ASSESSMENT OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) COMPETENCE OF SECONDARY SCHOOL TEACHERS IN LUVUVHU CIRCUIT

by

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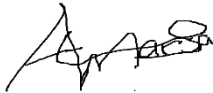
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DECLARATION

I, Amaigbo Doris Amarachi, declare that the dissertation "**ASSESSMENT OF ICT COMPETENCE SKILLS BY SECONDARY SCHOOL TEACHERS IN LUVUVHU CIRCUIT**" - is my own work and has not been previously submitted and in any form whatsoever, by myself or anyone else, to this University or any other educational institution for any degree or examination purposes. All resources that I have used or quoted have been indicated and duly acknowledged by means of complete references.

SIGNATURE   **DATE**
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18 August 2022

DEDICATION

This research work is dedicated to my supportive husband, Mr Amaechi Henry Chibuzor and to our three adorable sons, Chimeremeze, Ugomsinachi and Munachi. I am praying for God's protection upon them in their daily activities.

ACKNOWLEDGEMENTS

ABSTRACT

The main purpose of this study was to examine the ICT competency skills possessed by secondary school teachers in the Luvuvhu Circuit, Vhembe District, Limpopo Province. A quantitative research design was adopted to achieve the purpose of this study. Data was collected using a structured questionnaire guide and analysed using a statistical package of social science (SPSS), version 25.0. The population of this study were secondary school teachers in nine secondary schools, in Luvuvhu Circuit and the sample comprised of 90 participants. A simple random sampling method was applied to select a total of ninety (90) teachers in the nine secondary schools. This study used connectivism as its theoretical framework to explain how teachers and learners make connections between nodes of information to build knowledge and through this connected web, students can stay up to date.

There are underlying factors that are obstructing the adoption rate of computer use for instructional purposes in schools. This study focused on those problems with a view to determining which critical success factors promote a higher adoption rate of computer usage in education. This study revealed that modern technology has the potential to strengthen teaching and learning, influence student-teacher and student-peer interaction, thereby bridging the isolation gap that normally exists between them.

KEYWORDS: Connectivism, E-learning, Information communication Technology (ICT), Technology enhanced learning.

LIST OF ACRONYMS

DoE	Department of Education
ICT	Information Communication Technology
IT	Information Technology
ISTE	International Society for Technology in Education
NSTE	National Council for Technology in Education
OBE	Outcome-Based Education
SPSS	Statistical Package for Social Sciences

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CHAPTER 1

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 INTRODUCTION

This chapter presents the introduction and background to the study on ICT competency skills of secondary school teachers in Luvuvhu Circuit. The discussions would focus on the background to the study, statement of the problem, objectives of the study, research questions and hypotheses. The chapter also covers the theoretical framework of the study, defines key concepts, and outlines the methodology to be used. Details on the methodology comprise the paradigm, research design, and research methodology. The research methodology was discussed in terms of the research population, sampling technique, data collection instrument, and data analysis. The significance, delimitation and ethical considerations were also addressed.

1.2 BACKGROUND TO THE STUDY

Currently, there is a great demand on teachers to improve their teaching and learning activities as we enter the digital age. The purpose of this study was to investigate ICT competency skills of secondary school teachers in the Luvuvhu Circuit, Vhembe District, Limpopo Province. ICT is becoming increasingly important in our daily lives as well as in the educational system. During the last decades, the South African government has provided core funding for computer installations in schools, while donor organizations and corporate sponsors have donated R20 million to bring computers into schools (Khanya, 2005:2; Fares, Fowler & Gegas, 2021: 2). A huge portion of these allocations went into the improvement of the existing infrastructure and the procurement of hardware and software however, teachers are yet to change their method of teaching (Nasr, 2020: 168). ICTs have the potentials to accelerate, enrich, and deepen skills, to motivate and engage students, to help relate school experience to work practices, create economic viability for tomorrow's workers, as well as strengthening teaching and helping schools change (Yusuf, 2005:316). This recent advancement in information technology innovations and computer usage is rapidly

transforming teaching and learning and teachers need to promote the learners' curiosity in content by presenting how knowledge relates with real world situations. The COVID-19 pandemic situation has posed unprecedented challenges requiring teachers to adapt to teaching online. As part of the consequence of the COVID-19 pandemic lockdown, thousands of schools in South Africa were closed in March 2020 and many schools had to resort to online teaching. Teachers, unfortunately face significant challenges in adapting to online teaching, and maintaining at least a minimum of communication with students. König, Jäger-Biela and Glutsch (2020:608) emphasised that the extensive school closures occurred during an era that has generally been shaped by rapid transformation in technological innovations and digitalization, not least in the educational contexts. Schools and universities in South Africa and in the rest of the world are currently faced with the challenges of the COVID-19 pandemic that is affecting how teaching and learning are conducted. To save the 2020 school year, the South African Department of Basic Education instructed schools to use ICT hand to adopt online teaching and learning (Motshekga, 2020:1). Teachers' competency and opportunities to learn digital competency contribute to their mastery of the challenges of the current situation. The digital skills that teachers need to have long moved on from just being able to use word processing and spreadsheets software, rather they are expected to include cloud storage and sharing solutions, social media, web editing, image editing, presentation software, and general media in this 21ˢᵗ Century. Classroom education is increasingly moving away from teaching students at schools to a more collaborative project based model, and digital technology plays a fundamental role in this context. The use of ICT, such as the internet, extends teaching and learning beyond the classroom and the use of mobile technology devices, such as tablets, can promote motivation, sustain conversations, and support seamless learning experience (Chen, 2015:22). For this to happen, teachers must have adequate access and skills to ICT, otherwise they might be forced to resort to traditional teaching and learning methodologies.

Bhargava and Agra (2005:3) indicated that quality of education and learner's performance depends upon teacher's competence. A good teacher is committed to his/her work, has skills to communicate, has abilities to use different technologies in the teaching and learning process. During the previous two decades technologies have emerged in all discipline of life, especially, in the field of education and even most

developing countries try to use technologies in the teaching and learning process. Teachers, as change agents are critical, as within the schools, their influence on student learning is expected to improve on learners' competency skills in this modern age. Competence is a group of knowledge, skills, attitude, belief, motivation, and personality hidden in people, which are reflected in their working behavior, and these qualities are measurable and observable (Alexander, 2017:130; Ozcelik & Ferman, 2006:72). Consequently, a competent teacher has been conceptualized as one who produces desired results in the course of his/her duty as a teacher (Uchefuna, 2001:3). These days the curricular content has been reviewed to ensure that it is comprehensive and ICT-driven in accordance with the global acceptance. It becomes imperative that teachers must demonstrate content and professional knowledge, skills, and dispositions reflecting research, proficiency with technology and assessment. Competency of teachers can be assessed and evaluated in relationship to the students' performance, established cooperation and mutual satisfaction, as Longo (2004:5) and Alexander (2017:151) state "the quality of relationship often depends on the quality of communication". The latest approaches to education are based on the concept of 'teacher-communicator' and include the application of information technologies and communication knowledge and skills. It is believed that what constitute a successful teacher are 12% knowledge and 88% skills (Hawley, 2002:2). Notably, the use of technology for educational purposes has always been in the forefront of most cutting-edge open and distance learning systems. Amidst the recent pandemic, technology-enhanced teaching and learning has helped enormously in overcoming the physical distances between teachers and students, enabling the flexible delivery of education at a distance, anyplace, anytime (Aruleba & Jere, 2022:2). Teacher's expertise and competency skills in the use of ICT are, therefore, sacrosanct in today's teaching and learning environment.

Generally, it is accepted that computer technology has the potential to enhance teaching and learning (Gordin, Hoadley, Means, Pea & Roschelle, 2000:76; Liang, 2021:) and provide students with a learning experience that other strategies cannot provide (Wellington, 2005:23). Being prepared to adopt and use technology and knowing how that can support student learning, must become an integral skill in every teacher's professional repertoire (Wellington, 2005:23). Governments in most developing countries have responded to the challenge by initiating national programs

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to introduce computers in education. To better prepare pre-service candidates for teaching in the information age, the International Society for Technology in Education (ISTE) has defined National Educational Technology Standards to guide technology integration into teacher education programs (Gomez et al., 2017:160; NETS, 2002:61). These include dividing teachers' application of technology in instruction into six categories: technology related-understanding, designing of experiences, implementation of curriculum plans, assessment strategies, enhancement of productivity, legal-ethical issues (NETS, 2002:63).

There are now initiatives, mandates, recommendations by different government organizations, policies, and the ever-increasing use of technology worldwide, however, it has been observed that computers are not being used effectively by the teachers involved in various subjects, like Science, Mathematics, Languages, Commerce, Social sciences, among others (Nasr, 2020:169). A study by Schiller (2003:171) conducted in Australia, reported that more research should be done to understand why the full potential of computers for teaching purposes is not being developed. In a similar instance, Lim and Hang's (2003:49) investigation of activity theory in Singapore's schools suggested that additional research is required to determine whether computers assist learners to engage in higher order thinking or not. The hope that a substantial disbursement of funds would lead to a change in the way educators teach, however, has not yet been fully realised (Miller, Van Belle, Naidoo & Chigona, 2006:57; Gomez et al, 2017:160). The adoption of ICTs in education continues to pose challenges both globally (John & Sutherland, 2004:101) and locally in South Africa (Hodgkinson-Williams, 2005:107). Awolaju, Akinloye, and LLori (2010:615) indicated that there is a need for a modern way of teaching and learning so that student academic achievement can improve in all institutions.

In countries, such as Austria, Finland, Sweden, Denmark and United Kingdom, teachers and students have, generally, a positive attitude towards e-learning and relatively advanced IT competences (Vicente, Rosalin, & Lopaz 2006:45). The adoption of ICT in education has been seen as a powerful way to contribute to education change, better prepare students for the information age, improve learning outcomes and competencies of learners, and equip students with survival skills for the information society. The Department of Education (DoE) stipulates that participation

in the information society means that, "Every South African learner in the general and further education and training bands will be ICT capable (that is, use ICTs confidently and creatively to help develop the skills and knowledge they need to achieve personal goals and to be full participants in the global community) by 2013" (DoE, 2003:17).Teachers are, therefore expected to integrate ICT into their teaching and learning activities. The proposed paperless education system will give pupils access to learning material, workbooks, and other subject matter through the use of ICT.

Research proves that teachers' attitudes towards technology influence their acceptance of the usefulness of technology and its integration into teaching (Huang & Liaw, 2005:729; Khlail, 2018:165). If teachers show positive attitudes towards the use of educational technology, then they can successfully provide useful insight about the adoption and integration of ICT into the teaching and learning processes. South Africa provides an example of a country which is at a comparatively advanced stage of implementing ICT in education, yet access to educational technology in South Africa is still limited to the advantaged few in the more urban areas (Aruleba & Jere, 2022:2), whilst many learners in disadvantaged areas remain on the periphery. In their study of computer usage, Lundal, and Howell (2000:378) argued that the problem is not always caused by the lack of resources, but how teachers use the available educational tools in their teaching. In the same study the researchers give evidence that teachers in schools with limited resources do not maximise the use of computers for pedagogical purposes. Howie, Muller, and Paterson (2005:3) argue that computer use will provide learners with the opportunity to learn ICT skills that will be valuable in a technology-saturated work environment. Howie et al., (2005:3) assert that the integration of computer-use across the curriculum should be able to support learners in becoming creators of knowledge; for instance, by searching the internet for information related to their projects, task or assignments, learners are simultaneously sharpening their research skills. They stated that educators must fulfill a pivotal role in ensuring that teaching and learning are geared to equip learners adequately for the information-loaded environment (Howie et al., 2005:9; Khlail, 2018:167). Some facilities and resources such as computers and internet are very essential tools for teachers if ICT learning is to be embraced in earnest. This, however, raises important question like - Are there facilities at the disposal of the teachers in secondary school? If they are - Are the teachers utilising the facilities and resources?

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Research studies show that most teachers do not make use of the potential of ICT to enhance the quality of learning environments, although they indicate that they do value this potential (Smeets, 2005:231; Ajuzie, 2009:76 & Akukwe, 2009:201). It is for these reasons that the researcher is interested in this area of study.

1.3   STATEMENT OF THE PROBLEM

As the world is evolving in the use of advanced technologies and amidst the Covid 19 Pandemic, so the role of the teacher as manager in a teaching-learning context is still sacrosanct. Over the years, the competency of teachers in the use of ICT to improve the teaching and learning situation has been in doubt. There is predominance of e-education in both literature and within instructional settings, despite this, teacher's pedagogical readiness to effectively implement ICTs into their teaching and learning is rarely assessed. To date, the e-Education policy has made significant strides in developing ICT administrative systems in schools, but it falls short of achieving the strategic targets of impacting classroom practices. Evidence shows that there is limited research on how teachers' competency and skills' levels influence teaching and learning in South African schools. Due to the topic being a relatively under-researched domain, this study, therefore, examines the extent of ICT skills possessed by teachers. Also, with the shortage of teachers and the huge dropout of learners in South Africa, a radical and consistent approach to propel the educational system forward is urgently required. The recent spate of curriculum reforms in education demonstrate that teachers need to deviate from their traditional methods and use technology to enhance teaching and learning (Spillane, 1997:187). The legacy of apartheid in education is persistent and there is strong evidence that South Africa is behind other developing countries in terms of the quality of its educational outputs (Strydom, Thomson, & Williams, 2005:71; Fares et al., 2021:5). This means that, research involving curricular innovations and successful implementation for progressive educational reforms are critical to improve the quality of teaching outputs. The use of ICT in education has been on the policy agenda in South Africa since 1995, with a brief note in the South Africa Schools Act No 84 of 1996 on the value of ICT in education (DOE, 1996:46), however, with its efficient policy-making ability, the country somehow has fallen into the same problem of poor policy implementation that characterises most developing countries, especially those in Africa. The South African e-education policy was

introduced into schools with the view of transforming teaching and learning (DOE, 2004:46). The basic intention of the e-education policy is that through information and communication technology (ICT), schools will improve their level of functioning, teachers will be more competent in changing their teaching practice and students' learning will improve (DOE, 2004:46). In the last decades, government and institutions have encouraged the use of ICT instruments in teaching and learning in secondary schools, unfortunately, these mandates and recommendations on the increasing need for the use of these ICT instruments for teaching and learning, ICT-based tools have remained under-utilised in South Africa by teachers in various subjects, such as science, mathematics, languages, commerce, and social sciences. A visit to most secondary schools revealed that many teachers are not equipped with the basic computer operational skills, therefore, for teachers to be able to integrate ICT into the school curriculum, groundwork must be done at the pre-service teacher education level; this brings us to the following questions:

- Could it be that the teachers do not possess ICT competency skills?
- If they do, how often do teachers employ computers and ICT in their teaching activity?
- What are the factors preventing the use of ICT by the teachers?

Based on the above stated problems, this study investigated secondary school teachers' ICT competency skills in the Luvuvhu Circuit, Vhembe District, Limpopo Province.

1.4 OBJECTIVES OF THE STUDY

The main objective of this study was to examine the ICT competency skills possessed by secondary school teachers in Luvuvhu Circuit, Vhembe District, Limpopo Province. The study objectives were achieved by using the following specific objectives:

- To assess the level of ICT competency skills possessed by secondary school teachers in Luvuvhu Circuit.
- To identify the factors that influence teachers' use of competency skills in ICT in Luvuvhu Circuit.
- To find out the differences between teachers' competency levels regarding ICT, based on gender.

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1.5 RESEARCH QUESTIONS

In order to obtain answers that would address the research objectives, the following research questions were formulated:

- What is the level of ICT competency skills possessed by teachers in Luvuvhu Circuit?
- What factors influence teachers' use of competency skills in ICT in Luvuvhu Circuit?
- Is there any significant difference between teachers' competency level regarding ICT based on gender?

1.6 HYPOTHESIS

- The competency level of ICT skills of teachers influences the rate of computer use in schools
- There is a significant difference between male and female teachers' competency level regarding the use of ICT.

1.7 THEORETICAL FRAMEWORK

This study is underpinned by Siemens' (2004:4) connectivism theory to establish secondary school teachers' competency skills in ICTs usage in Luvuvhu Circuit. Siemens, who is considered the precursor of connectivism, defines it as "a learning theory which is contextualised in a digital era characterised by the influence of technology in the field of education" (Siemens, 2004:4).

Siemens' connectivist theory is relevant for this study because of its insights into the ways technology has fundamentally altered how we approach knowledge and knowledge acquisition. Siemens's (2006:4) theory has shifted the locus of learning from the acquisition of knowledge by an individual to the idea that knowledge is gleaned through sharing, via networks. In other words, knowledge is stored on the Internet and can be sourced by anyone with access to networks on information. No one individual can store or access the vast amount of knowledge that is out there but networks of individuals can share different bytes of knowledge with others thus adding to the store of knowledge and diversifying knowledge. This in turn changes the way we perceive information and knowledge and shifts the relative status of knowledge itself since the networks through which knowledge are shared, absorbed, and

communicated become more essential than knowledge itself. We cannot talk about technology, however, without understanding the whole concept of connectivity.

Siemens (2004:6) points out that such traditional learning theories as behaviourism, cognitivism, and constructivism have limitations because these theories were developed at a time when technology had not impacted on learning to the degree it has done today (Siemens, 2005:3). In essence, connectivism is a learning theory in which knowledge exists outside of the learner and in which the learner makes connections between information to build knowledge (Siemens, 2005:3). This theory of learning recognises that technology has impacted society and has changed how we learn in the classroom, from a learner-centered teaching perspective to connectivism. This approach provides opportunities for students to make choices about their learning by promoting group collaboration and discussion, allowing for different viewpoints and perspectives to aid in problem-solving, decision-making, and making sense of information. Connectivism in teaching acknowledges that learning is no longer individualistic but relies on the informal learning that occurs through participation in communities of practices, personal networks, and work-related tasks. In the connectivist model, learners rely upon existing network communities to develop their own net presence, hence, the role that educational institutions play in individual learning may be reduced by guiding and crediting what students have learned (Siemens,2004:10).

Connectivism is a theory which views learning as a network phenomenon influenced by technology and socialisation (Siemens, 2006:1). It is claimed to have roots in principles revolving around chaos, network, and complexity as well as self-organisation theories (Siemens, 2005:3). Downes (2006:92) adds that, the networks learners connect to can be small and local or vast and global; the author asserts that during learning learners may traverse multiple knowledge domains as the peripheries of knowledge fields are porous. Learners therefore have potential access to rich tapestries of resources, which are dynamic and interconnected, created not only by knowledgeable others but by all members of the community and by technology.

