept that is related to your teaching objective ***(Participant 1).***

Yes, very much so, learners enjoy the lessons more and thereby understand concepts easier ***(Participant 3).***

Yes it does, I search for information on the internet and download useful activities for learners experiencing barriers to learning ***(Participant 4).***

Nearly all teachers said that ICT makes their teaching more effective because of the change in behaviour they notice especially when they are teaching learners experiencing barriers to learning. The teachers believed that the learners were

motivated to learn and those with, for example, ADHD, were able to concentrate during the lessons. Technology allowed learners to learn at their own pace and perform better. ICT improved the teaching-learning process since teachers were able to download useful activities from the internet and also record tutorials that learners experiencing barriers to learning can play multiple times in order to grasp the concepts they did not understand. With regard to learners experiencing barriers to learning, ICT can assist learners to construct new knowledge, acquire new skills and respond to their own learning styles.

4.2.2.5 Suggestions on ways to make ICT effective in school

When the following question was asked of the teachers: “What do you suggest can be done in this school so that teachers can effectively use ICT in delivering their lessons when teaching learners experiencing barriers?” The teachers said the following:

> *Improve teacher competency in the teaching of learners experiencing barriers to learning through effective training (**Participant 1).***
>
> *The school must buy more computers in order for the teacher to use his or her own computer **(Participant 2).***
>
> *More training and workshops should also be conducted so that teachers are well equipped with ICT knowledge so that they can be well versed with current technologies **(Participant 3).***
>
> *Teachers should be trained, especially those teachers who are unable to use the smart board and there should be workshops they need to attend for training **(Participant 5).***
>
> *I suggest the school should provide more training and workshops to the educators so that they have full knowledge on how to help these learners experiencing barriers to learning **(Participant 6).***

The teachers listed several suggestions to use ICT effectively at their respective

schools. Teachers need to be trained and to attend workshops on the use of ICT and this will help improve their skills to assist learners experiencing barriers to learning. They also said that the schools should buy more technological devices, for example, computers, laptops and tablets for both teachers and learners. The devices should also be well maintained and software should be updated regularly. More security should be provided so that the devices will not be stolen. They should attend meaningful on-going teacher workshops that would empower teachers to be able to use technology to teach learners experiencing barriers to learning effectively.

4.2.3 Enhancement in quality of teaching and learning through the use of ICT

4.2.3.1 Enhancement through the availability of ICT facilities

When teachers were asked about the ICT facilities in their schools, they expressed the following:

> *I highly rate it – network connections are always monitored by an on-site technician* ***(Participant 1).***
>
> *I can say we are not yet there because we need more computers* ***(Participant 2).***
>
> *At our school, it is bad. From a scale of one to 10, I will give it a four because we still have a long way to go and more work to be done* ***(Participant 3).***
>
> *Scales of six out 10, it's because the facilities are good but they can be improved* ***(Participant 4).***
>
> *To me, they are good, very efficient, and very effective* ***(Participant 5).***
>
> *Rate of out of 10, I will give seven. There is Wi-Fi and all learners have individual tablets that they use* ***(Participant 6).***

Most of the teachers rated their ICT facilities found in their schools highly. They said the ICT equipment was good and has improved the learners' performance. There were some teachers who felt that their ICT facilities were not good and they needed more

computers.

4.2.3.2 Enhancement of teaching and learning through acquisition of ICT skills

When teachers were asked about their skills in using ICT, they had mixed views. The following verbal quotes confirm what the teachers said:

> *Yes, I have the skills to teach learners experiencing barriers to learning because of the kind of training I was exposed to during the workshop training* ***(Participant 1).***
>
> *Yes, I research to find best methods so that I can help learners experiencing barriers to learning* ***(Participant 4).***
>
> *Yes, I have sufficient knowledge that I acquired during training workshops* ***(Participant 5).***
>
> *Yes, I have to research on how best I can help these learners experiencing barriers using ICT* ***(Participant 6).***
>
> *No, we still need more workshops on ICT so that we can be able to teach these learners experiencing barriers to learning* ***(Participant 2).***
>
> *The knowledge is there but limited, more training is required from time to time to keep up with the latest trends and technologies* ***(Participant 3).***

Some teachers said that they had ICT teaching skills. However, other teachers said that they need more training and suggested that workshops should be conducted frequently. They explained that the courses which were conducted focused on acquiring basic ICT skills and not on how to develop the methodology aspects on how to use ICT during lessons to learners experiencing barriers to learning. Teachers may have very little knowledge on integrating ICT with classroom pedagogy and barriers to learning because of the type of training they received. Some teachers may also not be trained in dealing with learners experiencing barriers to learning in the classroom and may not explain how certain aspects of ICT should be handled in order to reduce these barriers.

4.2.3.3 Teachers' and learners' attitudes towards the use of ICT

When teachers were asked about their attitudes towards using ICT, the following quotes show the teachers views:

> *It raised even their self-esteem, self-confidence and even their creativity. They are now showing great interest in learning. Through the use of internet, they are able to discover and research a lot of educational information helping them to improve in their academic performance* ***(Participant 1).***
>
> *It helps in a way that it works as concrete media during the teaching and learning process* ***(Participant 2).***
>
> *They understood more learning about something and actually see its images, for example, it made a huge difference to learners and also, instead of just listening to the teacher, learners discover things for themselves* ***(Participant 3).***
>
> *They understood the lesson faster and they enjoy lessons and absenteeism is low* ***(Participant 4).***
>
> *I can say that learners have been motivated. Interest has been aroused in them to learn. Their confidence has improved* ***(Participant 5).***
>
> *They are more involved in their learning. It helped learners to master the skills when they see the images visually* ***(Participant 6).***

Most teachers were positive in terms of how ICT is used in their teaching of learners experiencing barriers to learning. Teachers indicated that ICT had facilitated their ability to teach, acquire knowledge and apply technology in their lessons. Teachers said that ICT had raised their self-esteem and self-confidence, and has given them a deeper understanding of their lessons. The learners were now enjoying their lessons and showing more interest in their learning.

