THE IMPACT OF INTERNATIONAL COMPUTER DRIVING LICENCE TRAINING ON THE USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN THE CLASSROOMS BY TEACHERS IN THE ZAMBEZI REGION

A THESIS SUBMITTED IN PARTIAL FULFILMENT

OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF EDUCATION (CURRICULUM, INSTRUCTION AND ASSESSMENT STUDIES)

OF

THE UNIVERSITY OF NAMIBIA

BY

PATRICK MUYAU KACELO

9003991

APRIL 2018

MAIN SUPERVISOR: DR PERIEN J. BOER

CO-SUPERVISOR: MR ALLEN M. CHAINDA

Abstract

The Namibian government, through Ministry of Basic Education, Arts and Culture chose ICDL training as a pathway for equipping teachers with basic ICT literacy skills. The purpose of this study was to investigate the impact of ICDL literacy training on Zambezi Region teachers and their use of ICTs in their classroom practices. An explanatory sequential mixed methods design was used for this study and targeted teachers who received ICDL training between 2007 and 2011. Purposive sampling was used to select a sample of 198 teachers for the quantitative phase and eight for the qualitative phase. One hundred and twenty questionnaires were returned with ninety-six completed and twenty-four blank. An adapted Becker survey and structured interviews were used to collect data and data analysis was done using both quantitative (SPSS) and qualitative methods. The results revealed that fifty percent of participants did not acquire the minimum requirements of four modules to be eligible for the ICDL certification. Fifty-three percent of teachers use computers outside their classrooms for lesson preparation and other professional activities, while only fourteen percent use ICTs regularly in their classrooms. Although ICDL training empowered participants with confidence to use PowerPoint, Word processing, Excel and internet skills, it failed to translate into teachers with anticipated critical thinking and technical skills needed to assess technologies and use them effectively in their classroom practices. The findings further revealed many challenges faced during and after training and recommendations include that more training be offered taking into account varying teachers' ICT skill levels, computers and ICT equipment be supplied in schools for easy use by teachers and competent ICT literacy trainers be used during trainings.

Table of Contents

List of tables

List of figures

List of abbreviations and acronyms

ETS	Education Test Services
ETSIP	Education and Training Sector Improvement Plan
GRN	Government Republic of Namibia
ICDL	International Computer Driving License
ICT	Information and Communication Technology
IT	Information Technology
MEAC	Ministry of Education, Arts and culture
MOE	Ministry of Education
NETSS	National Education Technology Service & Support
NPC	National Planning Commission
TECH/NA!	Technology is Good

Acknowledgements

Foremost, I would like to express my sincere gratitude to my supervisor and mentor Dr. P.J. Boer and my co-supervisor Mr. Allen Chainda for their continuous support of my study and research, for their patience, motivation, enthusiasm, and immense knowledge despite been under pressure and burnout. Dr. Boer's guidance, assisted me during the rough times of the research and writing of this thesis. I could not have imagined having a better advisor and mentor for my study.

My sincere gratitude also goes to the principals of the eight schools in the Zambezi Region where the research was carried out, they passionately welcomed me in their schools and their assistance cannot be measured. I also thank all the teachers who took time out of their busy schedule to complete the questionnaire and participate in the interviews.

Nobody has been more important to me in the pursuit of this study than the members of my family. I would like to thank my parents whose love and guidance are with me in whatever I pursue. They are the ultimate role models. Most importantly, I wish to thank my loving and supportive wife, Wendy, and my two superb children, Samantha Libebelo and Liberty Muyau, whom I robbed precious time to bond with and for providing me with unending inspiration.

Lastly and humbly, my sincere thanks go to our Almighty Father in heaven for His grace, guidance and uncounted blessings.

Dedication

I dedicate this thesis to my family and many friends, a special feeling of gratitude to my wife Wendy Njekwa whose patience, advice and word of encouragement kept me focused throughout the study period. I also dedicate this thesis to my lovely kids Samantha and Liberty Kacelo who always asked their mother whether I had a bed in the office because of spending too much time there. Thanks family for being such an inspiration.

I also dedicate this thesis to my all my sons and daughters who looks up to me as a father-figure and have always been there for me. I truly appreciate your presence around me and all of you have been my cheerleaders.

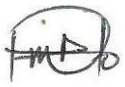
Lastly, I dedicate this thesis to my CIAS departmental colleagues who supported and inspired me during the study. I owe you one.

Declaration

I, Patrick Muyau Kacelo, hereby declare that this study is my own work and is a true reflection of my research, and that this work, or any part thereof has not been submitted for a degree at any other institution of higher education.

No part of this thesis/dissertation may be reproduced, stored in any retrieval system, or transmitted in any form, or by any means (e.g. electronic, mechanical, photocopying, recording or otherwise) without the prior permission of the author, or The University of Namibia in that behalf.

I, Patrick Muyau Kacelo, grant The University of Namibia the right to reproduce this thesis in whole or in part, in any manner or format, which The University of Namibia may deem fit, for any person or institution requiring it for study and research; providing that the University of Namibia shall waive this right if the whole thesis has been or is being published in a manner satisfactory to the University.

Patrick Muyau Kacelo		29 October 2017
Name of Student	***Signature***	***Date***

CHAPTER I: INTRODUCTION

1.1 Introduction

The discussions of this chapter include the background of the study, the statement of the problem, significance of the study, research questions, limitations of the study and definition of concepts.

1.2 Background of the study

Information and Communication Technology (ICT) literacy training is a critical element in enhancing an individual's performance as through it, new knowledge, skills and attitudes are acquired enabling such a person to effectively work in a knowledge-based economy. The impact of ICT literacy in today's world has been so remarkable that it has penetrated the avenue of education transforming all its spheres to a point that no educational system can fail to bear testimony to the positive effect of ICT (Careemdeen & Nonis, 2015). A trend worldwide is to ensure that every nation's workforce becomes ICT proficient so that it can compete in international environments. The Namibian government is not an exception to this trend and in response to it, developed Vision 2030 as its national development plan to "improve the quality of life of the people of Namibia to the level of their counterparts in the developed world by 2030" (NPC, 2004, p. 7). Vision 2030 envisions changing the shortage of Information Technology (IT) human resources in Namibia by strengthening Information Technology training from pre-primary through secondary education (NPC, 2004). Namibia also developed a bold 15-year improvement plan for the education and training sector known as the Education

and Training Sector Improvement Plan (ETSIP) (Government Republic of Namibia, 2007). Inspired by Vision 2030, the strategic plan aims to transform the education and training sector into a more effective tool for supporting the attainment of core national development goals, e.g. poverty reduction and social inequalities (Government Republic of Namibia, Education and Training Sector Improvement Programme (ETSIP), 2007). One of the thirteen main aims of ETSIP is improving access to ICTs to enhance learning and administration including making ICT a subject and a cross-curricular tool, staff training in ICTs, and developing support services and structures for deployment and maintenance (Government Republic of Namibia, 2007; Shafika, 2007).