According to Downes (2005:29), knowledge on connectivity networks require four traits which are diversity (different point of view), autonomy (self-organisation),

interactivity (interaction) and openness (readiness for interaction). In connectivism the starting point of learning occurs when knowledge is actuated by learners connecting to and participating in a learning community. Individualised knowledge is comprised of network information, which feeds into organisations and institutions, which in turn feed back into the network, and then continue to provide learning to individual. This circulation of knowledge development (individualised to network to organisation) enables the learner to remain current in their field through the connections they have formed.

Anderson and Dron (2011:80) further explained that connectivism is built on an assumption of a constructivist model of learning, with the student at the centre, connecting and constructing knowledge in a context that includes not only external networks and groups but also his or her own histories and predictions. Integration of technology into teaching and learning is represented by connectivism that sharing experiences, knowledge within digital platform, enriches skills of learners by the support of social networking sites (Aksal, Gazi & Bahcelerli, 2013:243).

The invention of the internet has provided access to the views and opinions of wide range of individuals opening opportunities for new forms of communication and knowledge formation inside and outside of the formal education system. There is a significant need to approach learning principles and process which should be reflective on social interaction, dialogue, and inquiry. Making technologies and connections parts of the learning activities can bring learning theories into the digital age and students will be able to surf the internet competently without the constraint of established academia.

Connectivism introduces a model of learning that acknowledges the tectonic shifts in society where learning is no longer an internal, individualistic activity, but rather provides insight into learning skills and tasks needed for learners to flourish in a digital era. Siemens states that learning occurs within nebulous environments of shifting core elements, not entirely under the control of the individual (Siemens,2004:4). Connectivism is driven by the understanding that decisions are based on rapidly altering foundations. The ability to differentiate between information that is important

and unimportant is very vital, similarly, the ability to recognise when new information alters the landscape based on the decisions made yesterday is also crucial (Siemens, 2004:4).

Connectivism framework is relevant to this study as it emphasises and focuses on the urgency of providing insights into learning skills and tasks that are relevant for learners to flourish in a digital era, using technology as a delivery tool (Al-Shehri, 2011:65). Connectivism suggests that learning is more effective when a student is actively engaged in the learning process rather than attempting to receive knowledge, passively. Furthermore, the utilization of a connectivity approach has effects on students learning because students become active partakers in the process of knowledge construction and dissemination.

Connectivism provides a useful lens through which teaching and learning using digital technologies can be understood and managed. Teachers have an important role to play and cannot escape the fact that today's teaching must provide technology-supported learning.

1.8 DEFINITION OF KEY TERMS

To understand how ICT through effective pedagogies can enhance and influence teachers' competency skills in teaching and learning environments, a short introductory explanation of some pertinent key terms or concepts that are operational throughout this study is now presented.

1.8.1 Connectivism

Connectivism is a learning theory for the digital age which seeks to describe how students use personalized, online, and collaborative tools to learn in different ways to previous generations of students. It defines learning as a continual process which occurs in different settings including communities of practice, personal networks, and work-place tasks. Connectivism is considered as a learning theory that focuses on complex thinking, networking, and self-organizing theories. It underlines the notion of learning as being connecting information sets within digital technology (Siemens, 2005:3).

1.8.2 E-learning

E-learning is the use of information and communication technologies in diverse processes of education to support and enhance learning in institutions of higher education; it includes the usage of information and communication technologies as a complement to traditional classroom (Mackeogh & Fox, 2009:147). The White Paper on e-education states that using computers for teaching adds value to education, improves teaching and learning, encourages innovations while contributing to transformation (DOE, 2003:17). The realisation of this DOE goal, thus, requires the integration of computers into teaching and learning.

1.8.3 Information Communication Technology

Information Communication Technology can be defined as a means of accessing or receiving, storing, transferring, processing, and sending ideas, perception or information through computers and other telecommunication facilities (Ezekoka, 2009:3). ICT is a term that includes any communication device or application, encompassing - radio, television, cellular phones, computer and network hardware and software, satellite systems and so on, as well as the various services and applications associated with them, such as video-conferencing, and distance learning (Gipps, 2005:171).

1.8.4 Technology-Enhanced Learning

Kirkwood and Price (2014:36), the term 'technology-enhanced learning' is used to describe the application of information and communication technologies to teaching and learning.

1.9 RESEARCH METHODOLOGY

This research study is located within the quantitative methods of research to enable the examination of secondary school teachers' competency in using information communication technology (ICT) for teaching and learning in the Luvuvhu Circuit, Vhembe District, Limpopo Province. The rationale for settling on quantitative research methods was influenced by the researcher's interest to understand the participants'

views regarding the impact that ICT is making in improving learners' and teachers' success rates. This research study was also guided by positivism, quantitative design, with all the processes and procedures that are a part of this type of research. The following section focuses on the research paradigm, design, validity, and reliability.

1.9.1 Research paradigm

This study will be guided by a positivist paradigm. Maree (2012:47) describes a paradigm as a philosophical position or stance that is adopted by a researcher and forms the basis of investigating a particular phenomenon. A paradigm is defined by Wahyuni (2012:68) as a worldview or window through which researchers perceive the reality under study. This shows that a paradigm is a philosophical position or attitude that is adopted by researchers in carrying out a study in social research. Positivism may be seen as an approach to social research that seeks to apply the natural science model of research as a point of departure for investigations of social phenomena and explanations of the social world (Denscombe, 2008:14). Positivists believe that knowledge resides outside of human existence. This means that it occurs independent of human understanding and interpretation. It is information that is scientific and represented in quantitative form. This paradigm was used to maintain a detached or neutral position to assume the role of an objective analyst.

1.9.2 Research design

This study will use a quantitative research design. A quantitative research method attempts to collect quantifiable information to be used for statistical analysis of the sample. Quantitative design involves the use of numerical statistical analysis and measurements to examine social phenomenon (Kivunja & Kuyini, 2017:30). Researchers exercise care in selecting a representative sample so that they can make generalizations. Quantitative researchers tend to keep themselves distant from those they are researching on to avoid contaminating the data or influencing the participants' responses to draw unbiased conclusions (Leedy & Ormrod, 2010:95). Quantitative data is usually composed of the responses of respondents which are coded, grouped, and reduced to figures. This enables the manipulation of data for statistical purposes (Claydon, 2015:43). The rationale for settling on quantitative method was influenced

by the researcher's interest to understand the teacher's competency in the blending of ICT into their teaching and learning activities.

1.9.3 Validity and reliability

Validity and reliability are important concepts because they allow researchers to accurately measure the entire domain related to the variable or construct of interest in research (Miller, 2011:1). Hussey and Hussey (1997:57) state that validity is the extent to which the research findings accurately represent what is really happening in the situation. These two concepts are discussed as follows: According to Miller, (2011:1), validity is the extent to which the research findings accurately represent what is really happening in the situation. The emphasis is on the realization of anticipated results from the execution of an instrument. In the present case, validity was achieved by pilot testing the questionnaire. This was done through administering it to 5 teachers who were not part of the schools in the context under study. The questionnaire ensured content validity by measuring the degree to which the responses were in line with the questions set out in the survey schedule. This study used Cronbach's alpha coefficient in the validation of the questionnaire instrument (Taber, 2017:1278).

Reliability is the extent to which results are consistent over time, therefore, an accurate representation of the total population under study (Golafshani, 2003:598). A test is seen as being reliable when it can be used by different researchers under stable conditions, with consistent results, that is, the results not showing any variations; reliability, thus reflects consistency and replicability. The questionnaire was distributed to all respondents, with equal and enough time frames provided for filling out the instrument. It was developed based on the research questions and they were constructed precisely so as not to confuse the respondents. Relevant literature search was done to ensure that valid constructs were used to draw inferences about test scores related to the concepts being studied.

1.10 SIGNIFICANCE OF THE STUDY

The study intends to add knowledge to assist teachers in understanding the usefulness of technology and its integration into teaching and learning. it has been established that technologies are available, however, they are not utilised to assess

students, nor are the potential benefits seen as something that could change the face of student learning, especially in distance education contexts. The study intends to demonstrate that the emergence of educational ICTs not only makes it possible for technology to diversify assessment tasks but also to capture a broader range of skills than traditional assessments can achieve.

Results would also assist the Department of Education to gain much-needed information towards integrating ICT into school curriculum and making sure groundwork is done at the pre-service teacher education level. It would also provide detailed instructions to the Education Department for the optimisation of their educator-training program as ICTs help to provide learners with the necessary skills required in an information society.

1.11 DELIMITATION OF THE STUDY

This study was undertaken to provide a clear picture in an environment where issues, such as computer technology, the digital divide and knowledge economy are not yet understood. It particularly, assessed the ICT competencies of secondary school teachers in Luvuvhu Circuit schools. Teachers were selected to respond to questionnaires in the study. There are nine secondary schools located in Luvuvhu Circuit under Vhembe District in the Limpopo Province and all the schools were visited. It excluded primary schools, further education training colleges and higher education institutes, such as universities. The researcher chose to conduct this study at Luvuvhu circuit due to financial reason, time factor as it is nearer to the researcher's place of work.

1.12 ETHICAL CONSIDERATIONS

This study has followed the generally agreed upon ethical principles of social research. Before data for this study were collected, the researcher applied for ethical clearance from the University of Venda Ethics Committee (see Appendix 4, p.88) and Limpopo Provincial Research Ethics (see Appendix 1, p.81). In this study the necessary ethical standards were maintained by first coming to an agreement, with the research participants, recognising the necessity of confidentiality and informed consent, and

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developing procedures for ensuring full disclosure of the nature, purpose, and requirements of the research. Participants were free to withdraw from the research study at any time if they so wished without any penalties. The researcher approached the participants of this study not as objects to be investigated, but as people who are knowledgeable, and from whom the researcher can learn something of value. In research, since coercing the respondent would be in violation of the main fundamental ethical principle, therefore, the researcher requested the teachers to sign a consent form confirming their willingness to participate in the research.

The researcher understood that ethical code of behaviour require confidentiality, so, as a rule in the whole study, care was taken to ensure that no names or forms of identification were used. All the information received were treated with privacy. This means that names and address would not be publicly disclosed. All the data gathered would be kept secret, in a safe place for a period specified. This means that the respondents would remain anonymous, and their identity would be protected. Furthermore, special care was taken to ensure that there was no physical, psychological, and mental damage to the respondents for taking part in the study.

1.13 OUTLINE OF THE STUDY

The dissertation comprised of five chapters structured in the following ways:

Chapter 1: offers an introduction to the premises of the study and the structure or design of the entire thesis. In this chapter, the researcher presented the background and context of the study, the problem statement and rationale for undertaking the study. Thereafter, the purpose statement, research objectives, research questions, research methodology, significance of the study, delimitations, ethical considerations, and definitions of operational concepts are described. As a conclusion to the chapter, content outlines for the remaining chapters are explained.

Chapter 2: The chapter presents the conceptualisation of the study. It will discuss both theoretical and empirical literature related to the research problem, aim and objectives.

Chapter 3: The chapter covers the study's methodology, including data validation and ethical considerations. The study used quantitative research methods to examine teachers' ICT competency in Luvuvhu Circuit. It also discussed the steps that were undertaken for the research from sample collection technique to the method of analysis, limitations of the study and ethical considerations.

Chapter 4: presents the results, that emerged from the questionnaire distributed to the participants, and analysed using SPSS.

Chapter 5: The chapter draws the discussion of the study findings.

1.14   CHAPTER SUMMARY

This chapter offered an introduction and outline of the entire dissertation by examining the teachers' competency in the use of information communication technologies, the problem statement, research purpose, objectives, research questions, methodologies, including the study's delimitations. The aim of this study was to promote learning, by motivating teachers, steering their approach to teaching and giving them useful information to inform changes in their teaching sessions. This would be done by investigating the ICT competency of selected teachers in the Luvuvhu Circuit under Vhembe District in the Limpopo Province. Currently, technology plays an important role because of its ability to promote interactivity and collaboration when compared with traditional paper and pencil teaching methods.

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter discusses the literature pertaining to the competency skills of secondary school teachers. It focuses on a literature review on the contextualization of ICT in education, perspectives on the use of ICT in schools, the importance of ICT in teaching and learning, perceptions of teachers on the use of ICT in education and challenges affecting the use of ICT in schools. The chapter also provides a conclusion based on the issued discussed.

2.2 CONTEXTUALISING ICT USE IN EDUCATION

Globalisation has created the sharing of knowledge through the use of technology (Meggiolaro, 2018:497). The emergence of this new trend has serious implications for the nature of teaching and learning in many educational systems. An increase in the need to access fast and current information has made educational institutions not content with the use of limited forms of transmitting knowledge but to rely on technological tools that have universal applications. This makes schools, also to be sensitive to the ever-expanding knowledge and to be equipped with the necessary technology to deal with advances in knowledge. Information and communication technologies, which include radios and television, as well as newer digital technologies such as computers and the internet, have been proven as potentially powerful tools for educational change and reform.

Information and communication technology involves unified communications and integration of electronic equipment and systems. These include computers, electronics, software, and projectors; these are systems that enable users to access, store, transmit and manipulate information. ITC is concerned with the entirety of electronic gadgets which involves the processing of information for effective communication. Teachers use such tools to store information, plan lessons, deliver lectures as well as provide feedback to learners.

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According to Khokhar (2016:1), information and communication technology emerged in response to a communication revolution and has also been acclaimed as the foundation of a revolution in the education system. The purpose of ICT in education is to improve the effectiveness and efficiency of educational attainments at various levels for learners and students. ICT, hence, has the potential to innovate, accelerate, deepen as well as enrich the knowledge and skills of learners (Goktas, Gedik & Baydas, 2013:213). It motivates and engages learners, strengthens teaching, facilitates school change, and creates economic viability of future workers. Akude (2010:5) defines ICT as "a diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information".

It is believed that the thoughtful use of new forms of ICTs can be exploited to strengthen and enhance teacher development programmes, address access, and improve the quality of educational delivery (Goktas, Gedik & Baydas, 2013:213). ICT can be used in several areas such as follows:

- It can be used to train students in skills which they will need in further education and as an ongoing learning process throughout the rest of their lives.
- For blended learning by combining conventional classroom learning with e-learning systems.
- It can provide access to information and communication outside the classroom, via the internet.
- To broadcast material and online facilities or CD-ROM can be used as sources of information in different subjects.
- To use the online resources like, email, chat, and discussion forum to support collaborative writing and sharing of information.
- To facilitate communication for pupils with special needs.
- To carry out internet-based research to enhance educational processes.

2.2.1 Perspectives on the use of ICT in education

This section focuses on issues pertaining to the competency skills of teachers in the use of ICT in teaching and learning. The discussion proceeds by addressing the international, African perspective and the South African perspectives on ICT use.

2.2.1.1 International perspective

In Canada, like all over the world, the infusion of Information and Communication Technology in education has become a priority. This is touted as a mechanism to improve and transform the education system for the betterment of learner outcomes. Computers are used to convert learners into knowledgeable workers who are productive (Saxena, 2017:58). ICTs are perceived to improve the problem-solving skills of learners, theoretical understanding of concepts and group productivity skills. Goktas, Gedik and Baydas (2013:213) observe that computers can increase the level of learner motivation through fostering participation, self-esteem, self-efficacy, goodwill towards educational institutions and interest in activities done outside classrooms. Computers have the ability to transcend time and space in transforming the education enterprise. Nikolopoulou and Gialamas (2016:65) contend that ICT allows both teachers and learners to access huge amounts of information, quality materials and the chance to interact with peers with reduced restrictions. This implies that access to the tools of ICT, such as the internet, email, audio-visual media, and telecommunications, is quite fundamental in facilitating teaching and learning.

Goktas, Gedik and Baydas (2013:215) aver, however, that the use of ICT can fail to cater for the entire educational needs. The integration of computers in the instructional process requires proper alignment of several variables; these include appropriate hardware and software as the number of computers needs to be related to the size of the class. In addition, teacher skills must have to be high and accompanied with an increased level of commitment to the available technology. Saxena (2017:58) observes that a high ratio of learner numbers to computers in the classroom has been seen to present a barrier to the successful use of computers in the classroom, however, Lei (2010: 457) argues that there is no significant relationship between an increase in the number of computers and the performance of learners. Johnson, Smith, Willis, Levine, and Haywood (2011:4) indicate that limited finance and the rapid changes in the make-up of technological gadgets constitute barriers to the availability and use of computers in schools. Nikolopoulou and Gialamas (2016: 60) note the effect of varying backgrounds and approaches regarding the use of computers in classrooms. The gaps in the knowledge of teachers on the use of ICT for example

reduces the potential of learning with computers during teaching and learning. Teachers are rarely consulted about the formulation of policies and their application in the classroom activities, therefore, sometimes they are not prepared for the introduction of innovations; this affects their general use of computers.

Some teachers show negative attitudes to the use of ICT technologies in education, and it has a negative impact on the use of computers by learners (Hammond, 2014:195). Teachers have the power to influence the attitude of learners towards their use of computers. This means that teachers who are dedicated and committed to the use of computers and give meaningful tasks to work on the computer, tend to encourage the participation of learners in given tasks, although, it is the support and scaffolding done at schools that goes a long way towards successful application of computers in schools. While it is noted that teachers who lack computer proficiency encounter challenges in the use of computers in class, it is equally true also that some teachers who bring with them a wealth of computer knowledge in class might still face the problem of a disconnect in the smooth integration of computer skills, with the presentation of subject content (Saxena, 2017:65).

In Spain, the use of computers and the competency of teachers in them, have realised constant improvements over the years (Radia et al., 2013:790). The use and integration of computers in the classroom are basically dependent on contextual factors and those related to the characters of teachers. Contextual issues involve concerns on conditions that facilitate the integration of ICT in teaching and learning. It is believed that the affinity of teachers to apply ICT technology in teaching is influenced by, among others, the cultural values and norms of society, the support for integration received by teachers, teacher training and the way in which teachers adapt to demands that reside outside of themselves (Radia et al., 2013:790).