4.2.3.4 The enhancement of teaching and learning through professional ICT training

The teachers were asked whether they had ICT training. Their views are below:

> *Yes, I was trained in ITSI Educator console training level I* ***(Participant 1).***
>
> *Yes, but it was basic ICT training* ***(Participant 2).***
>
> *Yes, I have but it was for basic computer skills* ***(Participant 3).***
>
> *Yes, basic training but not specifically for teaching learners experiencing barriers to learning* ***(Participant 4).***
>
> *I have attended ICT training in our province; tutors were sent to schools even to clusters so that they are able to train teachers on how to use ICT* ***(Participant 5).***
>
> *Yes, I did. It was a basic computer training course* ***(Participant 6).***

Almost all teachers said that they were trained to use ICT, for example, the use of computers and smart boards but, for some, it was just basic computer training. Most teachers said that they had basic computer training which was not specifically on how to teach learners experiencing barriers to learning using ICT, so they researched on the internet on how to help these learners.

4.2.4 Observations

The data from the observations done by the researcher on how ICT was used by the teachers and learners in the classroom was based on the collection of information regarding behaviours and processes. The researcher employed non-participant observation, observing the ICT use in the chosen classrooms and observed the behaviour of the learners. The purpose of the non-participant observation was to enhance the empirical information collected in order to gain an in-depth knowledge of the use of ICT in regard to the teaching and learning of learners with barriers to learning. All the information acquired was transcribed so that further analysis and

comparison could be done with the data attained through interviews.

The data from the non-participant observation by the researcher showed that most of the classrooms were equipped with ICT resources such as computers, tablets, laptops for the teachers, smart boards, interactive white boards and overhead projectors. These tools enabled the learners to be more involved in their learning and the researcher observed that the learners were enthusiastic during the teaching and learning process in all the classrooms that observed. The learners were motivated and concentrated on the teaching and learning process because of the use of smart boards, computers and tablets. In one of the classrooms, the learners demonstrated their understanding of the maths problems they were being taught by the teacher on the interactive white board by working out the given problems and taking turns to go on the smart board.

The researcher observed colourful objects and videos on the computers that were used in one of the classrooms and that the learners paid attention during the lesson. Smart boards kept the learners busy and motivated to learn. Teachers passed positive comments and encouraged learners to participate in the lesson. The teacher in one of the classrooms projected images on the smart board and encouraged learners to go to the interactive whiteboard and demonstrate on the activity being taught, which made learning more engaging.

The researcher observed that ICT brought improved teaching skills and enhanced the classroom environment for learners experiencing barriers to learning. ICT allowed teachers to teach different concepts in a way that learners experiencing barriers to learning can understand them. Learners experiencing barriers to learning perform better when they are fully engaged and hands-on and this may be possible through the use of ICT. ICT in classrooms improves learning, enhances literacy, boosts attentiveness and increases comprehension. Learners experiencing barriers to learning were excited about being able to use technology and were eager to learn. ICT turned the classroom environment into an engaging and interactive learning experience for both the teachers and learners experiencing barriers to learning. It helped learners to remain absorbed

and involved in their own learning experiences.

4.3 Discussion of findings

The discussion of findings makes reference to the CHAT framework that was adopted to inform the present study and to help understand the different perspectives of ICT as mediation equipment for teaching and learning. The findings in this study are discussed to answer the study's sub-research questions.

4.3.1 Sub-research question 1: How do teachers use ICT to teach learners experiencing barriers to learning?

The findings of the present study showed that learners who experience barriers to learning perform better if teachers implement effective teaching methods which include the use of ICT. The study showed that teachers use these ICT devices to present colourful objects which arouse learners' interest and increase the concentration span of learners during the lessons. Despite the many problems learners encounter, ICT, as an approach, allows for creativity in the teaching process to address some of the learning barriers. Teo et al (2015:338) investigated educational teaching practices using IWBs in British primary schools where IWBs are part of ICT. The results of this investigation showed that there were speedy and smooth presentations of learning to learners experiencing barriers to learning. Most learners were motivated to learn and their concentration span improved due to the fact that ICT was used. Oyaid (2010 cited by Umar & Yusoff, 2014) postulates that ICT can increase self-esteem, make learning more interesting and increase the listening span. ICT offers learners the possibility of individualised learning experiences according to their needs and abilities.

The use of ICT comes with challenges, as revealed by most teachers. The issues of load shedding in South Africa and a lack of ICT devices were mentioned. According to the findings of Copriady (2014), the use of ICT in teaching and learning poses challenges both globally and in South Africa. The challenges encountered are a shortage of equipment, unreliability of equipment and a lack of technical support. The

results of the study highlight that the biggest challenge in schools, if not effectively monitored, is that learners are tempted to go on sites that have nothing to do with the concept being taught. Some devices break during the lesson that disturbs the learning process. Teachers' use of ICT allows them to develop creative ways for transformational learning. However, as highlighted in the CHAT, it is important to look at the context (history, culture) in which the teaching and learning occurs to address barriers which can impact teachers' attitudes and beliefs towards the use of ICT in the classroom.

4.3.2 Sub-research question 2: What is the role of ICT in the teaching and learning of learners experiencing barriers to learning in primary schools?

The study showed that the role of ICT in the teaching and learning of learners experiencing barriers to learning is to eliminate barriers. Most teachers believed that ICT helps learners to be fully involved in the learning process especially those with behavioural problems such as attention deficit hyperactivity disorder (ADHD). The present study revealed that ICT has an important role in the teaching-learning process by motivating learners and improving their concentration. The findings of the present study are in line with the CHAT theory which explains that learners' interactions with the correct tools and resources enable improvement in learning and knowledge. This agrees with Bester and Brand (2013) who investigated the effect of technology on attention and achievement in classroom settings. Their findings show that there was improvement in the acquisition of knowledge after the use of ICT during lessons. The present research adds that learning activities become more interesting that reduces boredom among learners.

