Teachers’ perception on the use of ICT in Teaching and Learning: A Case of Namibian Primary Education

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ABSTRACT

Technological advancement in this digital age require teachers to innovatively integrate and use Information Communication Technology (ICT) in teaching and learning across the curriculum. However, the perceptions stakeholders such as teachers hold towards the use of ICT in teaching and learning are the key determining factor to the success or failure of use of ICT in education. Hence, this research work aims to contextually investigate the Namibian primary school teachers’ perception on the use of ICT in teaching and learning. Further, the study explores the extent to which Namibian primary school teachers use ICT in their classrooms and the criterion they based on to use ICT for teaching. Additionally, the study examines effect of gender on the use of ICT in teaching and learning.

Self-administered questionnaire with open- and closed-ended questions were anonymously used to collect data from primary schools across Omusati Region in the Northern part of Namibia. A total of 90 teachers participated and the content of the quantitative data was descriptively and inferentially analysed using SPSS software from IBM. Whereas the qualitative data was discussed along with the findings from the quantitative analytics.

The findings indicate that the participants agreed that ICT usage in schools will improve teaching and learning. Additionally, notwithstanding the challenges of ICT integration in education, there is moderate use of ICT in classrooms. Regarding the selection criterion, the result shows that teachers decide to use ICT in teaching and learning based on the lesson objectives, activities, subject policy, curriculum, learners’ diverse learning needs, accessibility and availability of the devices. Furthermore, the study shows that the use of ICT by male teachers is significantly higher than their female counterparts. Disparity is associated with sociocultural belief of taking ICT use as mannish, inborn stigma of male superiority, female inferiority complex and technophobic. While, the results of this research work are significantly necessary for the policy makers and curriculum developers in Namibia to make informed decisions with regards to the provision of ICT and the strategies for the use of ICT in teaching and learning, teacher training institutions will be able to intensify their training programmes in line with the training needs emerge from this study. This research work contributes to the domain of research that seek to promote ICT integration in the education sector.

Keywords: ICT; Teaching and Learning; Primary school; Selection criteria; Effect of gender; Namibia.
DEDICATION

This thesis is dedicated to our daughter: Faith Twegapewa Sari Jatileni
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<th>Description</th>
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<tbody>
<tr>
<td>BYOD</td>
<td>Bring Your Own Device</td>
</tr>
<tr>
<td>CPD</td>
<td>Continuous Professional Development</td>
</tr>
<tr>
<td>ETSIP</td>
<td>Education and Training Sector Improvement Programme</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communication Technologies</td>
</tr>
<tr>
<td>IMTE</td>
<td>Integrated Media and Technology Education</td>
</tr>
<tr>
<td>MoE</td>
<td>Ministry of Education</td>
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<tr>
<td>MoEAC</td>
<td>Ministry of Education Arts and Culture</td>
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<tr>
<td>NDP5</td>
<td>The 5th National Development Plan</td>
</tr>
<tr>
<td>NIED</td>
<td>National Institute for Educational Development</td>
</tr>
<tr>
<td>NQA</td>
<td>Namibian Qualification Authority</td>
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<tr>
<td>NQF</td>
<td>National Qualifications Framework</td>
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<tr>
<td>UN</td>
<td>United Nations</td>
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<td>UNESCO</td>
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1. INTRODUCTION

The background of this research is elaborated in this section, particularly on literature defining the topic sentence of this thesis are discussed. The objectives, motivation and significance of the study are as well discussed.

1.1 Background

The fast advances of Information and Communication Technology (ICT), in recent times, has correspondingly revolutionized the educational sector into making teaching and learning flexible. Despite the challenges associated with ICT integration in education, ICT has provided flexibilities in teaching and learning. For instance, with the use of ICT, remote students can learn and collaborate among themselves for the purpose of achieving good academic performance. With this relevance, the emergence of Educational Technology research has considerably delved into evaluating the influence of using ICT in teaching and learning through research. Research in the domain are mostly concerned with the impact of ICT on students’ academic engagement and performance (Youssef & Dahmani, 2008; Kolog, Tweneboah, Devine & Adusei, 2018).

The United Nation’s 2030 Agenda for sustainable development is one of the international bodies that require a UN member country to implement ICT as a way of promoting national development. Under the goal 17 of the UN international policy framework, the UN recognizes the importance of ICT as a tool for nation building. Through effective integration of ICT, the UN aims to enhance international cooperation and access to science, technology, and innovation (STI). What is more, the agenda aim “to promote the development, transfer, dissemination, and diffusion of environmentally sound technologies to developing countries on favourable terms” (UN, 2015, p.31). This implies that the UN agenda for 2030 intends to entirely “operationalize the technology bank and science, technology and innovation capacity building mechanism for the least developed countries by 2030. This is to enhance the use of enabling technology, in particular information and communications technology.” (UN, 2015, p.31).

In line with the aforementioned strategies, the Namibia’s 5th National Development Plan (NDP5) for 2017 is one of the national documents that underscore the need for Information and Communication Technology (ICT). The document has set out strategies with the desired
outcomes for Namibia to have universal access to information, affordable ICT infrastructure and services by the year 2022. Namibia intends to integrate ICT in all sectors of the economy including education with priorities in learning, business, health, and governance (Ministry of Economic Planning, 2017). Namibia quests is to integrate and implement ICT in schools is based on the curriculum for basic education. In the Namibian National Curriculum for Basic Education, the Ministry of Education (MoE) encourages teachers to use learning materials to facilitate and develop a knowledge-based society by equipping learners with knowledge and skills. Learning through ICT contributes to the foundation of knowledge-based society in developing the pupil’s understanding of knowledge and skills acquisition (MoE, 2010). Additionally, the use of ICT tools allows pupils to develop skills that can be used in processing and presenting of information in the school settings.

The Article 20 Section 1 of the 1990 Namibian Constitution makes it a prerogative that all persons must have the right to education (Ministry of Justice, 1990). Similarly, Article 53 of Part IX in the Education Acts (16/2001) of Namibia advocates for compulsory free education to all Namibian children from 7 to 16 years. Right after Namibian independence, the MoE recognises the access, equity, quality, democracy and lifelong learning as five major goals toward education for all (Ministry of Education Sport and Culture, 1993). It is of these goals that strategic objectives of the National Strategic Plan of Action (2017-2022) were crafted to fast track the realization of quality and provision of ICT in education. This is coupled with the capacity building on the need to augment productive use of ICT in education. In the same vein, the Agenda 2063 of the African Union aspires Africa to be a prosperous continent endowed with “well educated and skilled citizens, underpinned by science, technology and innovation for a knowledge-based society is the norm” (African Union, 2015, p.2).

Furthermore, with the roadmap and collective vision of the Agenda 2063, the African Union Commission in 2015 commits to speed-up action in the quest “to connect Africa through world-class Infrastructure, including interconnectivity between island states and the mainland, and with a concerted push to finance and implement the major infrastructure projects” (African Union, 2015, p.5). Therefore, ICT infrastructural development is one the top priorities. The idea is to transform Africa into “a continent on equal footing with the rest of the world as an information society, an integrated e-economy where every government, business and citizen have access to reliable and affordable ICT services by increasing broadband penetration by 10% by 2018, broadband connectivity by 20% points and providing access to ICT to children
in schools and venture capital to young ICT entrepreneurs and innovators and migration to digital television broadcasting by 2016” (African Union, 2015, p.16).

The international benchmark, ICT competency framework for teachers, set by the United Nations Education, Scientific and Cultural Organization (UNESCO) in collaboration with various industrial leaders and global subject experts earmarked competencies necessary for teachers to teach effectively with ICT. The framework stresses and focus on teachers’ competencies in ICT. Most importantly the willingness to use ICT to help learners become collaborative learners, problem solving, creative learners are through effective utilization of ICT. This, in turn, transforms students into effective citizens and members of the workforce towards a sustainable development in this ever-increasing era of Information Technologies.

The framework to empower teachers is structured into three stages of successive teachers’ development which intend to nurture teachers’ perception towards the use of ICT in education. In the act of accelerating the activation of teachers’ perception on the use of ICT in teaching and learning, these stages include technology literacy, knowledge deepening and knowledge creation (UNESCO, 2011).

Given the international and National agenda and inspirations toward quality education, the ministry of education in Namibia anticipates a paradigm shift away from ICT in education (provision of ICT) into ICT for education (the use of ICT). Therefore, in the first key area of the National Standards and Performance Indicators for Schools in Namibia, the MoE pledges to drive towards the attainment of human resources or intellectuals capable of effectively and efficiently use ICT in education (MoE, 2007). The current Namibian President Dr. Hage Geingob, through the Harambe Prosperity Plan (HPP), embraces effective use of ICT for education as a vibrant tool in building a knowledge-based Namibian household where no one feel left out (The Office of the President, 2016).

1.2 Motivation and significance of the study

This study seeks to investigate teachers’ perceptions on the use of ICT in teaching and learning within the Namibian context where primary schools were the target. Further, this study explored the use of ICT in classrooms as well as the criterion that teachers use in selecting ICT tools for teaching. This study was inspired by several apprehensions or concerns within the
educational domain were teachers seem unaware of the potential use of ICT in teaching and learning (Mselle, 2012; Ndibalema, 2014).

In 1995, Namibia developed an ICT policy to serve as a guide in providing educational stakeholders the required guidance in integrating ICT in teaching and learning (MoE, 2005). While the Namibian ICT policy was revised in 2000, Moonen (2008) maintain that many developing countries are currently developing ICT policies to help in the implementation of ICT in schools. According to Nihuka and Voogt (2011), several international studies are published to show that primary school teachers lack competencies on the use of ICT as a pedagogical tool necessary for teaching and learning. Thus, it is crucial to undertake this study to probe further in the Namibian primary school context. According to the ICT Policy for Namibian Education, the use of ICT does not only provide an advantage delivery of equitable education, but it improves the quality of education (MoE, 2005).

Considering the fast development of ICT, Mathipa and Mukhari (2014) were certain that many educational systems would be formalizing the integration of ICT in teaching and learning. This is particularly important for remote or physically challenged students who intend to access formal education with ease. Thus, schools should no longer continue to only be viewed as venues where knowledge is transmitted from the teachers to learners by using textbooks as the only source of information. Consequently, teachers are encouraged to integrate ICT into teaching. As the use of ICT is increasing in all sectors, Ghavifekr, Kunjappan, Ramasamy & Anthony (2016) believe that its use in education has the potential to transform teaching for the desired results.

The current trends in education requires a paradigm shift from the mere supply of ICT in education into a comprehensive use of the ICT in education. However, the perceptions teachers hold towards the use of ICT in teaching and learning are the key determining factors to the success or failure of the use of ICT in education (Apeanti, 2014). As a result, it is vital for this study to gather information on the perceptions of the Namibian primary school teachers towards the use of ICT in classroom instructions. On the one hand, the results from this study would therefore be helpful for the curriculum developers and policy makers to make informed decisions as far as the provision and strategies for the use of ICT in teaching and learning are concerned. On the other hand, the results would also be essential to the teachers training institutions to intensify their training programmes in line with the training needs emerge from
this study. Furthermore, results will also help the Continuous Professional Development (CPD) unit to strategize on how to help teachers at schools in acquiring necessary ICT skills.

1.3 Thesis organisation

This thesis is organised in seven chapters. Each of these chapters are briefly described as follows:

Chapter 1 provides the background and significance of the study at local, national and international spectrums.

Chapter 2 introduces the main concepts and definitions connected with this study. ICT and perception are the significant concepts defined in this chapter. Hence, varying scholarly definitions and from both policy and pedagogical perspectives are presented. In the same vein, the chapter discusses the literature that underlies the use of ICT in education. Here the chapter emphasizes the background of ICT usage in education, related literature on the perception that teachers hold in using ICT for teaching and learning, both international and in the context of the Namibian education. In the end, the chapter captures the learning theories relevant to this study.

Chapter 3 presents the research aims and objectives. To achieve the research aims and objectives, the framing research questions are formulated and elaborated in this chapter. In view of the research questions, hypothesis has been formulated and presented in the latter part of the chapter.

Chapter 4 has seven sections. The first section outlines method on which this research work was conducted. The second section looks at the research strategy employed in this study. The third Section reports on the research context. The fourth section reflects on the data collection methods. The fifth section presents the sampling, data collection process and ethical consideration. The sixth section deliberates on the methods on which the collected data was analysed. In the end, the seventh section captures the research validity and reliability.

Chapter 5 provides the results of this study which are presented in line with the research questions and objectives.
Chapter 6 sets out the discussion which presents critical interpretation of the results, literatures backed results analysis and the explanation of the significance of results.

Finally, Chapter 7 provides the conclusions based on the answers to the research questions, limitations, an evaluation of the legitimisation, validity of the research process and recommendations for the future studies.
2. LITERATURE REVIEW

In this section, these researchers discuss literature that underlies the use of ICT in education. This takes in account the background of ICT usage in education, related literature on the perception that teachers hold in using ICT for teaching and learning, especially in the context of the Namibian education.

2.1 Information and Communication Technology

The use of Information and Communication Technology (ICT) has become a motivational instrument in advancing education across the globe. ICT can be understood in different ways as it is being explained in different categories of life. The way ICT is explained in educational fields may differ from the way it is explained in the field of nursing or engineering. Thus, this section presents the holistic definitions of ICT within the educational arena.

In the United States for instance, the term Technology and Educational technology are often used interchangeably to mean ICT (Lloyd, 2005). Hutchison and Reinking (2011) attribute the description of ICT to the digital forms of communication which are often referred to as the ICT which is recognised in the mainstream of everyday literacy. Claro (2012) reports that the use of ICT in education helps to facilitate teaching and learning in the school settings. With the use of ICT in learning environments for example, students are able to take lessons remotely at anytime and anywhere provided there is active internet connectivity. Similarly, Sim and Theng (2007) describe ICT as tools which is primarily consists of laptops, liquid-crystal display, projectors and courseware equipment. Toomey (2001) generally relate ICT to the technologies which are oftenly used to access, gather, manipulate and present and communicate information in teaching and learning. Such technologies may include hardware such as computers and other devices; software applications; and connectivity such as local networking infrastructure, internet connections and video conferencing. Lloyd (2005) described ICT as an important instrument in information and knowledge management. According to the researcher, ICT forms the core component of teaching and learning in this 21st Century.

From the perspective of Pelgrum and Law (2003), ICT in education can be explained from three different perspectives which is based on the curriculum. Firstly, *learning about ICT*, where they describe ICT as a subject of learning in the school such as ICT literacy or computer, information literacy and or computer science. Secondly, *learning with ICT*, which the
researchers refers to as the use of ICT such as multimedia, websites or the internet as a standard to enhance learning instructions or as a replacement for other media without changing the views about the tactics and methods of teaching and learning. Thirdly, *learning through ICT*, which explains the integrations of ICT as an essential tool for teaching and learning to an extent that learning is almost impossible without them.

Regarding the Namibian National ICT Policy for Education of 2005, ICT is described as all encompassing technologies used for the communicating and handling of information and their overall use in education. Such technologies include audio-visual systems, broadcast receiving, systems computers, and telecommunication systems. Media such as microcomputer-based laboratories videodiscs and compact discs are also included in the technologies. The local and wide area networks, instructional software, virtual learning centres, printed media, Internet, educational television (TV), satellite communication, voice mail, e-mail, cable TV, VCRs, interactive radio and conventional form part of the educational technologies (MoE, 2005).

The Namibia Ministry of Information and Communication Technology (2009) view ICT as a term that includes any communication device or application, television, encompassing radio, personal digital assistants, cellular phones, computer. Moreover, software and network hardware, satellite systems as well as the various services and applications associated with them, such as video conferencing that are used in distance learning are all ICT. Additionally, ICT refers to “all technologies, including computers, telecommunications and audio-visual systems that enable the collection, processing, transportation, and delivery of data, information and communications services between users who are in this regards teachers and learners” (MoE, 2010, p.13).

### 2.2 Teachers’ perception on the use of ICT in education

Boulton (1997) describes the term *perceptions* as attitudes, behaviours, self-beliefs and/or views that a person has developed towards anything. Having considered Boulton’s description as applied to this research work, teachers perceptions can be referred to the attitudes, behaviours, self-beliefs, views and the understanding that teachers hold towards the use of ICT in education. Teachers' perceptions explain the beliefs that teachers have about the relevance of integrating ICT into teaching and learning, and the perceived obstacles that are associated with using ICT in Education (Hutchison & Reinking, 2011). Furthermore, teachers' perceptions
in using ICT can tell about the teachers' beliefs, including their self-efficacy on ICT usage into teaching and learning. According to Wang (2002), the teacher’s perception on the use of ICT can be explained as the way in which teachers’ regard, understand and interpret the use of technology in teaching and learning.

While ICT is touted as a tool for facilitating teaching and learning in the educational arena, Kolog et al., (2018) revealed that senior high schools in Ghana do not allow their students to use mobile devices in the school premises. This policy raises concerns among some stakeholders of education. The findings from their study was ascertained from the perception that teachers, students and the Ghana Education services hold regarding this policy. These researchers waged into the debate on whether students should be allowed to use mobile devices in school. The researchers found the reason for this policy is attributed to the negative influences that mobile devices will bring to students towards their academic performance. However, majority of the participants advocated for the inclusion of mobile devices under strict conditions and regulations. With this finding, these researchers recommended the schools to allow students to use mobile devices on regulated and strict conditions which was based on the perception of the stakeholders.

2.3 ICT selection criteria in teaching and learning
The selection criteria, of ICT tool/software, enable teachers to understand what tool is appropriate for what lesson they teach. However, teachers’ intrinsic and extrinsic motivation towards the use of specific ICT tool is one of the various factors that influences teachers’ decision to select ICT tools for their lessons. Schulz (2015) points out that the integration and selection of ICT tools depends on how well they (ICT) fit into the teaching and learning process as well as on how easy it is to use such tools. Teachers may select an ICT tool to use in teaching based on the specific instructions such as online collaborative tasks with emphasis on teacher to student or student-student interactions (Ying-Tien, 2013). Shin (2015) states e-safety influences teachers selection criteria for online materials making them to choose the type of materials that they feel safe to use. In the similar vein, Pecay (2017) explains that science teachers select ICT such as YouTube to enhance their science instruction and to assist them in clarifying lessons concepts that they find challenging. In accordance with Bokhove (2010), teachers select ICT tools that are easy to use for them and for students. In a study conducted Sweden, Bergström (2015) reports that teacher’s selection criteria of ICT tools is influence by
curriculum reforms that aims to move from pen and paper styles of learning to digital didactical design and media tablet (iPads) programs. Also, Ottestad (2013) finds some educational policy documents to dictate teachers to use specific ICT tools in teaching and learning.