Consistent with the objectives of Vision 2030, ETSIP and being informed by other national frameworks and blueprints, the Namibian Ministry of Education (MOE) developed an ICT policy for education in 2003, which is an update of the original policy developed in 1995 and revised in 2000 (Shafika, 2007). Among the policy objectives listed below, goal one and two are relevant to this study:

- GOAL 1: Produce ICT literate citizens.
- GOAL 2: Produce people capable of working and participating in the new information and knowledge-based economy and society
- Goal 3: Leverage ICT to assist and facilitate learning for the benefit of all learners and teachers across the curriculum
- Goal 4: Improve the efficiency of educational administration and management at every level from the classroom, school library, through the school, and on to the sector as a whole
- Goal 5: Broaden access to quality educational services for learners at all levels of the education system and
- Goal 6: Set specific criteria and targets to help classify and categorize the different development levels of using ICT in education (MoE, 2005).

In realizing its policy goals, the Namibian Ministry of Education developed TECH/NA! a comprehensive implementation strategy based on its ICT policy for education (Republic of Namibia MoE, 2006). This implementation plan detailed a comprehensive strategy for the integration of ICT across the education sector and one of its key elements, is training and usage support (Republic of Namibia MoE., 2006; Shafika, 2007). Furthermore, development levels were established for each of the above priority areas to give institutions targets for implementing ICT, ranging from level one to level five, differing on emphasis on the following areas: classroom facilities, display facilities, internet access, teacher ICT skills, computer usage, application software usage (word processor) and communication with parents via ICT (email) (GRN., 2005).

In achieving this key area of ICT literacy, the Ministry of Education entered into a special agreement with the International Computer Driving License (ICDL) (SA) through National Education Technology Service & Support (NETSS) centre to offer ICDL training in fulfillment of the intermediate and advanced level of the Namibian ICT Literacy certification for teachers (Brannigan, n.d.). ICDL is an internationally accredited certificate that certifies one's ability and competency to use a computer and its most popular applications, (Microsoft Office Suite which includes: Concepts of ICT, Using the Computer and Managing Files, MS Word, MS Excel, MS PowerPoint, MS Databases, Presentation & Web Browsing and Communication) (Lubbe & Benson, 2010).

The Namibian Government chose ICDL as a vehicle for teacher ICT literacy because it was more relevant in addressing what the ICT policy for education specifies, as the ideal ICT literacy level required of teachers (GRN., 2005). It was also chosen as it is the

world's leading end user computer skills certification programme and an internationally recognized qualification designed specifically for those who wish to gain a benchmark qualification in computing to develop ICT skills and enhance career prospects (Lubbe & Benson, 2010) .

The training of teachers in ICDL commenced in 2007 and was offered throughout Namibia by National Education Technology Service & Support Centre (NETSS). NETSS was created as a public/private partnership between the Ministry of Education and various private and civil society partners such as SchoolNet/Namibia and Microsoft to provide the sourcing, refurbishment, installation and support of ICTs in all educational institution (Shafika, 2007). NETSS first provided ICT equipment to schools and later offered ICDL training to all teachers free of charge as a way of empowering them with ICT skills to use such equipment.

The purpose of using ICDL training as an ICT literacy tool was to enhance capability and proficiency of teachers to use a computer and other ICT tools in classroom settings in particular and in teachers' professional work in general. In this study, the researcher investigated the impact of ICDL literacy training on the use of ICT in the classrooms by teachers in the Zambezi Region with reference to what ICT policy for education specifies in the Namibian context. The specific goals are:

- Teachers, learners and students to achieve key ICT knowledge and skills
- Pedagogical use of ICT as an integrated tool in the teaching and learning process at all levels in the educational system (GRN., 2005).

1.3 Statement of the problem

The implementation of ICT literacy training for teachers has been a key priority for Ministry of Education, but progress has been irregular across the country (Boer, 2012). A requirement for using ICTs in classroom practices is an acquisition of appropriate technical proficiencies in order to operate computers and software applications competently (Rockman, 2004). Statistics still show that the majority of the teaching force predominantly in Zambezi Education Region have not received the ICDL training as promised by the Ministry of Education due to the fact that the training was put on halt in 2011 due to government directives (Cocklin, 2012). The level at which ICT has been embedded in the curriculum and used to support teaching and learning across a wide range of subject areas varies from region to region and school to school. In a study by Boer (2012), the findings indicated that in all regions of Namibia, teachers are at a fundamental level of ICT integration which resembles the use of presentation software, a projector and a teacher in front of class. Despite various efforts from SchoolNet/Namibia and Microsoft in the 90's and 2000's, the schools remain at an early phase of ICT adoption even with the deployment of computers to schools since 2006 (2012). A few Namibian studies, such as Iipinge (2010) and Boer (2012), focused on teachers' integration and use of technology in the classrooms, but none has attempted to link aspects of the ICT literacy training to use.

Through a ministerial initiative supported by ETSIP, between 2008 to 2011, 172 teachers from eight (8) senior and combined schools received training in ICDL in Zambezi Education Region (Cocklin, 2012). Despite the universal acknowledgement

that ICT plays an important role in changing and reforming educational systems, empirical evidence is still absent in particular in the Namibian education system to ascertain to such impact of ICT. Up to date, no study bears proof to the impact ICDL training has had on teachers' use of ICT in their teaching and personal lives in Namibia.