The present study's findings are that most learners have the skills to use ICT because of the availability of technological devices in their homes. This augments the knowledge they gain when they come to school. According to the CHAT theory, the role played by ICT in teaching and learning of learners experiencing barriers to learning can be strengthened because ICT serves as an appropriate mediation tool for learning that is

within the learners' reach and can constantly be repeated to enhance understanding. It emerged from the current study that ICT makes learning effective when teaching learners experiencing barriers to learning because most learners are motivated to learn. ICT allows learners to learn at their own pace which enhances their academic performance. The findings from the observations done by the researcher when ICT was used to teach the learners experiencing barriers to learning showed that learners were motivated and concentrated on the learning process. This also confirms what was said by the teachers in their interviews.

This study revealed that, for ICT application to be effective in the teaching of learners experiencing barriers to learning, the teachers need professional empowerment through workshops. Du Plessis and Webb (2012) asserted that most teachers have limited ICT skills and knowledge, hence they need more training**.** The schools should also buy more ICT devices so that effective learning can take place. Maintenance and security of these ICT devices should be given priority. Development of teachers' skills and ensuring quality ICT is a critical aspect in continual learning of activities. The need for professional development and enhancement of ICT devices should therefore be considered to support the continuing learning process.

4.3.3 Sub-research question 3: How can ICT be used to enhance teaching and learning of learners experiencing barriers to learning in primary schools?

This study established the fact that teachers used facilities which are of high standards but were operated by personnel with limited skills. One of the teachers said that the school has an on-site technician who monitors the day-to-day running of the ICT facilities because these teachers lack expertise. Two teachers revealed that they have sufficient knowledge to use ICT equipment efficiently and effectively when teaching learners experiencing barriers to learning because of the training and workshops that are being held at their schools. The teachers said that they research on the internet how to use these ICT devices in order to help these learners. This is supported by Pitchford et al (2018) who conducted research that reflects that interactive apps raised learning

standards in pupils with special educational needs and disabilities (barriers to learning).

The use of ICT had a positive impact on these learners as shown by the findings of this study. The teachers said that ICT had raised the learners' confidence, boosted their self-esteem and helped them understand the concept being taught. Oyaid (2010 cited by Umar & Yusoff, 2014) postulates that teachers in this study believe that ICT can increase learners' interest during lessons. ICT offers learners the possibility of learner-centred activities which target needs and capabilities. The effective use of technology has the potential to improve curriculum delivery, including learners' ability to understand concepts (Chigona et al, 2014).

To enhance ICT as a teaching strategy for learners experiencing barriers to learning, teachers have to undergo professional ICT training. Most teachers said that they had undergone ICT training. Although it was just basic computer training, it is helping them to transmit knowledge to learners experiencing barriers. Some teachers said that ICT training is provided by the department as the Department of Education sends tutors to cluster schools so that they can train teachers on the use of ICT. Drawing on the CHAT framework, the above results show that the use of technology enhances teaching and learning and facilitates transformational learning as can be seen in learners. However, the disruptions and challenges of this engagement require rules to be set out for the lessons. The teacher, as explained in CHAT, should incorporate into the lesson plan what the subject, object, tool, outcome, rules, community and division of labour of the lesson should be. It is there important to note the need for professional ICT training for use in teaching and learning.

4.4 Conclusion

The presentation and analysis of data and discussion of findings were presented in this chapter. This chapter discussed the findings from the in-depth interviews and non-participant field observations. The findings about ICT as an important mediation tool for teaching and learning of learners experiencing barriers to learning were discussed,

guided by the study's sub-research questions. The findings show that it is a friendly approach within the reach of learners and teachers and enhances various aspects of learning as well as teaching through creativity. ICT increases the learners' levels of motivation and their concentration span has also improved. Most teachers believed that ICT helps learners to participate in the learning process which makes learning more effective. Lessons become more interesting and more engaging when ICT is used.

ICT serves as an appropriate tool for teaching and learning because most learners are already familiar with different ICT devices as they use them at home where technology has become an integral part of their lives. ICT allows learners experiencing barriers to learn at their own pace and to improve their academic performance. Professional development and quality ICT devices are important to enhance the teaching and learning process. However, the use of ICT comes with challenges which include a lack of equipment and load shedding, when the devices will not function, disturbing the learning process. The following chapter presents the summary, recommendations and conclusion of the study.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this study, the aim was to explore the usage of ICT in teaching learners experiencing barriers to learning in an ordinary primary school classroom. It focuses on schools in Ekurhuleni North District. This chapter presents the summary, as well as conclusions and recommendations.

5.2 Summary of the study

Findings drawn from this study established the role and usage of ICT and the enhancement of knowledge. The following findings emerged from the study:

5.2.1 Utilisation of ICT in the teaching and learning process

A number of teachers from this study revealed that the use of ICT has improved the academic performance of learners experiencing barriers to learning. Learners' concentration spans improved while ICT also gives teachers the opportunity to give learners individual attention. The use of a computer or tablet has resulted in independent learning. The learners experiencing barriers to learning immersed themselves in researching more information on the internet about the subject matter. ICT tools enrich the learning process which translates to improved performance among the learners experiencing barriers to learning. Videos are visual with colourful images and help learners to visualise and understand the educational matter imparted by the teacher. For example, if a teacher explains the seasons of the year and goes on to show a video of each season, learners can grasp the concept. It therefore presents a stimulating platform for learners and also improves the teaching process as teachers engage with creative pedagogical methods that aid in learning.