Moreover, teachers tend to select ICT tools and software that they have being trained or familiar to use. This agrees with the findings of a study done in Jordan by Ajlouni (2011) and similar studies done in France, Germany, Italy, Portugal and the UK where teachers selected KidSmart software in teaching because of the proper training they have received. Some influencing factors for teacher’s ICT selection criteria embraces human factors. These factors are, for example, teachers' satisfaction, level of interest, teachers' skills, attitudes, user requirements towards ICT tools such as level of interactivity, usability, adaptability and meeting specific learning requirements for certain ICT tools (Schulz, 2015). In a study carried out in Namibia, Mufeti (2011) states that it is essential to encourage the uptake of ICT in teaching and learning. Although, ethical concerns and sense of insecurity may prevent teachers from selecting some ICT tools such as the Electronic Notes System and mobile devices (Mufeti, 2011). On the contrary, Osakwe (2017) reports that most teachers and learners in Namibian schools are in possession of their own handheld mobile devices and majority of them are able to use Mobile ICT effectively. Thus, allowing teachers to select mobile devices for learning would help learners to easily access internet, search for learning materials, read assignments and post comments on blogs using mobile devices. Luu (2011) observed that some school policies include specific ICT tools, software and educational programs that teachers ought to use in their classrooms based on the believe that such tools help students learn subjects effectively. Teachers’ choices of ICT tools depend on the subjects they teach. According to Bolton (2008) studies have shown that ICT can be of a significant support in teaching especially to the music teachers as it is associated with increased motivation for the learners, higher levels of motivation, confidence and self-regulated (individualised) learning. Thus music teachers are likely to use ICT compared to other subject teachers.

2.4 Effect of gender on the use of ICT in teaching and learning

Several studies have been done to establish the effect of gender on the use of ICT in teaching and learning. This line of research seeks to ensure equity in terms of ICT usage among gender. According to Jordan (2013), gender plays key role in teachers’ self-assessment in the use of ICT knowledge, perceptions and its integration in teaching and learning. Therefore, gender
differences on the use of ICT in classrooms is inevitable. However, Luu (2011) expressed that gender differences on the use of ICT in teaching and learning are based on the type of ICT tool/software, teacher’s personal choice and initiative of teachers to learn how to use ICT in teaching and learning. A study conducted in Australia indicated that full-time female teachers, in 2005, were less confident than the male teachers when using ICT in teaching and learning (Jamieson-Proctor, Burnett, Finger & Watson, 2006). Similarly, Ghavifekr, Kunjappan, Ramasamy and Anthony (2016) shows that the use of ICT tools by male teachers in classroom is higher compared to female teachers. Conversely, in the Ghanaian Primary Schools, female teachers use ICT to teach more than their male counterparts (Natia & Al-hassan, 2015). Additionally, in Taiwan by Yuan and Lee (2012) the findings show no gender difference on school teachers' perceptions toward the use of ICT in teaching and learning mathematics. The aforementioned reviews on this subject indicates the variation in the use of ICT among genders in diverse context. It is against this that this study has investigated in the gender difference in the use of ICT in teaching.

The difference in gender is associated with teachers ability to use ICT tools to teach, caused by lack of access to internet connection, electricity or power problem, inadequate number of ICT tools and insufficient teachers’ technical know-how in ICT (Natia & Al-hassan, 2015). Yunus (2007) states that there are factors that affect the use of ICT among gender. One of the factors is that many teachers are not familiar with ICT tools thus, they do not use them in teaching and learning. Despite the differences that comes with gender in the use of ICT, male and female teachers in Namibia are encouraged and expected to appropriately choose and correctly use the available ICT tools according to purpose in teaching and learning (MoE, 2010).

2.5 Education in Namibia

This section takes insight into education in Namibia. With this, these researchers have delved into discussing the nature of teachers continuing professional development and the pedagogical training of teachers that considers their capability to use ICT after passing out of the teacher training institutions.
2.5.1 Teacher Continuing Professional Development in ICT

This section sheds light on the Continuous Professional Development (CPD) in ICT for the Namibian teachers. It covers the discussion of different programs that the Namibian Ministry of Education Arts and Culture (MoEAC) has been embarking on to help teachers use ICT in teaching and learning. In relation to the requirements of the Ministry of Education (MoE), in-service training was advanced to reach as many teachers as quick as possible (Peacock, 1993).

The Namibian Qualification Authority (NQA) has established a National Qualifications Framework (NQF) which aims to advance a competency-based approach to education and training. These bodies have set up the National Professional Standards for Teachers in Namibia (NPSTN) with the aim of ensuring quality education (MoE, 2006b). Thus, there is a growing interest in the integration of technologies into the classrooms’ settings. Guzman and Nussbaum (2009) affirm that a range of initiatives has been launched towards a continuous professional development for teachers. The primary purpose of these initiatives is to strengthen the integration and use of ICT in teaching and learning.

The current condition for teachers in relation to the initial requirement set out by the MoEAC is teacher licencing. For this condition, the MoEAC pledges for every newly qualified teacher in Namibia to undergo an organised and intensely supported mentorship programme (MoE, 2006b). Under this initiative, newly appointed teachers are accorded opportunities to learn under favourable conditions where they are assigned to a mentor teacher who will continue their development in a planned and structured way. The MoEAC further advocates for the newly appointed teachers to be trained based on their training needs, so that their practical skills are developed over a two-year period or until they are ready to be recognised as competent professionals provided, they meet the set National Standards. The plan is for the teachers who meet the requirements or the set National Standards to be licensed, and the license is to be renewed every five years. However, the much-anticipated National Standards and teacher licensing do not aim at blaming teachers, but its primary purpose is to encourage teachers to continue improving their knowledge and skills in meeting the 30 competencies (see Appendix III) that every teacher in Namibia is expected to attain (MoE, 2006b).

According to Namibia’s 5th National Development Plan (NDP5) for 2017/2018, the availability and access to telecommunication services in rural areas is fraught with challenges largely due to the irregular access to electricity and high unit costs for rolling out ICT
infrastructure in a vast geographic area (Ministry of Economic Planning, 2017). Rural schools are therefore not spared from these challenges as far as the provision of ICT is concerned. While rural schools are faced with challenges of inadequate provision of ICT infrastructures as contained in the NDP5, the MoE (2007) has also highlighted the challenge of some Namibian teachers that did not receive ICT training as part of their teachers’ pedagogical training.

In line with the National Professional Standards for Teachers in Namibia, the competence one element two requires a competent teacher to be able to operate ICT applications in an educational context whereby they are expected to apply audio-visual hardware and software in presenting information to pupils. The expectation is further extended to the teachers’ abilities to use ICT presentation applications, access educational software, use of learning management systems and Office suite applications to support teaching and learning. Similarly, competence seven requires teachers to access and prepare to learn how to use ICT as well as embrace new technologies. In addition, competence thirteen require teachers to use ICT to support the inclusion of learners with special educational needs. Whereas, under competence fifteen requires teachers to assess and evaluate learning using ICT applications (MoE, 2006b)

While the National Professional Standards for Teachers in Namibia require teachers to possess ICT competencies to be licensed as competent professionals, the MoE (2007) concedes that a number of Namibian teachers fall short of these competency requirement. Thus, there is a need for the teachers, in the category of not having received ICT pedagogical training, to undergo in-service training to help them acquire skills on how to utilise ICT in their teaching. Additionally, in the National Professional Standards for Teachers in Namibia, the MoE acknowledged teachers who are not able to receive quality training at the outset through no fault of theirs. A typical example are teachers who were not trained in ICT competencies. Therefore, such teachers are to be granted opportunities to develop the required competencies if they are committed and wish to improve their practice as part of their continuing professional development process. The idea is for the professional teachers to undergo a continuous professional development process which may include short courses with external providers, training from school mentor teachers at schools and clusters level. Eventually, these teachers would be accorded the opportunity to develop and master the competence before being assessed for licensing purposes (MoE, 2006b.)
Teachers professional development (TPD) has long been a subject of grave importance captured in the Namibian National Vision 2030 policy. Hence, at the inception of the TPD, it was acknowledged that, although the four colleges of education in Namibia at a time were producing teachers for basic education only 49.6% of the teachers in service were well qualified (Eita, Appolus, Ndimbira, & Schumann, 2002). The University of Namibia (UNAM), on its part, is producing an increasing number of graduate teachers to occupy the education sector.

Additionally, the Namibia Ministry of Information and Communication Technology (2009), the government creates opportunities for the enhancement of the ICT skills through various facilities and programmes. The government of the republic of Namibia funds facilities such as Community Learning Development Centres, Multi-Purpose Regional Community Centres, Vocational Training Centres, Youth Centres, Community Skills Development Centres, Community Libraries and Post Offices, Teacher Resource Centres where teachers are able to have access to ICT. Furthermore, the Community Education through various Youth programmes are as well provide public access to ICT.

The MoE (2007) through the Education and Training Sector Improvement Programme (ETSIP) phase I of 2006 -2011 has acknowledged that teachers’ training and development in Namibia have reached a turning point away from the customary pedagogical training into ICT centred pedagogical training. Such a turning point is evident when, the MoE continue to make massive investments in the enhancement of ICT practices through ETSIP. This aims to improve the quality of education in Namibia, and this is the reason why the education sector continues to receive the biggest share of the National budget (Naris & Ukpere, 2012).

Namibian Vision 2030 for economic development, advocates for the human technical capacity building, provision of modern technological infrastructure and suitably qualified teaching force ideal for the realization of access, equity, quality and efficiency in the education system (Eita at al., 2002). Further, the MoE has created a favourable conditions for teachers to assess their professional development. For this reason, teachers are encouraged to be self-driven and self-motivated towards professional development programs (MoE, 2006b). What this means is that, all teachers should strive to meet the requirements of the National Standard for Teachers with or without the MoE funding. Generally, only 46.9% of teachers are recognised as fully qualified with a minimum qualification required which is a diploma or degree in education. Thus, Eita at al. (2002) assert that teachers without a minimum teaching qualification are encouraged to
upgrade their qualifications through in-service training or several other programmes offered by recognised training institutions. Meanwhile, the in-service teachers will be supported as they strive towards new qualifications (MoE, 2006b).

Simon and Ngololo (2015) admonish Namibian teachers to continuously undergo CPD to bring themselves up-to-date with the new ICT tools and as well updates their skills necessary to cope with the current trends in education. In addition, teachers should be encouraged to develop lesson plans that reflect on the motive of ICT use and integration as well as to develop own tools as content materials. Additionally, Mary (2006) asserts that the goal of ICT in the Namibian education and teacher professional development is nothing short of transformative as it is helping teachers and pupils to attain the 21st-century skills. In comparison, Namibia appears well ahead of some African counterparts regarding its level of ICT infrastructure, use of ICT in instruction and teacher education, and commitment to ICT for teacher and pupils learning (Mary, 2006). In laying a foundation for effective use of ICT in education, Namibia has recognized the need to help primary and secondary school teachers in developing ICT skills and teachers’ ability to interlink the acquired skills with the pedagogical instructions (Mary, 2006). Most of these ICT related professional development had been carried out through the National Institute for Educational Development, UNAM CPD unit, Namibia College of Open Learning, online and distance learning.

2.5.2 Teachers pedagogical training in ICT

The Namibian education and its teacher training sector has gone through major reformation and transformation over the past few decades. These reforms took place because the existing programme needed to be improve to catch up with modernisation and technological pace (Gaffney, Richards, Kustusch, Ding & Beichner, 2008). As part of these reforms, teacher training programs are redesigned to ensure that the post-apartheid education fraternity is equipped with qualified personals (Dahlström, 2002). As a result, the colleges of education and the BETD programme was formed which was later merged into the University of Namibia (UNAM). With this merge, UNAM trains both early childhood development and secondary school teachers.

Right after independence in 1990, the Namibian government has instituted a decoupling program which aimed at transforming Namibia from an autocratic education system, grounded on absolute rote knowledge, to problem-based learning with focus on creativity (Zeichner,
The idea was to create an education system that is more of a learner-centred and democratically focusing on the development of pupils understanding through quality education. The reforms took the attitude of teachers as agents of change in teaching and learning rather than objects in the reform process (Angula & Lewis, 1997). A typical example of the change under review is the introduction of a three-year national pre-service Basic Education Teachers Diploma (BETD). The introduced programme highlighted the training of teachers as insightful experts who can “participate in working out the details and necessary adaptations that are needed to give meaning to the broad Namibian education system” (O’Sullivan, 2002, p.221)

The quality that the teaching staff deliver to the pupils has an impact on pupils learning. Therefore, there is a need to enhance teachers’ skills whilst providing them with ICT resources to consider designing new ways which will enhance pupils learning (Naris & Ukpere, 2012). Namibian “teacher education was considered one of the most important areas of reform at independence. It was considered crucial to the success of the national reform because of teachers’ strategic role in the reform efforts” (Dahlstrom, 1995, p.279). As a result, a new curriculum was introduced at all levels of education, efforts have been put in place to improve teachers’ qualifications and gradually equipped the teaching fraternity with suitably qualified teaching force (Eita et al., 2002). It is against this background that the MoE, through National Professional Standards for Teachers in Namibia, enforced new approaches relevant in the advancement of teacher training and development. Since 2006 to date:

- Teacher education training and development is based on the National Professional Standards where ICT in teaching and learning is an important component of the competencies.

- Pre-service providers such as Universities, Colleges, and private providers are all required to align their curricula, programmes, and qualifications to meet the requirements of the national standards for teachers in Namibia.

- Before offering programmes of learning towards the National Standards, pre-service providers will need to be accredited by the Namibian Qualifications Authority (NQA). This includes in-service teacher training providers as well.
• A qualification that a teacher obtains at the end of pre-service training should allow such a teacher to enter a managed internship, in a supportive environment (classrooms). Intern Teachers are expected to work over a two-year period to achieve a Professional Qualification which would as well qualify them to use ICTs in their teaching and learning.

• The Professional Qualification awarded at the end of the internship will equip teachers to become licensed (registered) teachers who are fit to deliver quality lessons.

• Teacher Qualifications after pre-service training, and at the end of the practicum will be registered on the (NQF). Thus, teachers should make sure that where ever they are trained, their qualification should be accredited by (NQA) and perfectly meet the national standard for teachers.

• There is an independent Professional Board to oversee the professionalisation of teaching and learning and to be the final arbitrator on matters of professional registration and licensing (MoE, 2006b, p. 5).

Hennessy, Harrison and Wamakote (2010) highlights two important supports for ICT integration into teaching and learning: The Initial Teacher Education (ITE) and Continuing Professional Development (CPD). Together, these supports have the most significant effect on the beliefs and practice of teachers. Teachers with advanced technological and pedagogical content knowledge are able to use ICT effectively and can add the greatest value to teaching and learning (Draper, 2011). Like any developing country, Namibia faces a notable challenge in the skills needed to manage the liberalisation and ICT distribution. However, the government, as an institution, cannot reach all the national aspirations. As a result, the Government of Namibia has provided appropriate incentives to the private sector to encourage the development of local technology necessary for the upliftment of ICT skills in education. The Namibia Public Private Partnership (PPP) Policy was formulated. The policy aims to encourage the private sector to invest in infrastructural development including the provision of ICT to public school and other projects/services where the value for money can be effectively demonstrated (Ministry of Trade and Industry, 2017). The idea is the provision and effective usage with accountability towards the desired outcomes in education among other public sectors. Despite the inception of the PPP, the Government of the Republic of Namibia remains
the custodian of providing adequate funding for ICT skills development in all public sectors (Ministry of Information and Communication Technology, 2009).

The Education and Training Sector Improvement Programme (ETSIP), long-seen as the torchbearer for capacity building and development in Namibia, spearheaded the craft and creation of the ICT Policy for Education to enhance the use and development of ICT in the delivery of education and training (MoE (2007). According to Iipinge (2010), the Namibian government exploits the opportunities for the use of ICT in education. As a result, the government embarked on the development of national policies such as the ICT policy for education, ETSIP, National Professional Standards for teachers in Namibia, National Standards Performance Indicators and strategies for integrating ICT into the education curriculum. The purpose was to contribute to Namibia becoming a Knowledge-based Economy. Hence, the Colleges of Education, which was the main teacher training institution, could not hesitate to integrate ICT across the curriculum. This is aimed at achieving Level 4 of the ICT policy regarding the use, knowledge and expected to teach competencies (Iipinge, 2010).

As stated in the overarching ICT Policy in the Republic of Namibia of 2009, the government is committed to providing adequate funding for ICT skills development and/or education in Namibia (Ministry of Information and Communication Technology, 2009). At the colleges of educations, teacher educators expressed interest and willingness to integrate ICT in their overall teaching and learning situations as well as in Integrated Media and Technology (IMTE) (Iipinge, 2010). A pre-service education course in instructional media was also revised at the College of Education to include ICT integration, as part of a national program that infuses ICT throughout Namibia’s educational system (Wilder, 2012). Similar views are expressed by Mary (2006) who states that Integrated Media and Technology Education is offered for Pre-service Teachers in Colleges of Education.

At UNAM, the integration of ICT in the teacher training colleges is more than it was with the colleges of education. With UNAM, teachers are prepared to use ICT through the curriculum in courses such as Computer literacy, Integrated Media, and Technology Education 1-2, Project Base Learning and or Educational Technology 1-2 which are specifically designed to prepare teachers on how to use ICT in teaching and learning (Faculty of Education Prospectus, 2018). The extent to which the lecturers in the Faculty of Education at the UNAM implemented the national ICT Policy for Education was recounted in a study conducted by Isaacs, Kazembe &
Kazondovi (2018). The findings from their study show that teachers have a good understanding of the national ICT Policy for Education in Namibia. Also, most of the lecturers indicated that they were at the beginning level of using ICT for teaching and learning. Nevertheless, the results also revealed that “some teachers lacked training in ICT pedagogy, the time to learn and incorporate ICT skills and tools into lessons, and exposed insufficient budget allocation in place for procurement of ICT tools both hardware and software” (Isaacs, Kazembe & Kazondovi, 2018, p.105). The current trends in education strives towards a knowledge-based development paradigm. Hence, the integration of ICT into education and training system become of paramount importance (MoE, 2005).