Therefore, the purpose of this research was to investigate the impact of ICDL literacy training on Zambezi Region teachers and their ICT usage in classroom practices with reference to Goals 1 and 2 of the ICT policy for education. The study was further aimed at investigating the challenges faced by Zambezi region teachers in effectively using ICTs in their classroom environments. The study shed light on the significance of ICT literacy training on empowering teachers with technical and cognitive proficiencies as prerequisites for ICT use in their classrooms. The schools involved in this study were five senior secondary schools and three combined schools where training was offered and Zambezi region was chosen on the basis of accessibility and limited resources to cover all fourteen regions in Namibia.

1.4 Research questions

The main research question of this study was: "What is the impact of ICDL literacy training on Zambezi Region teachers and their use of ICTs in their classroom practices?"

The following sub-questions aided in providing answers to the main research question:

1. How has the ICDL training impacted teaching and learning in Zambezi Region?
2. What are Zambezi Region's teachers' self-efficacy regarding their ICT skills?
3. What do teachers identify as challenges affecting compliance to Goals 1 and 2 in the ICT in educational policy?
4. What kind of support does the Ministry of Education give to teachers for them to realize a more successful integration of the ICDL ICT literacy training in their classroom practice?

1.5 Significance of the study

The findings of this study may have significance for teachers taking the ICDL as in-service literacy training by discovering the impact of the training for meeting individual ICT needs. The findings may also have significance for the education profession by discovering the level that ICDL training yields the preferred outcomes of progress in basic ICT skills and the critical cognitive skills essential to use ICT in classroom practices. Consequently, the findings may also have direct significance for the Ministry of Education Arts and Culture or both Ministries of Education in Zambezi Region by evaluating the impact of the ICDL literacy training. The findings may also have significance for the companies dealing with developing the course content and offering training or training delivery modes by identifying the relevance of existing ICDL training for meeting individual ICT usage requirements of teachers and coming up with

a tailor-made course outline addressing technical and including some pedagogical skills training. The findings may also bring to light the possible challenges of ICT use by teachers in Namibian schools. Finally, the results may assist researchers in related studies to expand on findings and limitations of this study.

1.6 Limitation of the study

The scope of the study was limited to an investigation of ICDL literacy training among Zambezi Region teachers who enrolled for the ICDL training between 2008 and 2011 and therefore, cannot be generalized nationally. The scope of the study forms a limitation of the study in the ability to generalize the findings about the impact of ICDL literacy training on ICT use in classrooms beyond the Zambezi teachers' population. The probability of researcher bias influencing the study findings is another limitation. The direct involvement of the researcher in data collection and analysis may account to this biasness. However, the use of the mixed sequential method that started with a quantitative phase minimizes the researcher's bias on the findings. The scope of the study is limited to investigating the impact of ICDL literacy training on teachers' use, knowledge and skills attained from the training. This study does not investigate the deficiencies of the ICDL training course per se, however, elements of the findings will touch on either the delivery mode, the difficulty level etc. Additionally, the study is not focused on the ICT integration practices of teachers entirely, but rather whether teachers going through the ICDL training would be more likely to use ICTs for their class lesson preparation, notes and to whether it could naturally extend into integration practices.

1.7 Definition of terms

In this study the following terms implies:

Information and Communication Technology (ICT): The term refers to technologies that provide access to information through telecommunications. It is similar to Information Technology (IT) but focuses primarily on communication technologies. This includes the Internet, wireless networks, cell phones, and other communication mediums (Christensson, 2010).

Information and Communication Technology (ICT) Literacy: The term means using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society (Panel, 2002)

Impact: a progressive change in ICT proficiency and abilities in the specific subject matter areas addressed by the ICDL modules as well as a positive change in the critical thinking skills necessary to apply the knowledge in a professional teaching environment (Hatmi, 2009).

International Certificate Driving License: An internationally accredited certificate that certifies one's ability and competency to use a computer and its most popular applications, (Microsoft Office Suite which includes: Concepts of ICT , Using the Computer and Managing Files, MS Word, MS Excel, MS PowerPoint, MS Databases, Presentation & Web Browsing and Communication) (Lubbe & Benson, 2010)

CHAPTER II: LITERATURE REVIEW

2.1 Introduction

The fast expansion in ICT have brought noteworthy changes in the twenty-first century and have, in the same vein affected the demands of all societies (Baubeng-Andoh, 2012). ICT has become an inevitable phenomenon in our daily lives and in the education sector at large. This been the scenario, educational institutions are under pressure to respond to such a fast-emerging demand to adopt ICT to teach the skills and knowledge appropriate for students to operate in the twenty-century. Taking recognizance of the impact of ICT on the workforce and daily life, ministries of education are at task trying to reform their curricula and equipping classrooms with ICT equipment, with the aim of narrowing the evident technology gap in teaching and learning. Tomei (2005) states that: "this restructuring process requires effective adoption of technologies into existing environment in order to provide learners with knowledge of specific subject areas, to promote meaningful learning and to promote professional productivity".

This literature review will avail the context and answers to the research questions.

The research questions are:

- How has the ICDL training impacted teaching and learning?
- What are Zambezi Region's teachers' self-efficacy regarding their ICT skills?
- What do teachers identify as challenges affecting compliance to Goals 1 and 2 in the ICT in educational policy?

- What kind of support does the Ministry of Education give to teachers for them to realize a more successful integration of the ICDL ICT literacy training in their classroom practice?

This chapter will review literature on the historical context of ICT literacy globally and specifically in Namibia, looking at the development and impact of ICT especially in the education sector. Literature continues by analyzing the impact of ICDL/ICT training on teaching and learning. The last section describes the Educational Testing Service (ETS) ICT literacy theoretical framework which provides a model that will be used to investigate the impact of ICDL literacy training on Zambezi Region individual teachers' skills related to ICT use in their classrooms.

2.2 Global historical context of ICT literacy

Computer technology as previously known was introduced three and half decades ago in the early 1980s as an innovation that might be adopted in the learning environment. This innovation raised confidence that ICT would revolutionize the outlook of education as teachers were motivated to use technology in their classrooms (Aczel, Peake, & Hardy, 2008). It was further envisioned that ICT would be used extensively and that coupled with the introduction of e-learning, textbooks might become old-fashioned (Baubeng-Andoh, 2012). With reference to this optimism, world investment in ICT to enhance teaching and learning in schools comes a long way as initiatives embarked upon by many nations bears testimony.