5.2.2 ICT and elimination of barriers to learning

Most teachers from the study revealed that, if ICT is used effectively, it may minimise barriers to learning. Utilisation of educational videos in acquiring knowledge will change the mind set of learners experiencing barriers to learning. ICT reduces boredom and makes learning more interesting. A classroom environment is usually a tense atmosphere with desks, textbooks and a teacher imparting knowledge to the learners. However, the incorporation of ICT (e.g. watching a video or doing an exercise on the computer) enhances the learning environment, learner motivation and engagement in the activities. Unlike reading textbooks and a teacher-centred approach, ICT eliminates barriers to learning by providing interactive tools that keep the learner wanting to explore more about the subject. During the teaching and learning process, teachers can teach learners experiencing barriers through individualised computer based learning programmes. Learners create their own learning and their learning environment.

5.2.3 Effectiveness of ICT

Information that emerged from the study is that ICT is effective in transmitting knowledge to learners experiencing barriers to learning because teachers are able to download useful learning activities from the internet and they can also record tutorials that learners experiencing barriers to learning can play multiple times for revision purposes and to grasp concepts in their own time. The utilisation of ICT has a favourable influence on the education of learners experiencing barriers to learning because it improves learners' self-confidence and also facilitates knowledge acquisition. If learners are well versed in ICT, this will make them perform well in an environment where there is technology. A technology based environment will make learners experiencing barriers to learning perform better because they are familiar with ICT tools used at home. The utilisation of ICT in the education sector contributes to innovative teaching methods which helps learners to enhance their understanding. Different subject concepts can be learned more effectively on ICT devices. ICT assists the teachers when planning for the lessons so that they become motivated. The advantage

of using ICT equipment is that it creates a more interesting and favourable environment and helps in maintaining discipline in the class.

5.2.4 Enhancement through acquisition of ICT skills

Most teachers from the study reiterated that ICT allowed learners experiencing barriers to learning to learn at their own pace. Teachers indicated that ICT had facilitated their ability to teach learners experiencing barriers and increased their knowledge acquisition in terms of the application of technology and understanding of their lessons. Teachers ought to be lifelong learners through continuous construction of on-going knowledge about teaching using ICT by interacting with their peers in the school as well as from neighbouring schools. Schools should be encouraged to invest in generators and solar power in order to remain functional in case of load shedding. There is a need for the school authorities as well as the Department of Education to engage partners in the private sector or non-governmental organisations because they can bring much needed ICT resources to improve the implementation of the learning matter.

5.3 Conclusions of the findings

5.3.1 How do teachers use ICT to impart knowledge to learners experiencing barriers to learning?

Teachers stated that they use ICT when delivering lessons especially to learners experiencing barriers to learning in primary schools as ICT can help to eradicate some of the barriers that learners experience. ICT usage can support the teachers when implementing the curriculum by scaffolding using diagrams. Teachers' use of ICT devices presented colourful objects which stimulated learners experiencing barriers to learning to become interested during the learning process. ICT allows for creativity in the teaching process to address barriers to learning. Most learners were motivated to learn and their concentration span improved due to the fact that ICT was used. However, the application of ICT in the classroom has some challenges, for example, lack of equipment, load shedding, unreliable equipment and lack of technical support.

5.3.2 What is the role of ICT during teaching-learning process of learners experiencing barriers to learning?

ICT minimises barriers to learning in the teaching and learning process. ICT helps learners with behavioural problems, such as ADHD, to be motivated to learn and improve their concentration. ICT makes learning activities more interesting hence reduces boredom among learners.

5.3.3 How can ICT be used for the enhancement of concepts?

ICT has managed to raise the learners' confidence, boosted their self-esteem and also helped learners' understanding of the concepts taught. ICT offers learners the chance of a learner-centred process which targets learners individually during lessons. The appropriate use of technological devices improves the grasping of concepts.

5.4 Recommendations

The following recommendations emerged from this study:

- **Recommendation to practice**

Findings from the study showed that some of teachers lacked appropriate ICT training. The preceding fact calls for training and on-going workshops on the use of ICT. There were also challenges of shortages and maintenance of ICT equipment. The department and schools can have a dedicated ICT budget as part of the strategic plan to ensure on-going capacity building and maintenance of technological devices. This can be used for workshops, security, maintenance and other related issues. Training programmes can include knowledge and skills on how to integrate different ICT devices within the curriculum. These should be appropriately designed and effectively implemented for learners experiencing barriers to learning. It is important for teachers in schools to use different ICT tools since it can improve the abilities of learners experiencing barriers to perform better.

- **Recommendation to policy**

Equity is a principle integral to ICT and Inclusive Education. Based on both the (DoE,2004) White paper 7 and the White paper 6 on Inclusive Education (DoE, 2001), ICT should be incorporated as an important pedagogical method to facilitate learning as it addresses the inflexible curriculum that presents as a barrier for Inclusive Education.

- **Recommendation for future study**

In the study, focus was limited to a sample of three schools and six teachers in Ekurhuleni North District, hence the challenge to generalise the findings with regard to schools in other districts. A much larger demographically representative sample is recommended for future studies. It would also be useful and complementary to the epistemology of research if a study is done on how teachers are being assisted to cope with ICT skills since some of them lacked the skills given the fact that schools have introduced online lessons.

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APPENDIX A: Proof of Registration

UNISA college of education

university of south Africa 1912

SHURO V MRS
25 CAICOS ISLES
STUDENT NUMBER 4696-222-0

SILVER STREET GOEDEBURG
ENQUIRIES TEL FAX 0861670411 (012)429-4150

1501
eMAIL : mandd@unisa.ac.za

2019-01-11

Dear Student

I hereby confirm that you have been registered for the current academic year as follows:

Proposed Qualification: MED (INCLUSIVE EDUCATION) (90867)

PROVISIONAL EXAMINATION

CODE

PAPER S NAME OF STUDY UNIT

NQF crdts LANG. EXAM.DATE CENTRE(PLACE)

Study units registered without formal exams:
DLIED95 Dissertation of Limited Scope (MEd - Inclusive Educatio 60 E
@ DLIED95 Dissertation of Limited Scope (MEd Inclusive Educatio 68 E
@ Exam transferred from previous academic year

You are referred to the "MyRegistration" brochure regarding fees that are forfeited on cancellation of any study units.

n Your attention is drawn to University rules and regulations (www.unisa.ac.za/register).