The Computer Association of Namibia (CAN) played an integral role in reviewing the training of school teachers to fit the integration of ICT in education (Kiangi, 1998). Goktas, Yildirim, and Yildirim (2008) investigated teacher educators’, prospective opinions about the effectiveness of ICT related courses and the ways to improve the courses in Turkey’s pre-service teacher education programs. The results of the study show that, while the majority of the participants felt that ICT interrelated courses are effective, most participants indorsed that such courses need to be restructured to be more beneficial in practice. Thus, it is crucial for those that are involved in designing teachers’ education curriculum see to it that it is beneficial in practice.

2.6 Impact of ICT usage in Education

This section discusses the impact of ICT in Education. It draws on the existing ICT in Education and shed lights on ICT in Namibian Education.

2.6.1 Some existing technologies in education

According to Lee (2015), multimedia such as audio and video are crucial in learning. For this reason, lessons presented with audio and video improves learning outcomes especially for the verbal information in the audio lesson. Teaching and learning materials such as audio and video have been largely acknowledged as some of the most significant components in language teaching to ensure a successful language learning (Dewi, 2016). Miller (1992) reports that the goal of using computers in schools produce computer literate pupils rather than producing mere users of computers to instruct pupils in classroom lessons.
Fabian and MacLean (2014) assessed the benefits and possible pitfalls of the use of mobile devices in teaching and learning activities. Their findings show that, regarding learning content, tablets are used in consumption, creation, and sharing of content (Fabian & MacLean, 2014). While in terms of the range of learning activities carried out with mobile devices, tablets can stimulate activities well when compared to traditional computers. Also, the use of tablets can facilitate collaborative learning by engaging self-regulated learning, distracted face-to-face contacts, pupils discourse and peer support. Lumsden (2015) maintained that mobile devices have become an advanced mode for learning in the modern classrooms. Likewise, teachers and pupils can use tablets and Smartphones to access unlimited amount of information that is accessible anytime and anywhere. In Spanish education for example, it is suggested that mobile devices can be used in teaching and learning as tools to develop innovation and to access countless materials available online (Placeres, 2014).

It is the right of every pupil in Namibia to learn regardless of their challenges and abilities. Braille machines are some of the existing technologies that are used by blind people in learning. Bola (2016) investigated the complex skills, such as braille reading of twenty-nine sighted braille teachers and educators over a 9-months course. The results show that most of the sighted braille teachers and educators were eager to learn and use whole-word braille reading and machine operation. However, the study further reveals that a successful use of the whole-word braille reading is determined by the right method and teacher motivation to teach visually impaired pupils.

Nicolas-Gavilan (2017) investigated the influence of the use of television series as a means of teaching in schools. Among the results, two direct areas of impact were found. First, in the case of teaching, the television is linked to innovative teaching practices which can be improved by unremitting ways of advanced teaching. In the case of learning, the use of television series promotes pupils interest in learning in a significant way. In line with similar research by Liu (2005), both teachers and pupils have a positive attitude towards the use of television in teaching and learning, especially for foreign or second language.

As much as software and hardware are important in the educational community, it is equally important to understand that they cannot be operated without social networks. In a study by Pidduck (2011), electronic social networks improves learning towards a conducive, non-intimidating and non-discriminatory learning environment. This means students with special
needs, those live in remote areas, home schooled students and introvert students are accorded a favourable opportunity to engage in learning anywhere and at their pace. Similarly, Balakrishnan (2014) explains that using social network and e-learning-integrated tools in educational sectors can speedily improve teaching and learning activities. Reyes (2015) has revealed that teachers and pupils uses social network, such as YouTube, Facebook, Twitter and blogs, for academic purposes. Despite the fact that some students or learners use social network mischievously, others rely heavily on social media for academic lessons and news items. YouTube, for instance, is one such platforms that contains much academic stuff from different disciplines that students are able to learn on their own.

One common state of the art technology in education is the use of the virtual learning environments (VLE). Virtual learning classrooms are premeditated to address global competencies in the areas of learning abilities by improving global competencies and increase global citizenship among pupils (Patterson, 2012). Michael (2012) states that virtual learning classrooms include online learning which is associated with increased flexibility, cost reductions, development of pupils’ visual literacy skills. However, VLEs are fraught with technical challenges that distort smooth learning. As technology advances and a considerable research in the VLEs, the challenges are expected to be minimised in the near future. Milošević (2015) investigated pupils’ attitude towards Facebook as a virtual learning classroom. The analysis shows that the use of Facebook as the virtual learning classroom improves the quality of education process. Thompson (2013) describes pupils as digital natives who spend much of their time on social networks. Thus, teachers are encouraged to take advantage of these opportunities such as Facebook virtual classrooms.

Learning Management Systems (LMS) are equally important in teaching and learning. According to Lonn (2011) educators uses Learning Management Systems as web-based systems which enable teachers and learners to share materials and interact online the use of Learning Management Systems in education allows learners to learn in institutional contexts or specific time periods (Conde, 2014). In this perspective, LMS promotes personalize learning process.

2.6.2 ICT in Namibian education

Several policies and programmes are developed to ensure smooth implementation of ICT in the Namibian schools. According to Isaacs (2007), Namibia has played an advancing and
visionary role in African continent in the area of ICT integration in education. This effort serves as a guiding light for many countries operating across the African continent. Again, Namibia provides innovative options on affordable and sustainable access to ICT through active involvement of the local youth under the leadership of School Net Namibia. Namibia adopted the National ICT policy for Education in 2005 and the National ICT Policy Implementation Plan in 2006 to guide the ICT implementation process in schools (Ngololo, Howie & Plomp, 2010). According to Shalyefu and Nakakuwa (2004), Namibia is considered as one of the technological innovators in Africa. Hence, Namibia has responded well to the current trends of global realities that embrace ICT knowledge in education (Shalyefu & Nakakuwa, 2004).

There are five distinct development areas of ICT on which the Namibian education is grounded. These development areas are investigation and development of appropriate ICT solutions, maintenance and support of ICT, deployment of ICT infrastructure, ICT integration and ICT literacy (MoE, 2005). As a result, Namibia prioritize that by 2022, all schools should be covered by broadband infrastructure and ensure optimum use of ICT across the education sector (Ministry of Economic Planning, 2017).

The National ICT policy for Education has identified key issues regarding the solidification and exploitation of ICT courses in Namibian schools including the use of ICT in education (MoE, 2005). The ICT policy has also identified the reasons for introducing ICT in educational institutions. Tech/NA! is an ICT in Education Initiative for MoE (2006c) which intends to equip educational institutions with hardware, software, connectivity, curriculum, content, and technical support for teachers, and learners in ICT literacy and ICT integration across the entire curriculum. In Namibia, the implementation of ICT curriculum aimed at assisting pupils and teachers to look for information, manage information and present information through ICT (Quest, 2014).

In the National ICT Policy, national strategic documents and policies that acknowledged the need to advance ICT within the Namibian education sector are explicitly outlined. Among the strategies, the National ICT Policy critically identified teachers’ training in ICT as a top priority (MoE, 2005). Equally, the ICT Strategy for Ministry of Higher Education aims to increase the nations ICT skills. In the same vein, the Public Service Information Technology Policy has introduced Information Technology (IT) at the junior secondary school level. Introducing IT at junior secondary level equips learners with higher-order skills of problem-solving, analysis,
synthesis, and evaluation necessary for Research-Based Learning (RBL) as well as the Problem-Based Learning (PBL) of the 21st century.

Moreover, National policies such as Vision 2030 has well-set strategies for integrating ICT education and training into education and training system (Eita et al., 2002). The recently launched 5th National Development Plan (NDP5) together with the Ministry of Basic Education, Sport and Culture has introduced Computer Literacy as a compulsory subject in schools (National Planning Commission, 2004). The strategic plan for the Ministry of Basic Education from 2001 – 2006 aimed at enabling teachers to manage and use modern Information Technology to communicate and share educational information (Ministry of Basic Education, 2001). Information for Development and Self-Reliance, a policy framework for libraries and allied information agencies for Namibia also aims to promote ICT Literacy among the population (Harper, 1997).

The government of the Republic of Namibia strives to produce citizens with ICT skills, people who are capable of participating and working in the new economies and societies arising from ICT and related developmental education (Ministry of Information and Communication Technology, 2009). Also, through the MoE the government has leveraged ICT to assist and facilitate learning for the benefit of all learners and teachers across the curriculum (MoE, 2010). The goal is to improve the efficiency in the educational administration and management at every levels of the education sector. Through the provision of formal education, the government has broadened access to quality education for learners at all levels of the education system. Likewise, there are set specific criteria and targets to aid in the classification and categorisation of the different developmental levels of using ICT in education (Ministry of Information and Communication Technology, 2009).

To fulfil the educational agenda contained in the National Vision 2030, the Ministry of Basic Education is mandated to identify learning regarding core skills and critical learning areas. Hence, ICT core skills are expected to be developed gradually through all learning areas or across curricula. As such the Namibian National Curriculum for Basic Education sets out specific ICT skills which illuminate both teachers and pupils ability to:

- appropriately choose and correctly use ICT as tools according to the purpose
- be multipurpose in using hardware and software and different media
• practise computer hygiene and follow ethical norms in using ICT.
• be able to access, critically evaluate, use information, and transform information into knowledge
• distinguish between fact from opinion and communicate effectively using ICT
• Understand how technological systems form an integral part of social systems, cultural and economic frameworks.
• Understand the value of information and their roles and responsibilities as citizens in the development of ICT in society (MoE, 2010, p. 11).

The MoE embarks on a series of the developmental levels towards effective implementation of ICT policy in Namibian education. These series of developmental levels are outlined from level 1 to level 5. Schools and institutions at level 1 are expected to have a small room equipped with ICT devices. There must be at least one or two qualified teachers in ICT to help in teaching ICT skills, such as basic computer uses, word processing applications and introduction to the Internet. At level 2, all schools should be connected to internet. Further at level 2, all teachers should have access to computer in a ratio of 1 computer to 5 teachers and 1 computer for every 10 learners.

Schools that falls under level 3 should be well equipped with ICT (at least a computer for every 3 teachers and better than 1 computer per 10 learners). 30% of staff members should have some ICT qualifications. Further, schools at level 3 are expected have one or more classrooms equipped with computers and projectors and/or the capacity to display audio-visual materials to learners. At level 4, all learners and staff members are expected to have access to a computer with reliable internet connectivity for at least better than 1 computer per 5 students/learners and 1 computer per 1 member of staff respectively. Over 50% of the staff member are expected to have ICT qualifications. Level 5 is for the schools and institutions at exceptionally advanced stages of ICT usage by all staff members and learners (MoE, 2006a).

Given these development levels of the National ICT policy for Education as narrated above, the MoE has set out a target for all schools with secondary grades to at least be at development level 2 in ICT. Whereas, Tertiary Education establishments are to at least at development level 3, all Primary schools to at least be at development level 2 and for all Pre-service teacher-training facilities to at least be under development level 4 (MoE, 2006a). Apart from the
developmental levels, the Ministry of Education thrives to ensure that ICT content in the Namibian curriculum at basic level is adequately captured to orient and help learners in the acquisition of ICT skills. Hence, ICT skills training or informatics is covered within the Namibian curriculum (Mary, 2006). However, Simon and Ngololo (2015) investigated how Life Science teachers, with access to technologies, use and integrate ICT into their classroom through collaborative and creative teaching. The finding shows that, in Namibia, ICT use and integration in the classrooms remains limited. Additionally, the study revealed that Life Science teachers use ICT in their classrooms such as smart boards connected to Learning Management Systems and collaborated with each other by sharing notes but did not co-teach nor developed their teaching materials (Simon & Ngololo, 2015). This is in line with the National ICT policy implementation plan which states that individual subject curriculum will also be adjusted to reflect the role ICT can play in teaching and learning across the subjects (MoE, 2006a). The mainstream ICT in Namibian primary and secondary education strengthens subjects such as English, mathematics, natural sciences, entrepreneurship, arts and design and technology in grades 5-12 (Tencalla, 2006). Isaacs, Kazembe and Kazondovi (2018) indicated that most lecturers at the University of Namibia mainly use word processors and presentation tools in their teaching. This makes them to fall under level 2 instead of level 3 of the National ICT policy.

2.7 Use of ICT in teaching and learning

This section presents the use of ICT in teaching and learning. The focus is mainly on teachers’ perception towards the use of ICT in teaching and learning, the pedagogical impact of ICT in education and the challenges of ICT integration in education.

2.7.1. Teachers Perception of the use of ICT in teaching and learning

Teachers hold diverse perspective on the use of ICT in education. Teachers’ perceptions are critical to the success or failure of ICT integration in education (Apeanti, 2014). For this reason, it is vital that researchers gather information about the apprehensions teachers holds regarding the use of ICT in the classrooms. The decisions regarding whether and/or how to use ICT in education rests on the shoulders of the classroom or subject teachers. It was reported that for education sector to achieve fundamental changes from classroom teaching practices, there is a need to examine the beliefs teachers hold about the use of ICT in teaching and learning (Hutchison & Reinking, 2011). For instance, Gebremedhin and Fenta (2015) reported a
significant relationship between the perception of teachers towards the integration of ICT in teaching-learning process and the use of ICT. Regarding this, Gebremedhin & Fenta (2015) maintain that the association is motivated by several other factors in schools such as staff motivation, willingness to use ICTs and availability of resources.

Furthermore, Gebremedhin and Fenta (2015) have assessed teachers' perception on integrating ICT in Teaching-Learning process in a study conducted at Adwa college in Ethiopia. The study found teachers to be confronted with the unavailability of ICT resources for teaching and learning. The findings imply that most teachers in the college have not integrated ICT in their course teaching. Mac-Callum and Jeffrey (2014) reported that the adoption of innovative technology in teaching and learning is based on measuring teachers’ beliefs and attitudes to the technologies. Mac-Callum and Jeffrey (2014) studied the factors that impact teachers’ adoption in mobile learning. This study was centred on three key variables, and these are digital literacy, ICT anxiety, and ICT teaching self-efficacy. Based on these constructs, Mac-Callum and Jeffrey (2014) investigated the behavioural intentions of teachers to use mobile learning. The study found all the variables to have an impact on the teachers’ behavioural intentions to use mobile learning in their academic activities. Mac-Callum and Jeffrey (2014) undertook their study by adopting the technology acceptance model (TAM). Additionally, teachers perceived usefulness, ease of use or effort needed to learn to use the modern technology, the teachers’ skills to use digital technology or literacy, ICT teaching self-efficacy and ICT anxiety are some of the factors that can influence a teacher’s use and perception of new technologies in teaching.

Hlasna, Klímová and Poulova (2017) pointed out that teachers at the primary school level, who uses ICT in teaching, need adequate training. This training, according to the researchers, would improve teaching output through effective use of ICT. Based on the research conducted by Hlasna et al. (2017), they concluded that teachers who have had methodological training in the use of ICT in teaching quest to use ICT in teaching while the opposite is reluctant to use ICT in teaching. This goes to underpin the relevance of providing ICT training to teachers.

Sim and Theng (2007) examined teachers’ attitudes towards the use of ICT in education which reflected positive and negative attitudes. Moreover, teachers perceive that utilizing ICT in education makes them more effective in their teaching and organized in their work. In addition, using ICT makes teachers rely less on textbooks and enable them to meet the varying needs of pupils. Again, some teachers maintain that the use of different technologies in teaching and learning enriches lesson plans, enhance the organisation classroom activities and subsequently
enable teachers to cater for all pupils needs. Some positive perceptions as such are indications that teachers are willing to integrate more ICT applications into their teaching (Sim & Theng, 2007). Silviyanti and Yusuf (2015) reported that most teachers hold high motivation towards the use of ICT in English Language Teaching (ELT). Findings further reveal that teachers acknowledged the importance of ICT in ELT as it makes learning enjoyable, interesting, and effective, among other constructive outcomes. Teachers’ motivation is a derivative of their perceptions that technology can bring about positive changes such as the impact on higher thinking skill and content attainment for language learning.

Although not all teachers have negative perceptions towards the use of ICT in education, Silviyanti and Yusuf (2015) state that the negative perceptions from teachers are one of the barriers which limits the use of ICT in education. Furthermore, the effective use of ICT in education is determined by the teachers’ personal beliefs and concerns that pursue their likelihood to use technology (Angers & Machtmes, 2005). It cannot be denied that the way teachers see their roles in education will influence the way they teach with technology. Teachers’ positive perception towards the integration of ICT in teaching-learning process serves as a catalyst in ICT usage in classrooms and subsequently stimulate learners’ productive thinking such as pedagogical content knowledge. Moderately, “lessons should be ICT driven but focused on clear teaching and learning objectives where ICT is used as a vehicle to support the achievement of those objectives” (Kizlik, 2008, p.1). Kreijns (2013) investigated teachers’ intentions, attitudes, norms and self-efficacy regarding using ICT in teaching and learning. Teachers tend to use ICT based on their previously used ICT, perceived knowledge, and skills to use some ICT devices (Kreijns, 2013). Adam (2017) shows that using ICT in the educating pupils with learning difficulties inspires pupils to better educational outcomes.

2.7.2 Pedagogical impact of ICT in education
It is important to acknowledge numerous significant roles ICT plays in teaching and learning (Kizlik, 2008). For a person to become well-educated in today's world, pupils and students ought to become expert in the new literateness of the 21st-century technologies (Hutchison & Reinking, 2011). As a result, educators or teachers have a great responsibility to effectively integrate ICT into the curriculum with the aim of preparing students for the needed skills and literacy future they deserve. Gebremedhin and Fenta (2015) believe that integrating ICT in teaching and learning increases the quality of productiveness in teaching, as teachers will be more efficient in their delivery of lessons. Ghavifekr et al. (2016) maintain that the use of ICT
in education has the potential to transform teaching into the desired results. Hennessy, Harrison, and Wamakote (2010) state that some teachers need to attain basic ICT skills which will help them to determine the type of ICT applications to use in added value for learning the subject area. Furthermore, bringing ICT into teaching and learning can have a significant impact on the practice of teachers, when ICT is conceptualised as a tool that supports a pedagogical change in the teaching approaches.