Innan and Lowther (2010:138) contend that the ability of teachers to use ICT services is dependent on the general support from schools and technical support availed to them, as part of an integrated support structure of the institution. Sang, Valcke, van Braak, Tondeur and Zhu (2011:163) identify teacher training as pivotal in the process of integrating ICT in teaching and learning. This ensures that teachers possess requisite competencies to deliver teaching content with the facilitation of ICT. Teachers

who hold the needed knowledge and skills to use ICT tend to develop a positive attitude to ICT adoption.

Spanish teachers reflect personal characteristics which influence the use of ICT in the education sphere. These include perceptions on the usefulness of ICT, inclination to innovate, attitudes, expertise, feelings towards ICT and beliefs pertaining to teaching and learning. Radia et al., (2011:791) note that the interests of teachers and the ease in the use of computers have a telling effect on their employment in classroom teaching; teachers must exude an openness to change. This also influences their willingness and motivation to accept technology and pedagogic innovations. Ramirez, Canedo and Clemente (2012:147) state that the adoption and use of computers by teachers depend on a display of either technological affinity or aversion by teachers. In addition, teachers who adopt constructivists theories of teaching and learning are more inclined to explore the application of computers in classroom than those driven by other philosophical foundations. Radia et al., (2011:792) further believe that the levels of confidence, satisfaction, and comfort that teachers experience with computers shape the latter's attitudes and interests regarding their use in classrooms.

2.2.1.2 African perspective

Kgalemang, Leteane, Moakofhi, Pholele and Phiri (2016:2) contend that Botswana has invested a lot in terms of technology in the education system. It has also provided development opportunities for teachers to assist them to acquire knowledge and skills required in the use of ICT. This development is guided by policy imperatives such as the Botswana's Vision 2016 and the Revised National Policy on Education 1994. The ICT services are provided by computers, telephones, digital cameras, internet cell phones and projectors (Kgokgwe, 2012:21).

The use of ICT requires requisite skills and competencies. This implies that teachers, as major players in the process, must be trained and professionally developed to ensure that they have the practical ability to facilitate the infusion of technology in the educational enterprise (Kgokgwe, 2012: 21). It is also critical that teachers have positive attitudes to the application of ICT in teaching the competencies that are primary in the teaching and learning endeavour (Leteane & Moakofhi, 2015:4).

Kgalemang et al., (2016:1) maintain that the government of Botswana has, hence, invested a lot on equipping schools with computers to ensure that e-teaching and learning is supported.

Teachers need to possess the right competencies and skills to adopt and use ICT effectively in schools. Prestride (2012:450) suggests that teachers should be familiar with ITC packages, such as data and word processing, spread sheet, internet, PowerPoint, and email services. These packages are essential in that they assist teachers to plan lessons, research, deliver presentations, assess the work of learners, and provide feedback. This calls upon the responsible authorities to educate and retool teachers to be able to handle lessons demanding the integration of ICT. E-education needs to be supported by positive attitudes, interests, and the cultural values of teachers regarding the significance of ICT in teaching and learning discourse (Leteane & Moakofhi, 2015:6). There is no doubt that the skills of teachers, their perceptions, and attitudes in relation to ICT influence the way computer integration is implemented in classrooms. Kgalemang et al., (2016:2) support the notion that personal entrepreneurial, positive attitudes and computer skills have a great impact on decisions and proficiency of teachers in the use of ICT applications.

Kgalemang et al., (2016:2) continue that there are challenges regarding the use of computers in teaching and learning. These challenges relate to inadequate equipment, software and hardware, time, education, and training; these have been identified as common impediments to successful integration of technology. Some teachers appear not to have received adequate training in technology during their pre-service education, although, it has also been observed that some teachers are resistant to change. This evokes in them, feelings of dislike, discomfort and computer phobia regarding the use of computers in teaching and learning. Teachers need to be supported to overcome these feelings as well as with functioning computers, fast and reliable network, and swift technical support from technology experts to motivate the whole process.

Kenya, like other countries on the African continent has taken strides to ensure it achieves success in integrating technology in the classrooms. This is because technology is touted as useful in realising school improvement and performance of

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learners (Tong & Trinidad, 2010:3). According to Syomwene (2017:34), the perceptions of stakeholders regarding the use of ICT in education is the mainstay to the implementation of computer technology in schools. There is need for enabling conditions to be put in place for the implementation of ICT during subject-content delivery in schools; these include the required resources and facilities. Mwendwa (2016: 410) states that the infusion of ICT in classrooms can be a success through the provision of support to teachers, adequate infrastructure, professional development and the availability of necessary hardware and software. Teachers need to demonstrate the required competencies for the integration of ICT and a broader grasp of curriculum, financial, technical, social and the administrative aspect regarding the use of ICT in education.

Teachers need to demonstrate competency in the development of content suitable to be disseminated through ICT. This includes not only the educational content, but also interactive multimedia teaching and learning materials and even radio programmes; these will depend on the mode of instructional delivery through ICT. Mohammed and Abdulghani (2017:83) show that ICT assists independent learning, develops research skills, problem-solving skills and learning enjoyment. Mwendwa (2016:410) indicates that teachers in Kenya are devoid of skills in spread sheet, database, the internet, and data search. Few people in Kenya have computers at home due to challenges with electricity and network connectivity, although, the use of cell phones, radio, television have grown, and internet shops, cafes and access centres have become common place, especially in urban locations.

In Kenya, the use of computers in education is hampered by high levels of poverty, frequent power cuts and limited electrical power in the rural areas (Mwendwa, 2016:410). Most schools have computers that are only for administrative use, hence, in most cases, the reality is that the learner-computer ratio is too high, like 150 learners per computer. In majority of schools, the available infrastructure was obtained through the efforts of parents, the government, non-governmental organisations, developmental agencies, or the private sector.

2.2.1.3. South African perspective

The integration of ICT in the South African education system has steadily progressed over the years, although not at the pace desired by the government (Padayachee, 2017:37). Vandeyar (2015:348) maintains that there are a lot of setbacks in the integration of ICT in schools; du Plessis and Webb (2012:46) argue that the current guidelines on the integration of e-learning in schools do not provide enough information pertaining to the way in which teachers and schools should make use of ICT in the South African education landscape.

Nkala and Krasuss (2014:3) point out that the use of ICT in education is hampered by the lack of self-efficacy of teachers. Teachers feel that they are not well prepared to use computers effectively in the classroom as they do not have the competencies to apply computer skills with learners in the delivery of the curriculum. Tamim, Borokhovsk, Pickup and Bernard (2015:2) reveal that there is a belief that the mere presence of computers in the classrooms is, at times, misinterpreted to indicate effective integration of ICT in teaching and learning. There are factors which are usually associated with the diminished computer use in teaching. These include, lack of time, lack of clarity regarding policy on e-education, inadequate support, and implementation skills (Padayachee, 2017:38). There is also the problem in South Africa, of putting more focus on the technical side of computer use to the negation of the pedagogical and theoretical aspects of computer application in classrooms.

The ICT policy states that managers, teachers, and learners should be capable of using ITC confidently and creatively to develop the knowledge and skills they need as lifelong learners and to achieve personal goals as participants in the global community by 2013 (Department of Basic Education (DoBE), 2004:17). The Department of Education has a framework on e-education implication at a very basic level which outlines the objectives, resources, funding and strategies for integrating ICT in the classroom; this may involve the internet, hardware and software, CD-ROM, WhatsApp, email and other forms of media and telecommunications (DoBE, 2004:15), however, it is noted that the policy is not explicit with regard to the categories of technologies that need to be used in curriculum delivery. In this regard, Ndlovu (2016:90) notes that the practical enforcement of the policy on ICT integration is

lacking and that there are inconsistencies in the understanding of the policy of ICT integration in schools.

According to the Department of Education Action Plan 2015, there are four main strategies that need to be adopted to enhance ICT integration in education. These pertain to the establishment of a link between ICT use in the classroom and learning goals and an understanding of available technologies for classroom practices. Schools should work to establish collaborations with stakeholders to push forward ICT use, while also analysing the status of ICT initiatives as linked to their results (Padayachee, 2017:40).

2.3 IMPORTANCE OF ICT IN TEACHING AND LEARNING

The importance of ICT in education cannot be over-emphasised. This is especially so in the current pursuit of technology-based instruction as advancement in digital focus nears the 4th Industrial Revolution. The use of ICT is associated with an increase in the motivation of learners as this gives learners the impetus to actively participate in learning activities (Naji, 2017:84). The employment of computer technology in education stirs interest in learners; they can interact with web-oriented tools in ways which demands them to utilise psychomotor skills. Learners can continuously oscillate from theoretical learning to practical manipulation of computer technologies. In the process, this offers learners the chance to relax from the intensity of solely using their minds during the instructional discourse. Basargekar and Singhavi (2017:69) contend that the place of ICT in instruction enables the utilisation of innovative educational resources and the renewal of effective teaching and learning resources.

The application of ICT helps to establish a more active collaboration of learners and the simultaneous acquisition of technological knowledge. It has the capacity to assist learners to improve regarding discernment. This relates to the ability of learners to make judgements or to make decisions in relationship to educational matters. Learners are empowered to search for various sources for use in their studies and compare them. The search for information is made easy because it is done at the click of a button. This is contrasted with the laborious and previous format of searching for

information in the complicatedly arranged shelves of institutional libraries. ITCs have the added benefit of helping learners to organise or structure information.

The educational environment which is laden with technological resources enthuse learners (Badia et al., 2013:791). The interest is triggered through access to various learning resources such as websites, videos, games, and graphics. This transforms the way in which the learning of traditional subjects is conducted; the content and methods of learning are brought closer to learners. In fact, the normally dull strategies of teaching and learning are changed through the infusion of entertainment in the instructional process. In the long term, learners are encouraged to attend classes.

The interactivity framework that is injected into the teaching and learning context is crucial in enhancing the academic performance of learners. Technology use facilitates the formation of study teams; in this case, learners can work together in school projects, which further boosts cooperative attitudes as they learn from each other (Meggiolaro 2018:498). This situation is inconsistent with the traditional forms of learning which learners are introduced to in their communities; e-learning presents learning as modelled around the sharing of knowledge and skills from community interactions (Basargeka & Singhavi, 2017:71). The convergence of learners as they assist each other to address an issue of educational significance helps to relive the cultural settings which they are familiar with at home; this sharing of ideas also helps to consolidate mastery of educational content.

ICT tools stimulate the development of imagination and initiation (Bas et al., 2016:177). The constant interaction with technology resources fosters sustained practice and this sees learners taking an initiative to understand learning concepts. In this context, they rarely wait for teachers to introduce learning activities but are propelled to stay ahead of teachers in the coverage of the curriculum. This cultivates entrepreneurial skills and creativity in learners. This resonates with the goal of education which seeks to develop critical-thinking skills in learners - the basis for innovation and national development.

The adoption of ICT in schools helps to improve communication between learners and teachers and among learners (Meggiolaro, 2018:498). This is facilitated through the

various channels of communication which are available to learners. This sharing of information can be more spontaneous and informal; hence, it can be synchronous or asynchronous. Asynchronous communication implies that learners can learn alone, through connecting with the teacher at any time outside the classroom (Qasem & Viswanathappa, 2016:563). Synchronous interaction involves learners simultaneously converging to receive instruction from a model. This can be a teacher or any other person or learner, who may be knowledgeable in a given learning content.

ITC has removed the walls of classrooms which provide barriers to teaching and learning; this has increased access to education, which was previously limited by time, distance, resources, and other personal circumstances (Qasem & Viswanathappa, 2016: 563). This implies that learning can continuously take place throughout the life of the learner, even outside the boundaries of the school. This is helpful in times of health pandemics, such as the covid-19 pandemic, which required an abrupt shift from face-to-face instruction to blended or fully online teaching and learning. ICT not only helps in the teaching and learning process, but it also helps in assessment and evaluation, as well as in promoting inclusive education (Tikam, 2013:2). This implies that ICT tools can be used to assess and evaluate the assignments of learners, especially those submitted online.

2.4 PERCEPTIONS OF TEACHERS ON ICT COMPETENCIES IN SCHOOLS

It is widely believed that successful implementation of ICT contributes to the improvement of school functioning and academic performance of learners. Basargekar and Singhavi (2017: 69) believe that a productive use of ICT hinges on the way in which teachers perceive themselves to be proficient in the application of digital tools in the classroom. This perception depends on the influence of manipulative and non-manipulative factors in the operations of teachers. Manipulative factors refer to influences that can be changed in the practice of teachers such as the language of instructional delivery and teacher training. Non-manipulative influences, on the other hand, relate to the factors which cannot be altered in the functioning of teachers (Basargekar & Singhavi, 2017:69). These include variables such as age, gender, work experience and home background.

The personal attributes of teachers have been observed to contribute to their competencies in the use of ICT in schools. According to Buaneng-Andoh (2012:137), the characteristics of teachers inclusive of age, gender, teaching experience and academic qualifications determine the ability of teachers to use ICT in the classrooms. It may be possible, therefore, to associate people of a defined gender and age with an affinity for the adoption of ICT in teaching.

The competency of teachers in the implementation ICT can be influenced by the gender characteristic. This is an essential factor which can determine the training needs of teachers as well as the allocation of teaching loads at school. Female teachers, like girls are perceived to exhibit a low attitude towards the acquisition of computer skills for use in educational discourses (Wachiuri, 2015:28). This has a knock-on-effect regarding their tendency and confidence to use computers. In essence, females reflect depressed self-confidence in the employment of digital-based teaching and learning.

Teachers with more years of teaching experience are believed to support the use of computer-based technology in class (Basargekar & Singhavi, 2017: 70), however, this supposition is quite fluid as there are other variables which tend to heighten the likelihood of females using digital tools in instructional practice. Issues such as home background, social class and school quintiles exert a huge impact on the future employment of computerized teaching and learning options of people. Wachiuri (2015: 28) avers that there is no correlation between the work experience of teachers and the rate of ICT use in teaching. In some instances, young and inexperienced teachers may be found to be interested in the use of computers compared to long serving and experienced teachers. Young teachers tend to be more enthusiastic towards the use of technology to teach learners. These are more likely to have experienced hands-on computer experience during their training compared to old teachers, whose training may not have included even basic skills in computers.

The environment of the school has an influence regarding the adoption and use of ICT (Bas, Kubiatko & Sünbül, 2016:176); this entails the structure or organisation of the entire school curriculum. In this case, the dichotomy of private and public schools and the way in which they are capacitated suggest either the increased use or non-

implementation of computer technologies. Private schools tend to lean more on blended or online teaching and learning compared to public institutions. These schools service learners from a higher socio-economic class, use English as a medium of instruction and have pride in the adoption of e-learning modes. English is the dominant language used in computer software and facilitates the utilisation of ICT tools (Indradhikara, Marhaeni & Santosa, 2017:2).

Teachers consider their own training for integrating ICT applications in the classroom as very crucial. Badia et al., (2013: 791) indicate the necessity of teacher training in the process of integrating ICT in teaching in schools. The training of teachers in ICT does not just assist them to build technology literacy, but also inspires them to use ICT in teaching operations (Abuhmaid, 2011:156). The persistent tendency is that most teachers who trained a long time ago were not appraised in the knowledge and use of computers. This group of teachers was mainly exposed to the traditional face-to-face teaching, which emphasised pen and paper kind of teaching. The provision of training programmes to up-skill or retool teachers in the use of ICT appear not to have matched the demand for such competencies in schools. Ali, Haolader and Muhammad (2013: 4061) argue that insufficient in-service training of teachers has been identified as one of the main obstacles in the integration of ICT in the classrooms.

The exposure of teachers to ICT competencies is paramount. The process is helpful because it triggers a paradigm shift in the way teaching is implemented in schools. Badia et al., (2013:791) contend that teachers who are knowledgeable in ICT have a positive attitude towards its use in teaching. Attitude refers to the disposition either to respond positively or negatively regarding the use of ICT and the need for teachers to acquire requisite computer skills. A positive attitude facilitates internet use in instruction (Ramirez, Canendo & Clemente, 2012:147).

2.5   CHALLENGES AFFECTING THE USE OF ICT IN SCHOOLS

There are challenges regarding effective use of ICT in teaching and learning. These relate to factors that are perceived to invariably inhibit the application of computer innovation in education. Tedla (2012) observes that there are two main types of challenges that impede the integration of ICT in teaching and learning. These

obstacles are described in terms of school characteristics and teacher characteristics. The school's characteristics are also referred to as external barriers and constitutes factors which have a wide scope in affecting teaching and learning processes in the classrooms. They encompass issues like - inadequate access to ICT, poor internet connectivity, lack of training of teachers, non-knowledge of ICT policy and timelines. Teacher characteristics relate to internal barriers and include - the beliefs of teachers, their lack of confidence, negative attitudes and poor ICT knowledge and skills. These variables, however, are interrelated and consequently influence the success or failure of implementation of ICT in teaching and learning. Khokhar (2016:3), rightly points out that ICT integration in education does not depend on one individual factor but it is a process that involves a set of interrelated factors.

2.5.1 Attitudes and beliefs of teachers towards ICT use in the classroom

The attitude and beliefs of teachers are shaped by the teaching philosophies that they hold (Sugar, Crawley & Fine, 2004:201). This is derived from the understanding that all teachers hold beliefs pertaining to their work, learners, the subject matter, and their roles and responsibilities. It is in this regard, that the beliefs of teachers are thought to exert a filtering effect on the way in which they construct their concepts of teaching, decision-making and professional judgements (Kgalemang et al., 2016:2). It is necessary for teachers to change any negative beliefs and attitudes for the application of computer technology to be successful in classrooms.

Teachers, generally, accept the use of computers as valid tools in education, but at the same time, experience anxiety about their personal competence in facilitating ICT in teaching and learning; these determine the way an individual is willing to try out an innovation (Hammond, 2014:195). The present situation is that teachers may appear to exhibit a positive attitude towards the use of computers and recognise the need for them in classrooms, but their uneasiness to implement the idea compromise the entire agenda. Teachers must be confident and competent in the use of computers to facilitate the transference of the same skills to learners. For this to happen, teachers need to keep abreast with competencies required to use technological appliances in education as well as in relation to their own areas of specialisation (Kgalemang et al., 2016:2). A positive shift in the beliefs and attitudes of teachers on the use of

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technology, will enable them to function more as facilitators by helping learners to access and process information (Bas, Kubiatko & Sünbül, 2016:176).