The subject of introducing computers in education found its way in educational policy-making in the early 1980s when comparatively affordable microcomputers hit the consumer market. Inspired by government policies and triggered by the fright of lagging behind in the technology race, many countries entered the microcomputer market by making their own brands and distributed them to schools. According to Daniels (2002) ICTs have become within a very short time, one of the basic building blocks of modern society. Several countries now regard understanding ICT and grasping the basic skills and concepts of ICT as part of the center of education, together with reading, writing and numeracy. However, a misconception seems to be evident that ICTs generally refers to 'computers and computing related activities'. This, in the actual sense is not the truth, although computers and their application play an important role in current information management, other technologies and/or systems also comprise of the phenomenon that is commonly regarded as ICTs.

In the late 1980s, the term 'computers' was replaced by 'IT' (information technology), representing a move of emphasis from computer technology to the capacity to store and retrieve information. Following this, was the introduction of the concept 'ICT' around 1992, email availability to the general public begun (Pelgrum & Law, ICT in Education around the World: Trends, Problems and Prospects, 2003) The trend of introducing microcomputers in education was met with high hopes that it would make education more operative and exciting. When the potential use of computers in schools was first introduced, the main conception was that students would be 'taught' by computers (Mevarech & Light, 1992). The understanding thereof, was that the computer would 'take over' the teacher's job similarly in a way a robot may take over a welder's job in a

workshop. However, after many surveys had indicated that computers were used mainly as a complement to the current curriculum and much less as tools that were totally incorporated in the learning of traditional subject matter, the general feeling of great disappointment was shown by many policy-makers. This state affairs led to a decrease in investment in staff development, research programs on ICT and hardware between 1992 and 1995 (Pelgrum & Law, 2003).

The 1990s was the era of computer communications and information access, predominantly with the popularity and availability of internet-based services such as electronic mail and the World Wide Web (WWW). Concurrently the CD-ROM became the standard for dispensing packaged software (replacing the floppy disk) (Noor-ul-Amin, 2008). As a result, the political interest in ICT was quickly increased once more and educators shifted their focus on the utilization of the technology to enhance student learning as a justification for investment. However, the use of ICT in the educative process has been divided into two broad categories: ICT for Education and ICT in Education. ICT for education refers to the development of ICT specifically for teaching/learning purposes, while the ICT in education involves the adoption of general components of ICT in the teaching learning process (Noor-ul-Amin, 2008). The aforesaid interest by politicians of investing in ICT was accompanied by a generally established rhetoric that education systems would need to prepare citizens for lifelong learning in an information society. This rhetoric was characterized as follows:

1. As a result of ICT, many societies will change into information societies,

2. Citizens in these information societies will need new competencies that have not yet been (or that have been, though insufficiently) targeted and attained in the traditional education systems; and,
3. Educational innovations aimed at attaining these new skills (with the help of ICT) and at finding a new balance between old and new educational targets as needed. (Pelgrum & Law, 2003, p. 20)

As per the above status quo, education as a sector requires to become highly focused on offering opportunities for learners to acquire new skills set to enable them to learn independently, communicate effectively, solve real-life problems and learn collaboratively through several synchronous and asynchronous ICTs. This requires schools or classrooms to become learning environments that promotes self-directed learning and individual responsibility among learners (Pelgrum & Law, 2003).

The fast growth of ICT at the close of the twentieth century have prompted many governments to embark upon initiatives to revolutionize education with a common understanding that preparing citizens for lifelong learning, teamwork and ICT facilitated learner-centred approaches are inevitable. Based on this framework, reference is given below to how ICT literacy has evolved across the globe turning the world into a digital information society.

2.2.1 ICT literacy in Europe

The introduction of the **eEurope** project by the European commission in December 1999 indicated the starting of the European Union's broad term goal of becoming the greatest competitive working and information economy in the world (Tornero, 2004). The aim of the initiative was to bring everyone into the digital age and

online arena by offering training to teachers so they can adjust their curriculum to accommodate new technologies. Furthermore, the aim was to ensure that by the time learners leave the classroom, they have become "digitally literate" so that they will be able to operate in the digital world effectively. Another milestone in Europe's ICT literacy journey was the approval of a communication called "eLearning - Designing Tomorrow's education" on 25 May, 2000 which took recognizance of the fundamental significance of training and education, as a leeway to survive and operate in the new knowledge society. Within this eLearning framework, the reality of the "digital divide" between those that have access to the new information and those that don't emerged and a need to address it was emphasized (Tornero, 2004).

In March 2010, the European Commission took off ground the Europe 2020 strategy in order to prepare the EU economy for the challenges of the subsequent decade (Commission, 2010). The Digital Agenda features as one of the seven flagship enterprises of this strategy with the overall aim of delivering sustainable economic and social benefits from a single market based on the fast and ultra-fast internet and interoperable applications (Commission, 2010). It is further mandated to define the key enabling role that the use of ICT will have to play if Europe is to prosper in its goals for 2020. New evidence on computer and information literacy and the pedagogical use of ICT in schools emerged in Europe through the International Computer and Information Literacy Study (ICILS) (Commission, 2014).

The commission stated that:

> The 2013 European Commission Communication on Opening up Education set out a European agenda for stimulating high-quality, innovative ways of learning

and teaching through new technologies and digital content, and also stressed the importance of assuring that learners acquire the digital competences needed in a digital world (p. 7).