Khokhar and Javaid (2016) carried out a study on the views of teachers’ towards the use of ICT in classroom teaching, learning and assessment. The researchers revealed that teachers have access to computers in schools and at home and they use them for different educational purposes. Khokhar and Javaid (2016) indicated that teachers have access to ICT devices, such as desktop PCs, laptops, Tablets, iPads, and internet-enabled smartphones. The usage of these devices has quite similarities such as enhancement of communication with colleagues, information search and preparation of assigned tasks and lessons. Earle (2002) acknowledges four main reasons for technology use by teachers. Firstly, teachers use ICTs in developing material in preparation for classroom teaching. Secondly, teachers use ICTs such as computers to do administrative work such as compiling pupils data, typing assessment tasks and feedbacking. Thirdly, to facilitate pupils’ learning in a classroom and to complete the assigned tasks. Over several years the critical drive in the education sector across the globe has been the search for ways in which teachers can be influenced to make ICT usage an essential part of their teaching and learning approaches (Galanouli, Murphy & Gardner, 2004). In addition, among the strategies are the teachers’ training programmes that are explicitly designed to equip, raise skill levels and most importantly cultivate teachers’ positive attitudes towards the use of ICT in teaching and learning.

Silviyanti and Yusuf (2015) noted that teachers with e-readiness can use and adopt technologies into their classrooms when perceive that technology can be a useful tool in delivering quality lessons in a learner centred learning environment. Angers and Machtmes (2005) stated that technologies are the important tools which adds value to the lessons, and to the students learning and motivation. With this finding, teachers are urged to use ICT to motivate pupils in learning. Garrison (2007) states that ICT in education is essential for supporting collaborative learning and discourse associated with higher levels of learning. Studying online is one of the benefits which enables both teachers and pupils to become explorative in their education because learning can take place anywhere and any time with less need to attend lessons in
person (Garrison, 2007). The importance of ICT in education is that it “can provide more flexible and effective ways for teachers’ professional development, improve pre- and in-service teacher training, and connect teachers to the global teacher community” (Jung, 2005, p.94).

Technological advancement in education has revolutionized the teaching and learning strategies (Blair & Serafini, 2014). What this means is that new strategies for teaching subject contents has evolved and teachers are to adjust these strategies in order to help learners to adapt. In most cases and some parts of the developing economies, social media is not a well known tool for teaching and learning in education. Often, social media is associated with destructiveness in teaching and learning. However, a study by Blair and Serafini (2014) revealed the pedagogical impact of social media in teaching and learning. According to the researchers, social media networks can leverage the user activity with the ICT applications in education. Nowadays, teachers can provide content by involving pupils and meets learning objectives. By reviewing social media networks such as Facebook, Twitter, Pinterest, Blogs, Instagram, and Evernote, teachers can position, equip and uplift themselves to be as technology-savvy as modern pupils (Blair & Serafini, 2014). Blair and Serafini (2014) reported that the Internet has changed the way we perform research, communicate, and rationalises the access people have to education. Thus, using ICT in teaching and learning is no longer an option as today’s pupils must leverage their access and become proficient with the latest technological tools. Most schools use internet for information sharing purposes. This includes a large number of different cross-curricular approaches such as working in groups to encourage pupils to look for information as part of their homework to supplement textbooks information with more up-to-date information from the web (Fredriksson, Gajek, & Jedeskog, 2009).

Literature shows that social learning has proven to be significance in education. Pupils use mobile devices like smartphones, tablets, or computers to learn and to enable peer review through eLearning and social media. Social media accords Internet users, and social learning uses the power of education (Warkentin, Johnston & Shropshire, 2011). Again, some pupils embrace social method of learning since it makes them highly motivated to interact socially with their peers (Blair & Serafini, 2014). Leach and Scott (2003) explained that the advancements in web technologies could be useful for educational purposes. Example is the peer review where pupils are able to collaborate with each other and reflect on the key learning points in their subjects.
According to Towner and Lego Muñoz (2011), Facebook has become an essential part of pupils’ life, and teachers can use Facebook to interact with pupils on key classroom ideas. In the views of Hansen, Nowlan, and Winter (2012), social media tools have appealed to not only librarians but teachers as well. Some teachers use Pinterest in the classroom to inspire pupils, increase pupils’ participation, and help them in telling stories (Hansen et al., 2012). Hu, Manikonda, and Kambhampati (2014) suggested that, although Instagram has attracted relatively less attention from the research community, its importance in education is inevitable. An example to this scenario is that a teacher could indulge learners in book review and thereby further creating an Instagram video to share key points they have learned (Hu et al., 2014). Correspondingly, if pupils are learning English, the Instagram application can help them develop an academic vocabulary.

Blogs are well-known for its contribution to teaching and learning. Apart from promoting critical and analytical thinking in pupils, Huette (2006) explains that Blogs can serve as a vessel for extra support in the classroom, including tutorials, educational videos and reference materials. In addition, Blogs provides updates of information to teachers to share with their students (Huette, 2006). Teachers can also use Twitter for educational purposes. Twitter can be used in the classroom to help engage students and teachers in the teaching and learning processes. Twitter as a media can serve as a back channel for teachers after a lesson to share resources, extend the class discussion, promote brainstorming, and to indorse pupils a sense of community (Wright & Forbes, 2016). Heemskerk, Brink, Volman, and Ten Dam (2005) noted that ICT applications are not only substituting the existing teaching and learning tools, but teachers also use ICT to promote a new kind of learning in which they support and coach pupils especially those with special learning needs. Therefore, the use of ICT in teaching and learning is more evident in inclusive in teaching and learning.

The quality of learning, in a contemporary digital age, widely depends on the availability and usability of the ICT devices and social technology across the curriculum (Blair & Serafini, 2014). This implies that using ICT as a teaching medium across the subjects add value to education. In Fig. 1, Kizlik (2008) highlights different opportunities that the purposeful and appropriate application of ICT in subjects can offer to pupils. Firstly, pupils are accorded an opportunity to acquire and use ICT capability to progress well in learning across the curriculum. Secondly, pupils can engage meaningfully in higher order and critical thinking skills. Thirdly, help pupils “to demonstrate, apply and reinforce their understanding of ICT
capability within a range of subject contexts. The transferability of ICT capability is an important aspect of progression in pupils’ knowledge, skills, and understanding” (Kizlik, 2008, p.3). Furthermore, Kizlik (2008, p.5) maintains that “the use of ICT as a medium of teaching can enhance and stimulate the learning experiences of pupils and contribute to the achievement of subject objectives.”

![Figure 1. ICT across the curriculum (Adapted from Kizlik, 2008)](image)

Drent and Meelissen (2008) discussed some of the factors or criterions which stimulate or limit the teachers' innovative use of ICT in education. Their results show that teachers level or knowledge of a certain type of ICT can influence the implementation of ICT and its use in education. Even though researchers are emphasizing the importance of integrating technologies into the curriculum, Sadik (2008) asserts that the use of technologies can only be effective if teachers possess the expertise to use technologies in a meaningful way in the classrooms.

2.7.3 Challenges of ICT integration in education

The diffusion of ICT is still a growing phenomenon in the education sector. It is not surprising that, although it is a leading exercise, its integration within the educational sector is faced with numerous challenges. Gebremedhin and Fenta (2015) have admitted that ICT integration into education is fraught with numerous challenges that have bedevilled its effective integration into education. Gebremedhin and Fenta (2015) identified the challenges as a shortage of resources or technological tools, lack of technical support, poor ICT preparation for teachers and lack of encouragement for teachers which may have negative implications on the teachers’
perceptions towards the use of ICT in teaching and learning. Thus, they remarked that teachers perceived that teaching and learning would improve with ICT integration provided the challenges above are eliminated or minimised.

Ghavifekr et al. (2016) found significant challenges associated with the use of ICT tools in teaching and learning. With this finding, the implementation of ICT in teaching and learning is faced with limited accessibility and poor network connection, limited technical support, limited time and lack of teachers’ competency. With the intent of using ICT, Khokhar and Javaid (2016) stated that teachers are bedevilled with challenges such as ICT devices being restricted to classroom teaching. Equally, some teachers maintain that to use ICT in education, more time is needed for instruction. What this means is that much instructional responsibility and skills is required to use the technological tools (Sim & Theng, 2007).

One of the challenges that teachers face when integrating ICT in education is that some schools have forbidden mobile phones, iPods claiming that they often interfere with their lessons (Mura & Diamantini, 2014; Kolog et al., 2018). In the same vein, these challenges can further be stretched to the teachers’ practice of spending much of their teaching hours online, mainly to play games, engaging on social media and watch movies or listen to music instead of searching for educational materials. Based on the views of Kizlik (2008), it is crucial that teachers teach their pupils to appropriate ICT capability before applying it in other subjects. Even though there is a strong relationship between ICT the subject and ICT in subjects, some teachers may find it a challenge to lay a foundation of ICT usage for their pupils if they (teachers) are not capacitated on the effective use of ICT.

Despite the benefits of ICT usage in education, there are risks associated with using ICT for teaching and learning. For instance, teachers may fall victims of cyberbullying or perhaps feel very unsafe when surfing the net in search of educational materials (Mura & Diamantini, 2014). Moreover, Internet failure can sometimes cause problematic situations, for example, interruptions in connections of the ICT devices may result in cancellation or postponement of a lesson.

Due to pupils’ exposure to different technological tools in education, the new generation of learners tend to overlook the printed materials such as books, newspapers, magazines. Hence, they often take to online media to rather use social platforms or search engines for learning
where they are required to utilize devices like smartphones, tablets, and computers (Blair & Serafini, 2014). Such a practice can be a challenge in places where printed materials are the most readily available teaching and learning aids. Pupils’ ability to apply their ICT capability in the curriculum is largely rooted from the effective teaching and learning of and with ICT (Kizlik, 2008). This implies that the use of ICT by pupils in learning may not be effective if they (pupils) do not already have an appropriate skills and a better understanding of ICT capability. This may be a challenge as it can result in a little to no progress in the learning of ICT and the subject area.

Goktas, Yildirim and Yildirim (2009) reveal that “the majority of the educational stakeholders believe that lack of in-service training, lack of appropriate software and materials, and lack of hardware are the main barriers for integrating ICT in teaching and learning” (p.193). In addition, Tondeur, Van-Keer, van-Braak and Valcke (2008) stated that school-related policies, such as an ICT support, ICT plan, and ICT training have a significant effect on the class use of ICT. This implies that school policies can often be underdeveloped and underutilised, and consequently lead teachers to use only a limited number of ICT devices in their classrooms. In the same vein, modern technologies are obligating teachers to learn how to use them in teaching and thus, increasing opportunities for the teachers' training needs (Jung, 2005). The challenging part is that some teachers may not be willing to learn the modern technologies. This may be due to the lack of updated skills and knowledge to use in their lessons. In addressing these challenges, Sife, Lwoga, and Sanga (2007) advocate that teachers lack of awareness goes along with attitude. Hence, teachers' positive attitude towards integrating ICT in education is widely recognized as a necessary condition for their effective implementation.

In most developing countries like Namibia and across African countries, there are many challenges in facing the integration of ICT in education sectors (Hennessy, Harrison & Wamakote, 2010). Due to physical and cultural factors that affect ICT use by teachers, limited technological infrastructure expressly internet access, lack of reliable access to electricity, hardware or software facilities, bandwidth and language of instruction are some of the challenges outlined by Hennessy, Harrison and Wamakote (2010).

In Namibia, “the availability and access to telecommunication services especially in rural areas remains a challenge largely due to uneven access to electricity and high unit costs for rolling out ICT infrastructure in a vast geographic area” (Ministry of Economic Planning, 2017, p.41).
The primary reason for the Namibia’s reduction in ICT development status is the inadequate levels of achievement for school leavers in mathematics and science subjects causing the sector to suffer from a lack of trained and skilled ICT human resources (National Planning Commission, 2004). Matengu (2011) highlights some of the major barriers to successful ICT integration in the Namibian schools. Teachers’ attitude towards ICT integration and their willingness to use ICT, inadequate pedagogical training in ICT are some of the factors highlighted to have implications on the successful integration of ICT in education despite the availability of the resources. Boer and Black (2008) advises developing countries like Namibia that seek to strengthen ICT with innovative ideas within the school and teacher education curricula, to be watchful that pedagogical challenges that hinder ICT implementation can easily be overcome by using practical solutions.

2.8 Learning theories and their link to ICT

The current study is inspired by the cognitivist, behaviourist, constructivist, connectivist, the theory of planned behaviour (TPB), Problem-based learning (PBL). Each of these theories are important in the educational arena as it details and outlines the understanding of learning. Among the aforementioned theories, cognitivism, behaviourism, and constructivism are the three extensive theories that are often applied in the creation of instructions in the classrooms or a learning environment. The long existing theories were developed in a time when learning was not impacted through technologies (Siemens, 2014). Within the last twenty-one years, technologies made its way in education and had modernised our ways of learning, living and obviously how we communicate. Driscoll (2000) explains learning as a continuing change in human performance which results from learners’ experience and interaction with the world.

2.8.1 Cognitivist learning theory

According to Good and Brophy (1990), the cognitivist learning theory is the attainment or rearrangement of the cognitive structures through which pupils’ process and store information. Keskin (2011) states that the focus of ICT in the cognitivist learning theory is on how information and content are delivered in learning, the use of multimedia learning such as images, audio, video, text, and animations. In the cognitivist learning theory, knowledge is seen as a symbolic mental construct in the pupil's mind, and the learning process is the means by which these symbolic representations are committed to memory (Siemens, 2014). Cognitivism often takes a computer information processing model whereby learning is viewed as a process.
of inputs, managed into short-term memory, and coded for long-term remembrance (Driscoll, 2000). Memory storage and retrieval are believed to be connected to cognitivism because it views learning as that which occurs through effective information organising and processing (Jordan, Carlile & Stack, 2008).

The cognitivism learning theory shares the concept of information processing with computer science education (Huitt, 2003). The focus of cognitivism theory in the use of ICT in teaching and learning is on content delivery that is supported by using technological devices such as videos, audios and or TV (Keskin, 2011). Similarly, the Namibian National Curriculum for Basic Education requires teachers to help pupils in developing the cognitive skill to organise and experience learning for rational understanding and behaviour inwardly. The cognitive skills such as the ability to research, to think critically, plan solutions and solve problems try out and develop ideas, to use the imagination and think creatively. Cognitive skills can further be stretched to the ability to understand situations, inter-relationships, and systems and to think innovatively can all be attained through ICT devices in teaching and learning (MoE, 2010).

2.8.2 Behaviorists learning theory

Behaviourism focuses on how pupils act and what impacts upon and changes how they act (Collins, 2012). Furthermore, in this theory, there is consideration of thought processes in the mind as the mind is viewed as a tabula rasa (blank slate), largely irrelevant. In the behaviourist paradigm, learning is viewed to be the best facilitated through the reinforcement of an association between a certain stimulus and a response (Naismith, Sharples, Vavoula & Lonsdale, 2004). Smearing this to the use of ICT in education, Naismith at al (2004) stated that computer-aided learning is the presentation of a problem (stimulus) followed by the contribution on the part of the pupil of the solution (response). Also, the feedback from the system provides reinforcement. Collins, (2012) explain that behavioural learning theory lent itself to instructional design based on very specific and discrete learning steps. In addition, the computerisation of instructional process through new forms of learning technologies such as programmed instruction, computer-assisted instruction (CAI) and teaching machines explains the link between ICT usage in teaching and learning and this theory.
2.8.3 Constructivist learning theory

Constructivist learning theory explains how people understand, know or learn (Savery & Duffy, 1995). According to Bruner (1966), learning is a process which is always in process where pupils are allowed to actively construct new idea (knowledge) or concepts based on their existing and/or past knowledge. Three goals can characterize the theory. The first goal is the pupils understanding of the subjects’ content is in their interaction with the environment (Savery & Duffy, 1995). In relations to this study, it means that what pupils learn depends on how they learn it or merely on the ICT tools that they use in learning the content. If pupils are provided with all the tools, they need in searching information, the information that they will be exposed to cannot be the same as when they have a textbook as the only source of information. The second goal states that cognitive conflict is the stimulus for learning and regulates the organization and nature of what pupils learnt (Savery & Duffy, 1994).

In a learning environment, for example, the classroom, there is some stimulus or goals for teaching and learning. In simplicity, as much as a teacher has a purpose for teaching, pupils also have a purpose for learning. Therefore, the goal is not only the stimulus for teaching and learning. Nonetheless, but it is also the main factor in determining what the pupil attends to learning and how the teacher presents it (Ackermann, 2001). Also, the prior experiences pupils bring to learning bear many fruits in the construction of understanding the content. The understanding that pupils get is constructed based on the tools used in the process of learning. The third goal affirms that knowledge progresses through social concessions and the evaluation of the viability of pupils’ understanding (Gaffney & Anderson, 1991). Teachers and pupils can use handheld games, interactive podcasts, interactive mobile TV and text messages in a social environment for collaboration or interaction to develop a set of knowledge (Naismith, Sharples, Vavoula & Lonsdale, 2004).

Piaget (2013) explains that pupils construct fresh knowledge from the experiences they have in the process of accommodation and assimilation. In the context of education, the theory of constructivism aims for pupils to discover knowledge on their own when they are provided with the necessary learning tools which can be ICT in this regard. Duffy and Jonassen (2013) emphasised that instructions in teaching and learning should be provided together with the assistance that will aid the pupils in making sense of the learning environment. The theory is linked to the learner-centred approach to learning which is of relevance to the Namibian education (Bonk & King, 2012). As Namibia prepares for a knowledge-based society, the
realization of this requires a learner-centred approach through the effective use of ICT in teaching and learning. While the focus is on what learners already know and can do, the ability to acquire new knowledge through the utilization of ICT tools in education can bring meaningful and relevant ways of applying knowledge in a creative and innovative manner (MoE, 2010).

2.8.4 Connectivist learning theory

Connectivism is still a moderately new learning theory and not without criticism (Garcia, Brown & Elbeltagi, 2013). Connectivism theory is defined by Siemens (2005) as a learning theory for the digital age. Connectivism learning theory was established from a belief that there is a need for a learning theory, which takes due cognizance of the ways in which societies has changed because of the new technologies or technological advancement (Garcia, Brown & Elbeltagi, 2013). The theory has been developed with the aim of providing a model through which teaching and learning, the use of ICT such as digital technologies, can be better understood and managed (Siemens, 2005).