Watson (1999:4) argues that the integration of innovative technologies into settings in education needs a paradigm shift in the way in which teachers work. This change is usually handled differently by teachers, therefore, it is critical to consider the differences in the attitudes of teachers to change, as this influences the way in which they operate in classrooms. Khokhar (2016:3) avers that a positive attitude of teachers towards the use of computers helps to shape their understanding of the manner that this kind of technology has benefits to the teaching and the learning of learners. Khokhar (2016:40) on the use of technology in education, had established that while teachers acknowledge the existence of more than enough appropriate technology for use in education, they were unsure that they were being guided, supported, and rewarded for the integration of technology in teaching and learning. According to Empirica (2006:4), teachers who were not applying technology, such as computers in their classrooms still harbours the conviction that the use of ICT has not been and would not really be of benefit to the educational enterprise.

The implementation of Outcome-Based Education (OBE) in South Africa, attracted a lot of negative attitudes from teachers as they had negative opinions about the innovation (Hammond, 2014:195). Teachers generally, did not understand the reasons for the change and the need for them to adopt different teaching styles. This explained their resistance to the planned change. The purpose of enacting the new policy was to change the legacy of apartheid education and training and to equip learners with knowledge, skills and competencies that were needed to be successful in the current workplace. It is in this context that Balanskat (2006:1) argues that the success of innovation in the curriculum depends on the attitudes of teachers. Spady (1994:130) notes that the Outcome-Based Education, with its inclusive approach, sought to ensure that all learners can learn and succeed as they engage with concepts at different times and using varied methods. OBE provided a unitary system of education, where learners were able to learn at their own pace. The apartheid system of education did not provide for teachers to deal with slow learners. This aspect was inherent in the OBE, which required teachers to be involved in dealing with all categories of learners. To enhance the competencies of teachers in this new role,

teachers needed to make lessons informative and exciting through the adoption of technology. This demanded that teachers be competent in the use of a wide range of technological tools such as scanners, podcasts, projectors, and software in lesson delivery (Kgokgwe, 2012:21), however, use of these innovations had to fit into the beliefs and theories of teachers in the classroom.

It is believed that teachers are unlikely to use new technologies in their teaching unless they realise the need to alter their professional practices. Teachers that appear to resist change may not really be against the planned innovation but lacking in the requisite education needed for them to embrace the changes (Hammond, 2014:195). These teachers must be provided with opportunities to ponder and understand the purpose and benefits of the new technologies to their teaching and learning in the classroom. In a review of educational reform, Fullan (2001:3) suggests that the universal nature of technology, implies that the issue is not about the importance of technology but the way in which individuals must contend with it. As technology becomes more powerful, it becomes an indispensable part of curriculum delivery, and teachers need to be experts in the design of relevant pedagogy to go with the innovation (Meggiolaro, 2018:500). It is, therefore, logical to think that the level of development of teachers in technology and their beliefs in the use of computers in the classroom depend on the quality of available teacher development programmes. Such programmes are expected to change the theories and beliefs of teachers towards computer use in the classroom (Siddiquah & Salim, 2017:498).

2.5.2 Teachers access to computers

Strydom (2005:71) indicates that non-access to the necessary computer hardware and software, lack of time and quality support are some of the factors that prevent the use of computers in the classroom. Syomwene (2017:32) concurs that lack of computer resources is especially challenging to teachers who teach large classes. It may even be more appropriate not just to focus on teachers' access to computers but the availability of computers for teachers to plan for lessons (Kgalemang et al, 2016:2). The plans need to be done at their own time and be accompanied with sufficient time also to search for more relevant information. It is preferable for teachers to have their own personal computers so that they can make detailed and informative plans. The

limited access to computers by teachers, including their absence at their home, presents another form of barrier that discourages teachers from embracing the integration of new technologies in education (Kgalemang et al., 2016:2).

Sicilia (2005:50) maintains that teachers have always indicated that they experience lack of computers in their professional practice, hence, it is difficult for teachers to always have computer to use for teaching and learning purposes. In some schools, teachers must book in advance to have access to computers; occasionally, teachers forget to book them owing to heavy loads and multiple roles they play in their schools. They may also be unable to book them for several periods to accomplish long-run projects with learners. The implication is that teachers would not have ready access to ICT materials because they must share them with other teachers at school (Ramirez et al., 2012: 147). Siddiquah and Salim (2017:498) state that failure to access ICT materials is not always due to unavailability of hardware and software within the school, but because of several factors such as poor-quality hardware, poor organisation of resources, inappropriate software, and inaccessibility of equipment for individual teachers.

Bas, Kubiatko and Sünbül (2016:176) established that European schools experience infrastructural barriers inclusive of unavailability of broadband access. It was discovered that a third of European schools still do not have access to broadband internet connectivity. This exerts a negative impact on the integration of ICT in teaching and learning. Pelgrum (2001:63) explored the views of practitioners on the obstacles to the implementation of ICT in 26 schools. The conclusion was that four out of the top 10 common challenges concerned inaccessibility of ITC materials for teaching and learning. Obstacles included inadequate numbers of computers, meagre numbers of software copies, insufficient peripherals, and lack of simultaneous access to the internet (Indradhikara, Marhaeni & Santosa, 2017:2). Similarly, Toprakci (2006:1) conducted a study in Turkish schools and revealed that the successful implementation of ICT in Science education was hampered by limited numbers of computers, obsolete gadgets and scarce hardware and software. According to Al-Alwani (2005:24), lack of access to the internet during school periods and lack of software were some of the factors impeding the integration of technology in Saudi schools.

Poor choices of hardware and software and a lack of an appropriate assessment of suitable tools for the content of teaching are some of the problems experienced by teachers (Newhouse, 2002). Similarly, Jones (2004:238) indicates that lack of access to computers inhibits effective use of technology in classroom teaching and learning. Three types of failure of access are - poor organisation, lack of quality hardware and poor or incompatible quality of software. Bates (2000:35) further explains that while schools can buy a lot of computers for instructional purposes, the limited access of these computers to teachers and learners deem such an investment a waste of time. On the other hand, teachers can only make profitable use of computers when they are easily available, in good working order and well connected to a fast and reliable internet. Howie (2005:1) shows that less than 15% of schools in South Africa have access to computers for teaching, and this scenario hampers the effective application of ICT in education.

2.5.3 Personal Characteristics

Personal characteristics of individuals such as age, level of education, gender, teaching experience, knowledge of computers and attitudes on the use of computers in education influence the adoption of ICT services (Hammond, 2014:195; Kgalemang et al., 2016:2). In a survey by Becta (2000:36), 1.8% of respondents suggested that the age of teachers is an important factor in influencing the use of ICT in teaching and learning; this is because older teachers appear less prone to the use of technology. Studies focusing on the gender of teachers and the use of ICT note that the level of computer-use by female teachers is associated with limited access to technology, limited skills, and lack of interest in computers (Buaneng-Andoh (2012: 137), however, there are some studies that reveal that gender variable is not a predictor of ICT integration in classrooms (Norris, Sullivan, Poirot & Soloway, 2003). Kay (2006) observes that male teachers have relatively higher levels of computer usage, although, it is supposed that the quality of computers and adequate preparation for the use of technology lessen gender disparities related to computer use in schools. Teachers are encouraged to adopt the integration of ICT into teaching and learning activities (Prestride, 2012:450), but their preparedness to engage with computers determines these computers' effectiveness and not just the mere presence of technology materials

in the classrooms. According to John (2015:232), lack of experience, anxiety, and fear to engage with ICT impedes its use thereby, fostering the conventional teaching and learning approaches. It is, therefore, important to understand the personal characteristics of teachers to appreciate their affinity to the adoption and integration of ICT in teaching and learning.

2.5.4 Technical Support

Technical support is one of the contextual factors that affect the use of computer technology in education. Inadequate technology support for hardware and software retards computer use (Radia, Meneses & Sigales, 2013: 790). Teachers are usually concerned about the breaking down of technological equipment before the completion of the lesson and they may also be afraid to damage the equipment. Jones (2004) reports that the breakdown of a computer results in interruptions and the absence of technical support to bring about regular repairs lead teachers to run short of facilities for use during lessons, thus, teachers are afraid to use the equipment because there would be no one to assist with repairs once there is a breakdown. Siddiquah and Salim (2017:498) contend that lack of technical assistance implies that technical maintenance will not be conducted regularly, resulting in increased risks of further technical breakdowns.

In Ireland, the National Council for Technology in Education, NCTE 2005 reports that about 85.3% of schools showed that technical support is a priority and suggested that it should be a critical element of ICT environment at the school. There should, therefore, be proper technical support for the maintenance of available hardware and infrastructure (Innan & Lowther, 2010:138). It should be noted that there is a narrow divide between the fear of causing damage to an equipment and hindered use of a tool owing to lack of confidence. The main source of anxiety in the use of computers emanates from the concern of teachers about damaging the hardware of the computer or information base. This anxiety disturbs teachers in their attempts to use computers even prior to any damage occurring (Hammond, 2014:195). Evidence from the British Suppliers Association (BESA, 2002) reveal that a third of desktop computers were found to be faulty and unsuitable for teaching purposes. Thus, the characteristics of individuals and quality of the equipment can be used to explain the demotivation of

teachers from using computers (Leteane & Moakofhi, 2015:6). This is exacerbated by the fact that most computers that are used in schools may be old or faulty as they are usually procured through the benevolence of well-wishers and donors.

2.5.5 Lack of Teacher Competence

Aktaruzzaman, Shamim and Clement (2011:114) contend that the competency of teachers is an indispensable variable that can be used to ensure the successful use of ICT in teaching and learning. While there are available computer laboratories and media centres in many urban schools, teachers noted several issues that impede the use of technology in pedagogic practice. Competence in computers describes the ability to handle a wide range of computer applications for many purposes (Van Braak, Tondeur & Valcke, 2004). Majority of teachers who show negative attitudes towards the integration of computers in teaching lack the knowledge and skills to use computers (Kgalemang et al., 2016: 2). Teachers should be exposed to training and development to attain adequate competencies for use in teaching and learning in schools. Without possession of requisite skills, teachers will not be well positioned to integrate ICT in classroom practice (Sang et al., 2011: 163).

2.5.6 Lack of skills training

Insufficient knowledge and skills of teachers in ICT work as a major hindrance to e-learning in schools, therefore, teachers require sufficient and regular training to be able to integrate computers in classroom instruction. Lack of in-service training is also cited as one of the major barriers for integrating ICT in the classroom (Ali, Haolader & Muhammad, 2013:406). John (2015:231) points out that many teachers who trained a long time ago and are of old age would not have received computer education while in college. This means that such teachers need computer-skills training to allow them to use computers in class. Many teachers have inadequate training, especially in their ability to address technical problems and in grasping the basic functions of technology. To address the situation, the initial focus in the training of teachers need to deal with the basic operations of technology and software applications (Naji, 2017:84). Once they have acquired the basic skills, it is then that they can proceed to pedagogical

training in ICTs. This training could offer differentiated training, based on the experiences and skills of teachers on the use of computers.

There has been concern that student teachers lack the opportunity to receive ICT training during their initial teacher training segment. This lack of training in computers affects the practice of teachers after qualifying (Wachiuri, 2015:28). It is believed that failure of student teachers to be trained in the use of computers results from the fact that lecturers in teacher training institutions have little experience in the use of technology in curriculum delivery. This makes them unable to pass on computer skills to student teachers. Cuckle and Clarke (2002) observe that while student teachers have good ICT skills for their own personal use, they are unable to transfer these skills to the use of ICT in class. Furthermore, on receipt of pedagogical training in ICT, student teachers are still unable to maximise the outcomes of training as the conditions in the classrooms do not match those experienced during training (Saxena, 2017:65). It is believed that the weak application of ICT skills in teaching and learning is fueled by lack of encouragement of teachers to use that strategy in classrooms, however, Khokhar (2016:5) reports that most experienced teachers and mentors are very supportive of new teachers in the use of ICT during lessons. The enthusiasm to adopt ICT in classrooms is affected by other general factors that decide the support that teachers give to each other at school.

Lack of appropriate ICT subject content, especially in the language's forms one of the challenges to the use of ICT (Khan, Hasan & Clement, 2012:62). The main obstacle is that English serves as the basis of communication in technology use. This implies that teachers and learners who limited command of English language experience hurdles in using computer software and hardware in classroom teaching and learning (Kgokgwe, 2012:21). This may appear to contradict the educational policy, which encourages learners in the foundation phase to be taught in their mother tongue. The effect of this policy is that learners struggle or delay to maximise the use of technological tools owing to their limited exposure to English, which is used in digital technology.

2.5.7 Lack of time

The shortage of time to use ICT in teaching and learning is one problem which exists among teachers. Teachers are pressed for time to complete many aspects of their work, let alone to teach, and use ICT with learners (Padayachee, 2017:38). Basargekar and Singhavi (2017:69) observe that learning new skills in a profession needs time, but teachers have very little of it as they spend most of their day teaching. Teachers are faced with many other commitments such as interacting with parents and attending staff meetings. This takes away their time to practice and experiment with technology, share experiences with colleagues and attend to in-service training on technology.

Mwendwa (2017:409) reports that teachers indicate that there is a great deal of work that is required in preparing ICT materials for learners. This is particularly the case for learners with a wide range of abilities. The time appears to be too limited for teachers to explore materials for potential use with ICT (Ramirez, Canendo & Clemente, 2012:147). Cuban (2001) conducted a study on ICT use based on two American high schools and established that there was not enough time for computers to be incorporated fully into daily teaching. Teachers need time to preview web sites, prepare multimedia materials for lessons and be engaged in training (Mwendwa, 2017:410). This challenge is universal to teachers, implying that it affects those who use less of ICT in their teaching as well as those that are quite committed to ICT integration. Teachers must work longer hours to use ICT successfully; this results in teachers being constantly exhausted.

2.5.8 No perception of benefits

It is imperative for teachers to realise that there are benefits in using ICT in teaching and learning, according to Mwendwa (2017:409). This can be achieved through focused training and professional development to familiarise teachers with the way in which technology can assist in their own teaching and learning situations (Abuhmaid, 2011:156). Teachers can observe others teach using technology as a way to encourage them to also adopt ICT in the teaching process. Teachers also need to question or be willing to change their professional practices to foster the use of ITC in classrooms; it is critical for teachers to perceive the importance of computers in

teaching. This means that this aspect should be incorporated in any ICT training programme to ensure teachers are convinced about the value of utilising ICT for teaching and learning (Ramirez, et al., 2012:147). Similarly, Yuen and Ma (2002) mention the need for teachers to perceive the essential nature of ICT use; this is a factor that influences a wider acceptance of computers. It is quite central for teachers to understand that computers are applicable to a certain type of context and the way in which they can be integrated during teaching and learning in order to make the e-learning endeavour a success.

2.6 GENDER AND ICT USE IN EDUCATION

The infusion of ITC in enhancing teaching and learning has been widely accepted in schools the world over. This is because the integration of ICT tools in teaching media makes teaching interesting and innovative. Indradhikara, Marhaeni and Santosa (2017:2) note that there is a disparity in ICT use according to gender and age. The gender factor has a significant effect on the application of ITC tools in the classroom (Saleh Mandi & Sa'ad Al-Dera, 2013:57). It is believed that men and women use ICT differently and that men tend to be more proficient than the women counterparts in the employment of ICT (Indradhikara, et al., 2017:3). The low proficiency of women in computer use, for example in Indonesia, emanates from the fact that women do not have a lot of resources and income to purchase and utilise ICT tools. Most women are illiterate and have limited access to education compared to men. The society is deeply patriarchal, making men to have greater influence in the control and use of technology than females. Sida (2015) conducted a study on the use of ICT by gender and established that the number of ICT consumers has reached 4 million people but only 20 per cent of them are females.

Moghaddam (2016) conducted a study in Scotland on gender status regarding the nature of employment in digital technology and revealed that there are few women who work in the digital technologies' sector as compared to men. Only 18 per cent of women were found to be employed in the digital sector, compared to 82 per cent of men. It was established that women lack the confidence to study or train in technology. Indradhikara, et al., (2017:3) write that, women in Africa have less access to the

This is because women experience barriers due to factors such as -high costs, poor network coverage, lack of security, harassment, mistrust, and technological illiteracy.

There are, however, studies that refute the claim that women participation in the technology sector is constricted. Ester and Emenka (2017) conducted a study in the Rivers State of Nigeria and concluded that there is no difference in the use of ICT by female and male teachers, hence, that gender is not a barrier to the use of ICT in schools. On the same point, Basargekar and Singhavi (2017:80) argue that the proficiency regarding the integration of ICT in classrooms show that female teachers hold better skills in ICT for use in teaching and learning.

Meggiolaro (2017:408) observes that the frequent use of computers at home and school has been associated with better performance of learners at various levels of education. Boys have long been found to outperform girls on the use of ICT in Mathematics. This is based on several theories that incorporates-cultural, biological, attitudinal, and pedagogical considerations. Meggiolaro (2017:408) insists that female learners generally use computers less frequently compared to males; this causes them to exhibit less experience and competencies and that contribute to lower academic performance in e-learning; however, Krumsvik, Jones, Øfstegaard & Eikeland (2016:157) conducted a study on the digital competency of 2477 secondary school teachers, and the results showed that women have a higher mean score than men

2.8 CHAPTER SUMMARY

This chapter discussed the literature pertaining to the competency skills of secondary school teachers. It focused on the theoretical framework which underpins the study, the contextualization of ICT in education, perspectives of using ICT in schools, the importance of ICT in teaching and learning, perceptions of teachers on the use of ICT in education and challenges affecting the use of ICT in schools. The chapter identified some of the significant research gaps in the previous literature, along the main research questions of the study. To better address the problems, it introduced and presented Siemen's Connectivity theory. The argument is that the utilisation of ICT in teaching and learning is an expensive and complicated process that demands a lot of

skills and resources for its success. Teachers may be avoiding embracing the use of ICT not necessarily because they are not interested in innovations and ICT, rather, this could be because of lack of the skills and access to resources which enhance the use of such ICTs in teaching.

RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter discusses the research design and methodology used in this study. This includes an outline of the research paradigm, which is the philosophical basis upon which the research endeavour is anchored. The quantitative research approach that was employed in this study is informed by the positivist paradigm and influenced the choice of the descriptive survey design. Aspects of the research design, such as the study population, sampling procedures and the sample are presented within the survey design, thereafter, the methods of data collection and analysis are also discussed. Finally, issues of significance of the study, delimitation, ethical considerations, and measures of quality control form part of the chapter.