The Communication emphasized the significance of concrete proof to evaluate improvements and yield complete benefit of the impact of technology on education, and advocated for continued determination and global collaboration to enhance their knowledge-base in this area (Commission, 2014, p. 7) . Europe places much emphasis on the role of ICT by investing 5% of its Gross Domestic Product (GDP) in the ICT sector which is interpreted as € 660 billion annually. This sector contributes extremely more to the overall productivity growth (20% directly from ICT sector and 30% from ICT investments) (Commission, 2010). The social impact of ICT has become noteworthy in Europe as more than 250 million people uses the internet daily and most Europeans own mobile phones (Commission, 2010). Despite such a trend, Europe still faces an outcry from its citizens that ICT is failing to fulfill its mandate of providing better public service (Commission, 2010) . This is so because Europe is failing to furnish itself sufficiently with relevant digital technologies and providing relevant skills to its citizens in order to flourish and compete in the ever-growing global knowledge (Commission, 2010) economy

2.2.2 ICT literacy in Asia

The dawn of the knowledge economy and global economic contest has forced nations to prioritize educational quality, lifelong learning and education for all. All over the world, legislators unanimously admit that having access to ICT in education can assist individuals to compete in a global economy by producing a skilled labor force and

facilitating social mobility (Wallet, 2014). In addition to this belief, lawmakers stress that ICT in education has a multiplier effect all over the education system, by promoting learning and equipping pupils with new sets of skills; accessing learners with poor or no contact in rural areas; by conducting and enhancing teacher training; and by reducing the financial strain related to teaching by using traditional methods (Wallet, 2014).

Asia is the largest region by land mass and also the largest by population harboring nearly 60% of the world population and is diversified in terms of culture, history, language and ethnicity (Division, 2014). Specifically notable for assimilating and supporting ICT across numerous fields, including education, Asia also reveals substantial economic discrepancy (Wallet, 2014). Organization for Economic Cooperation and Development (OECD) reported that despite high levels of investment in their national networks, some OECD member states in Asia have met or beaten international standards in the field of ICT- asisted teaching, while in other countries improvements to national networks, teledensity developments, improved countrywide connectivity, and the the introduction of new Interent Provider (IP) transfer technologies are creating a conducive environment for the acceptance of ICT (OECD, 2011). However, because of the disparity among Asian countries, much progress is yet to be made espcially among least developed countries (LDCs) in which internet-based forms of teaching and learning as well as essential infrastructure to support are limited (Wallet, 2014).

Wallet (2014) further reported that apart from sub-regional discrepancies, the interior digital divide of emerging countries has also intensified considerably as urban centres quickly embrace ICT while it remains out of reach for rural and remote regions.

Considering these constraints in mind, ICT in education in Asia can be perceived from two very diverse viewpoints. The first reveals a expansion dialogue that emphasizes the function of ICT in curbing the digital divide by reaching the unreached and giving support to those who cannot reach needed infrastructure, qualified teachers and other quality educational resources. The second perception holds on to an e-learning model and is a reaction to the developing knowledge society where ways of teaching and learning are changing at a fast pace to support learner-centric educational environments, which boost partnership, knowledge construction and knowledge sharing. While countries are definitely at diverse stages of incorporating ICT in education, eventually both viewpoints will be progressively valid for countries in Asia (Wallet, 2014).

2.2.3 ICT literacy in Sub-Sahara Africa

In sub-Sahara Africa, reference is given to Botswana and South Africa with regard to historical context of ICT literacy generally and in particular in the education sector. These two countries are referred to for comparative reasons to Namibia's level of ICT development.

2.2.3.1 Botswana

Botswana is one of the small countries in Africa but very dynamic with a insightful governance specifically in the area of ICTs in education. Despite having a strong liberal telecoms policy, a link exits between its education and national ICT policies and the broader economic vision (Farrell & Isaacs, 2007). Botswana in practice,

is a country in Africa among those show-casing the top PC concentration in education institutions, evidently with all junior and senior secondary schools as well as public tertiary institutions having computer labs (Isaaks, Survey of ICT and Education in Africa (Volume 2), 2007). This state of affair did not come on a silver platter but with government financial commitment in order to boost connectivity and enhance ICTs educational use.

The Infodev ICT in Education report (2007) indicated that ICT infrastructure is very good but under-utilized as only 5% of the population account for internet usage (p. 4). A great discrepancy in terms of accessibility to ICT services between urban and rural areas is evident due to exorbitant internet usage charges, comparatively expensive PCs and lack of electricity in rural areas. The table below shows a clear picture of the status of ICT infrastructure in Botswana (Isaaks, Survey of ICT and Education in Africa (Volume 2), 2007).

Table 1: Status of ICT Infrastructure in Botswana (Isaaks, Survey of ICT and Education in Africa (Volume 2), 2007)

Indicator	
Fixed-line subscribers	69.7 per 1,000 persons (2004)
Mobile subscribers	708 per 1,000 persons
Dial-up subscribers	6,000 (2005)
Broadband subscribers	0 (2004)
Internet users	7.167 (2004)
Television broadcast stations	1
Radio stations	41

At the 8th conference of the Intergovernmental Council for the Information for All Programme in 2014, Botswana was granted a responsibility to create a national ICT literacy policy as a model for other Information For All Programme (IFAP) member states (Mpoeleng, 2016). The key goals of the Botswana ICT Literacy Project are:

- **Identify** current Botswana ICTs in education environment and practices
- **Review** the current country Education Policies and Literature that focus on ICT Literacy and ICT in Education.
- **Identify** Botswana practices of ICT in Education
- **Compare** the Botswana practices on the use of ICT in Education with global practices
- **Summarize** the study findings
- **Highlight** gaps, strength and opportunities of Botswana ICT Literacy
- **Recommend the ICT Literacy Policy Framework, in** line with IFAP Information Literacy focus area of information literacy.
- The **UNESCO** Post-2015 Education agenda and Country's long term objectives of Education (Mpoeleng, 2016).

In 2007, the Government of Botswana concluded an ICT national policy called the Maitlamo National ICT Policy to guide all ICT enterprises in the country (Esselaar & Sebusang, 2013). The National ICT Policy targets to establish a supporting environment for growth of an ICT industry in Botswana and for delivery of general service and admittance to ICT facilities, with the critical aim of Botswana becoming a regional ICT center. The Policy further aims at strengthening a proficient and economical ICT infrastructure, creating universal access to local and relevant

information, introducing an ICT legal framework, and improving government services and healthcare through the use of ICTs (Esselaar & Sebusang, 2013). Emanating from the national Maitlamo Policy on ICT, is the Thuto-net component used by the Ministry of Education and Skills Development **(**MoESD) as an effort to deploy ICTs in the education sector by providing computers though the access ratio is still below the standards (Mpoeleng, 2016). For this programme to be a success, Mpoeleng (2016) suggested that an efficient infrastructure connecting all schools and learning centers which is accessible, affordable, fast and offering reliable network services must be provided.