Please note the new requirements for reregistration and the number of credits per year which state that students registered for the first time from 2013, must complete 36 NQF credits in the first year of study, and thereafter must complete 48 NQF credits per year.

Students registered for the MBA, MBL and DBL degrees must visit the SBL"s ESOnLine for study material and other important information.

Readmission rules for Honours: Note that in terms of the Unisa Admission Policy academic activity must be demonstrated to the satisfaction of the University during each year of study. If you fail to meet this requirement in the first year of study, you will be admitted to another year of study. After a second year of not demonstrating academic activity to the satisfaction of the University, you will not be re-admitted, except with the express approval of the Executive Dean of the College in which you are registered. Note too, that this study programme must be completed within three years. Non-compliance will result in your academic exclusion, and you will therefore not be allowed to re-register for a qualification at the same level on the National Qualifications Framework in the same College for a period of five years after such exclusion, after which you will have to re-apply for admission to any such qualification.

Readmission rules for M&D: Note that in terms of the Unisa Admission Policy, a candidate must complete a Master's qualification within three years. Under exceptional circumstances and on recommendation of the Executive Dean, a candidate may be allowed an extra (fourth)year to complete the qualification. For a Doctoral degree, a candidate must complete the study programme within six years. Under exceptional circumstances, and on recommendation by the Executive Dean, a candidate may be allowed an extra (seventh)year to complete the qualification.

BALANCE ON STUDY ACCOUNT: 0.00

yours faithfully, Dr F Goolam

Registrar

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Telephone: + 27 1 2 429 31 11 Facsimile: + 27 1 2 429 41 50

www.umsa.ac.za

APPENDIX B: Request for permission to conduct research (Gauteng Provincial Department of Education)

21 – 08 – 2019

The Head of Department

Gauteng Provincial Department of Education

17 Simmonds St, Marshalltown, Johannesburg, 2107

Gauteng

Dear Sir / Madam

Re: Request for permission to conduct research at Ekurhuleni ordinary primary schools

I, Vimbai Shuro am doing research with Dr K Malahlela in the Department of Inclusive Education towards a M Ed degree at the University of South Africa. I would like to conduct research in ordinary primary schools around Ekurhuleni North District in Gauteng, which are the schools where learners experiencing barriers to learning can be placed into general curriculum or in one or more “regular” education classes to learn alongside normally developing peers. The topic of my research reads as follows: **Use of Information and Communication Technology in teaching of learners experiencing barriers to learning in primary schools in Ekurhuleni North.**

The study will entail finding out the role of Information and communication technology in the teaching and learning of learners experiencing barriers to learning, how teachers use ICT to teach these learners and how ICT can be used to enhance teaching and learning of learners experiencing barriers to learning. Interviews will be conducted preferably at a quiet place, free from distractions, and each session will last for

approximately forty-five minutes. Observations will also be done in 5 selected ordinary primary schools. The natural boundary for data collection through nonparticipant observation will be for a period of four weeks (1month).

The possible benefits to the Department of Education that teachers and principals will acquire knowledge about the importance of Information and Communication Technology as an advanced tool to support new ways of teaching and learning of learners experiencing barriers to learning.

There will be no potential risks for any person who will participate in this study. There will be no reimbursement or any incentives for participation in the research. The researcher upon completion of the study, the results will be reported to the department of education and will be submitted for publication in scientific journals.

Should you require any further information about any aspect of this study including its outcomes, please contact me at 0767953200 or email: vshuro@gmail.com.

Yours sincerely

Vimbai Shuro

Researcher

APPENDIX C: Response Letter from Gauteng Department of Education

GAUTENG PROVINCE
Department: Education
REPUBLIC OF SOUTH AFRICA

8/4/4/1/2

GDE RESEARCH APPROVAL LETTER

Date:	13 August 2019
Validity of Research Approval:	04 February 2019 – 30 September 2019 2019/211
Name of Researcher:	Shuro V
Address of Reseacher:	27 Silver Street
	Benoni
	1501
Telephone Number:	076 795 3200
Email address:	vshuro@gmail.com
Research Topic:	Use of Information and communication technology in the teaching and learning of learners with barriers to learning in ordinary primary school classrooms in Ekurhuleni North.
Type of qualification	MEd in Inclusive Education
Number and type of schools:	Three Primary Schools
District/s/HO	Ekurhuleni North

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved to conduct the research. A separate copy of this letter must be presented to both the School (both Principal and SGB) and the District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted.

13/08/2019

The following conditions apply to GDE research. The researcher may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

1

Making education a societal priority

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

1. *Letter that would indicate that the said researcher/s has/have been granted permission from the Gauteng Department of Education to conduct the research study.*
2. *The District/Head Office Senior Manager/s must be approached separately, and in writing, for permission to involve District/Head Office Officials in the project.*
3. *A copy of this letter must be forwarded to the school principal and the chairperson of the School Governing Body (SGB) that would indicate that the researcher/s have been granted permission from the Gauteng Department of Education to conduct the research study.*
4. *A letter / document that outline the purpose of the research and the anticipated outcomes of such research must be made available to the principals, SGBs and District/Head Office Senior Managers of the schools and districts/offices concerned, respectively.*
5. *The Researcher will make every effort obtain the goodwill and co-operation of all the GDE officials, principals, and chairpersons of the SGBs, teachers and learners involved. Persons who offer their co-operation will not receive additional remuneration from the Department while those that opt not to participate will not be penalised in any way.*
6. *Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal (if at a school) and/or Director (if at a district/head office) must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.*
7. *Research may only commence from the second week of February and must be concluded before the beginning of the last quarter of the academic year. If incomplete, an amended Research Approval letter may be requested to conduct research in the following year.*
8. *Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.*
9. *It is the researcher's responsibility to obtain written parental consent of all learners that are expected to participate in the study.*
10. *The researcher is responsible for supplying and utilising his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institutions and/or the offices visited for supplying such resources.*
11. *The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research report without the written consent of each of these individuals and/or organisations.*
12. *On completion of the study the researcher/s must supply the Director: Knowledge Management & Research with one Hard Cover bound and an electronic copy of the research.*
13. *The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned.*
14. *Should the researcher have been involved with research at a school and/or a district/head office level, the Director concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.*

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

.....