In line with Kizito (2016) observation, there are possible characteristics and values for designing learning activities that are high and dry on connectivism which an emerging learning theory in education embraces. Meanwhile, Kizito (2016, p.19.) attributes connectivism to an experimental attempt of connecting “a theory to the prevailing technology adoption archetypes used with the aim of extracting influences that can shape pedagogical technology adoption in educational contexts.” Connectivism has been argued to be a new learning theory that emerged from the field of online learning (Clarà, 2014). Siemens (2005) did a thorough study on connectivism learning theory and later attests that it provides insight into learning skills and tasks needed for pupils to excel academically in the frame of the current trend of education which is vehemently driven by digitalization (Siemens, 2014). The significance of this theory is that it recognises that learning and knowledge are situated in a diversity of opinions and may as well reside in non-human appliances like ICT devices or tools (Siemens, 2005). Besides all these, Siemens (2005) attributes the theory to nurturing and maintaining desired connections to enable constant learning through the rightful use of ICT devices.
2.8.5 Theory of Planned Behavior and Technology Acceptance Model

The Theory of Planned Behavior (TPB) foresees an individual's intention to participate in behavior at a specific time and place (Ajzen, 1991). Furthermore, it theorises that individual behavior is determined by behavior intentions, with three bases. These bases include the individual’s attitude toward the behavior, subjective norms, and perceived behavioural control (Ajzen, 1991). In addition, the Technology Acceptance Model (TAM) explains perceived usefulness and usage purposes regarding social influence and cognitive instrumental processes of an individual or teacher (Venkatesh & Davis, 2000). Apeanti (2014) remarks that the Technology Acceptance Model is the most widely applied theoretical model in the technology use research which was developed to explain computer usage behaviour. Thus, both the theory and the model are observed fit in this study. In line with the planned behavior theory, the focus is on the teachers’ intentions or attitudes of using ICTs in teaching and learning.

The behavioural intentions in this study represents teachers’ motivation in the sense of conscious plan or decision to perform certain behavior, in this case, is the use of ICT in education (Conner & Armitage, 1998). The first base of the behaviours in this manner is the teacher's attitudes towards the use of ICT. This means the degree to which teachers have a positive or negative feelings perception of the use of ICT, which is the behavior of interest (Ajzen, 2002). The second base is the subjective norms that reveal the teachers’ perception of the social environment surrounding the use of ICT in education as the main behavior (Ajzen, 1991). It also has to do with the belief about whether other teachers think their fellows will use ICT in education which is the performance of the main behavior. The last base is perceived behavioural control which explains the extent to which teachers’ performance of the behavior or use of ICT in education is perceived easy or difficult to use (Oreg & Katz-Gerro, 2006).

2.8.6 Problem-based Learning Theory

Problem-based learning (PBL) is an educational learning theory that requires learners to identify a problem as a context for learning (Hushman, 2011). Additionally, thinking skills, deductive reasoning, knowledge, and behaviours can be developed when pupils learn how theory can be applied to practical settings. Thus, Hushman (2011) notes that problem-based learning encourages pupils to be self-directed in learning, learn for lifelong, and share knowledge within a group. PBL is explained by Edwards (2006) as a pedagogical approach to learning that emphasises pupils centred engagement with real-life problems or situations,
involving pupils in active decision-making processes and in using theory to inform practice. The significance of the theory to this study is that pupils and teachers can learn anywhere any time provided that they have the needed ICT devices. In addition, the knowledge that is acquired in learning can be shared using social media which are ICT. Learners, through problem-based learning are able to use ICT to guide their search for solution to problems they have formulated. According to Huang (2002), Problem-based learning cannot entirely be separated from the constructivism theory of learning as it required pupils to identify a problem, use different ICT devices to construct the knowledge and justify or reason accordingly.

Gubacs (2004, p.37) asserts that “PBL provides a context within which pupils are communally and meaningfully engaged in learning activities while participating in worthwhile tasks. It is within such contexts that ICT can be successfully integrated into teaching in a way that involves complex thinking about academic and pedagogical content. Using PBL to integrate digital technology into the learning process enabled students to learn content and innovative pedagogy while being fully engaged in the pursuit of educational projects.”
3. RESEARCH QUESTIONS AND HYPOTHESIS FORMULATIONS

This section outlines the research questions and hypothesis formulations. These formulations are connected to the research objectives. In the subsequent sections, a developed methodology is outlined to find answers to the research questions.

3.1 Research aims and objectives

The Namibian government has embarked on a number of ICT initiatives to support and ensure ICT integration in education as narrated in chapter 2. Despite the initiatives, there is a need to explore the state of ICT usage in classrooms. Hence, this research work aims to investigate the:

➢ perception teachers hold towards the use of ICT in teaching and learning.
➢ extent teachers use ICT in classrooms
➢ criteria teachers use in deciding the type of technology to use
➢ effect of gender on the use of ICT in teaching and learning

3.2 Research questions

To achieve the aims and objectives of this study, these framing research questions are formulated:

RQ1: What perception do the Namibian primary school teachers hold about the use of ICT in teaching and learning?
RQ2: Do the Namibian primary school teachers use ICT in classrooms?
RQ3: What criteria do Namibian primary school teachers use in deciding the type of technology to use?
RQ4: Does the teachers’ perception on the use of ICT in teaching and learning has any effect on ICT usage in classroom?
RQ5: Does gender affects the use of ICT in teaching and learning?

3.2 Hypothesis formulations

In view of the aforementioned research questions, the following hypothesis have been formulated:
$H_1$: Teachers hold positive perception towards the use of ICT in teaching and learning

$H_2$: Teachers rarely use ICT in classrooms

$H_3$: Teachers' decision to use the type of technology in teaching is influenced by the ICT tools at their disposal.

$H_4$: Teachers’ perception on the use of ICT in teaching and learning has a positive effect on ICT usage in classrooms.

$H_5$: Gender has an indirect effect on the use of ICT in teaching and learning.
4. METHODOLOGY

The section delves into the methodological process of this study, thereby outlining the research methods, research context and participant settings, sampling and data collection from the designed questionnaire. In addition, the section presents the research approach, validity of the research questions and methodology, and the reliability of the research data. In the end, the methods of data analysis also form part of this section.

4.1 Research method

This study employed a mixed research method. A mixed research method was employed because of its widely acceptance for the advancement of educational research (Teddlie & Sammons, 2010). Mixed research method fits well in this study because it gives credence to both qualitative and quantitative research approaches. Its application in this study provides credibility to the results on explaining the perception of teachers in the use of ICT in education. This is because the reportage of the quantitative findings is supported by the qualitative findings in this thesis work, giving rise to the essence of the mixed research approach. To buttress this point, Teddlie and Sammons (2010) has found out that the fundamental significance of using mixed research method is its flexibility in simultaneously addressing multiple and diverse research questions through integrated qualitative and quantitative techniques.

On the one hand, the quantitative aspect of the mixed research, dealt with the computation and analysis using a scientific approach (Creswell, 2013). Creswell (2013) further points out that the objective of the quantitative research method is to develop and employ models based on statistical approach and theories pertaining to the nature of an ICT phenomenon. On the other hand, the qualitative part deals with a comprehensive analysis of how Namibian primary teachers perceive the use of ICT in teaching and learning. The qualitative method seeks to discover the ways in which individuals experience and perceive educationally related phenomenon or viewpoints on an event other than those of the researcher (Tuomainen, 2015; Gaskell, 2000).

4.2 Research context

This research work was randomly carried out from primary and combined schools across Omusati Region in the Northern part of Namibia. Omusati Region is one of the fourteen
political Regions in Namibia. The study targeted both classroom and subject teachers from Junior Primary (grade 0-3) and Senior Primary (grade 4-6). From our preliminary investigation, these educational level teachers perceive the use of ICT differently, use different ICT devices with various reason with diverse selection criteria of the ICT gadgets. Thus, the motive to investigate the targeted teachers’ perception on the use of ICT in teaching and learning, their use ICT in teaching and learning and the selection criteria of ICT tools in teaching and learning.

4.3 Data collection method
In this study, the questionnaire was developed to contain both open- and close-ended questions. With the close-ended questions, Ross (2005) explains that respondents are restricted to a finite set of responses, easy to answer and code. Additionally, close-ended questionnaires permit the inclusion of more variables in a research study. This is because the format enables the respondent to answer more questions in a reasonable time. In this study, the close-ended part of the questionnaire has been developed using a 5-point Likert scale, where 1 – *Strongly disagree*, 2 – disagree, 3 – *Neutral*, 4 – agree and 5 – *Strongly agree*. The questionnaire was developed based on the objectives of this study. On the one hand, the first part of the questionnaires dealt with the participant's personal information such as gender, educational background, age, pedagogical training and years of teaching with ICT. On the other hand, the open-ended part of the questionnaire gave participants the opportunity to express their views regarding the subject of this study. The open-ended questions allow the participants to express their views and formulate their answers without any constraints (Phellas *et al.*, 2011).

The data, in this study, are collected through self-administered questionnaires. Choosing self-administered questionnaires for this study is motivated by Phellas *et al.* (2011) who justified self-administered questionnaire as a cheap method to administer. The justification is based on the fact that less cost is involved. Further, Phellas *et al.* (2011) stated that the only cost involve in the process of a self-administered questionnaires is minimally associated with the designing of the questionnaires and electronic distribution. However, in recent times, advance in technology has provided the opportunity for design and transmission of questionnaires to participants without incurring relatively much cost, time and travel. The self-administered questionnaire is useful when researching with geographically dispersed populations as it is a case for Namibia. In the same vein, self-administered questionnaires reduce the biasing error caused by the characteristics of the interviewer and the variability in interviewers’ skills.
4.4 Sampling, data collection process and ethical considerations

Data were collected from 90 Namibian teachers in a period of three months (January – March 2018). All the participants for this study are self-selected volunteer which gave credence to voluntary sampling method. Hence, an anonymous electronic questionnaire was administered to the participants in their respective schools. In support of this dissemination process, Burgess (2001) indicates that questionnaires can be delivered to the respondent by various means including post, e-mail attachments or via publishing on a website for interactive completion.

The questionnaires were developed in English language, and in return, the participants responded in English. Preference was given to the English language because it is an official language of instruction in the Omusati Region where the data was collected. The region is one of the multilingual Regions in Namibia. Furthermore, the use of English language enables these researchers to test the validity of the data without shear misinterpretations. In conformity with YongqiGu (2016), research development of questionnaire is a concern for most researchers especially in the cases where the participants and the researcher do not communicate in the same language. Therefore, the onus lies with the researcher to decide on the language that would not hinder the participants to respond to the questionnaires neither to the researchers’ analysis of questionnaire data. It is for this reason that the English language has been chosen as the best medium for this research.

The electronic questionnaire was administered to selected schools where the participants work. Permission was sought from the Omusati Regional Council, the Directorate of Education, Arts and Culture (Appendix II). In effect, this approach aligns and complies with the ethical considerations of the University of Eastern Finland. The purpose of this research, the directions for answering the questionnaires and ethical consideration were written on the questionnaire. The idea was to give the participants the opportunity to know what the research is about and the steps that has taken to collect the data. Additionally, the participants were given the opportunity to opt out if they deemed it necessary or contradicts their expectations. A total of 95 questionnaires were received from the participants. However, 5 of the received questionnaires, representing 5.26%, could not be considered due to the incomplete response and multiple skipping of most of the questions. Hence, a total of 90 responses, which is equivalent to 94.74%, were deemed to be valid and appropriate for data analysis.
4.5 Method of Data Analysis

As earlier indicated, the quantitative component of the data analysis encapsulated the descriptive and inferential analysis of the data. This was accomplished with the help of the Statistical Package of Social Science (SPSS) software from IBM (SPSS, 2011). Computations of mean and standard deviation were mainly used in the descriptive analysis. Through the descriptive data analysis, mean was used to ascertain the average value from the respondent and standard deviations to establish the amount of variation in the data (Kolog, 2017). The overall mean value depicts the average responses from the respondents while standard deviation denotes the amount of variation in data.

Regarding the inferential statistics, independent sample t-test was used to ascertain a statistical significance from the comparison of the means between gender on the perception teachers hold towards the use of ICT in teaching and learning (Muijs, 2011). Additionally, a nonparametric test called Mann-Whitney U –test was performed on the use of ICT in classrooms and the selection criteria because they were found not to be in normal distribution (Muijs, 2011; Field, 2013). Multiple Linear Regression analysis was performed to ascertain the significance level of various constructs on the use of ICT in teaching and learning (Field, 2013; Kolog, 2017 and Muijs, 2011). Moreover, the relationship between various constructs in relation to the Namibian primary teachers’ perception on the use of ICT in teaching and learning was investigated using Pearson correlation (Muijs, 2011). The qualitative data was discussed along with the finding of the descriptive statistics. However, these computations were based on the research objectives and were performed after the internal consistency (reliability) of the data was determined using Cronbach alpha. According to Muijs, (2011) the internal consistency (reliability) greater than 0.70 is ideal or reasonable enough for the researcher to proceed with data analysis.

4.6 Research validity and reliability

The questionnaire was given out to experts in the field to review and validate. In this case, various research experts including the supervisor of this thesis work were consulted to help in the validation of the questions and to restructure the questionnaire accordingly. Moreover, the questionnaire was piloted with 30 Namibian teachers to respond. The data from the piloting process were coded into SPSS to test the validity and the internal consistency (Reliability). The reliability of the data was computed using Cronbach alpha. A Cronbach alpha for the
piloted data was greater 70% and deemed to be ideal to certify that the data had high reliability for further analysis. Hence, the questionnaires’ suitability for the really data collection.

In the end, data collected from the validated questionnaire were coded into SPSS and the internal consistence (reliability) was tested. Table 1 shows the reliability coefficient of each constructs. The overall reliability (for all items tested) yielded .831 which depicts 83.1% of internal consistence. However, the reliability for each construct was also computed of which the reliability for the perception in ICT use constructs yields .709 represents 70.9% of internal consistence while ICT usage in classrooms yields .724 which represents 72.4% of internal consistence. The criterion for ICT selection yields .794 which depicts 79.4% of internal consistence. Therefore, the data were deemed reliable for analysis.

Table 1. Cronbach alpha for the internal consistencies

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Cronbach Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher’s perception in ICT use</td>
<td>.709 (70.9%)</td>
</tr>
<tr>
<td>ICT usage in classroom</td>
<td>.724 (72.4%)</td>
</tr>
<tr>
<td>ICT selection criteria</td>
<td>.794 (79.4%)</td>
</tr>
<tr>
<td>Overall Reliability (for all test items)</td>
<td>.831 (83.1%)</td>
</tr>
</tbody>
</table>
5. RESEARCH FINDINGS

The results of this study are presented in this section. This considers both the quantitative and the qualitative findings after the data analysis.

5.1 Participants’ demography

The participants' demography, in this study, is focused on the gender, age, ICT pedagogical training and years of teaching with ICT. As indicated in Figure 2, 35% (n = 31) of the respondents were male while the remaining 65% (n = 57) were female. In the figure, the least age group that responded to the questionnaires falls under 20 years of age, which therefore represents 1.34% (n = 1) of the respondents and they were all female. Of the respondents above the age of 50, which is the highest age bracket, 1.34% (n = 1) of each of the gender responded to the questionnaires. This implies a total of 2.68% (n = 2) of the participants were above the age of 50 years. Of the total number of the participants, 12.5% (n = 11) were between the age bracket of 40 to 49 years. With this number, 6.82% (n = 6) were male while 5.68% (n = 5) female participants. From the age range of 30 to 39 years 29.55% (n = 26) of the participants represented. Of this number, 12.50% (n = 11) were male and the remaining 17.05% (n = 15) were female. The highest number of the participants that participated in the study fell within the age group of 20 to 29 which denotes 54.54% (n = 48) of the total respondents. With this number, the number of male participants were 14.77% (n = 13) while the female participants were 39.77% (n = 35).

*Figure 2. Gender and age representation*
In Figure 3, the variations in pedagogical training received by the participants are presented. In the figure, 15.6% of the respondents did not receive any pedagogical training in ICT, 29.5% received a 1 year training in ICT, 27.8% received between 1 to 2 years of ICT training, 10% of the respondents received 2 to 3 years of the training, 11.1% of the respondents received 3 to 4 years of ICT training and 4.4% of the respondents received a pedagogical training in ICT over a period of more than 4 years.

Participants were also asked to indicate the period to which they have used ICT in teaching. The finding is presented in Figure 4. In the figure, 7.8% of the respondents have been teaching without using ICT, 80% reported to have been using ICT for 1 to 5 years while 7.8% have been using ICT for 6 to 10 years and only 3.3% have been using ICT for 11 to 15 years of teaching. This finding shows that many of the Namibian primary school teachers are not using ICT in classroom.

![ICT pedagogical training received](image)

*Figure 3. ICT pedagogical training received*
5.2 ICT usage in Namibian education

In this section, these researchers present the perception that teachers in the Namibian education sector holds towards the use of ICT in teaching and learning. Five Likert-type scale (i.e., 1=strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree) was made the options for the respondent to rate from 11 items used in investigating Namibian primary school teachers’ perception on the use of ICT in teaching and learning. However, item 10 is a negative item and was firstly converted to positive by reversing or recording the scale. Hence, a reversed Likert-type scale (i.e., 5=strongly disagree, 4=Disagree, 3=Neutral, 2=Agree and 1=Strongly Agree) was used. From the data analysis, the overall mean score on the perception of ICT usage was 4.23 (SD = 0.770). Such overall mean score and standard deviation demonstrates that participants in this study portrayed a positive perception towards the use of ICT in teaching and learning.

As indicated in Table 2, majority of the participants agreed that using ICT in teachings make their teaching easier (91.1%, n = 82, M = 4.48, SD = .738). In line with this agreement, one of the participants wrote subjectively in support of the quantitative response that:

“It makes my teaching very easier especially in my subject (social studies). I get to show learners videos and images, and I get to use my resources for a longer time.”
Majority of the participants agreed that the use of ICT in teaching and learning enhances learners’ critical thinking (86.6%, n = 78, M = 4.18, SD = .680). In line with this quantitative view, one of the respondents wrote that:

“ICT makes work easier for teachers and learners. It enhances critical thinking and helps learners to be actively involved in learning”.

The participants agreed that using ICT in teaching and learning promotes innovation and problem-solving skills of their students (77.8%, n=70, M = 4.02, SD = .779). In support of this finding, one of the participants stated:

“learners are more motivated and as such, they become more creative when they are faced with new learning environments. Also, they are prone to assimilate in a disciplined way working collaboratively with their peers. As a result, they can generate knowledge. They will have the capacity to handle rapid change in any environment”.