Furthermore, Botswana have the Education and Training Sector Strategic Plan (ETSSP), a five-year medium term strategy 2015-2020 designed to comprehensively and basically change education from pre-primary to tertiary level by introducing activities that work towards sustaining teaching practices in the classroom (Mpoeleng, 2016). Also relevant to ICT in Botswana, is its Vision 2016, a national manifesto that expresses the long-term economic objectives for the country including approaches to address them. ICT is a vital part of the first goal, which is to be an educated and informed nation. Mpoeleng (2016) states that the country will seek and acquire the best available information technology and become a regional leader in the production and dissemination of information. Mpoeleng (2016), further stated that the emphasis put on ICT in Botswana is also evident in its National Development Plan 9 (NDP9) where it is a major focus on the country's economic agenda (p. 33).

2.2.3.2 South Africa

South Africa is also lagging behind in the race to close the digital divide gap brought by the technological developments of the twenty-first century. It has like any other country; put ICT at the core of the educational development process. Mdlongwa (2012) state that the use of ICT in schools to enhance learning could help overcome some of the challenges of improving the efficiency and productivity of both learning and teaching in South African schools, thereby narrowing the digital divide.

The use of computers surfaced in schools in South Africa during the 1980s, predominantly in private schools and a few well-resourced government schools. The main purpose of computer use in these schools was for administration, thus, recording of continuous assessment marks, creation of timetables and school reports as well as maintaining students' databases, but with continuous developments in ICTs, this later improved (Mdlongwa, 2012).

Mdlongwa (2012) further stated that:

> There are 2 311 schools in South Africa with one or more computers, and it is estimated that 10 per cent of South Africa's 28 000 schools have access to one or more computers. The implementation of ICT in South African schools is being led by SchoolNet, which also provides staff development and ICT support to schools. One of the biggest challenges to implementation of ICT across all South African schools is that the Government of South Africa does not have enough funds to purchase computers and build infrastructure with regard to ICT in the various provincial educational departments (p. 2)

ICT implementation was not prioritized in comparison to other basic human needs such as clean running water, electricity and sanitation which always receive first priority. Based on the Department of Education White Paper on e-Education of 2003, ICT implementation has been effected at varying rates of progress in the nine education provinces, with Gauteng, Western Cape and Northern Cape showing notable progress at that time whilst the other six remained behind (DoE, 2003).

The grim picture of South Africa in terms of ICT use in schools is still bad as according to DoE (2003), despite that there has been a rise in the number of schools with computers from 12.3 percent in 1999 to 26.5 percent in 2002, statistics of 2003 indicated that more than 19 000 schools still had no computers for teaching and learning purposes.

In offsetting this imbalance in ICT implementation, the government in conjunction with non-governmental organizations (NGOs), embarked upon a number of initiatives, among others, the following:

- INTEL 'Teach to the Future' teacher development programme offers perceptions for teachers on ICT integration into teaching and learning.
- SCOPE, which is a Finnish development support programme, has, in partnership with SchoolNet SA and the South African Institute for Distance Education (SAIDE), developed 11 teacher development modules for introduction into schools.
- SchoolNet SA runs online, mentor-based programmes that offer in-service training to teachers on how to integrate ICT into the curriculum and its management (Howie, Muller, & Paterson, 2005; Shafika, 2007)

Despite the challenges South Africa is experiencing in implementing or introducing ICT in schools, research both locally and around Africa has indicated that the use of ICT can greatly influence and increase the productivity and efficiency of both teaching and learning (Mdlongwa, 2012). The utilization of ICT in South African schools will not only improve learning and teaching in education, but in the long run will offer South African people a relative benefit in coping with and competing in an ever-demanding twenty-first century labour market and discovering solutions to some of Africa's developmental challenges (Mdlongwa, 2012).

2.3 ICT literacy in Namibia

2.3.1 Overview

In all counties of the world, the dissemination of ICT in schools has led to a key transformation of the education scenery. Namibia is one of the African countries that have played a ground-breaking and visionary role in the area of ICT in education and serves as a pillar for many organizations and groups operating across the African continent (Shafika, 2007). Namibia wants to eradicate the 'digital divide' and to build a society in which the ICT sector is a vital enabler of social development and economic growth for individuals, households and businesses, regardless of economic position or geographic location, in a services sector-led economy (GRN, 2012). Namibia, like any other country, has seen ICT as having the capacity to enhance student performance, improve access to schooling, boost competencies and minimize costs, promote students' ability to learn and be lifelong learners as well as prepare them for a world competitive labor force (GRN., 2005). Since independence in 1990, Namibia have undergone drastic

policy changes in response to turning itself into a knowledge-based economy as evidenced by the historical account of ICT in Namibia below.

2.3.2 Historical account of ICT in Namibia

2.3.2.1 Vision 2030

The Namibian Government developed Vision 2030 as its national development plan to "improve the quality of life of the people of Namibia to the level of their counterparts in the developed world by 2030" (NPC, 2004, p. 7). Vision 2030 envisions changing the shortage of IT human resources in Namibia by strengthening IT training from pre-primary through secondary education (NPC, 2004). The policy further aims at changing Namibia into a healthy and food-secure nation, in which all preventable, infectious and parasitic diseases are eliminated through healthy living (NPC, 2004). As required by Vision 2030, the country will operate a totally integrated, unified, flexible, and high-quality education and training system that prepares Namibian learners to take advantage of a fast-changing global environment, including developments in science and technology. Arising from the overall capacity-building investments, Namibia will be transformed into a knowledge-based society (NPC, 2004).

2.3.2.2 Education and Training Sector Improvement Plan (ESTIP)

ETSIP symbolizes the education and training sector's reaction to the call of *Vision 2030.* Its main purpose is to substantially improve the sector's input to the achievement of strategic national development goals, and to facilitate the shift to knowledge based economy (Government Republic of Namibia, 2007). This bold 15-year improvement plan for education identifies five core strategic objectives: (i) Quality/effectiveness, (ii) Equity and Access, (iii) Development relevance and Responsiveness, (iv) Delivery Capacity and Management and (v) Efficiency of resource mobilization and utilization. (Government Republic of Namibia, 2007) This set of strategic objectives applies to all sub-programmes however, each sub-programme has its specific order of priority. Critical to this study is the sub-programme, 'ICT in Education' with the following strategic objective:

Strategic Objective: Mainstream ICTs into the education system

Component 1: Review and develop curriculum and content

Component 2: Review, develop and implement training model

Component 3: Develop and deploy ICT services and infrastructure

Component 4: Strengthen education management through the use of ICT

Component 5: Monitoring and evaluation (Government Republic of Namibia, 2007).