Mrs Faith Tshabalala
Acting Director: Education Research and Knowledge Management

DATE: 13/08/2019

Office of the Director: Education Research and Knowledge Management
7th Floor, 17 Simmonds Street, Johannesburg, 2001
Tel: (011) 355 0488
Email: Faith.Tshabalala@gauteng.gov.za
Website: www.education.gpg.gov.za

APPENDIX D: Request for permission to conduct research at Ekurhuleni North Circuit Office

The Circuit Manager

Ekurhuleni North Circuit Office

Benoni

Tel: 0117468012

Dear Sir

Re: Request for permission to conduct research at Ekurhuleni ordinary primary schools

I, Vimbai Shuro am doing research with Dr K Malahlela in the Department of Inclusive Education towards an M Ed degree at the University of South Africa. I would like to conduct research in ordinary primary schools around Ekurhuleni North District in Gauteng, which are the schools where learners experiencing barriers to learning can be placed into general curriculum or in one or more “regular” education classes to learn alongside normally developing peers. The topic of my research reads as follows: **Use of information and communication technology in teaching learners experiencing barriers to learning in primary school in Ekurhuleni North District.**

The study will entail finding out the role of Information and communication technology in the teaching and learning of learners experiencing barriers to learning, how teachers use ICT to teach these learners and how ICT can be used to enhance teaching and learning of learners experiencing barriers to learning. Interviews will be conducted preferably at a quiet place, free from distractions, and each session will last for

approximately forty-five minutes. Observations will also be done in 5 selected ordinary primary schools. The natural boundary for data collection through nonparticipant observation will be for a period of four weeks (1month).

The possible benefits to the Department of Education that teachers and principals will acquire knowledge about the importance of Information and Communication Technology as an advanced tool to support new ways of teaching and learning of learners experiencing barriers to learning.

There will be no potential risks for any person who will participate in this study. There will be no reimbursement or any incentives for participation in the research. The researcher upon completion of the study, the results will be reported to the department of education and will be submitted for publication in scientific journals.

Should you require any further information about any aspect of this study including its outcomes, please contact me at 0767953200 or email: vshuro@gmail.com.

Yours sincerely

Vimbai Shuro

Researcher

APPENDIX E: Response letter from Ekurhuleni North Circuit

GAUTENG PROVINCE
REPUBLIC OF SOUTH AFRICA

EKURHULENI NORTH DISTRICT

Enquiries: Kagiso Mogaswane (T) 011 746 – 8295 (E) Ramahowa.Mogaswane@gauteng.gov.za
Sub-Directorate: Information Systems and Strategic Planning

TO : SHURO V.

FROM : MRS N.P. NTUTA
DISTRICT DIRECTOR

DATE : 20th AUGUST 2019

SUBJECT : LETTER OF ENDORSEMENT TO CONDUCT M.ED RESEARCH IN SCHOOLS UNDER EKURHULENI NORTH DISTRICT OFFICE OF EDUCATION

This letter is reference to above.

The Ekurhuleni North District is situated at 78 Howard Avenue, Munpen Building under the Gauteng Department of Education. The district office is servicing a total 266 both public ordinary and independent (some state subsidised) schools.

This letter serves as an endorsement for the approval by Gauteng Department of Education to Ms V Shuro to conduct research. The validity of the research will be between the 04th February 2019 to the 30th September 2019.

The Ekurhuleni North District office hereby endorses permission granted by GDE for the said research to be conducted as per the pre-scripts of Gauteng Department of Education: Education Research and Knowledge Management Directorate.

The research will be conducted in four schools within the Ekurhuleni North District office

The research is for a M.Ed degree and the topic is **"Use of Information and Communication Technology in the teaching of learners with barriers to learning in ordinary primary school classrooms in Ekurhuleni North".**

Kind regards.

MRS NP NTUTA
DISTRICT DIRECTOR: EKURHULENI NORTH

Making education a societal priority

Office of the District Director: Ekurhuleni North
Munpen Building, 78 Howard Avenue, Benoni, 1500
Private Bag X 059, Benoni, 1500
Tel: (011) 746-8000 Fax: (011) 746-8027/70

APPENDIX F: Request for permission to conduct research (School Principal)

The School Principal

Dear Principal

Re: Request for permission to conduct research at Polokwane mainstream secondary schools

I, Vimbai Shuro am doing research with Dr K Malahlela in the Department of Inclusive Education towards a M Ed degree at the University of South Africa. I would like to conduct research in ordinary primary schools around Ekurhuleni North District in Gauteng, which are the schools where learners experiencing barriers to learning can be placed into general curriculum or in one or more “regular” education classes to learn alongside normally developing peers. The topic of my research reads as follows: **Use of information and communication technology in teaching learners experiencing barriers to learning in primary schools in Ekurhuleni North.**

The study will entail finding out the role of Information and communication technology in the teaching and learning of learners experiencing barriers to learning, how teachers use ICT to teach these learners and how ICT can be used to enhance teaching and learning of learners experiencing barriers to learning. Interviews will be conducted preferably at a quiet place, free from distractions, and each session will last for approximately forty-five minutes. Observations will also be done in 5 selected ordinary primary schools. The natural boundary for data collection through nonparticipant observation will be for a period of four weeks (1month).

The possible benefits to the Department of Education that teachers and principals will

acquire knowledge about the importance of Information and Communication Technology as an advanced tool to support new ways of teaching and learning of learners experiencing barriers to learning.

There will be no potential risks for any person who will participate in this study. There will be no reimbursement or any incentives for participation in the research. The researcher upon completion of the study, the results will be reported to the department of education and will be submitted for publication in scientific journals.