3.2 RESEARCH PARADIGM

This study was guided by a positivist paradigm. Maree (2012:47) describes a paradigm as a philosophical position or stance that is adopted by a researcher and forms the basis of investigating a particular phenomenon. A paradigm is defined by Wahyuni (2012:68) as a worldview or window through which researchers perceive the reality under study. Similarly, Kivunja and Kuyini (2017) maintain that research paradigms are fundamental concepts which researchers rely on in the conduct of research. This shows that a paradigm, therefore, is a philosophical position or attitude that is adopted by researchers in carrying out a study in social research.

Positivism may be seen as an approach to social research that seeks to apply the natural science model of research as a point of departure for investigations of social phenomena and explanations of the social world (Denscombe, 2008:14). In addition, positivism adheres to the view that only factual knowledge gained through observation, including its measurement, is trustworthy. The positivist assumptions are categorised

into ontology, epistemology, and methodology (Kivunja & Kuyini, 2017:27). Ontology is a belief in reality, hence, has a particular focus on the existence of reality. Positivists believe that knowledge resides outside of human existence; this means that it occurs independent of human understanding and interpretation. It is information that is scientific and represented in quantitative form. Epistemology relates to the source and nature of knowledge, and the way in which it is acquired and communicated. This research will utilise quantitative methods to collect data, however, in the positivists' stance, the role of the researcher is limited to data collection and interpretation in an objective way.

The researcher's rationale for using positivism as its research paradigm is to maintain a detached or neutral position to assume the role of an objective analyst, thereby making detached interpretations about the data that have been collected, in an apparently value-free manner (Morris, 2006:3). The positivist researcher prefers working with an observable social reality, and such research will produce generalizations like those produced by natural scientists.

3.3 RESEARCH DESIGN

This study utilised a quantitative research design. A quantitative research design attempts to collect quantifiable information to be used for statistical analysis of the sample. Cresswell (2014:13) states that the use of quantitative design facilitates the production of descriptive data. Quantitative design involves the utilisation of numerical statistical analysis and measurements to examine social phenomenon (Kivunja & Kuyini, 2017:30). Researchers exercise care in selecting a representative sample so that they can generalize. Quantitative researchers tend to keep themselves distant from those they are researching on to avoid contaminating the data or influencing the participants' responses to draw unbiased conclusions (Leedy & Ormrod, 2010:95).

Quantitative designs perceive reality as comprised of instances that can be observed and measured. The design endeavours to produce measurements of an investigation which are accurate. Positivists advocates the use of quantitative research designs as the bedrock for the study to be precise in the description of the parameters and coefficients in the data that are gathered, analysed and interpreted in the presentations

(Fadhel, 2002:21). McMillan and Schumacher (1993:30) also make a similar conclusion that quantitative design include gathering information about the variables of the study. It also deals with various aspects of methods and procedure adopted by the researcher in the process of data collection and data analysis.

Quantitative data is usually composed of the responses of respondents which are coded, grouped, and reduced to figures. This enables the manipulation of data for statistical purposes (Claydon, 2015:43). The transaction can involve quantitative tallying of opinions or events in the form of frequency responses (Babbie, 2016: 66). The design puts more focus on objectivity and reliability of findings and strives to achieve the replication of the research in other contexts and the achieving of similar results. Quantitative design may not be entirely suitable for business and social research studies because the concerned phenomena cannot be measured in an accurate and reliable way. This further reduces the validity of the results (Claydon, 2015: 43).

The rationale for settling on quantitative design was influenced by the researcher's interest to understand the teacher's competency in the blending of ICT into their teaching and learning activities. A quantitative design was also considered appropriate for this study, based on its ability to measure which variables have the greatest impact on teaching when computers are used in the classroom. This is a relational or correlational objective which cannot be tackled through the employ of qualitative methods. Quantitative methodology is considered descriptive, objective and aimed at forecasting and clarifying the degree and correlation between data and results. The results obtained from the sampled population, in quantitative research are generalizable to the wider population (Babbie, 2016: 67).

3.4 RESEARCH METHODOLOGY

The research methodology adopted for this study is a survey methodology which aimed at assessing teachers' ICT competency and skills in Luvuvhu Circuit. Tachin (2019:50) states that a research design is plan that is intended to obtain responses to research questions by using a set of methods and items. It is viewed as a step-by-step protocol that is used by a researcher to guide the entire research endeavour from the

selection of the sample, through data collection and analysis, to reporting of findings. Descriptive survey research design involves collecting information from one or more groups of people about either, their characteristics, values, ideas, perceptions, plans and beliefs by administering questionnaires and tabulating their ideas (Leedy & Ormrod, 2010:187).

The researcher's rationale for using survey methodology was to learn about a large population by surveying a sample of that population with the use of questionnaires to get required information on the topic. Also, as stated by McMillan and Schumacher (2001:10), survey data is used to describe and explain the status of phenomena, to trace change and to draw comparisons. The descriptive survey design affords an accurate description of reality while allowing for the location of fresh data and the process of causation. It is important to note that the selection of a research design in a study is guided by the interests of the researcher, the research questions and research objectives (Tachin, 2019:57). The descriptive survey method is quite simple compared to other quantitative designs. In this case, the researcher only poses a series of questions to willing respondents, summarises their responses in the form of percentages, frequency counts, or more sophisticated statistical indexes, and then draws inferences about a particular population from the responses of the sample (Leedy & Ormrod, 2010:187).

3.5 SAMPLING

A simple random sampling method was applied to select a total of 90 teachers from all the teachers in the nine secondary schools, to complete the survey questionnaires. A list of all the teachers in the Luvuvhu Circuit was drawn, names written on pieces of papers, put in a hat selected randomly. Etikan and Bala (2017:150) contend that simple random sampling guarantees that every member of the population has an equal opportunity to be selected into the sample. The simple random sampling techniques ensure that the components of the sample do not have overlapping characteristics. In this investigation, the researcher focused on selecting the sample as informed by the homogeneous feature of the characteristics of interest in the study (Alvi, 2016:17).

According to Sauder, Lewis, and Thornhill (2003:150), the purpose of sampling is to "provide a range of methods that enable you to reduce the amount of data you need to collect…rather than all possible cases". This is done because it is not usually possible to include the whole population in research due to time or financial constraints (Jupp, 2006:244).

3.5.1 Population

The population of this study was all the 490 secondary school teachers in Luvuvhu Circuit., Babbie and Mouton (2005:43) describe the population as the theoretically specified aggregation of study elements. Polit and Beck (2017:78) maintain that a population is a small group of individuals selected from the whole population under study and exhibiting characteristics of the population from which it was drawn. The sample denotes a fraction of the group that is of focus in a scientific investigation.

3.5.2 Sampling procedure

In conducting simple random sampling, the list of all members of the entire population were made availed. A 'hat method' was executed to select respondents for the study. This involves writing or representing every member of the population on pieces of paper and putting them in a hat. The contents are shaken, and a piece of paper drawn out each time the hat is shaken. Each card or piece of paper that was picked from the hat was not returned into the hat. This was done until a total sample of 90 respondents was reached.

3.5.3 Study sample

Cohen (2007:157) describes a sample as a smaller group or subset of the population where the views will be a representative of the total population. De Vos (2001:191) defines a sample as the element of the population considered for actual inclusion in the study. Similarly, Braun and Clarke (2019:291) presents a sample as a small group of the total population which has characteristics that are inherent in the population. The sample was selected from the population, with all individuals having an equal

chance of being selected in the study, thus, minimizing biasness of the findings of the study (Babbie & Mouton, 2005:43).

3.5.5 Research instrument

The data used in this study was conducted using semi-structured questionnaires as a data collection instrument. McMilan and Schumacher (1993:238) regard the questionnaires as the most widely used technique for obtaining information from subjects. "It basically seeks the opinions of individuals in a sample or a population on issues directly related to the objectives of the research study" (Aina, 2004:348). The advantage of using a questionnaire is that it is relatively economical, has standardized questions, can ensure anonymity and questions can be written for specific purposes.

The instruments for data collection in this study is a researcher-designed questionnaire (Ref to Appendix 3, p.83) - "Questionnaire on teachers' competency skills in use of ICT (QTCSUICT)". The questionnaire was constructed containing two sections. The first section or section A focused on biographical data. This included the age of respondents, academic qualifications, position held and length of professional experience. The age of respondents was captured to reflect the interests, attitudes, and propensity of teachers to use ICT in teaching and learning. The academic qualifications indicate the skills and competencies of teachers. This implies that as teachers obtain cognitive competencies, it is likely that this will infuse into the content on ICT equipment and services. Section B of the questionnaire comprised items pertaining to ICT competencies of teachers for teaching and learning in schools. Respondents were required to indicate their choices regarding responses provided for questionnaire items; this was based on a provided Likert-scale type categories of *strongly agree, agree, disagree,* and *strongly disagree.* Each of the research questions or objectives carried four questions, implying that 16 questionnaire items were constituted in section B. These areas focused on the importance of ICT, perceptions of teachers on the use of ICT, challenges faced by teachers in the use of ICT in classrooms and the relationship between gender and ICT competencies in schools. The researcher ensured that respondents were supplied with answers to every question on the rating scale to avoid having any missing data or information and the

copies of the rating scale were collected immediately to guarantee a high percentage return.

3.5.6 Data collection procedure

Data collection is gathering of information that is regarded suitable for the research. Gundry and Deterding (2018:304) explain that data collection is the procedure of selecting respondents for the study and soliciting for information for analysis from them. The information should be related to the research questions and objectives. The idea is to make sure that the resultant data carries the tags of honesty and objectivity (Buka, Matiwane-Mcengwa & Molepo, 2017:19).

The researcher first secured permission from the District Manager and also permissions from the principals to allow for entry into the schools and to distribute the questionnaires. The respondents were allowed to fill in questionnaires themselves to save time and money. Questionnaires also required little cost to administer and are less labour-intensive. The questionnaire was chosen because it has some measure of objectivity, validity, and reliability. They are widely employed in collecting primary research data. They have an urge over other quantitative methods of data collection in that they can be used to collect data from a large sample, and in the process, save on time and finances.

Questionnaires were distributed online by email. This was done owing to the dictates of covid-19 regulations, which limited face-to-face contact. Covid-19 regulations enforced sanitisation, maintaining social distance and encouraged the use of virtual mode of communication. Principals of schools assisted in providing the contact addresses of teachers who were sampled for the study. The identified teachers were telephoned to introduce the researchers and explain the purpose of the study. The respondents were given one month to respond and return the questionnaires. however, they were reminded every week to ensure that they constantly remembered to fill out the instrument.

3.5 7 Data Analysis

The data collected in this study were analysed using a Statistical Package for Social Sciences (SPSS), version 25.0. Maree (2012:45) explains data analysis as focusing on all types of written material that could shed light on a studied phenomenon. It is a process used to inspect, clean, transform and reveal information that is helpful in the making of research decisions and conclusions (Xia & Gong, 2015:6). In the same vein, Merrian and Tisdell (2016:20) explicate data analysis as a logical process to organise and synthesise data collected in the operationalisation of an investigation. The SPSS, version 25 was used to summarise the responses of respondents using percentages, frequency counts, more sophisticated statistical indexes, and to draw inferences about the population of teachers pertaining to ICT competencies in teaching and learning in schools (Leedy & Ormrod, 2010:187).

3.6 SIGNIFICANCE OF THE STUDY

The study would add new knowledge which could assist in understanding the phenomenon of ICT integration in curriculum delivery. The study would raise intriguing questions related to the competencies of teachers regarding teaching and learning in classrooms. Teachers would be provided a fertile platform to present their views, opinions and suggestions concerning the infusion of ICT in the classrooms. The findings would provide insight on the current nature and levels of teacher competencies in ICT and the way in which such skills and knowledge can be transformed into pedagogical purposes. The study would provide for the voices of teachers to be head rather than to use the contributions of people outside the school premises to make educational decisions. The results will also assist the Department of Education to gain much-needed information towards integrating ICT into school curriculum and making sure that pre-service teacher education level is also used as the focal point to introduce ICT skills to future teachers. Subject advisors will be empowered and provided with key areas to use in assessing and monitoring the integration of computers in teaching. Findings will also provide detailed input to the Education Department for the optimisation of their educator-training programmes. Policy makers will also utilise the findings of the study to evaluate the spread of

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computer application in education and to decide on the possible need for policy shifts regarding the use of ICT in education. Opportunities for continuous teacher professional development and in-service training may also be initiated in the process.

3.7 DELIMITATION OF THE STUDY

This study was undertaken to provide a clear picture in an environment where issues, such as computer technology, the digital divide and knowledge economy are not yet understood. There are nine secondary schools located in Luvuvhu Circuit in Vhembe District in the Limpopo Province and all the schools were visited. The study excluded primary schools, further education training colleges and higher education institutions such as universities. The researcher chose to conduct this study at Luvuvhu circuit due to financial constraints, time factor and the convenient location of the research context to the place of work of the researcher.

3.8 ETHICAL CONSIDERATIONS

It is believed that ethical issues must be adhered to, especially those that involve research done with human subjects. Merrian & Tisdell, 2016:17). Ethical consideration basically pertains to standards concerning right and wrong in practice (De vos, Strydom, Fousche, & Delpot, 2011:67). Any research is likely to help society directly or indirectly, however, it is still acceptable for the researcher to only ask questions once the consent of the respondents have been sought. The following ethical issues were taken into consideration when the study was undertaken:

3.8.1   Permission to conduct the study

As a prerequisite for data collection, the researcher obtained permission to conduct the study from the University of Venda Research Ethics Committee. Permission to conduct the research study from the District Senior Manager of Vhembe Department of Education (Ref to Appendix1, p.80) was also requested to enable the collection of data from the schools. Once the permission was granted, the researcher submitted the letter to the Circuit Manager for approval and then to the school principals to allow the researcher to collect data from teachers in their schools.

3.8.2 Informed consent

The researcher informed and explained, in detail to the respondents, the aim of the study. This was done to enable them to make informed decisions and to understand what was expected of them. The researcher assured the respondents that the information gathered would be confidential and kept private. They were told that they are free to participate or not to, in this study since coercing the respondent would be in violation of the main fundamental ethical principle of research. Polit and Beck, 2011:156) indicate that respondents would be informed that participation in the study was voluntary, and that any participant was free to disengage at any point of the study without incurring any cost (Polit & Beck, 2011:156). The researcher requested the teachers to sign a consent form confirming their willingness to participate in the research as it would be unethical to collect data against their will.

3.8.3 Confidentiality

The researcher understood that ethical practices require confidentiality. So, as a rule in the study, care was taken to ensure that no names or forms of identification were used. All the information was treated with privacy, meaning that names and addresses were not publicly disclosed. All the data gathered would be kept secret and in safe place for a period specified. This means that the respondents would remain anonymous, and their identities would be protected. Data collected was handled in an anonymous form, hence, participants' identities, workplaces and residences were not published.

3.8.4 Privacy

The researcher ensured that the respondents' privacy was maintained throughout the study. The right and dignity of respondents were always maintained by handling their information privately. The privacy of respondents was maintained as the researcher strictly focused on the study rather than intruding on participants' personal matters. Furthermore, special care was taken to ensure that there was no physical, psychological, and mental harm to the respondents.

In quantitative research, validity and reliability have become important concepts because they allow researchers to accurately measure the entire domain related to the variable or construct of interest in research (Miller, 2011:1). According to Hussey, and Hussey (1997:57), "validity is the extent to which the research findings accurately represent what is really happening in the situation". These two concepts are discussed as follows:

3.9.1 Validity

According to Miller (2011:1), "validity is the extent to which the research findings accurately represent what is really happening in the situation". It is focused on the level of correspondence between theory and reality in practice (Gundry & Deterding, 2018:305). The emphasis is on the realisation of anticipated results from the execution of an instrument. In the present case, validity was achieved by pilot testing the questionnaire. This was done through administering it to 5 teachers who were not part of the schools in the context under study. The questionnaire ensured content validity by measuring the degree to which the responses were in line with the questions set out in the survey schedule; this concept looks at whether the instrument adequately covers all the contents that it should with respect to the targeted variable. This study used Cronbach's alpha coefficient in the validation of the questionnaire instrument (Taber, 2017:127).

3.9.2 Reliability

Reliability is the extent to which results are consistent over time, therefore, an accurate representation of the total population under study (Golafshani, 2003:598). If the result of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable. A test is seen as being reliable when it can be used by different researchers under stable conditions, with consistent results, that is, the results not showing any variations; reliability, thus reflects consistency and replicability. The questionnaire was distributed to all respondents, with equal and enough time frames provided for filling out the instrument. The questionnaire was

developed based on the research questions and they were constructed precisely so as not to confuse the respondents. Relevant literature search was done to ensure that valid constructs were used to draw inferences about test scores related to the concepts being studied.

3.10 CHAPETR SUMMARY

This chapter discussed the research design and methodology of the study. Positivism was presented as the philosophical paradigm upon which the study is anchored; this is presented as corresponding to a quantitative approach. Quantitative approach is based on an objective view of reality, which emphasises observation and description of unknown phenomenon. The chapter also discussed the descriptive survey design that made use of a questionnaire method of data collection. The population of study was presented as comprising of all secondary school teachers in Luvhuvu Circuit. A simple random sampling technique was used to select a representative sample of respondents. Data was analyses using the Statistical Package for the Social Sciences (SPSS), version 25. The study further discussed the significance of the study, delimitation of the study, ethical considerations, and measures of quality control.

PRESENTATION OF THE FINDINGS AND DISCUSSIONS

4.1   INTRODUCTION

This chapter involves presentation and analysis of data collected through questionnaire. The data collected were presented and analysed through SPSS format and although 90 questionnaires were distributed only 86 were returned. Results of the analysis were, thus made based on the answers, gotten from participants, for each of the research questions.