Based on the above strategic goal, Namibia embraces the significance of ICT as a tool for economic development and educational delivery and management. ETSIP targets to instill ICT across the entire education system and to incorporate the use of ICT

as a tool in the delivery of curriculum and learning, with an anticipated improvement in the quality of teaching and learning process at all levels. It is further stated that ICT skills and specializations are imperative if Namibia is to develop into a Knowledge Based Economy (KBE) and possess the appropriate ICT competent labor force it needs to compete on the global market (Government Republic of Namibia, 2006).

As inspired by Vision 2030, ETSIP has the following core aims:

- Improving the quality of general education from Grades 1 to 12, which includes curriculum revision, increasing the supply of textbooks, improving teacher performance, and enhancing special education
- Improving access to ICTs to enhance learning and administration including making ICT a subject and a cross-curricular tool, staff training in ICTs, and developing support services and structures for deployment and maintenance
- Improving efficiency and reducing wastage throughout the education system
- Expanding the provision of senior secondary education (Grades 11 and 12)
- Reforming and expanding vocational education and training, which includes establishing a national training authority, re-equipping government Vocational Training Centres (VTCs), and expanding community skills development centres (COSDECS)
- Strengthening tertiary education and training including the establishment of a National Council for Higher Education (NCHE) and other bodies to ensure high standards and efficient allocation of resources

- Developing a national system of knowledge management and innovation including establishing a national commission for public policy co-ordination and the financing of research
- Enhancing early childhood development and pre-primary education
- Strengthening access to information, culture, and lifelong learning
- Enhancing HIV/AIDS management in education
- Promoting equity in education
- Pursuing a capacity development programme to improve all aspects of institutional development (Shafika, 2007).

Policy implementation has financial implications, the first phase of ESTIP (2006-2011) attracted a cost of N$2.4 billion and the overall cost to change the education sector was estimated at N$23.4 billion. Out of this huge amount, the Namibian government provided N$21.8 billion and the reminder of N$2 billion was to be sourced from the donor community, development agencies as well the private sector (Government Republic of Namibia, 2007; Shafika, 2007).

2.3.2.3 ICT Policy for Education

Informed and been aligned to the objectives of Vision 2030 and ETSIP, the Ministry of Education developed an ICT policy for education in 2003 which is an improvement of the first policy created in 1995 and revised in 2000 (Shafika, 2007). In 2004, a mixed working group formed from the two Ministries of Education, developed this updated policy, which reflects current improvements in pedagogy, research, technology, and partnerships and provides a broad and holistic range of issues in its goal to access and ICTs use across the education sector (Republic of Namibia, 2005; Shafika, 2007). The policy further targets colleges of education and related in-service programmes; schools with secondary grades, teacher education programmes at tertiary institutions; VTCs; primary schools; libraries and community centres; adult education centres and special needs education as priority areas.

The overall policy goals are mentioned in chapter one on pages 2 & 3.

This study aims at establishing how ICDL literacy training has impacted on achieving policy goals one and two by using the Educational Testing Service (ETS) ICT literacy theoretical framework explained later in the chapter.

2.3.3 Policy implementation

2.3.3.1 TECH/NA!

In realizing its policy goals, the Namibian Ministry of Education developed TECH/NA! , an acronym for "Technology is Good". TECH/NA! is a broad implementation strategy grounded on the Ministry of Education ICT policy for education (Republic of Namibia, 2005). It is a wide sector approach, a key component of Namibia's overall education plan, the Education and Training Sector Improvement Plan (ETSIP). This implementation plan detailed a comprehensive strategy for the incorporation of ICT across the whole education sector and one of its ten key elements, is training and usage support. Its main objectives are to:

- Equip educational institutions with hardware, software, connectivity, curriculum, content, and technical support
- Educate administrators, staff, teachers, and learners in ICT literacy and ICT integration across the entire curriculum (Shafika, 2007; Government Republic of Namibia, 2006).
- Empower whole communities in narrowing the digital divide and meeting the goals of Vision 2030 (Brannigan, n.d.).

As an implementation plan, TECN/NA also targeted priority areas as earmarked by the policy and further established development levels for each area as a way of giving institutions descriptors for implementing ICTs. These developmental levels ranges from level one to level five, differing on emphasis on the following areas: classroom facilities, display facilities, internet access, teacher ICT skills, computer usage, application

software usage (word processor) and communication with parents via ICT (email) (Republic of Namibia, 2005).

2.3.4 Current ICT initiatives

Various initiatives were undertaken in Namibia as testimony of the government's commitment to support ICTs across the entire education sector. Reference is given to the relevant initiatives to this study.

2.3.4.1 National Educational Technology Services and Support Centre

The NETSS Centre was instituted after a review process with all partners involved in ICTs in education in Namibia. The centre is accountable for managing access to ICTs to all Namibian education institutions by supervising the sourcing, repair, installation, and support of ICTs. It also serves as a distribution point for ICTs in education and a national helpdesk for technical support (Brannigan, n.d.).

2.3.4.2 ICT Literacy Certification

In partnership with the National Training Authority, the Ministry of Education pioneered a national ICT literacy certification approved by the Namibian Qualification Authority. The Ministry of Education further states that the ICT Literacy Certificate, which includes Foundation, Intermediate and Advanced Levels, provides an entry-level programme for computer literacy which can be used by all institutes of learning (Government Republic of Namibia, 2006). In achieving this key area of ICT literacy, as already alluded to in chapter one, ICDL was chosen as a pathway to ICT skills training.

ICT plays an ever significant role in enhancing economic efficiency through digital economies, improving the delivery of public and private services and realizing broad socio-economic goals in education and other sectors. In response to global competition and closing the digital divide, countries world-wide have advanced ICT policies to this effect. The rate of ICT adoption and implementation differs from continent to continent and country to country and despite that there are still many challenges in introducing or implementing ICT in schools, research both in Africa and around the world has shown that the use of ICT can greatly influence and improve the productivity and efficiency of both teaching and learning.