Additionally, majority of the respondents agreed that using ICT in teaching and learning enhances collaborative learning among students (85.5%, n=77, M = 4.26, SD = .728). This finding was expected as many researchers agree that collaborative learning enhances learners’ academic performance. Similarly, most of the participants agreed that ICT promotes research-based teaching and learning (87.6%, n=77, M = 4.40, SD = .700). Moreover, most of the participants agreed that using ICT in teaching and learning serves a catalyst in the quest to ensure quality education (77.7%, n=79, M = 4.39, SD = .685). In harmony with this rating one participant asserts that:

“\textit{I want to play my part in contributing to the attainment of the sustainable development goals, where it advocates for quality education and ICT is one of the components that gives quality to education.”}

The participants maintain that lack of ICT at their disposal makes it difficult to keep up with the current trends in education (M = 4.37, SD = .814). In view of this, the participants acknowledged the relevance of using ICT in teaching and learning. Thus, most of them agreed
that the schools need to prioritize and integrate ICT pedagogical training in their CPD (98.9%, \(n=89, M = 4.46, SD = .706\)). One of the participants wrote to express the challenges that many of the teachers face in the use of ICT in teaching and learning.

“Some teachers do not know how to use/integrate ICT in their classroom, they received no or lack training on ICT.”

These researchers aimed to ascertain whether the use of ICT should be encouraged in schools. The study revealed that majority of the responded reacted positively to the statement that teachers need to be encouraged to use ICT in teaching and learning activities (98.9%, \(n=89, M = 4.63, SD = .608\)). Nevertheless, most of the participants disagreed that the use of ICT in teaching and learning is time consuming (70%, \(n=63, M = 3.70, SD = 1.16\)). However, most of the respondent agreed that ICT facilitates problem-based learning (62.1%, \(n=56, M = 3.62, SD = .919\)).

Table 2. Teachers' perception on the use of ICT in teaching and learning

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Using ICT make my teaching easier</td>
<td>4.48</td>
<td>.738</td>
<td>90</td>
</tr>
<tr>
<td>2 Using ICT enhances my learners' critical thinking</td>
<td>4.18</td>
<td>.680</td>
<td>90</td>
</tr>
<tr>
<td>3 Using ICT promote innovation and problem-solving skills of my learners</td>
<td>4.02</td>
<td>.779</td>
<td>90</td>
</tr>
<tr>
<td>4 Using ICT enhance collaborative learning among learners and teachers</td>
<td>4.26</td>
<td>.728</td>
<td>90</td>
</tr>
<tr>
<td>5 ICT promote research-based teaching and learning</td>
<td>4.40</td>
<td>.700</td>
<td>89*</td>
</tr>
<tr>
<td>6 Using ICTs help to ensure quality education</td>
<td>4.39</td>
<td>.685</td>
<td>90</td>
</tr>
<tr>
<td>7 Lack of ICT makes it difficult for teachers to keep up with the current trends in education</td>
<td>4.37</td>
<td>.814</td>
<td>90</td>
</tr>
<tr>
<td>8 Schools need to prioritize the ICT pedagogical training in their Continuous Professional Development (CPD)</td>
<td>4.46</td>
<td>.706</td>
<td>90</td>
</tr>
<tr>
<td>9 Teachers need to be encouraged to use ICT in their teaching and learning activities</td>
<td>4.63</td>
<td>.608</td>
<td>90</td>
</tr>
<tr>
<td>10 I find the use of ICT in teaching and learning a time consuming</td>
<td>3.70</td>
<td>1.12</td>
<td>90</td>
</tr>
<tr>
<td>11 ICT facilitates problem-based learning</td>
<td>3.62</td>
<td>.919</td>
<td>90</td>
</tr>
</tbody>
</table>

Overall 4.23 .770 |

* The total was less due to missing responses.

5.3 ICT usage in teaching and learning

Table 3 illustrates descriptive statistics of each item that tested ICT usage in teaching and learning. The respondents used a five-point Likert scale (i.e., 1=Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree) to rate their willingness to use ICT in teaching and learning. Nine items were used in this investigation. The results in Table depicts the overall
mean score of the frequency of ICT usage in teaching and learning as ($M = 2.91, SD = 1.16$) which infers that participants of this study moderately use ICTs in their classrooms.

Most of the teachers use ICT (computers/laptop with internet) to search information during their lesson planning and preparations ($83.2\%, n=74, M = 4.11, SD = .910$). Such significant agreement on the use of ICT gained overwhelming support from respondents’ views as expressed and extracted from the open-ended responses. One of the respondents wrote:

“teachers should use ICT devices for planning their lessons, as they will do more research on the topic to be presented.” Another teacher uttered similar sentiment by suggesting that “ICT may be a hustle to use in the beginning, but once one gets the hang of it - it makes daily lesson planning as well routine assessment more convenient and efficient. Also, learners will be more interested in the subject when it is presented with the aid of various ICT resources.”

The results in Table 3 shows a slight positive result as the majority of the respondent agreed that they use ICT (Interactive whiteboard/projector) to arouse and direct their learners’ attention which would subsequently make their lesson interesting ($48.3\%, n=43, M = 3.38, SD = 1.301$). Complement to this, these quotations represent some views of teachers extracted from the open-ended part of the questionnaire:

“It keeps learners curious of the next information to come. Viewing on a projector draw learners’ attentions”.

“teachers should incorporate ICT in teaching because it makes work easier and attracts learners’ attention.”

“using ICT makes teaching easier for teachers and it gasps the learners’ attention.”

The participants were tasked through the close-ended part of the questionnaires to indicate whether they motivate their students to learn collaboratively by solving task together through the use of internet. With this question, the majority of the respondents agreed that they constantly motivate their learners to learn and collaboratively solve tasks using the internet ($77.8\%, n=70, M = 3.35, SD = 1.109$). In view of this, we aimed to ascertain, subjectively, through the open-ended questions on what gingers their desire to such motivation. Various
teachers from the open-ended questions expressed complimentary remarks. For example, one teacher states that:

“enhance positivity and concentration, ICT promote higher self-esteem among learners, learners are motivated when seeing and doing.”

“using ICT in teaching and learning is the best and learners will be actively involved during the lesson.”

Furthermore, a substantial number of respondents disagreed that they use an e-reader (a device to read books and newspapers on screen) during their lessons (61.8%, n=55, M = 2.46, SD = 1.109). These disagreements can be attributed to “the lack of electricity supply and inadequate ICT tools in schools”. In similar vein, the teachers maintained that they are challenged by the “limited technical and pedagogical ICT skills especially among female and senior teachers, pose a serious challenge to academic development and lead them to develop hatred of using ICT and also some female teachers and senior teachers feel they are not good enough to use ICT and its’ too late for them to learn either”. Majority of the teachers disagreed with the statement that they use desktop computers with access to internet connectivity in their classrooms (68.25%, n=60, M = 2.36, SD = 1.233). This situation is a common challenge in the education sector in Namibia and Africa at large. With this regard, a moderate number of the participants agreed that they only have access to computers in their school’s computer laboratory 49.4% (n=44, M =3.04, SD = 1.469). Although the respondents showed their willingness to use ICT in their classroom, most of them disagreed that they allow their learners to use gadgets (ICT devices) during the lesson (77.8%, n=70, M = 2.00, SD = 1.102). Teachers, in their discoveries, expressed a sense of insecurity as they maintain that “the use of ICT tools (tablets, laptops, mobile or smart phones among others) also make some learners lazy, addicted and when they are abuse, students use it for non-educational needs, for instance searching for pornography”

Moreover, participants disagreed by a large margin (80.9%, n=72, M = 1.97, SD = 1.162) with the statement “I prefer using ICT on my own when no-one is around or watching to see me making mistakes”. This implies teachers’ willingness to use ICT in teaching and learning. Meanwhile, majority of the participants agreed that they confidently use variety of ICT tools in their teaching instruction (80.9%, n=72, M = 3.53, SD = 1.035). However, in the open-
ended section of the questionnaire, respondents highlighted the “inadequate pedagogical, and technical training in ICT, inadequate ICT tools, poor or lack internet connection, inferior complex among female and veteran teachers of taking ICT use as mannish and for the young generation respectively” as some of the challenges that may dent their confidence in attempting to use different ICT devices in teaching.

Table 3. ICT usage in teaching and learning

<table>
<thead>
<tr>
<th>Items</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I use ICT (computer/laptop with internet) to search information during my lesson planning and preparation</td>
<td>4.11</td>
<td>.910</td>
<td>89*</td>
</tr>
<tr>
<td>2. I use ICT (Interactive whiteboard/projector) to arouse and direct my learners’ attention/make my lesson interesting</td>
<td>3.38</td>
<td>1.301</td>
<td>89*</td>
</tr>
<tr>
<td>3. I motivate my learners to learn and solve task collaboratively through the use of the internet</td>
<td>3.35</td>
<td>1.109</td>
<td>89*</td>
</tr>
<tr>
<td>4. I use E-reader (a device to read books and newspapers on screen) during the lesson</td>
<td>2.46</td>
<td>1.149</td>
<td>89*</td>
</tr>
<tr>
<td>5. In a classroom, I use desktop computers with access to internet</td>
<td>2.36</td>
<td>1.233</td>
<td>89*</td>
</tr>
<tr>
<td>6. I only have access to computers in our school computer laboratory</td>
<td>3.04</td>
<td>1.469</td>
<td>89*</td>
</tr>
<tr>
<td>7. I allow my learners to use gadgets (ICT devices) during the lesson</td>
<td>2.00</td>
<td>1.102</td>
<td>90</td>
</tr>
<tr>
<td>8. I prefer using ICT on my own when no-one is around/watching to see me making mistakes</td>
<td>1.97</td>
<td>1.162</td>
<td>89*</td>
</tr>
<tr>
<td>9. I confidently use different ICT devices in teaching</td>
<td>3.53</td>
<td>1.035</td>
<td>89*</td>
</tr>
</tbody>
</table>

Overall | 2.91 | 1.16 |

* The total was less due to missing responses.

5.4 Criteria for ICT selection in teaching and learning

Table 4 shows descriptive statistics of each item related to the criteria that teachers adopt in selecting the type of ICT tools or software to use in teaching and learning. Like the aforementioned criteria on answering the questions, the respondents were tasked to respond the questions, in the regard, using the five-point Likert scale (i.e., 1=strongly disagree, 2=Disagree, 3=Neutral, 4=Agree and 5=Strongly Agree) in rating their levels of agreement on 7 items used to investigate the criteria Namibian primary school teachers apply when selecting or deciding the ICT devices to use in teaching and learning.

In Table 4, the overall mean (M) score of the criteria teachers use in selecting ICT tools/software in teaching and learning is 3.66 with a standard deviation (SD) of 0.979, which suggests that participants in this study have reacted positively that they base of a certain criterion select ICT tools for teaching and learning. With this finding, the majority of the respondents agreed that the selection of ICT tools or devices for teaching and learning depends largely on the taught subject or the lesson objectives (73.9%, n=65, M = 3.91, SD = .853). A follow up open-ended question revealed that teachers decide on the ICT tool usage based on
the syllabus and lesson objectives. The respondents indicate that their choices for using whatever ICT tools are determined by the availability and accessibility of the tools at their various schools (80.7%, n=71, M = 3.93, 1.02).

The participants take diversity in learners’ needs as a criterion for ICT selection in teaching and learning (67.1%, n=60, M = 3.37, SD = 1.06). Additionally, majority of the participants agreed that they consider their familiarity with the ICT devices (what they frequently use) as criteria for selecting ICT tools of software in their teaching and learning processes (80.9%, n=72, M = 3.99, SD = .923). One teacher backed up this rating by suggesting that “because they are familiar to learners as most of the learners use them during their ICT classes.”

Table 4. ICT selection criteria in teaching and learning

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>St. dev.</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1  The type of ICT tools I use in teaching is largely dependent on</td>
<td>3.91</td>
<td>.853</td>
<td>88*</td>
</tr>
<tr>
<td>the lesson objectives and activities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2  The type of ICT tools I use in teaching is largely dependent on</td>
<td>3.93</td>
<td>1.02</td>
<td>88*</td>
</tr>
<tr>
<td>the availability and accessibility at school</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3  The type of ICT tool I use in teaching is largely dependent on</td>
<td>3.37</td>
<td>1.06</td>
<td>89*</td>
</tr>
<tr>
<td>different learners’ needs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4  I choose the type of technology (ICT devices) that I am familiar</td>
<td>3.99</td>
<td>.923</td>
<td>89*</td>
</tr>
<tr>
<td>with or frequently use</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5  I choose the latest ICT tools available for my teaching</td>
<td>3.24</td>
<td>1.03</td>
<td>89*</td>
</tr>
<tr>
<td>6  I choose the type of technology to increase pupils'/learners'</td>
<td>3.46</td>
<td>.978</td>
<td>89*</td>
</tr>
<tr>
<td>confidence in learning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7  I choose ICT tool based on the curriculum or subject policies</td>
<td>3.71</td>
<td>.991</td>
<td>89*</td>
</tr>
<tr>
<td>Overall</td>
<td>3.66</td>
<td>.979</td>
<td></td>
</tr>
</tbody>
</table>

* The total was less due to missing responses.

The respondents agreed that their choice of selecting ICT devices/software for teaching and learning depends on the latest ICT tools available (40.4%, n=36, M = 3.24, SD = 1.03). A considerable number of participants agreed that they choose the type of technology which helps to enhance learners’ confidence in learning towards academic development (90%, n=81, M = 3.46, SD = .978). From the open-ended question, the participants buttress this quantitative finding by maintaining that “ICT enhance greater enthusiasm towards their lesson, with less boredom and as well creates huge exposure to their learners on subject content.” The participants disclosed that their choice of ICT tool selection is also based on the curriculum or the subject policies (65.1%, n=58, M = 3.71, SD = .991).

In this study, we aimed further through the questionnaire to find out the type of ICT tools that teachers frequently use in teaching and learning. It emerged from the analysing the data, as
indicated in Figure 5, that laptops, smart phones, projectors and mobile phones are the commonly used ICT tools by teachers. The result specifically indicates that out of the total participants who responded to this item, 92.2% (n=83) agreed on using or have previously used laptops. 66 (73.3%) and 63 (70%) of the respondents are using or have previously used smart phones and projectors respectively.

![Figure 5. Type of ICT tool use by teachers](image)

### 5.5 Relationship among the research constructs

Table 5 shows the relationship between Namibian teachers’ perception on the use of ICT in education, their actual use of ICT in classrooms and the criteria teachers utilize in selecting ICT tools for usage in teaching and learning were investigated using Pearson correlation. This aspect is to provide answers to the hypothesis that has been formulated in Section 3.

From the results in Table 5, a moderate correlation was found between the Namibian teachers’ perception on the use of ICT in education and their actual use of ICT in classrooms (r = 0.265, n = 87, p < 0.05). This answers the fourth hypothesis (H4) in Section 3 which indicates that Teachers’ perception on the use of ICT in teaching and learning has a positive effect on ICT usage in classrooms. In the same vein, a significant correlation (r = 0.587, n= 86, p < 0.01) was found between the use of ICT in classrooms and the selection of the ICT tools for teaching and learning.
learning. However, results reveal that there was no statistically significant correlation between teachers’ perception on the use of ICT and ICT selection criteria ($r = .169$, $n = 86$, $p = .120$).

Table 5. Correlation among the various constructs

<table>
<thead>
<tr>
<th>Teachers perception on ICT use</th>
<th>Pearson Correlation</th>
<th>ICT usage in classrooms</th>
<th>ICT tools selection criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>.265*</td>
<td>.120</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.013</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>89</td>
<td>87</td>
<td>86</td>
</tr>
<tr>
<td>ICT usage in classrooms</td>
<td>Pearson Correlation</td>
<td>.265*</td>
<td>.587**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.013</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>87</td>
<td>88</td>
<td>86</td>
</tr>
<tr>
<td>ICT tools selection criteria</td>
<td>Pearson Correlation</td>
<td>.169</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.120</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>86</td>
<td>86</td>
<td>87</td>
</tr>
</tbody>
</table>

*Correlation is significant at the 0.05 level (2-tailed). **Correlation is significant at the 0.01 level (2-tailed).

In further investigation, as this aligns with the research objectives, a Multiple Linear Regression (MLR) was used to predict the Namibian primary teachers’ perception on the use of ICT in teaching and learning. In this analysis, the constructs of ICT usage in classroom was identified to represent dependent variables. Whereas teachers’ perception on the use of ICT in teaching and learning as well as ICT tools selection criteria represented as the independent variables. Furthermore, gender was identified to denote a control variable. In predicting, we represented ICT usage in classroom as $Y$, Teachers’ perception as $x_1$, ICT tool/software Selection Criteria as $x_2$ and gender as $x_3$. Additionally, in this equation, “b” denotes a regression weight, “Y” represents dependent variables while “x” depicts the independent and control variables. Bearing in mind the equation above, a symbolic regression model is deduced from Table 8 and is represented by the equation 5.1 below. The equation 5.2 depicts a Multiple Linear Regression equation of the unstandardized model which signifies the relationship between the dependent and independent variables.

$$Y = b_0 + b_1x_1 + b_2x_2 + b_3x_3$$

(5.1)

$$Y = .149 + .355x_1 + .438x_2 - .174x_3$$

(5.2)

The overall $p$-value as shown in Table 7 is .000 which implies that the probability of F statistic (14.615) of the overall regression is statistically significant ($F (3,79) = 14.615$, $p < .001$). Table 6 shows an overall Multiple Regression for the relationship between constructs (dependent and independent variables) as .597 with the Adjusted R Square yielded .357. The overall model is
significant and thus, explains 35.7% of the variance in the Namibian teachers’ perception in
the use of ICT in teaching and learning.

Considering the individual constructs, the Multiple Regression model produced $R^2 = .357$, $F(3, 79) = 14.615$ which is statistically significant because the $p$-value is less than the significance
level of .001. Meanwhile the Durbin Watson is 2.075 which is close to 2, therefore there is no
autocorrelation in the sample and as such the independence criteria is filled. Further analysis
as shown in Table 8 reveals that ICT tools selection criteria ($p$-value = .000) and teachers’
perception on the use of ICT in teaching and learning ($p$-value = .017) had significant
regression weights, which implies that the hypothesis ($H_3$) and ($H_4$) can be accepted.
Meanwhile, the control variable as denoted by gender had an insignificant ($p$-value = 0.137)
regression weight.