4. 2 BIOGRAPHICAL DATA ANALYSIS

Age

The study sample size was 86, categorised in age as - 20 to 30 years as the first group, 31 to 40 years as the second, 41 to 50 as the third, 51 to 60 years as the fourth category
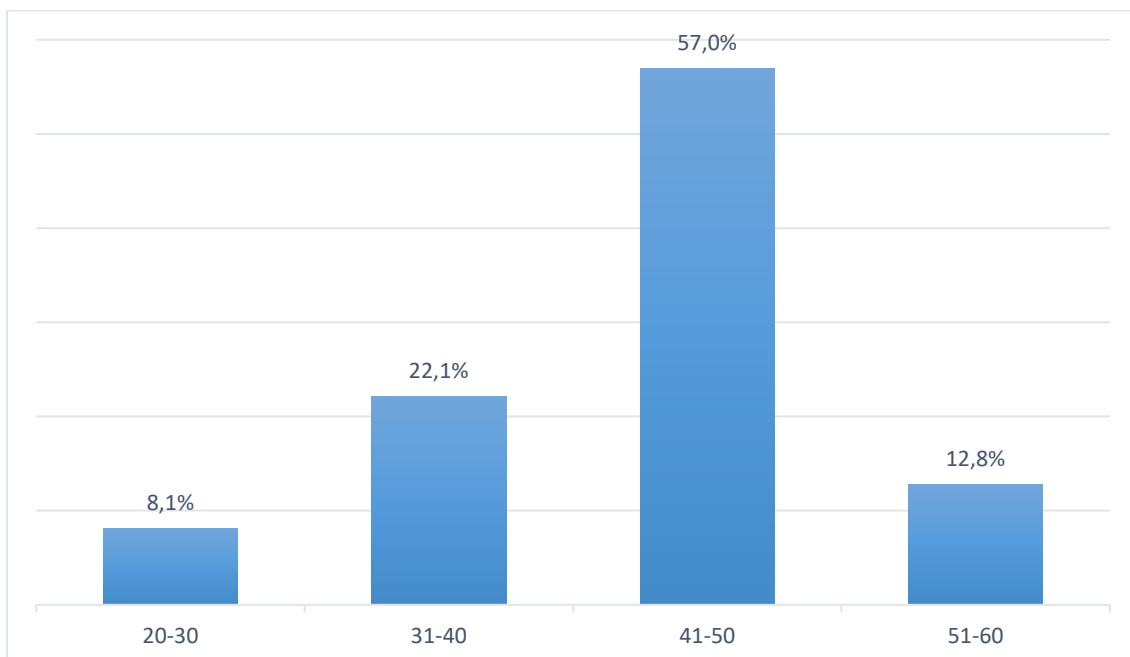
Graph 4.1: Age of participants

As illustrated in the graph, majority (n=49) which is 57% were from the 41 to 50 years, followed by approximately 22% coming from the 31 to 40 years category, followed by 51 to 60 years group accounting for 12.8% of the sample.

Gender

Gender is also one of the important criteria when profiling participant. The two gender categories were identified and profiled.
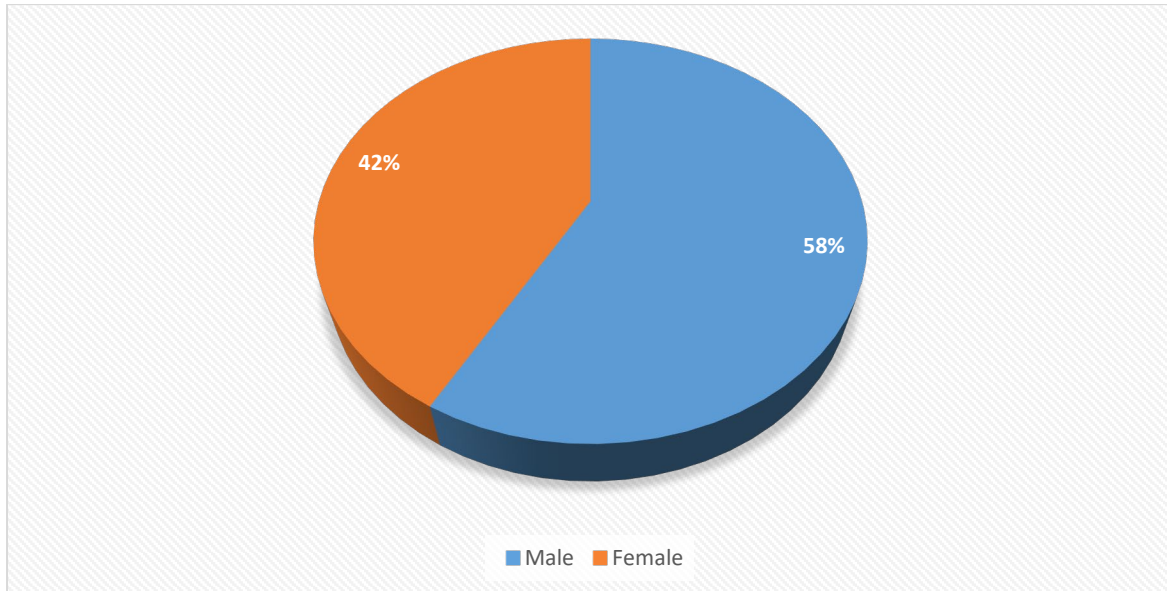
Graph 4.2: Gender of participants

Majority, 58% (n=50), of the participants were males and approximately 42% were females.

Race

Concerning race three different race groups were reported upon as shown in the graph.

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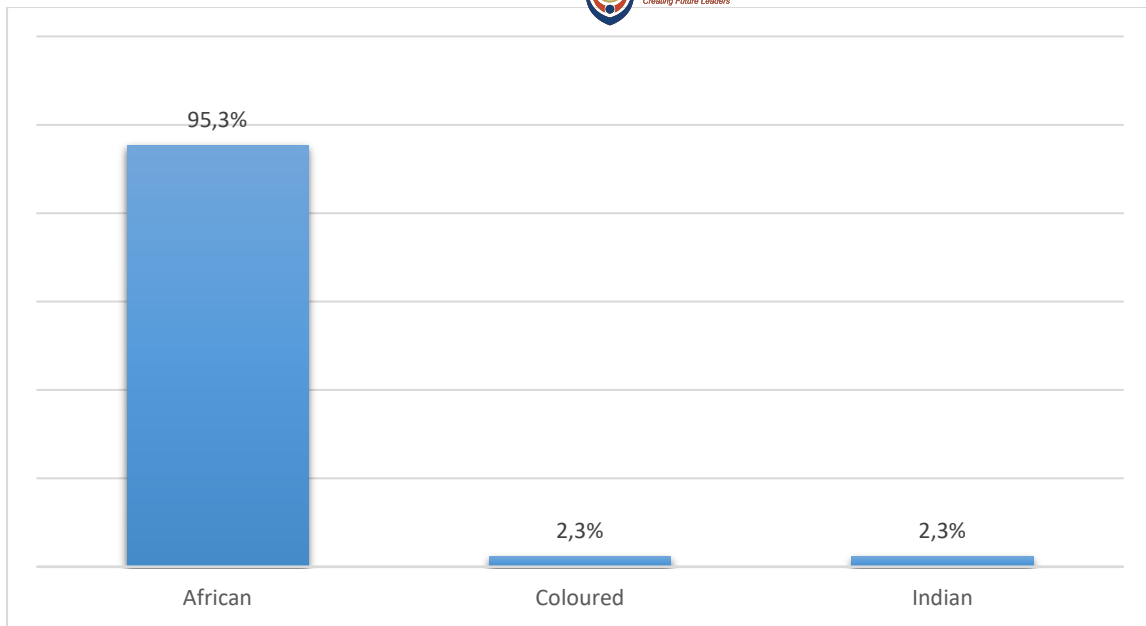
Graph 4.3: Race of participants

Majority of the sample were African at 95.3%, followed by Coloureds and Indians accounting for 2.3% each.

Highest Standard passed

The highest standard passed were categorised into post-matric, Grades 10 to 12 and no formal education.
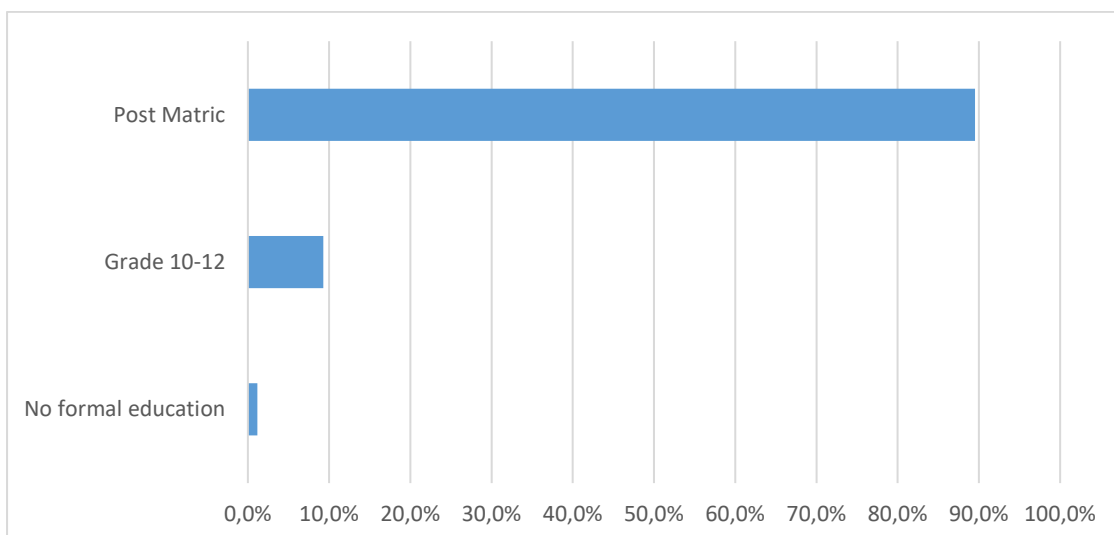
Graph 4.4 Highest standard passed

The results indicate that majority, approximately 90%, had post-matric qualification, while participants with Grades 10 to 12 qualification accounted for 9% and those with no formal education were 1% of the sample.

Highest academic qualification acquired

Participants were also requested to specify their highest academic qualification acquired; the categories, - certificates, diploma, junior degree, honours and masters - were used as illustrated in Graph 4.5 below.
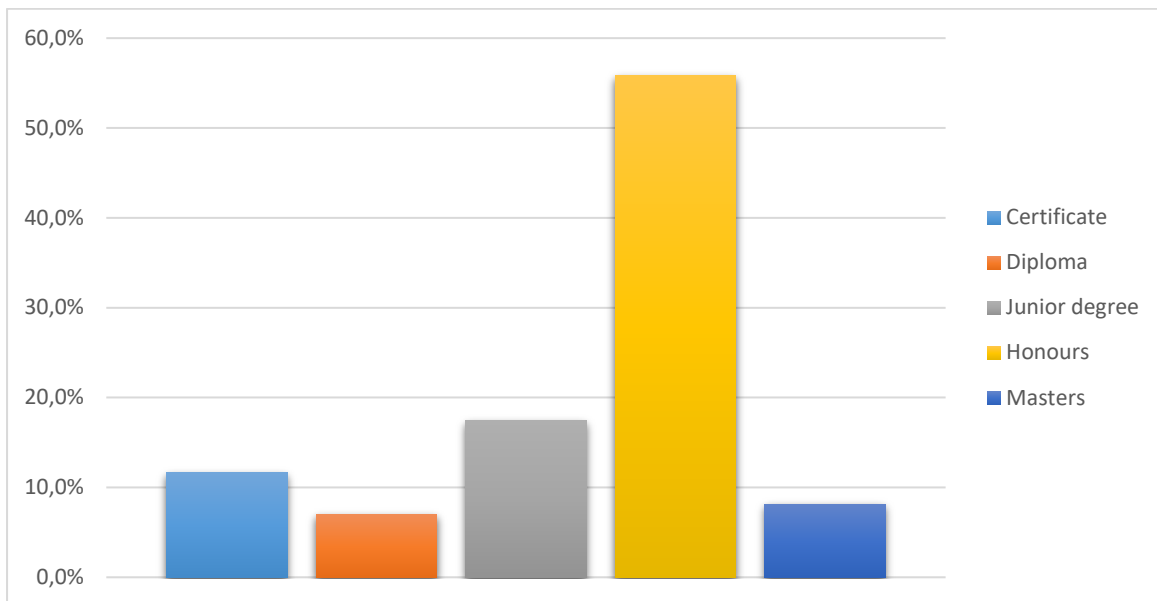
Graph 4.5: Highest academic qualification acquired

The sample detailed that of the 11,6% of the participants who had acquired certificates, 7% were diploma holders, 17,4% were junior degree holders, 55.8% had Honours degrees and 8.1% had masters.

Field under which your qualification fall

In terms of fields, majority of the participants were in the education field as compared to financial management as indicated in the graph.
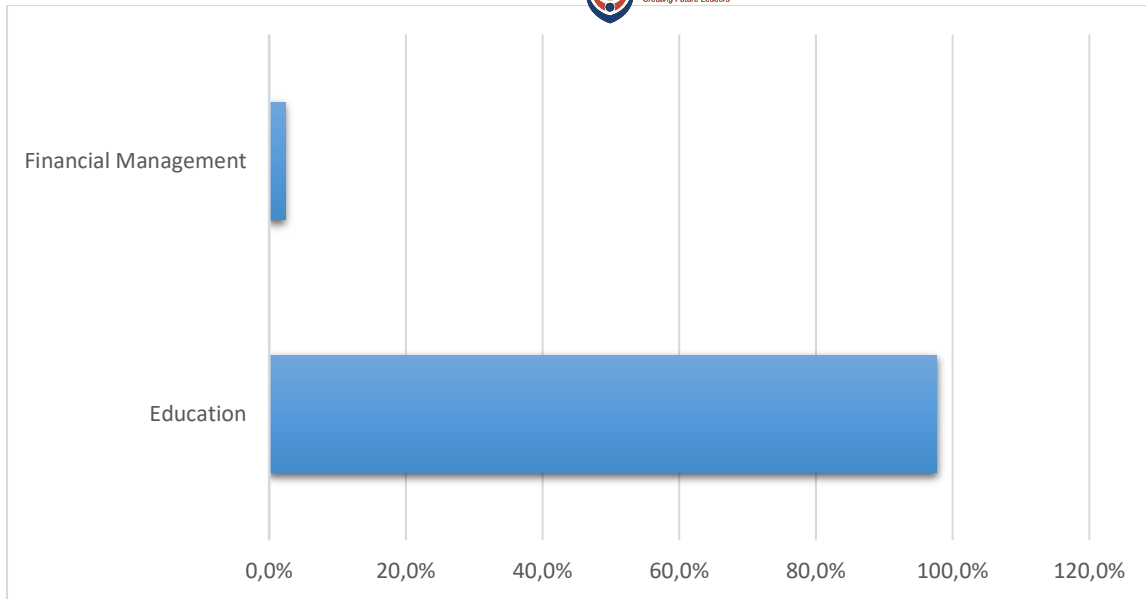
Graph 4.6: Field under which your qualification fall

Approximately 98% were in the education field while 2% were from the financial management field.

4.3 RESPONSES BASED ON RESEARCH OBJECTIVES

4.3 1 Teachers' competency in the use of ICT

This section presents the teachers' competency in the use of ICT, as shown in Table 4.1.

Table 4.1: Teacher competency skills

Factor	High competence	Moderate competence	Little competence	No competence	Mean	Std.dev
Manipulation of a keyboard,	42(48.8%)	32(37.2%)	12(14.0%)	0(0%)	1.65	0.71
Operation of word processing programme e.g., Microsoft,	38(44.2%)	36(41.9%)	12(14.0%)	0(0%)	1.69	0.70
Operation of a presentation programmes, e.g., PowerPoint,	30(34.9%)	34(39.5%)	19(20.9%)	4(4.7%)	1.95	0.86

Type-setting with computer,	30(34.9%)	41(47.7%)	13(15.1%)	2(2.3%)	1.84	0.75
Downloading information through the internet,	34(39.5%)	36(41.9%)	16(18.6%)	0(0%)	1.79	0.73
Installing and removing programme or application in the computer,	16(18.6%)	36(41.9%)	30(34.9%)	4(4.7%)	2.25	0.81
Operation of Corel draw or other photographic programmes,	16(18.6%)	30(34.9%)	30(34.9%)	10(11.6%)	2.39	0.92
Opening email and other social networks using computer,	25(29.1%)	41(47.7%)	19(22.1%)	1(1.2%)	1.95	0.75
Updating new application or software in the computer, and	21(24.4%)	33(38.4%)	26(30.2%)	6(7.0%)	2.19	0.89
Playing games using computer	17(19.8%)	34(39.5%)	29(33.7%)	6(7.0%)	2.27	0.86

The study investigated teachers' skills in the manipulation of the keyboard; the results reveal that 48.8% indicated *high competence*, 37.2% *moderate,* 14% *little competence* and none of the participants were *incompetent*. The mean was 1.65 and the standard deviation was 0.71 suggesting that teachers had competency in the use of ICT.

Teachers (44.2%) mentioned that they are *highly competent* in operation of word processing programme, 41% were *moderately competent,* 14% had *little competency* and 4.7% had *no competency*. The mean was 1.69 and the standard deviation was 0.70 which implies teachers were competent.

On the subject, "Operation of a presentation programme, for example, PowerPoint", 34.9% indicated *High competence,* 39.5% *Moderate competence*, 20.9% *Little competence* while 4.7%, *No competence.* The mean was 1.95 and the standard deviation was 0.85 suggesting that most of the teacher have skills in presentation of processing programmes.

Of the respondents, 34.9% indicated *high competency* on type-setting using a computer, 47.7% *moderate competency*, 15% *little competency* and 2.3% *no competency*. The mean was 1.84 and the standard deviation was 0.75 which implies that teachers were competent in type-setting on the computer.

The results also indicated that 39.5% of the participants had *high competency*, 41% *moderately competency* and 18.6% *little competency* on the subject "downloading information through the internet". Descriptively the mean was 1.79 and the standard deviation was 0.73.

Majority, 41.9% were *moderately competency* on installation and removing programme or application in the computer, 39.5% *high competency,* 34.9% *little competency* and 4.7% *no competency* on the subject. The mean was 2.25 with standard deviation of 0.81
The data indicated that 18.6% of the sample had *high competency* in the operation of corel draw or other photographic programmes, 34.9% *moderately*, 34.9% *little competency* and 11.6% *No competency*.

Majority, 47.7%, of the participants had *moderate competency*, 29% *high competency*, 19% *little competency* and 1.2% *no competency* about opening email and other social networks.

The data indicates that 24.4% had *high competency* in updating new application or software in the computer, 38.4% *moderate competency*, 30.2% *little competency* and 7% *no competency*. The mean was 2.19 with standard deviation of 0.89.