Should you require any further information about any aspect of this study including its outcomes, please contact me at 0767953200 or email: vshuro@gmail.com.

Yours sincerely

Vimbai Shuro Researcher

APPENDIX G: Participant information sheet (informed consent) for educators

DATE: 21 - 08 - 2019

TITLE: USE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN TEACHING LEARNERS EXPERIENCING BARRIERS TO LEARNING IN PRIMARY SCHOOLS IN EKURHULENI NORTH.

Dear Prospective Participant

My name is Vimbai Shuro and I am doing research with Dr K Malahlela, a Lecturer in the Department of Inclusive Education towards a M Ed at the University of South Africa. We are inviting you to participate in a study entitled: **Use of information and communication technology in teaching learners experiencing barriers to learning in primary schools in Ekurhuleni north.**

WHAT IS THE PURPOSE OF THE STUDY?

I am conducting this research to find out the role of Information and communication technology in the teaching and learning of learners experiencing barriers to learning, how teachers use information and communication technology (ICT) to teach these learners and how ICT can be used to enhance teaching and learning of learners experiencing barriers to learning.

WHY AM I BEING INVITED TO PARTICIPATE?

You have been purposively selected through the help and permission from your school principal to participate in this study for in-depth interviews because of your knowledge about learners experiencing barriers to learning. The number of educators that are purposively selected for participation in this study is scheduled to be 5.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

The study involves semi-structured interviews with audio recording and observation. Open-ended questions that allow you to freely divulge your experience on the use Information and communication technology and its effect on the learning process of learners experiencing barriers to learning will be asked in the interviews. The interview session will take approximately one hour to complete.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER HAVING AGREED TO PARTICIPATE?

Participating in this study is voluntary and you are under no obligation to consent to participation. If you do decide to take part, you will be given this information sheet to keep and be asked to sign a written consent form. You are free to withdraw at any time and without giving a reason.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

It is possible that you may not derive any benefit personally from your participation in the assignment including payment or incentive, although the knowledge that may be gained by means of the assignment may benefit other persons or communities. You will be given access to your own data and summary of findings upon request.

ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

No risks are foreseen in this study during and after your participation. There is no known injury or harm anticipated to be experienced as a result of your participation in this study.

WILL THE INFORMATION THAT I CONVEY TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

Confidential information provided by the research participants will be treated as such by

the researcher, even when the information provided enjoys no legal protection or privilege. Your anonymous data may be used for other purposes, such as a research report, journal articles and/or conference proceedings, but your role and contribution as participant will not be identifiable in such reports. Your identity as participant will be protected by the researcher from the general reading public by making use of pseudonyms instead of using your real name and the name of your institution. Your name will not be recorded anywhere and no one, apart from the researcher will know about your involvement in this research.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

Hard copies of your answers will be stored by the researcher for a period of five years in a locked cupboard/filing cabinet and the keys will be kept by the researcher, for future research or academic purposes; electronic information will be stored on a password protected computer. Future use of the stored data will be subject to further Research Ethics Review and approval if applicable. When necessary, hard copies will be shredded and/or electronic copies will be permanently deleted from the hard drive of the computer through the use of a relevant software programme.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

There are no known amounts of compensation to be provided to participants.

HAS THE STUDY RECEIVED ETHICS APPROVAL?

This study has received written approval from the Research Ethics Review Committee of the Senate Research, Innovation and Postgraduate Degrees Committee (SRIPDC), Unisa. A copy of the approval letter can be obtained from the researcher if you so wish.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, please contact Vimbai

Shuro (the researcher) on 0767953200, or email: vshuro@gmail.com

The findings are accessible for a year. Should you have concerns about the way in which the research has been conducted, you may contact Dr MK Malahlela 0124812755 or email:malahmk@unisa.ac.za.

Thank you for taking time to read this information sheet and for participating in this study. Thank you

Researcher' Signature: ----- ----------

Researcher's Name: Vimbai Shuro

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

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

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

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

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

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

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

method).

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

Participant Name & Surname (please print)

_____

_____

Participant Signature Date

Researcher's Name & Surname (please print) Vimbai Shuro

____ _____ 21/08/2019

Researcher's signature Date

APPENDIX H: Letter requesting consent for minors to participate in a research project

Dear Parent

Your child is invited to participate in a study entitled: Use of information and communication technology in teaching of learners experiencing barriers to learning in primary schools in Ekurhuleni north.

I am undertaking this study as part of my master's research at the University of South Africa. The purpose of the study is to find out role of Information and communication technology in the teaching and learning of learners experiencing barriers to learning, how teachers use ICT to teach these learners and how ICT can be used to enhance teaching and learning of learners experiencing barriers to learning. I am asking permission to include your child in this study because it will benefit all learners experiencing barriers to learning. I expect to have other children participating in the study.

If you allow your child to participate, I shall request him/her to:

- Be available or present in the classroom and participate in classroom activities to be given by his/her teachers. Your child's interaction with his/her teachers will be observed and recorded manually and with a voice recorder.

Any information that is obtained in connection with this study and can be identified with your child will remain confidential and will only be disclosed with your permission. His or her responses will not be linked to his or her name or your name or the school's name in any written or verbal report based on this study.

Such a report will be used for research purposes only. There are no foreseeable risks to

your child by participating in the study. Your child will receive no direct benefit from participating in the study; however, the possible benefits to education will entail find out the role of Information and communication technology in the teaching and learning of learners experiencing barriers to learning in ordinary primary schools of South Africa, specifically in Gauteng Province. Neither your child nor you will receive any type of payment for participating in this study.

Your child's participation in this study is voluntary. Your child may decline to participate or to withdraw from participation at any time. Withdrawal or refusal to participate will not affect him/her in any way. Similarly, you can agree to allow your child to be in the study now and change your mind later without any penalty.

The study will take place during regular classroom activities with the prior approval of the school and your child's teacher. However, if you do not want your child to participate, an alternative activity will be available.