Table 6. Model summary

<table>
<thead>
<tr>
<th>Model</th>
<th>$R$</th>
<th>$R$ Square</th>
<th>Adjusted $R$ Square</th>
<th>Std. Error of the Estimate</th>
<th>Durban-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.597$^a$</td>
<td>.357</td>
<td>.337</td>
<td>.357</td>
<td>2.075</td>
</tr>
</tbody>
</table>

$a$. Predictors: (Constant), ICT tools’ Selection Criteria, Teachers’ Perception on the use of ICT, Gender.

$b$. Dependent Variable: ICT usage in classrooms

Table 7. ANOVA table depicting the overall significance of the model

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Squares</th>
<th>$F$</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>10.646</td>
<td>3</td>
<td>3.549</td>
<td>14.615</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>19.182</td>
<td>79</td>
<td>.243</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>29.827</td>
<td>82</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$a$. Predictors: (Constant), ICT tools’ Selection Criteria, Teachers’ Perception on the use of ICT,

$b$. Dependent Variable: ICT usage in classrooms

Table 8. Regression coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
<td>Standard Error</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>.149</td>
</tr>
<tr>
<td></td>
<td>Teachers’ Perception on the use of ICT</td>
<td>.355</td>
</tr>
<tr>
<td></td>
<td>ICT tools selection criteria</td>
<td>.438</td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td>-.174</td>
</tr>
</tbody>
</table>

$a$. Predictors: (Constant), ICT tools’ Selection Criteria, Teachers’ Perception on the use of ICT, Gender.

$b$. Dependent Variable: ICT usage in classrooms
5.6 Effect of gender on the use of ICT in teaching and learning

The relationship between teachers’ perception on the use of ICT in terms of gender are presented in this section. The results from the Normality tests (Table 11) shows that Teachers’ Perception of teachers towards the use of ICT was normally distributed for both male (skewness of 0.128, SE = 0.427 and a kurtosis of -.540, SE = 0.833) and female (skewness of -0.356, SE = 0.316 and a kurtosis of 0.399, SE = 0.623). Regarding ICT usage in classroom, the data were normally distributed for male and for the female data were not normal distributed, with skewness of 0.624 (SE = 0.427) and kurtosis of 1.525(SE = 0.833) for male and a skewness of 0.612 (SE = 0.319) and a kurtosis of 1.886(SE = 0.628) for female. Similarly, the data for the ICT tools selection criteria was normally distributed for male (skewness of -.514, SE = 0.434, and kurtosis of 0.128, SE = 0.845) for male and were abnormally distributed for the female participants (skewness of -0.674, SE = 0.319; kurtosis of 1.590, SE = 0.628). Given that teacher’s perception on the use of ICT for both male and female is normally distributed, an independent sample t-test was performed to ascertain the significant level from the comparison. Whereas a nonparametric test (Mann-Whitney U – test) was performed on both ICT usage in classroom and ICT tool selection criteria respectively.

Tables 9 and 10 depict the results from the independent-sample t-test where the scores on the perception teachers hold on the use of ICT was insignificantly higher for male than for the female counterparts (t (85) = .711, p > .05, d =0.078). This implies that there is no statistical significance difference found between genders on the perception teachers hold on the use of ICT in teaching and learning. A Mann-Whitney test (Table 12 and 13) indicated that ICT usage in classroom was greater for male than for female (U = 525.500, p = .004, r = .308). This signifies that a statistical significance difference was found between gender on the use of ICT in classrooms. Further, a Mann-Whitney test indicated that ICT tool’s selection criteria was greater for male than for the female (U = 617.500, p = .070, r = .196). This suggests that no statistically significant was found between gender on the ICT selection criteria in teaching and learning.
Table 9. Independent sample t-test

<table>
<thead>
<tr>
<th>Teachers’ Perception on the use of ICT</th>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>T</td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>.422</td>
<td>.518</td>
<td>.711</td>
</tr>
<tr>
<td>Equal variances not assumed</td>
<td>.747</td>
<td>67.839</td>
<td>.458</td>
</tr>
</tbody>
</table>

Table 10. Descriptive Statistics table for the constructs

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Cohen’s d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers’ Perception on the use of ICT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (1)</td>
<td>30</td>
<td>4.12</td>
<td>.355</td>
<td>.078</td>
</tr>
<tr>
<td>Female (2)</td>
<td>57</td>
<td>4.06</td>
<td>.417</td>
<td></td>
</tr>
</tbody>
</table>

Table 11. Test of Normality in the data for the various constructs

<table>
<thead>
<tr>
<th>Gender</th>
<th>Skewness</th>
<th>SE</th>
<th>Kurtosis</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers’ Perception on the use of ICT</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (1)</td>
<td>.128</td>
<td>.427</td>
<td>-.540</td>
<td>.833</td>
</tr>
<tr>
<td>Female (2)</td>
<td>-.356</td>
<td>.316</td>
<td>.399</td>
<td>.623</td>
</tr>
<tr>
<td>ICT usage in classrooms</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (1)</td>
<td>.624</td>
<td>.427</td>
<td>1.525</td>
<td>.833</td>
</tr>
<tr>
<td>Female (2)</td>
<td>-.514</td>
<td>.319</td>
<td>1.886</td>
<td>.628</td>
</tr>
<tr>
<td>ICT tools selection criteria</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (1)</td>
<td>-.514</td>
<td>.434</td>
<td>.128</td>
<td>.845</td>
</tr>
<tr>
<td>Female (2)</td>
<td>-.674</td>
<td>.319</td>
<td>1.590</td>
<td>.628</td>
</tr>
</tbody>
</table>

Table 12. Mann-Whitney Test among the gender (male and female)

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICT usage in classrooms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (1)</td>
<td>30</td>
<td>53.98</td>
<td>1619.50</td>
</tr>
<tr>
<td>Female (2)</td>
<td>56</td>
<td>37.88</td>
<td>2121.50</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>86</td>
<td></td>
</tr>
<tr>
<td>ICT tools selection criteria</td>
<td>Male (1)</td>
<td>Female (2)</td>
<td>Total</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------</td>
<td>------------</td>
<td>-------</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>56</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>49.71</td>
<td>39.53</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1441.50</td>
<td>2213.50</td>
<td></td>
</tr>
</tbody>
</table>

Table 13. Test statistics for the ICT usage in classroom and ICT tool selection criteria.

<table>
<thead>
<tr>
<th>Test</th>
<th>ICT usage in classrooms</th>
<th>ICT tools selection criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mann-Whitney</td>
<td>525.500</td>
<td>617.500</td>
</tr>
<tr>
<td>Wilcoxon W</td>
<td>2121.500</td>
<td>2213.500</td>
</tr>
<tr>
<td>Z</td>
<td>-2.857</td>
<td>-1.811</td>
</tr>
<tr>
<td>Asymp.Sig.(2-tailed)</td>
<td>.004</td>
<td>.070</td>
</tr>
</tbody>
</table>
6. DISCUSSION

The purpose of this research work was to investigate the perceptions that the Namibian primary school teachers hold towards the use of ICT in teaching and learning. The study further investigated the use of ICT in classrooms and the criteria that teachers use in selecting ICT devices for their teaching. In the end, the study investigated the effect of gender on the use of ICT in teaching and learning. This section presents the discussion of the results.

6.1 Perceptions of ICT usage in Namibian education

The overall results as presented in Table 2 have exhibited that Namibian primary school teachers hold positive perceptions towards the use of ICT in teaching and learning. The implication of this finding is that teachers appreciate the relevance of ICT in teaching and learning. Teachers in Namibia understand that when ICT is allowed in schools, teaching will be flexible and students performance will improve. With this finding, the government’s effort of integrating ICT in all schools in Namibia will be smooth as the majority holds a positive perception towards its integration in schools. Respondents in this research work regards ICT pedagogical training and teachers’ motivation as measures that can speedily boast their desire and ability to use ICT in teaching and learning. As a result, teachers recommend for the schools to prioritize ICT pedagogical training and teachers’ motivation in their School-Based Continuous Professional Development (SBCPD). This finding is consistent with some learning theories and findings from literature in other parts of the world in respect of the ICT integrations in teaching and learning. For instance, research findings by Buabeng-Andoh (2012) reveals that CPD and teachers’ motivation at school level emerged as possible measures to tackle existing barriers such as lack of teacher ICT skills, lack of teacher confidence and lack of pedagogical teacher training. Similarly, Simon and Ngololo (2015) underscore CPD programme as a vibrate mode through which Namibian teachers can be motivated, equipped, readied and updated with modern ICT skills necessary to cope with the current trends in education. Furthermore, the overall findings support the results obtained by Al-Munawwarah (2014) where teachers have positive perceptions towards the use of ICT in teaching and learning of subjects such as English.

Furthermore, cultivating teachers’ positive attitude towards ICT usage has a potential impact on the perception of teachers. This is largely because of the constructive role that ICT play in teaching and learning (MoE, 2006a; MoE, 2010; Saxena, 2017; Adam, 2014; Yunus, 2014;
Despite the overall positive perception of teachers in Namibia towards teaching and learning, this finding shows that teachers’ motivation is a key and determining factor for using ICT in teaching and learning. This therefore implies an urgent for the Namibian government through the MoEAC to motivate teachers towards enhancement and sustainable positive perception on the use of ICT in teaching and learning. This can be supported by Hassanzadeh (2012) whose research reveals teachers' motivation as an integral part in enhancing teachers’ attitude towards the use of ICT in teaching and learning. With these findings, we believe that teachers’ motivation on the use of ICT can be boosted through various intervention such as courses, programmes, seminars, events and workshops, from fellow teachers or colleagues, through experience and experimentation, personal research, professional networks and associations or continuous professional development (UNESCO, 2011; MoE, 2006b; MoEAC, 2017).

Respondents of this study maintain that ICT make their teaching easier. This implies the acceptable level of teachers regarding the impact of ICT in pedagogical instruction of their pupil. With the use of ICT, Teachers in Namibia will be able to conduct teaching at anytime and anywhere with the use of ICT. This is more so when the internet is adequately used to connect with students remotely. This finding can be supported by similar research by Chiappe (2016) who advocates for the extensive use of ICT and the internet to make teaching easy. This approach, according to Chiappe (2016), helps in achieving collaboration or sharing of information between teachers and pupils.

Teachers and pupils benefit in education as ICT tools are associated with providing easy teaching and learning, increase efficiency and effectiveness of education, teaching with ICT facilities is more significant than that of ordinary teaching method (Abudu, 2012; Banday, 2012). The finding implies that teachers are aware and appreciative of the impact of ICT on their teaching. Similar literature can be drawn from the findings of Cox and Preston (2000) who reported that using ICT make classroom lessons more interesting, easier, fun for both teachers and pupils, more diverse, more motivating for the pupils and more enjoyable. Moreover, transcending from the traditional ways of teaching in Namibia into the contemporary approach, teaching requires teachers to research what to teach and teach what they research. Thus, respondents to this study felt the integration of ICT in teaching and learning promotes research-based teaching and learning. This finding goes to indicate that teachers in Namibia understands that ICT and the internet can help them to make research and
to get teaching materials for teaching. This implication therefore gives a brighter note for smooth implementation of ICT in schools. This finding compliments the findings obtained by Sejzi (2012) where the integration of ICT in teaching and learning suggested to have significantly pave ways for designing new learning environments and advancing research in the education fraternity.

In the end, teachers were positive that the current trends of ICT intervention in teaching and learning helps in the quest to ensure quality education for all. The implication of this perception indicates the acknowledgment of teachers on the advancement of ICT in recent times. This finding is a tacit admission of ICT being a way forward on achieving quality education. The finding concurs with the results of Ghavifekr and Rosdy (2015) where technology-based teaching and learning and professional development training programs for teachers are found to play significant role in ensuring quality education. In the same vein, the use of ICT facilitates the realization of student-centred approach necessary for the development of analytical, information handling skills and subsequently enhance educational quality (Venezky & Mulkeen, 2002).

6.2 The use of ICT in classrooms

It is evident from the results presented in Table 3 that there is a moderate use of ICT in classrooms as teachers are challenged by the inadequate ICT tools, poor electricity supply, poor or no internet connection, negative connotation attached to the use of ICT tools such as mobile or smart phones) and inadequate pedagogical training for teachers. These challenges impede ICT integration in teaching and learning despite the positive perception that teachers hold on the relevance of ICT in education. The implication, as we found, is that teachers’ willingness to adopt ICT is impeded by these challenges. In a related research work, Almani (2012) found that ICT tools are essential and useful in teaching and learning but majority of schools are without computers and networks or internet support. The findings also confirm the challenges raised by the Namibian’ Ministry of Economic Planning (2017) that the availability and access to telecommunication services in a larger part of the country has become a challenge because of irregular access to electricity and high unit costs for rolling out ICT infrastructure in a vast geographic area. These results also confirm those of Ngololo, Howie and Plomp (2010) who revealed that ICT and pedagogical use are low due to poor of pedagogical support in ICT, limited professional development courses in ICT, and insufficient of ICT related resources.
In Namibia and most developing countries, a considerable number of teachers lack ICT knowledge and faced with inadequate ICT related technical support, and this is reported as the major stumbling blocks in using ICT for teaching and learning (Isaacs, Kazembe & Kazondovi, 2018; MoEAC, 2017; Lau & Sim, 2008; Kiptalam & Rodrigues, 2010). Aside these challenges, respondents to this study also indicated confidential use of the available ICT tools to arouse and direct learners’ attention, which in a process makes their lessons interesting. This implies that teachers can use ICT tools to teach should there be adequate training and ICT resources or infrastructure. In a related study, findings revealed that ICT use in classrooms enhances learner support, pedagogical instructions and as a result create a conducive learning environment (Postholm, 2007). However, there is an urgent need for pre-emptive measures of addressing the challenges faced by teachers well before they (challenges) negatively affect teachers’ perception towards the use of ICT in teaching and learning.

This study has revealed that with the availability of ICT tools/software, teachers are able to search information during lesson planning and preparation and as well motivate learners to collaboratively use internet when solving learning tasks. These results align with the results of Kervin (2013) who found that Australian teachers use technology for lessons preparation and mobile technologies to communicate with their colleagues and pupils. Similarly, Postholm (2007) discovered that internet connectivity provides opportunity for pupils to search and access information from the internet. Additionally, Majumdar (2015) reported that various ICT tools facilitate the smooth implementation of prominent theories such as constructivism, problem-based learning, distributed cognition, socio cultural concept etc., necessary in designing a collaborative, learner centred and engaging learning environments.

6.3 Criteria for ICT selection in teaching and learning

In this study, the results presented in Table 4 shows various criteria teachers adopt in selecting ICT tools for teaching and learning. For instance, teachers decide to use ICT based on their lesson objectives and activities. With this finding, teachers in Namibia don’t just select any ICT tools for teaching and learning, rather teachers select or acquire ICT tools or software based on the intended objectives of the subject. For instance, teachers would acquire Microsoft office suite if they are to teach students a course in computer applications. These are still the expectations and perception of teachers in the use of ICT in teaching and learning. In a related
Richards (2005) reported that teachers need to consider overall design elements when setting-up specific teaching and learning activities, criteria, and outcomes which exemplify effective ICT-supported learning. The results also concur with those of Schmid (2012) who reported that teachers use ICT devices, such as interactive whiteboards, in classroom settings to meet their lesson objectives. This improves constructive classroom activities and implement a variety of different approaches in learning. Subject policy and curriculum also emerged to measure and determine the type of ICT to use in teaching and learning. The result aligns with that of McGarr (2009) when reported that the proliferation of ICT in society aid the transition from teaching ICT as a discrete informatics subjects into viewing ICT as a technological approach for learning across the curriculum. Thus, teachers are obliged to uphold the prevailing national, regional or school ICT culture just as the ICT subject policy and the national curriculum dictates.

The implementation of the much-advocated inclusive education needs to reconsider the integration of ICT to accommodate learners with diverse learning needs and background. Hence, respondents in this study, pinned pointed that they take due cognisance of the diversity in learning when deciding on the type of ICT tool or software to use in teaching and learning. This finding is in line with the work of Lau and Sim (2008) and Apeanti (2014) who identified ICT as key in helping teachers to meet the varying needs of students. Additionally, teachers turn to choose ICT devices that they are familiar with or frequently use and widely depend on the availability and accessibility at school. With this finding, Beach (2014) found that teachers and pupils are encouraged to use the readily available devices and those that they are familiar with when doing class activities.

The foremost ICT devices that teachers choose to use, as presented in Figure 5, are laptops, smart phones, projectors and mobile phones. This is because teachers find these devices to be affordable, accessible, portable and handy. Having to use these tools in teaching and learning is the way to go. Although, this study has revealed inadequacy of ICT tools and other mediating factors in the Namibian primary schools, teachers prefer the aforementioned tools. This finding alerts the government on some of the ICT tools that will easily be acceptable in the education arena. In a similar vein, Jacob and Isaac (2014) who found laptops, mobile and smart phone as popular mobile devices used in learning because of their affordability, portability, and handiness. Findings under this section implies that selection criteria enable teachers to understand what tool is appropriate for what lesson they teach.
Table 5 presents the overall relationship between teachers’ perception on the use of ICT, ICT usage in classrooms and the ICT tool selection criteria. On the one hand, the results show a significant relationship between the Namibian teachers’ perception on the use of ICT in education and their actual use of ICT in classrooms. This finding implies that what teachers perceive with respect to ICT usage in education is exactly what they practice or will practice. The perception is good for the Namibian government to achieve the Vision 2030 on integrating ICT education and training into education and training system. In the same vein, a significant positive correlation was also found between the use of ICT usage in classrooms and the selection criteria of the ICT tools for teaching and learning. The implication of this finding is that teachers use of ICT is largely dependent on the kind of ICT tools or software to use for teaching. As already established, the section criterion is also dependent on certain factors, such as the lesson objectives. A correlation analyses by Teo (2008) revealed a significant association between teachers’ computer use, level of confidence, and attitudes. Apeanti (2014) undertook a study and further established a significant positive correlation between the perception of prospective teachers and their willingness to use ICT in teaching. This finding implies that, teachers with positive perception about the use of ICT in teaching and learning will eventually be more willing to use ICT in their teaching than those with negative perception.