As indicated in the Table, 19.8% had *high competency*, 39.5% *moderate competency*, 33.7% *little competency* and 7% *no competency* in playing games using a computer.

4.3.2 Use of ICT by teachers

The teachers were invited to indicate how they use ICT. Answers are as shown in Table 4.2; the frequencies were also identified.

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Table 4.2: Use of ICT

Factors	Always	Often	Rarely	Never	Mean	Std.dev
Using computer to correct students' assignments and projects	2(2.3%)	15(17.4%)	48(55.8%)	21(24.4%)	3.02	0.71
Using e-mails to communicate with students e.g. online assignments	14(16.3%)	17(19.8%)	39(45.3%)	16(18.6%)	2.66	0.96
Ability to access the internet and get material for teaching and learning	13(15.1%)	41(47.7%)	30(34.9%)	2(2.3%)	2.24	0.73
Using power point for presentation in a conference or large classroom	6(7.0%)	10(11.6%)	57(66.3%)	13(15.1%)	2.89	0.73
Ability to access computer calculator for solving mathematical issues/problems,	12(14.0%)	13(15.1%)	50(58.1%)	11(12.8%)	2.69	0.86
Ability to use excel for working on students' results,	9(10.5%)	19(22.1%)	52(60.5%)	6(7.0%)	2.63	0.76
Use of world wide web to access information related to school or other assignments,	16(18.6%)	15(17.4%)	50(58.1%)	5(5.8%)	2.51	0.86
Interacting with students, friends and colleagues using e-mail and chat room,	13(15.1%)	13(15.1%)	51(59.3%)	9(10.5%)	2.65	0.86
Using of trazer or interactive board in teaching students,	3(3.5%)	13(15.1%)	49(57.0%)	21(24.4%)	3.02	0.73
Ability to open, store, download and print information from net.	24(27.9%)	16(18.6%)	44(51.2%)	2(2.3%)	2.27	0.90

Majority, 55.8% indicated that they *rarely* use computer to correct students' assignment and projects, 24.4% *never,* only 2.3% *always* use the computer and 17.4% *often* use the computer. The mean was 3.02 with standard deviation of 0.71 which implies that teachers do not use computer to perform these functions.

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On the enquiry, "Using e-mail to communicate with students", 16.3% mentioned that they *always* use the technology, 19.8% *often*, 45.3% *rarely*, 18.6% *never*. This was with a mean of 2.66 and standard deviation was 0.96. This suggests that teachers do not use email to communicate with their students.

Majority of the teachers, approximately 62.8% *often* have the opportunity to access the internet and get material for teaching and learning, 34.9% *rarely* and 2.3% *never*. The mean was 2.24 with the standard deviation of 0.73.

The analysis further disclosed that 18.6% of the teachers were able to use power point for presentation in a conference or large classroom presentations. Majority, about 66% *rarely* use PowerPoint and 15% *never*. The factor had a mean of 2.89 with a standard deviation of 0.73 suggesting that on average teachers do not use power point for conferences or large classroom presentations.

Teachers who have the ability to access computer calculator for solving mathematical issues or problem account for 29% of the sample, 58% *rarely* and 12.8% *never* used the computer calculator. The mean was 2.86 with standard deviation of 0.86 inferring that the teachers do not have the ability to access the calculator for mathematical issues.

The mean for the subject "Ability to use excel for working students' results" was 2.63 with standard deviation of 0.76. The data also indicate that 32.6% *has the ability* to use excel for working students' results while 60.5% *rarely* and 7% *never* used excel.

Majority of the participants about 50% *rarely* use the World Wide Web to access information related to school or other assignment, 18.6% *always*, 17.4% *often*. The mean was 2.51 and the standard deviation was 0.86.

Teachers who interact with students, friends and colleagues using e-mail and chat room were about 30% of the sample whereas, majority, about 59% *rarely* and 10.5% *never* interacted.

The data also indicates that majority of the teachers, about 57% *rarely* use trazer or interactive board in teaching the students, 24.4% *never*, 3.5% *always* and 15.1% *often*

use the interactive board. The mean was 3.02 with standard deviation of 0.73 suggesting that teachers do not use the trazer or interactive board.

Additionally, the results showed that majority, 51% *rarely* use the internet to open, store download and print information, 2.3% *never* but 46.5% have the ability to open, store, download and print information from internet.

4.3.3 Mitigating factors against the use of ICT
Section D

This section deals with mitigating factors against the use of ICT by educators. Seven factors were identified and used, as shown in the Table 4.3

Table 4.3: Factors militating against use of ICT

Factors	Strongly Agree	Agree	Disagree	Strongly Disagree	Mean	Std
1. High-cost of ICT devices,	20(23.3%)	51(59.3%)	15(17.4%)	0(0%)	1.94	0.6
2. Lack of electricity,	6(7.0%)	43(50.0%)	30(34.9%)	7(8.1%)	2.44	0.7
3. Lack of frequent training and retrieving of programmes from ICT,	16(18.6%)	59(68.6%)	9(10.5%)	2(2.3%)	1.96	0.6
4. Some teachers' reluctance to use ICT devices in teaching,	9(10.5%)	48(55.8%)	28(32.6%)	1(1.2%)	2.24	0.6
5. Adequate funds are not mapped out for ICT in the budget,	16(18.6%)	63(73.3%)	6(7.0%)	1(1.2%)	1.90	0.5
6. Presence of outdated ICT facilities,	14(16.3%)	65(75.6%)	5(5.8%)	2(2.3%)	1.94	0.5
7. Absence of functional ICT facilities	17(19.8%)	62(72.1%)	6(7.0%)	1(1.2%)	1.89	0.5

On the subject of "High-cost ICT device" majority of the participants approximately 80% *agreed*, while 17% *disagreed*. This factor has a mean of 1.9 and a standard deviation of 0.63 which implies that the high-cost ICT device is regarded as a factor against the use of ICT by teachers.

Lack of electricity was also identified as a factor that hindered teachers from using ICT by 57% of the participants while 43% indicated that electricity has no impact on the use of ICT. The mean was 2.44 with 0.74 standard deviation which means that not all teachers were affected by lack of electricity.

Majority, nearly 87% indicated that the lack of frequent training and retrieving programmes in ICT was a factor against the use of ICT by teachers, however, 12% indicated otherwise. The mean was 1.96 with standard deviation of 0.62. This implies that there were no frequent training and retrieving programmes in ICT.

Approximately 65% of the participating teachers were reluctant to use ICT device in teaching. The mean on the subject was 2.24 and the standard deviation was 0.64 Some 92% of the participants indicated that adequate funds were not mapped out for ICT in the budget, however, only 8% did not consider the budget as a constraint.

The analysis further revealed that 91.9% of the participants were of the view that the presence of outdated ICT facilities militates against the use of ICT by teachers, with, only 7% viewing it differently.

There was an absence of functional ICT facilities according to 91.9% of the participants, with a mean of 1.89 and standard deviation of 0.55.

SUMMARY OF THE FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter provides a summary of the findings on an assessment of ICT competency of secondary school teachers in Luvuvhu Circuit. The chapter also presents conclusion and recommendations for the improvement of the situation under study. Conclusions made were derived from the findings of the study and literature review. The chapter also make recommendations focusing on ICT skills of teachers as foregrounded by the research questions, literature review and findings of the study.

5.2 SUMMARY OF LITERATURE REVIEW

Information and communication technology involves unified communications and integration of electronic equipment and systems. These include computers, electronics, software, and projectors. According to Khokhar (2016:1), information and communication technology emerged in response to communication revolution and has been acclaimed as the foundation of a revolution in the education system. ICT has the potential to innovate, accelerate, deepen, enrich the knowledge and skills of learners (Goktas, Gedik & Baydas, 2013:213). Computers are used to convert learners into knowledgeable workers who are productive (Saxena, 2017:58). Nikolopoulou and Gialamas (2016: 65) contend that ICT allows both teachers and learners to access huge amounts of information, quality materials and the chance to interact with peers, with reduced restrictions, however, Nkala and Krasuss (2014:3) point out that the use of ICT in education is hampered by a lack of self-efficacy of teachers. The diminished computer use in teaching is caused by factors such as lack of time, lack of clarity regarding policy on e-education as well as inadequate support and implementation skills (Padayachee, 2017 38).

5.3 SUMMARY OF FINDINGS OF THE STUDY

This section presents a summary of findings as guided by the objectives of the study and literature review.

5.3.1 The level of ICT competency skills possessed by secondary school teachers

The study revealed that majority of teachers had high competency in the manipulation of the keyboard, those with moderate competency were significant in size, and none of the participants was incompetent. The standard deviation in this category was 0.71 suggesting that teachers possessed competency skills in the use of ICT. For the word processing programme, teachers reported high competency skills, while 4.7% of participants had no competency to operate the programme. Teachers also indicated their ability to operate a presentation programme such as PowerPoint. A very small number of teachers were shown as unable to do presentations using ICT.

Majority of participants had moderate skills in opening an email and other social networks, however, 29% were highly competent in that area of operation. A high number of teachers exhibited moderate skills regarding downloading information on the internet. The general picture in this aspect of ICT use, portrayed a group of teachers who are endowed with skills to download information for use in teaching and learning. Regarding typesetting using a computer, a sizable number of teachers had skills, only 2.3% of participants denied knowledge of downloading information. There were also many teachers who were moderately endowed with the competency to install and remove programmes or applications from the computer.

The study indicated that many teachers (34.9%) had the competency to operate corel draw or other photographic programmes; the same number of teachers showed that they possessed high competency skills in the area. Moderate competency was also recorded with regards to updating applications or software on the computer. Little competency of teachers was reported in playing games using the computer. This implies that teachers make effective use of computers to teach, however, they have no time to use it to play games.

5.3.2 Ways in which teachers use ICT skills in the delivery of their practice

The study found that majority of participants rarely use the computer to correct students' assignments and projects. The most notable category is of the 24.4% who had never used computer to correct the work of students. This clearly reflected the depressed level of computer integration in instructional processes in schools. The same picture emerged with the use of e-mails to communicate with students, where most participants said they rarely or have never used the devise for communication.

Majority of teachers had the ability to access the internet and get materials for teaching and learning, however, a significant size of participants indicated that they rarely employed the internet to assess the materials for teaching and learning. Similarly, majority of teachers revealed that they rarely use PowerPoint for presentation in conferences or in a large classroom.

A limited number of teachers were shown to have the ability to access computer calculator for solving mathematical issues or problems, also many teachers rarely use excel for working out the results of students, even though they may possess the ability to apply the knowledge. The data also showed that the participants rarely use the World Wide Web to access information related to school or other assignments, similarly, majority of participants rarely interacted with students, friends and colleagues using e-mail and chat room. This was also the case with the use of trazer or the interactive board in teaching the students to open, store download and print information from the internet.

5.3.3 Factors that militate against teachers' competency in ICT usage

The study revealed that the high cost of ICT devices was regarded as a demotivating factor against the use of ICT by teachers. This was similar to lack of electricity which was also identified as a factor that hinders teachers from using ICT. A significant number, however, refuted that electricity is a factor that prevents the use of ICT. This implies that not all teachers were affected by lack of electricity regarding the use of ICT in schools.

The lack of frequent training and retrieving programmes in ICT was identified as a militating factor against the use of ICT by teachers. Teachers who are exposed to continuous training programmes are better placed to regularly use computer services in teaching and learning. From this it can be assumed that due to inadequate development of teacher competencies in ICT, a lot of teachers showed a reluctance

to use ICT devices in the classrooms. Lack of funds was also highlighted as contributing to depressed use of ICT. Participants noted that adequate funds are not mapped out for ICT in the budget; a few participants, however, did not consider the budget as a constraint.

The study further showed that the presence of outdated ICT facilities militates against the use of ICT by teachers. Outdated or obsolete computers lack efficiency and are not compliant to a lot of new and innovative programmes that are recommended in classrooms, only 7% viewed it differently. Participants generally indicated that absence of functional ICT facilities hampered the use of ICT by teachers in their classrooms. The computers are, usually donated by companies or individuals after they have seen the better part of the day, hence, these donated old computers become a problem in schools as they fail to perform expected functions.

5.4 CONCLUSION OF THE STUDY

This section presents conclusions to the study on an assessment of ICT competence among selected secondary school teachers.

5.4.1 The level of ICT competency skills possessed by secondary school teachers

The study concludes that majority of teachers had high competence skills in the manipulation of the keyboard; those with moderate competencies were insignificant in size. The word processing programmes were known by the teachers as the findings recorded high competency skills, while 4.7% of participants had no competency in operating the programmes. Teachers also indicated their ability to operate presentation programmes, such as PowerPoint although, a very small number was shown as unable to do a presentation using ICT.

It is concluded that majority of participants had moderate competency in opening an email and other social networks. A similarly rated competency level pertained to the ability to download information from the internet. The participants were also able to use a computer to type-set documents and to install and remove programmes or applications from the computer.

Participants had minimal competency to operate corel draw or other photographic programmes. This component recorded the highest number of participants without the knowledge of a stated operation. Teachers had the capacity to update new application or software on the computer, however, limited skills were indicated in teachers' skills to play games using the computer. This implies that teachers make effective use of computers to teach, and not to play games.

5.4.2 Ways in which teachers use ICT competency skills in the delivery of their practice

The study concludes that participants rarely use the computer to correct students' assignments and projects. Some teachers cannot use computers to teach as they have never corrected students' work using them. There is a depressed level of computer integration in instructional processes in schools. The same picture is presented regarding the use of e-mails to communicate with students, where participants indicated that they had never used the devise for communication.

It can be concluded that majority of teachers possess an ability to access the internet and get materials for teaching and learning, however, a larger number indicated that they rarely employ the internet to assess the materials for teaching and learning implies that teachers differently used computers for teaching and learning. Computer proficiency can be graded as still low, as some teachers rarely using PowerPoint for presentation in conferences or in a large classroom.

A limited number of teachers were shown to have the ability to access computer calculator for solving mathematical issues or problems. Some teachers indicated that they did not use excel for working out the results of students, even though they possess the knowledge. Findings showed that the participants rarely use the World Wide Web to access information related to school lessons or assignments. Majority of participants indicated that they rarely interact with students, friends and colleagues using e-mail and chat room. This was also the case with the use of trazer or interactive board in teaching the students and the internet to open, store download and print information.

5.4.3 Factors that militate against teachers' competency skills in ICT usage

The study concludes that the high cost of ICT devices is militating against the use of ICT by teachers. This has a similar effect as the lack of electricity which was also identified as a factor that hindered teachers from using ICT. The absence of frequent training and retrieving programmes in ICT also worked against the use of ICT by teachers. Teachers who engage in continuous training programmes are better placed to regularly use computer services in teaching and learning. A lot of teachers were reluctant to use ICT devices in the classrooms, although, lack of funds contributed to the depressed use of ICT.

The presence of outdated ICT facilities militates against the use of ICT by teachers. Obsolete computers lack efficiency and are not compliant with a lot of new and innovative programmes that are recommended for the classrooms. Absence of functional ICT facilities hampers the use computers by teachers in their classrooms. Most computers are donated by companies or individuals after the former have passed their effective use; these donated old computers become a problem in the schools as they fail to perform expected functions.

5.5.RECOMMENDATIONS

The recommendations of the study as informed by the research questions, literature review and findings of the study are as follows:

- The Department of Education should source computers for use in schools so that teachers are able to acquire competencies in opening an email and other social networks, download information on the internet and type-set documents among other functions.
- The District Education Department needs to open computer centres in areas for both teachers and learners to learn computer manipulation. This would provide them with skills to draw or employ other photographic programmes and update new applications or software on the computer.
- The Department of Education should organise workshops and training programmes to impart computers skills to all teachers in the Circuit, and even the entire District. This would enable them to be competent in manipulating the

keyboard, use the word processing programme and present information on PowerPoint.

- The schools should institute staff development programmes to improve the attitudes of teachers towards effective use of computers to correct students' assignments and projects and use e-mails to communicate with students.

- The schools need to purchase power generators or solar panels to ensure that energy to power laptops is constantly available, even during load shedding.

- Vibrant income generating programmes should be established in schools to source money for the purchase and servicing of computers.

- Schools should make sure that outdated and obsolete computers are not donated to their schools. These hamper desired service during teaching and learning.

5.6 LIMITATIONS OF THE STUDY

There are limitations to any research study. This study comprised of only teachers who willingly participated in providing information necessary to construct findings. This made is difficult to triangulate sources of data. The study was also based on secondary school teachers in Luvuvhu circuit. The study also used quantitative methods and approaches, which prevented the use of complementary qualitative data, despite these limitations, it is quite possible for the findings to be generalized to other schools.

5.7 SUGGESTIONS FOR FURTHER STUDY

This section provides suggestions for further study. Another research could be conducted on a similar area using mixed methods research. The proposed study can increase or broaden the size of participants by incorporating principals of schools, learners, members of the School Management Teams (SMTs) and even the District Advisory Officers. It is also possible for another study to use a different theoretical framework to provide variant perspectives.

5.8 CHAPTER SUMMARY

This chapter presented a summary of the findings of the study, which were guided by the research questions and literature review. Conclusions of the study on the assessment of competency of teachers in ICT were also outlined based on the outcomes of the study. The chapter further tabulated the recommendations as well as the conclusions of the study. The limitations of the study and suggestions for further study were included in the chapter.