In addition to your permission, your child must agree to participate in the study and you and your child will also be asked to sign the assent form which accompanies this letter. If your child does not wish to participate in the study, he or she will not be included and there will be no penalty. The information gathered from the study and your child's participation in the study will be stored securely on a password locked computer in my locked office for five years after the study. Thereafter, records will be erased.

If you have questions about this study please ask me or my study supervisor Dr MK Malahlela, Department of Inclusive Education, College of Education, University of South Africa. My contact number is 0767953200 and my e-mail is: vshuro@gmail.com. The e-mail of my supervisor is: malahmk@unisa.ac.za.

Permission for the study has already been given by the Senior Manager (Gauteng department of Education, the Circuit Manager (Ekurhuleni North Circuit), your child's school Principal and the Ethics Committee of the College of Education, UNISA.

You are making a decision about allowing your child to participate in this study. Your signature below indicates that you have read the information provided above and have decided to allow him or her to participate in the study. You may keep a copy of this letter.

Name of child:

Sincerely

_____ _____ _____

Parent/guardian's name (print) Parent/guardian's signature: Date:

__Vimbai Shuro_____ _____

03/04/2019

Researcher's name (print) Researcher's signature Date:

APPENDIX I: A letter requesting assent from learners in a primary school to participate in a research project

Dear learner, Date 21/08/2019

My name is Teacher Vimbai Shuro and would like to ask you if I can come and watch you do some activities with your teacher .I am trying to learn more about how children do activities with their teachers using Information and communication technology.

If you say YES to do this, I will come and watch you when you are with your teacher doing activities. I will not ask to you to do anything that may hurt you or that you don't want to do.

I will also ask your parents if you can take part. If you do not want to take part, it will also be fine with me. Remember, you can say yes or you can say no and no one will be upset if you don't want to take part or even if you change your mind later and want to stop. You can ask any questions that you have now. If you have a question later that you didn't think of now, ask me next time I visit your school.

Please speak to mommy or daddy about taking part before you sign this letter. Signing your name at the bottom means that you agree to be in this study. A copy of this letter will be given to your parents.

Regards

Teacher Vimbai Shuro

Your Name	Yes I will take part 	No I don't want to take part 
Name of the researcher	Vimbai Shuro	
Date	27-08-2019	
Witness		

APPENDIX J: Interview schedule for educators

The following questions will be asked during in-depth interviews:

1.1 How do teachers use information and communication technology to teach learners experiencing barriers to learning?

1.1.1 What type of barriers to learning do you think learners experience?

1.1.2 How do you use Information and communication technology in your teaching and learning activities?

1.1.3 What are your experiences when using information and communication technology to teach learners experiencing barriers to learning?

1.1.4 What challenges do you face when teaching using information and communication technology?

1.2 The role of Information and communication in teaching of learners experiencing barriers to learning.

1.2.1 What are barriers to learning and in what way can information and communication technology eliminate barriers to learning?

1.2.2 Do learners experiencing barriers to learning have skills to make effective use of information and communication technology?

1.2.3 Is there any guideline or policy for teachers to use ICT in the school?

1.2.4 Does ICT make your teaching more effective?

1.2.5 What do you suggest can be done in this school so that teachers can effectively

use information and communication technology in delivering their lessons when teaching learners experiencing barriers to learning?

1.3 How can the use of information and communication technology be used to enhance teaching and learning?

1.3.1 How do you rate information and communication technology facilities provided to you for enhancement of teaching and learning purposes?

1.3.2 Do you have sufficient knowledge to use ICT equipment effectively and efficiently when teaching learners experiencing barriers to learning?

1.3.3 How has your use of ICT in teaching learners experiencing barriers to learning facilitated their ability in knowledge acquisition, use and understanding of your lessons?

1.3.4 Have you undergone any professional ICT training before? If yes, can you describe the kind of training?

APPENDIX K: Observation sheet

Participant	Comments
Types of ICT tools in the classroom	
ICT tools used during the lesson	
Teacher's responds to learners experiencing barriers to learning's needs relating to the use of ICT during the lesson	
Learners engagement in the learning process during the use of ICT	
The teacher's preparedness for the use of technology during instruction	

APPENDIX L: Editor's letter

Barbara Shaw
Editing/proofreading services
18 Balvicar Road, Blairgowrie, 2194
Tel: 011 888 4788 Cell: 072 1233 881
Email: bmshaw@telkomsa.net
Full member of The Professional Editors' Group

To whom it may concern

This letter serves to inform you that I have done language editing, reference checking and formatting on the thesis:

USE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN TEACHING PRIMARY SCHOOL LEARNERS EXPERIENCING BARRIERS TO LEARNING IN EKURHULENI NORTH DISTRICT

by **VIMBAI SHURO**

Barbara Shaw

03/10/2020

APPENDIX M: Ethical clearance certificate

UNISA university of south africa

UNISA COLLEGE OF EDUCATION ETHICS REVIEW COMMITTEE

Date: 2019/07/24

Ref: **2019/07/24/46962220/15/MC**
Name: Mrs V Shuro
Student No.: 46962220

Dear Mrs Shuro

Decision: Ethics Approval from 2019/07/24to 2022/07/24

Researcher(s): Name: Mrs V Shuro
E-mail address: 46962220@mylife.unisa.ac.za
Telephone: +27 76 795 3200

Supervisor(s): Name: Dr MK Malahlela
E-mail address: malahmk@unisa.ac.za
Telephone: +27 12 481 2755

Title of research:

Use of information and communication technology in the teaching and learning of learners with barriers to learning in ordinary primary school classrooms in Ekurhuleni North

Qualification: M. Ed in Inclusive education

Thank you for the application for research ethics clearance by the UNISA College of Education Ethics Review Committee for the above mentioned research. Ethics approval is granted for the period 2019/07/24 to 2022/07/24.

*The **low risk** application was reviewed by the Ethics Review Committee on 2019/07/24 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.

Open Rubric

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