From MLR analysis, the results as presented in Table 8 which reports the ICT selection criteria as the most significant motivational factor that influences the use of ICT in classrooms. The reported finding suggests that teachers habitually use computer and Internet applications in the classroom when: 1) there is adequate computers for use 2) teachers consider themselves to be more competent to use ICT in teaching and learning 3) teachers are convinced that ICT improve student learning and 4) teachers’ readiness to employs constructivist approach of teaching and learning (Petko, 2012). This implies that specific ICT tools can only be utilised in teaching and learning when teachers decide to use them based on their diverse selection criterion. Based on Table 4 and responses from the open-ended section of the questionnaire, these criteria may include what teachers are familiar to use, the availability and accessibility of the ICT tools, learners’ learning needs, teaching approaches, learning activities, lesson objectives, subject policy, curriculum etc. This further implies that selection criteria enable teachers to understand what tool is appropriate for what lesson they teach. Hence, teachers are at liberty to step-up personal scope by considering the overall design elements when selecting ICT tools for teaching and learning.
The results from this study found teachers’ perception on the use of ICT as a predictive factor that can also significantly triggers the use of ICT in classrooms. This infers that teachers’ positive perception has positive effects on the use of ICT in classroom. Hence, various measures aimed at boosting teachers’ perceptions on the ICT in classroom need to be inevitably undertaken at all levels of the education sector. These measures may include and not limited to teachers’ pedagogical, and technical training in ICT, modernized teachers’ motivational strategies, equitable provision of the ICT tools, electricity supply and internet connectivity to schools. In line with these findings, in their Strategic Plan for 2017-2022 the MoEAC has acknowledged these limitations and underscored an urgent need to the prioritization of the infrastructural development, enhanced teachers’ motivation, and pedagogical skills in ICT through CPD (MoEAC, 2017).

6.4 Effect of gender on the use of ICT in teaching and learning

Considerable studies have reported gender difference in relation to the use of ICT in classrooms, teachers’ willingness to use ICT, teachers’ attitudes towards ICT integration in teaching and learning, ICT self-efficacy, and the adoption of constructivist beliefs of teachers. In this study, the results as presented in Table 9, 10, 12 and 13 suggest that the use of ICT by male teachers is relatively higher than their female counterparts. This translate into a statistical significance difference between gender on the use of ICT in classrooms. Such disparities between male and female on the use of ICT can be because minimal to the lack of technical skills in ICT which would be preceded by sociocultural belief of taking ICT use as mannish. In addition, when such disparities are not addressed would give credence to escalation of the inborn stigma of male superiority and female inferiority complex towards the use of ICT and subsequently have a significant impact on the female teachers becoming technophobic. Extant research has reported that male teachers perceived confidence in the use of ICT than their female counterpart (Mahdi & Al-Dera, 2013). Teo (2014) found a significant difference between gender for perceived ease of use, with male teachers rating higher than their female counterparts. Also, in Ghana a study by Buabeng-Andoh (2015) reported that male teachers’ perceived confidence in the use of ICT was higher than for the female teachers.

In the quest to mitigate gender inequality on the use of ICT in education and technophobic, women are empowered to use and feel comfortable with ICT. Hence, a paradigm shifts from
ICT in education to ICT for education by all stakeholders regardless of gender, sociocultural belief or historical background (MoE, 2005). It therefore evident from this study that the superiority among male teachers is gradually fading. Thus, although more male teachers hold positive perception towards the use of ICT than their female counterparts there is no statistically significant difference between gender. However, there is still an urgent need for the intensification of the pre-emptive measures aimed at challenging the perpetual status quo of gender imbalances on the use of ICT in teaching and learning. Additionally, a statistically significant difference was found between gender on the ICT selection criteria in teaching and learning. In a related study, Saltan (2016) reported difference between ICT selection criteria such as ICT ease of use in terms of gender as an indicator but the difference is statistically insignificant.
7. CONCLUSION

The research questions formulated in Chapter 3 were answered by conducting a self-administered questionnaire, analysing literatures and driving conclusions based on several international and national ICT related policies and regulations. The self-administered questionnaire was used to gather information about the Namibian primary school teachers’ perception on the use of ICT in teaching and learning. Furthermore, the study also investigated the effect of gender on the use of ICT in teaching and learning.

Generally, the results show positive perception that primary school teachers hold on the use of ICT in teaching and learning. Despite the challenges associated with ICT integration in Namibia, teachers have demonstrated their willingness to use the available ICT tools for teaching and learning. In addition, teachers employ several criteria in selecting ICT tools to use in teaching and learning. Lastly, male teachers are found to use ICT than their female counterparts. This section presents the detailed answers to the research questions, recommendations, further research and limitations of the study.

7.1 Answers to the research questions

The results from this study are presented and discussed in Chapter 5 and 6 respectively. The answers to each research question are therefore presented in this section.

RQ1: What perception do the Namibian primary teachers’ hold about the use of ICT in teaching and learning?

Pursuant to this research question, the results show that Namibian primary school teachers hold positive perceptions towards the use of ICT in teaching and learning. With this finding, teachers maintain that ICT makes their teaching easier, promotes research-based teaching and learning and above all ensures quality education for all. Amidst challenges such as poor or lack of teachers pedagogical training in ICT, teachers remain positive towards the use of ICT. Teachers also recognise the relevance of ICT usage in teaching and learning. Thus, teachers recommend for the prioritisation of ICT in pedagogical training at school level in School-Based Continuous Professional Development. This finding was achieved through the collection of primary sources of data and eventually analysed from the qualitative and quantitative approaches.
RQ2: Do the Namibian primary teachers use ICT in classrooms?

Regarding this research question, the results reveal that there is a moderate use of ICT in the Namibian schools (Table 3). This is because teachers are challenged by inadequate ICT tools, lack of electricity supply, poor or no internet connectivity, negative connotation attached to the use of ICT tools (mobile or smart phones) by pupils and inadequate teachers’ pedagogical training. Despite these challenges, teachers use the available ICT tools to arouse and direct learners’ attention, which in a process makes their lessons interesting. In addition to this, teachers use the available ICT tools to search information during lesson planning and preparation. Likewise, where internet is not a hindrance, learners are motivated to collaboratively use internet when solving learning tasks.

RQ3: What criteria do Namibian primary school teachers use in deciding the type of technology to use?

Several selection criteria are required for successful use of technology in teaching and learning in the classroom of the 21st century. Some of these criteria were investigated and the teachers’ opinions were sought through open- and closed-ended self-administered questionnaire. From the analysis, teachers use ICT in teaching and learning based on the lesson objectives, activities, subject policy, curriculum and learners’ diverse learning needs. Additionally, the results reveal affordability, accessibility, portability and handedness as the criteria teachers use in selecting ICT devices such as laptops, smart phones, projectors and mobile phones (Figure 5). Based on the Pearson Correlation (Table 10), the results of the investigation reveal a significant correlation between the use of ICT in classrooms and the selection criteria of the ICT tools for teaching and learning. Subsequently, MLR analysis performed on the data which found ICT selection criteria and teachers’ perception on the use of ICT as the significant motivational factors that influences the use of ICT in classrooms (Table 8).

RQ4: Does the teachers’ perception on the use of ICT in teaching and learning has any effect on ICT usage in classroom?

Regarding this research question, Pearson Correlation (Table 10) and MLR analysis (Table 8) were performed on the data. Results from the Pearson Correlation exhibited a moderate correlation between the Namibian teachers’ perception on the use of ICT in education and their
actual use of ICT in classrooms. Additionally, form MLR analysis, teachers’ perception on the use of ICT was found as a significant motivational factor that influences the use of ICT in classrooms.

**RQ5: Does gender affects the use of ICT in teaching and learning?**

To establish the effects of gender on the use of ICT in teaching and learning, an independent sample t-test and Mann-Whitney U – test were performed on the data. The results indicated that there is a statistical significance difference between gender on the use of ICT in classrooms (Table 9, 10, 11,12 and 13). Hence, the use of ICT by male teachers is relatively higher than their female counterparts. Sociocultural belief of taking ICT use as mannish, inborn stigma of male superiority, female inferiority complex and technophobic emerge as the major contributing factors to the gender disparities on the use of ICT in education.

**7.2 Recommendations**

The results of this research work have revealed some evidence of deviations in the planning, distribution and use of ICT in Namibian primary schools. The relevance of this research work is to use the findings as base to bridge the existing gap between the planning, distribution of ICT devices to schools and enhance the ability for teachers to effectively use ICT devices in teaching and learning. In this section, key recommendations and guidelines are proposed for Namibia and other developing countries if applicable. The following are the proposed recommendations:

- Some of the prominent issue regarding the negative effect of teachers’ perception to the use of ICT is lack or poor ICT pedagogical training and teachers’ motivation. We recommend that the Namibian government, through the MoE, should ensure pre-emptive measures of equipping teachers with skills necessary for the adaption of modern ICT tools in education. Further, intensive teaching and teacher training programmes that cover ICT integration and the use of ICT need to be urgently enforced at all levels of education.

- Several limiting factors to the effective use of ICT in teaching and learning have emerged from this study. Notably, inadequate ICT tools, lack of electricity supply, poor or no internet connectivity, negative connotation attached to the use of ICT tools (mobile or smart phones) by pupils. To mitigate these challenges, these researchers
recommend for equitable distribution of ICT devices, reliable internet connectivity and electricity supply to schools. In addition, the government through the MoE, policies and decision makers should consider introducing and regulating the Bring Your Own Device (BYOD) strategy to schools. The proposed BYOD strategy refers to the “technology model where teachers and learners bring a personally owned ICT device with various apps and embedded features to use anywhere, anytime for teaching and learning purposes” (Song, 2014, p.52). Another dimension, the MoE, policies and decision makers at all levels need to consider is the introduction of mobile devices for learning. The BYOD strategy and introduction of mobile devices for learning are viable measures of ensuring teaching and learning is not hindered by the lack of ICT devices, internet connectivity, electricity supply and financial burdens to the government. Awareness about the application and relevance of ICT devices such as mobile devices for learning should be critically considered to all stakeholders especially teachers, learners and parents.

- We recommend the schools under the MoEAC to solicit donations of the ICT devices/software and renewable energy such as solar power from the corporate world (business community) and private sectors.

- Teachers training programs and Continuous Professional Development Programs at all levels (School, Circuit, Regional and National) should aim to inculcate tangible measures toward gender inclusivity on the use of ICT in teaching and learning. This recommendation is to bridge the gender inequality of the use of ICT in schools.

7.3 Limitations, suggestions for further research and research constrains

This thesis work was limited to teachers in the Namibian primary school in the Omusati Region. Thus, the results from this study cannot be generalised as the data was only collected from one out of fourteen educational Regions. Therefore, in order to complete the teachers’ views and generalize the findings, a similar research is needed in the other parts of the Namibian Educational Regions. Nevertheless, the findings are relevant for stakeholders of education towards the effective implementation of ICT in Namibia education.

Further, the study was limited to the perception of teachers in the use of ICT in teaching and learning. This, therefore, goes to suggest that these researchers did not administer any treatment, such as providing ICT training to teachers, on the use of ICT in teaching and
learning. We recommend that, future research in this subject would consider providing ICT pedagogical treatment to teachers. In this case, these researchers will be able to ascertain the real impact of ICT in teaching and learning through the collection of pre-test and post test data.

Teachers’ affect and psychological impact on the acceptance and use of ICT in teaching and learning was not thoroughly considered in this research work. Research have shown that teachers’ acceptance of ICT in teaching and learning is motivated by several factors. Among the factors, teachers’ motivation and affective state are key factors. In future, we recommend that similar studies should investigate further the affective influence of teachers towards the use of ICT in teaching and learning.

The research work was not without tremendous challenges. For instance, the number of participating teachers was small, which poses a challenge against the desired statistical analysis of the data. In addition, some potential participants could not partake in the study because of poor or lack of reliable internet connectivity at their respective schools. The researchers could not be able to travel to Namibia for data collection because of financial limitations. Hence, the data collection was limited to only self-administered electronic questionnaire. Challenges notwithstanding, these researchers achieve the research objectives. Thus, the above-mentioned challenges and limitations armed the researchers with useful experience to deal with similar challenges and in limitation in future studies or academics endeavours.
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APPENDICES

Appendix I : Questionnaire for teachers

Questionnaire on the Teachers’ Perception and Use of Information and Communication Technology (ICT) in Education at Primary Level

We are Master Degree Students from the University of Eastern Finland researching on teachers’ perception and the use of ICT in Education at Primary Level. The study form part of our Master Degree Thesis. Answering this questionnaire should require about 15 -20 minutes of your time. All responses are anonymous and are treated with strict confidentiality. Thank you very much for your collaboration. Your input is really important for our studies.

A. PERSONAL INFORMATION

1. Age
   [ ] Under 20  [ ] From 20 to 29  [ ] From 30 to 39  [ ] From 40 to 49  [ ] 50 or more

2. Gender
   [ ] Male  [ ] Female

3. ICT pedagogical training received
   [ ] None  [ ] Less than 1 year  [ ] 1 to 2 years  [ ] 3 to 4 years  [ ] More than 4 years

4. How long have you been using ICT in your teaching?
   [ ] None  [ ] 1 to 5 years  [ ] 6 to 10 years  [ ] 11 to 15 years  [ ] 16 to 30 years  [ ] More than 30 years

B. PERCEPTION OF TEACHERS ON ICT USAGE

This section contains a Likert scale where 5 – Strongly agree, 4 – agree, 3 – Neutral, 2 – disagree and 1 – strongly disagree. Tick as appropriate.

5. Using ICT make teaching easier
   [ ] Strongly disagree  [ ] Disagree  [ ] Neutral  [ ] Agree  [ ] Strongly agree

   [ ] Strongly disagree  [ ] Disagree  [ ] Neutral  [ ] Agree  [ ] Strongly agree

7. Using ICT promote innovation and problem-solving skills of my learners
   [ ] Strongly disagree  [ ] Disagree  [ ] Neutral  [ ] Agree  [ ] Strongly agree

8. Using ICT enhance collaborative learning among learners and teachers
   [ ] Strongly disagree  [ ] Disagree  [ ] Neutral  [ ] Agree  [ ] Strongly agree
9. ICT promote research-based teaching and learning
   [ ] Strongly disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly agree

10. Using ICT help to ensure quality education
    [ ] Strongly disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly agree

11. Lack of ICT makes it difficulties for teachers to keep up with the current trends in education
    [ ] Strongly disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly agree

12. Schools need to prioritize the ICT pedagogical training in their Continuous Professional Development (CPD)
    [ ] Strongly disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly agree

13. Teachers need to be encouraged to use ICT in their teaching and learning activities
    [ ] Strongly disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly agree

14. I find the use of ICT in teaching and learning a time consuming
    [ ] Strongly disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly agree

15. ICT facilitates problem-based learning
    [ ] Strongly disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly agree

16. What do you think about the benefits of integrating ICT in teaching and learning?

17. What do you perceive as the main challenges of using ICT in teaching and learning at your school?

18. I use ICT (computer/laptop with internet) to search for information during my lesson planning and preparation
    [ ] Strongly disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly agree

19. I use ICT (Interactive whiteboard/projector) to arouse and direct my learners’ attention/make the lesson interesting
    [ ] Strongly disagree [ ] Disagree [ ] Neutral [ ] Agree [ ] Strongly agree

20. I motivate my learners to learn and solve task collaboratively through the use of the internet
I use E-reader (a device to read books and newspapers on screen) during the lesson

I only have access to computers in the computer laboratory

I allow my learners to use gadgets (ICT devices) during the lesson

I prefer using ICT on my own when no-one is around/watching to see me making mistakes

I confidently use different ICT devices in teaching

The type of ICT tools I use in teaching is largely dependent on the lesson objectives and activities

The type of ICT tools I use in teaching is largely dependent on the availability and accessibility at school

The type of ICT I use is largely dependent on the diverse learners' needs

I choose the type of technology (ICT devices) that I am familiar with or frequently use

I choose the latest ICT tools available for my teaching

I choose the type of technology to increase learners' confidence in learning

I choose ICT tools based on the curriculum or subject policies
34. If in question 34 you disagree, please give reasons for your disagreement.

35. From the list below, indicate ALL the ICT device(s) that you are currently using/have used previously in teaching and learning

[ ] Desktop computer   [ ] Laptop   [ ] Mobile phone   [ ] Tablet

[ ] Smart phone   [ ] Television   [ ] Projector   [ ] Smartboard

36. Briefly explain what makes the ICT device(s) indicated in Question 36 suitable to use in teaching and learning?

37. What informs your decision for using the ICT tools in your teaching?

38. In what way can the use of ICT affect your learners’ attitude towards learning?

39. What advice would you give to other teachers about the use of ICT in teaching and learning?
Appendix II : Permission letters

To Whom It May Concern

Namibian teachers, who are participating in Master’s Degree Programme in Primary Education as a part of their studies, are conducting dissertation research. These studies consist of three different parts: a) planning seminar, b) working seminar and c) research report. To be able to complete the dissertation, they have to conduct empirical data collection, which is recommended to be carried out in Namibia. As a supervisor of their master’s thesis, I ask for Your kind support for their data collection under all necessary ethical requirements.

In Joensuu, 15th November, 2017

Sari Havu-Nuutinen
Professor
Academic head of the Master’s Degree Programme in Primary Education
Supervisor of Thesis
OMUSATI REGIONAL COUNCIL

DIRECTORATE OF EDUCATION, ARTS AND CULTURE

Team Work and Dedication for Quality Education

Tel: +264 65 251700
Fax: +264 65 251722

Enq: Laban Shapange
University of Eastern Finland
Joensuu
Yliopistokatu 2
PL 111, 80101 Joensuu

Att: Mr. and Ms. Jaliens

Subject: Permission for conducting dissertation research

This letter serves to notify the University of Eastern Finland that permission has been granted for their Namibian teachers (in reference of Mr. and Ms. Jaliens), who are participating in Master’s Degree Programme in Primary Education as part of their studies to conduct dissertation research. Please be informed that the research to be conducted at school should by no means whatsoever disrupt teaching and learning.

We hope and trust this exercise will enhance quality education in the Region.

Yours faithfully

Mr. Laban Shapange
Director of Education Arts and Culture

Cc: Inspectors of Education, Omusati Region;
    Principals for Primary Schools- Omusati Region

All official correspondence must be addressed to the Chief Regional Officer.
Appendix III: 30 Competencies

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