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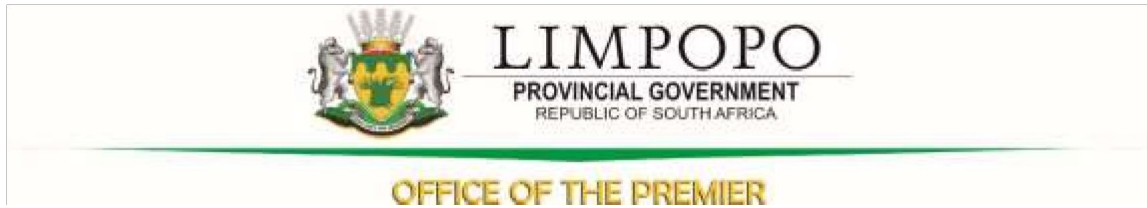
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LIMPOPO PROVINCIAL RESEARCH ETHICS

COMMITTEE CLEARANCE CERTIFICATE

Review Date: 31st August 2021

Project Number:LPREC/73/2021: PG

Subject: Assessment of ICT Competence Skills by Secondary School Teachers in Luvuvhu Circuit

Researcher: Amaigbo DA

Dr Thembinkosi Mabila

Chairperson: Limpopo Provincial Research Ethics Committee

The Limpopo Provincial Research Ethics Committee (LPREC) is registered with National Health Research Council (NHREC) Registration Number **REC-111513-038.**

Note:

i.   **This study is categorized as a Low Risk Level in accordance with risk level descriptors as enshrined in LPREC Standard Operating Procedures (SOPs)**

ii.   **Should there be any amendment to the approved research proposal; the researcher(s) must re-submit the proposal to the ethics committee for review prior data collection.**

iii.   **The researcher(s) must provide annual reporting to the committee as well as the relevant department and also provide the department with the final report/thesis.**

iv.   **The ethical clearance certificate is valid for 12 months. Should the need to extend the period for data collection arise then the researcher should renew the certificate through LPREC secretariat. PLEASE QUOTE THE PROJECT NUMBER IN ALL ENQUIRIES.**

© **University of Venda**

ENQ: Amaigbo DA

Cell: 076 854 8200

P.O Box 867

Thohouyandou

0950

7th SEPTEMBER 2021

The Principal

……………………………………….

Dear sir / Madam

REQUEST TO CONDUCT A REASERCH

1. The above matter has reference.

2. I am **Amaigbo DA** o f student number **11632802** registered for a Master's degree in Curriculum Studies with the University of Venda under the Supervision of **Dr MP Tshisikhawe.**

3. For one to qualify to graduate for the above Degree one should conduct a research study, hence the request to do research in your school. The research will be in a form of a questionnaire which will be filled by teachers at their spare time.

4. The topic of my research is: **ASSESSMENT OF ICT COMPETENCE OF SECONDARY SCHOOL TEACHERS IN LUVUVHU CIRCUIT.**

5. Hoping that you will find this in order.

Thanking you in advance

Yours faithfully

Signature of Principal

The applicant: Amaigbo Doris
Supervisor: Dr Tshisikhawe M.P.

QUESTIONNAIRE ON TEACHERS' ICT COMPETENCY SKILLS

Introduction

I wish to thank you for accepting to take part in this research project. You are assured that everything disclosed during this questionnaire will only be used for this project. You should not write your names, names of your colleagues or your school.

Section A

BIOGRAPHICAL INFORMATION

Answer the following questions by inserting the correct answer in the space or box provided:

1.   Name (optional)……………………………………………………………………

2.   Indicate your age by marking with an X in the space next to the corresponding correct answer provided in the table below:

Indicate your age range	Mark with a tick in the space provided below
20 -30	A
31-40	B
41-50	C
51-60	D
60 or more	E

3.   Indicate to which gender you are categorised by marking with an X in the space provided next to the correct answer:

Gender category	Mark with a tick in the space below
Male	A
Female	B

4.	Indicate to which South African racial group you belong. Choose by making with an X in the space next to the corresponding answer provided in the table below:

Race category	Mark with an X in the space provided below
African	A
Coloured	B
Indian	C
White	D

5.	Indicate the Highest standard passed by marking with an X in the space provided next to the correct answer in the table below:

Highest standard passed	Mark with an X in the space provided below
No formal education	A
Grade 1-7	B
Grade 08-09	C
Grade 10-12	D
Post Matric	E

6.	Academic qualification acquired. Choose the highest qualification by making with an X in the space next to the correct answer provided in the table below:

Highest Academic qualification acquired	Mark with a tick in the space provided below
Certificate	A
Diploma	B
Junior Degree	C
Honours	D
Masters	E
Doctoral or post-doctoral	F

7. Which field does your *qualification fall?* Choose one relevant field by marking with an X to the corresponding correct answer provided in the table below:

Field under which your qualification fall	Mark with a tick in the space provided below
Law	A
Education	B
Financial Management	C
School Administration	D
Engineering	E

8. What other or relevant management courses or diploma do you have? Select all that apply but do not reselect any answers chosen above in No 7.

No	Other management courses passed	Reselect correct answer
(i)	Advanced Certificate in Education (ACE)	A
(ii)	Advanced Diploma in Education Management	B
(iii)	Advanced Diploma in Public Administration	C
(iv)	Master's in Business Administration (MBA)	D

9. Teaching Experience: Below 5 years   (   )

                                         6-10 years   (   ),

                                          11years above   (   ).

QUESTIONNAIRE ON TEACHER COMPETENCY IN THE USE OF ICT (QTECSUICT)

SECTION B:

S/N	Items	High	Moderate	Little	No

		Competence	Competence	Competence	Competence
1.	Manipulation of keyboard,				
2.	Operation of a word processing programme e.g. Microsoft word,				
3.	Operation of a presentation programme e.g. (power point),				
4.	Type-setting with the computer,				
5.	Downloading information through the internet,				
6.	Installing and removing programme or application from the computer,				
7.	Operation of corel draw or other photographic programmes,				
8.	Opening email and other social network using computer,				
9.	Updating new application or software in the computer,				
10.	Playing games using computer,				

Kindly tick (√) to indicate your frequency of use of ICT as expressed in the following statement under section C.

Note that:

A= Always, O= Often, R= Rarely and N= Never

SECTION C: TEACHERS' USE OF ICT

S/N	ITEMS	Always	Often	Rarely	Never

11.	Using computers to correct students' assignments and projects,				
12.	Using e-mails to communicate with students, for e.g. online assignments,				
13.	Ability to access the internet and get materials for teaching and learning,				
14.	Using power point for presentation in a conference or a large classroom,				
15.	Ability to access computer calculator for solving mathematical issues/problems,				
16.	Ability to use excel for working on students' results,				
17.	Use of world wide web to access information related to school or other assignments,				
18.	Interacting with students, friends and colleagues using e-mail and chat room,				
19.	Using of trazer or interactive board in teaching the students,				
20.	Ability to open, store, download and print information from the Net.				

SECTION D: MILITATING FACTORS AGAINST THE USE OF ICT BY

TEACHERS

Kindly ticks (√) the statement below that best describe your situation, note that:

SA = strongly agree, A= agree, D= Disagree and SD = strongly disagree.

S/N	ITEMS	SA	A	D	SD
21.	High cost of ICT device,				
22.	Lack of electricity,				
23.	Lack of frequent training and retrieving programmes in ICT,				
24.	Some teachers' reluctance to use ICT devices in teaching,				
25.	Adequate funds are not mapped out for ICT in the budget,				
26.	Presence of outdated ICT facilities,				
27.	Absence of functional ICT facilities.				

LETTER OF INFORMATION

Title of the Research Study:

Assessment of ICT competence by secondary school teachers in Luvuvhu Circuit

Principal Investigator/s/ researcher: Amaigbo Doris

Supervisor: Dr Tshisikhawe M.P   **Co-Supervisor:** Dr Mafenya N.P

Brief Introduction and Purpose of the Study:

Introduction

I am Amaigbo Doris a Masters students in Education at the University of

Venda. I would like to request you to be part of my research study, which is

on the Assessment of ICT competency skills by secondary school teachers. I hope to identify the challenges that affect teachers in their day-to-day teaching and learning due to lack of skills in ICT usage.

Purpose of the study
The main objectives of the study include:

- To identify the level of ICT competency possessed by secondary school teachers in Luvuvhu Circuit.
- To find out the factors against the use of ICTs by teachers in Luvuvhu Circuit.

Outline of the Procedures:

The decision to take part in the study is not compulsory. If you agree to be

in this study, I will ask questions to find out your level of competence and also the factors that hinder teachers' use of ICT in their teaching methodology. You are at liberty to stop from participating at any time if you choose to do so. You do not have to answer any questions that you do not feel comfortable with throughout the duration.

An individual scheduled session will be staged to ask the questions below. The venue will be at your school at your convenient time which will be communicated in due course. Everyone is free to refuse to take part in the research study if they have doubts or think that their participation could leave them physically, emotionally or psychological disturbed. If you agree to take part but change your mind later, you can stop at any time during the session without giving reasons. Your honesty in providing the answers to the questions will be appreciated. The individual questionnaire schedule will take 20-30 minutes at the most.

Questionnaire process

The instruments for data collection in this study is a researcher-designed questionnaire labeled: "Questionnaire on teachers competency skills on the ICT usage". The instrument will comprise of four sections. Section A of the instrument will be used to gather information on the bio-graphical information which includes - names of school, gender and teaching experience. Section B of the instrument will be used to collect information on teachers' competence in ICT. Section C will be used to collect information on teachers' use of ICT. Section D is designed to collect information on factors against the use of ICT.

Risks or Discomforts to the Participant:

There will be no risk or discomforts to the participants as I do not think that taking part in the study will cause any physical or emotional discomfort or risk. As we are still dealing with Covid-19 virus, stringent guidelines for protection shall be followed without any compromise. Participants, hence, will be sanitized before handling any questionnaire guide and wearing of mask and social distancing will be observed.

Benefits:

Although you may not benefit directly, the study results may help us to improve the quality of education.

Reason/s a Participant May Be Withdrawn from the Study:

Participation in this study is voluntary. You will be expected to honour the session which will be conducted at your convenient time.

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You can withdraw your consent to participate in the study at any time during the interview without stating the particular reasons. In case you opt to withdraw, there will be no any disciplinary action to be taken against you. If you later wish to withdraw your consent, you may contact the researcher on the address provided.

Remuneration:
You will not be paid to take part in the study, therefore, there will be no monetary benefits for the participants. There are no costs involved for you to be part of the study. No form of remuneration will be awarded to the participants.

Costs of the Study: Participants will not be expected to pay any incurred expenses which result from research study. It is the responsibility of the researcher to see to it that all expenses are covered. The researcher will seek financial assistant from the Univen Research Grant.

Confidentiality:

The participants are informed that the research study is seeking to assess the ICT competency skills possessed by secondary school teachers. All records from this study will be regarded as confidential. I will not record any name anywhere and no one will be able to connect you to the answers you give. Gathered information will only be used for this research and will not be disclosed to any unauthorised people. Results would be published or presented in such a fashion that participants remain unidentified.

Research-related Injury:

No form of injury is anticipated from the sessions.

Persons to Contact in the Event of Any Problems or Queries:

Researcher: Amaigbo Doris

Cell No: 076 854 8200

Email: ameachidoris@gmail.com

Supervisor: Dr M.P Tshisikhawe Co-supervisor: Dr N.P Mafenya

Telephone Number: 015 962 9078

Email: paul.tshisikhawe@univen.ac.za

The University Research Ethics Committee Secretariat on 015 962 9058.

General:

Potential participants must be assured that participation is voluntary and the approximate number of participants to be included should be disclosed. A copy of the information letter should be issued to participants. The information letter and consent form must be translated and provided in the primary spoken language of the research population.

CONSENT

Statement of Agreement to Participate in the Research Study:

- I,   hereby confirm that I have been informed by the researcher, (Amaigbo Doris), about the nature, conduct, benefits and risks of this study - Research Ethics   Clearance Number: _,
- I have also received, read and understood the above written information (*Participant Letter of Information*) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerized system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation in the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Participant   **Date**   **Time**   **Signature**

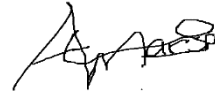…………………..   ……………   …………   …………...

Ⓒ University of Venda

I, …….. herewith confirm that the above participant has been fully

informed about the nature, conduct and risks of the above study.

Full Name of Researcher

Amaigbo Doris   Date: 29/04/2021   Signature:

Full Name of Witness (If applicable)

……………….   Date ……………….   Signature………………..

Full Name of Legal Guardian (If applicable)

…………………   Date………………   Signature…………………

Please note the following:
Research details must be provided in a clear, simple and culturally appropriate manner and prospective participants should be helped to arrive at an informed decision by use of appropriate language (grade 10 level- use Flesch Reading Ease Scores on Microsoft Word), selecting of a non-threatening environment for interaction and the availability of peer counseling (Department of Health, 2004)
If the potential participant is unable to read/illiterate, then a right thumb print is required and an impartial witness, who is literate and knows the participant e.g. parent, sibling, friend, pastor, etc. should verify in writing, duly signed that informed verbal consent was obtained (Department of Health, 2004).
If anyone makes a mistake completing this document e.g. a wrong date or spelling mistake, a new document has to be completed. The incomplete original document has to be kept in the participant's file and not thrown away, and copies thereof must be issued to the participant.

References:
Department of Health: 2004. *Ethics in Health Research: Principles, Structures and Processes*
http://www.doh.gov.za/docs/factsheets/guidelines/ethnics/
Department of Health. 2006. *South African Good Clinical Practice Guidelines*. 2nd

Ed. Available at:

http://www.nhrec.org.za/?page_id=14

ⓒ University of Venda

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ENQ: MANAGEMENT

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S I B A S A
0 9 7 0
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Email: thivhilaelisecschool@gmai

25 February 2022

TO WHOM IT MAY CONCERN

CONFIRMATION LETTER REGARDING THE RESEARCH CONDUCTED AT THIVHILAELI SECONDARY SCHOOL: AMAIGBO DORIS.

1. The above subject matter has reference.
2. This letter serves to confirm that Amaigbo Doris, a student from the University of Venda did conduct a research in our school.
3. Amaigbo Doris collected data on the assessment of ICT competency skills on secondary school teachers in Luvuvhu Circuit.
4. Amaigbo Doris collected data on 27 October 2021.
5. Hoping that you will find this to be in order.

DEPARTMENT OF EDUCATION
THIVHILAELI SECONDARY SCHOOL

Yours faithfully..................

2 4 FEB 2022

.SIBASA.0970

Mudau HA(Principal)

SAM MAVHINA SECONDARY SCHOOL

ENQ: THE PRINCIPAL
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THOHOYANDOU
0950
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VISION: "strive for the future"
BLOCK G, Muledane Village, THOHOYANDOU, 0950

TO WHO IT MAY CONCERN

Assessment of ICT competency skills by secondary teachers in Luvuvhu circuit (Sam Mavhina Secondary School) a research in our school.

1. The above state matte bears reference.
2. Kindly note that the above mentioned student conducted in our school relating to the above mentioned topic.
3. The research instruments were then collected on the 27th of October 2021 after completion by our educators.

Kind regards

Kholophe AD (Principal)

2022/02/24

Date

DEPARTMENT OF EDUCATION
SAM MAVHINA SECONDARY SCHOOL
PRINCIPAL

2 4 FEB 2022

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University of Venda

ETHICS APPROVAL CERTIFICATE

RESEARCH AND INNOVATION
OFFICE OF THE DIRECTOR

NAME OF RESEARCHER/INVESTIGATOR:
Mrs. AD Amaigbo

STUDENT NO:
11632802

PROJECT TITLE: Assessment of Information Communication Technology (ICT) skills by secondary school teachers in Luvuvhu Circuit.

ETHICAL CLEARENCE NO: SEDU/21/CSEM/11/1207

SUPERVISORS/ CO-RESEARCHERS/ CO-INVESTIGATORS

NAME	INSTITUTION & DEPARTMENT	ROLE
Dr MP Tshisikhawe	University of Venda	Supervisor
Dr NP Mafenya	University of Venda	Co - Supervisor
Mrs. AD Amaigbo	University of Venda	Investigator – Student

Type: **Masters Research**
Risk: **Minimal risk to humans, animals or environment (Category 2)**
Approval Period: **July 2021 – July 2023**

The Research Ethics Social Sciences Committee (RESSC) hereby approves your project as indicated above.

General Conditions
While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, please note the following.
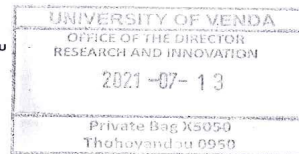• The project leader (principal investigator) must report in the prescribed format to the REC:
  – Annually (or as otherwise requested) on the progress of the project, and upon completion of the project
  – Within 48hrs in case of any adverse event (or any matter that interrupts sound ethical principles) during the course of the project.
  – Annually a number of projects may be randomly selected for an external audit.
• The approval applies strictly to the protocol as stipulated in the application form. Would any changes to the protocol be deemed necessary during the course of the project, the project leader must apply for approval of these changes at the REC. Would there be deviated from the project protocol without the necessary approval of such changes, the ethics approval is immediately and automatically forfeited.
• The date of approval indicates the first date that the project may be started. Would the project have to continue after the expiry date; a new application must be made to the REC and new approval received before or on the expiry date.
• In the interest of ethical responsibility, the REC retains the right to:
  – Request access to any information or data at any time during the course or after completion of the project,
  – To ask further questions; Seek additional information; Require further modification or monitor the conduct of your research or the informed consent process.
  – withdraw or postpone approval if:
  – Any unethical principles or practices of the project are revealed or suspected.
  – It becomes apparent that any relevant information was withheld from the REC or that information has been false or misrepresented.
  – The required annual report and reporting of adverse events was not done timely and accurately.
  – New institutional rules, national legislation or international conventions deem it necessary

ISSUED BY:
UNIVERSITY OF VENDA, RESEARCH ETHICS COMMITTEE
Date Considered: June 2021

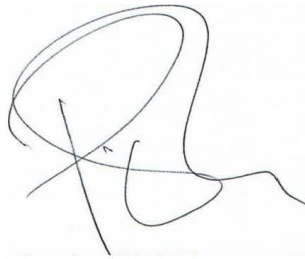Name of the RESSC Chairperson of the Committee: Prof Takalani Mashau

Signature: ....

UNIVERSITY OF VENDA
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RESEARCH AND INNOVATION
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PROOF OF EDITING

6 March, 2022

This is to certify that I, Dr P Kaburise, of the English Department, University of Venda, have proofread the dissertation titled - **ASSESSMENT OF ICT COMPETENCE OF SECONDARY SCHOOL TEACHERS IN LUVUVHU CIRCUIT** - by Amaigbo Doris A. (student number: 11632802). I have indicated some amendments which the student has undertaken to effect before the final dissertation is submitted.

Dr P Kaburise (0794927451/ 0637348805; email: phyllis.kaburise@gmail.com)

Dr P Kaburise: BA (Hons) University of Ghana (Legon, Ghana); MEd University of East Anglia (Cambridge/East Anglia, United Kingdom); Cert. Teaching English as a Foreign Language (Cambridge University, United Kingdom); Cert. English Second Language Teaching, (Wellington, New Zealand); PhD University of Pretoria (South Africa)

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ASSESSMENT OF ICT COMPETENCE OF SECONDARY SCHOOL TEACHERS IN LUVUVHU CIRCUIT

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