2.4 Information and Communication Technology (ICT)

2.4.1 ICT Literacy training

Various definitions of ICT literacy exist in literature and there is no common definition of ICT literacy in existence with organizations developing course objectives for ICT as stated by Kennewell (2002). An ICT policy for education defines ICT as a "concept covering all the technologies used for the handling and communication of information and their use specifically in education" (MOE, 2005, p. 4). Gordon (2007) realized that ICT symbolize core skills and transferable skills necessary to use information technology. ICT literacy is considered as having basic skills required to operate a PC, search for and retrieve information on the web, prepare a basic document, communicate by e-mail and operate a simple spreadsheet (MOE, 2005).

This notion is supported by Gordon (2007) who alluded that these skills are core as they require knowledge about the basic processes essential to input, handle, and obtain information from an information technology system. He further explained that these skills are transferable because they permit an individual to utilize the basic skills on any type of information technology system. Panel defined ICT literacy as, " using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society" (Panel, 2002, p. 2). Kennewell (2002) proposes that ICT competency can be defined in terms of definite abilities such as the capacity to know when utilizing an ICT system is needed, the capacity to use the functions of an ICT system, and the capacity to comprehend the total range of applications available to resolve specific problems.

All definitions by Gordon, Kennewell and Panel propose that ICT literacy includes both computer literacy and information literacy (2007; 2002; 2002). Computer literacy is defined as an understanding of the simple role of a computer and appreciating the usage of some software applications. Information literacy is a proficiency to recognize when information is required as well as the capacity to find, analyze, and effectively contextualize the information to a specific circumstance (Easton, Easton, & Addo, 2006). Another version of ICT literacy comes from Garnett (2008) who refers to ICT literacy as the skill to use a computer to access resources on the World Wide Web and to utilize electronic mail (email) as a communiqué device. He further identified six literacies that he claims are connected which are: information literacy, computer literacy, ICT literacy, system literacy, e-government literacy and e-learning literacy (Garnett, 2008). According to Gannett, these six literacies propose

that web/internet literacy and media literacy might be added to the definition of ICT literacy. Rockman further stated that ICT literacy includes the capacity to use technology to gather and handle information, which is a precise use of information literacy theory (2004). From the above definitions, ICT literacy is not limited to only having basic computer skills, but also includes possessing the abilities and knowledge to: 1) identify the type of information appropriate to resolve a problem, 2) choose methods to access the information, 3) understand limits to retrieving the information and 4) to apply critical inquiry to the information (Hatmi, 2009).

Hatmi (2009) in his study on "How effective is ICDL training for Omani Teachers?", disputed that while ICDL is effective at teaching basic skills in computer and application use, the training is not effective in training educators on critical assessment of technology or in how to use technology in the classroom. As a basis for the researcher's study, data from this paper will inform the researcher on how effective is ICDL literacy on training teachers in ICT skills and eventually its impact on their ICT use in their classroom practices (Hatmi, 2009).

Many definitions of ICT literacy exist in literature and it is still being developed and the lack of a standard definition contributes to the difficulty in establishing specific objectives for ICT for education. For this study, the Panel definition of ICT literacy was adopted is "using digital technology, communication tools, and/ or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society" (Panel, 2002, p. 16).

2.5 Impact of ICT on teaching and learning

Research done on the impact of ICT on teaching and learning has empirical evidence that ICT can assist teachers to teach and learners to learn more effectively (Higgins, 2003). However, findings suggest that although ICT can enhance learning there are a number of concerns that need to be deliberated if such technology is going to make a difference. Mdlongwa (2012), states that the incorporation of ICT into the curriculum of learners is of massive advantage to them. Access to ICTs permits learners to develop skills necessary to operate in a work environment which is continuously technology dominated. Furthermore the introduction of ICT into the school curriculum allows learners to become inventors of knowledge in their own right, by for example, using the internet search skills to locate and collect relevant data for their school projects and eventually produce a report, for example, a PowerPoint presentation. Other benefits of using ICT to learners are the development of information management skills, communication skills, independent learning, research and teamwork skills which are a prerequisite in today's international employment force (Mdlongwa, 2012).

Noor-Ul-Amin (2008) acknowledges the impact of ICT by agreeing that it has the capacity to invent, hasten, enhance, and expand skills, to influence and involve learners, aids to align school experience to work performances, build economic sustainability for tomorrow's workers, connects the school to the world as well as reinforcing teaching and assisting schools change (Davis & Tearle, 1999; Lemke & Coughlin, 1998; cited by Yusuf, (2005)). A report by British Educational Communications and Technology Agency (Becta), reviews that the impact of ICT in the learning process include increased

teamwork, greater engagement and perseverance, self-directed learning, effective communication, better conceptual understanding as well as improved achievement (Condie & Munro, 2007).

A study conducted by Careemdeen (2015), on the impact of ICDL training on classroom computer use by secondary teachers with special reference on Badulla District, revealed that an average of 51% of the 85 participants stated that ICDL training resulted in their use of new software applications in their classrooms. The results further revealed that most of the teachers (55%) can apply what they had learnt in the presentation module, while a majority of the teachers (75%) cannot apply Database (Access) and spreadsheet applications in their teaching and learning process. Nevertheless, findings further indicated that among the teachers who underwent ICDL training, computer knowledge and skills did not affect them at all in the use of ICT in the teaching and learning process. Factors identified as adversely affecting teachers' usage of ICT in classrooms are insufficient number of computers, insufficient internet connectivity, and insufficient number of interactive whiteboard, insufficient laptops and damaged computers. Abuhmaid's study (2011), on the conduct and effectiveness of ICT training courses for teacher professional development in Jorden revealed that while such courses, ICDL included, helped teachers to improve their ICT skills and knowledge, factors such as timing and modes of training, follow-up support, teachers' beliefs, school culture, workload and motivation negatively impacted the effectiveness of these training courses.

The incorporation of ICT can assist in reshaping both teachers and learners. ICT can help to enhance and develop the quality of education by giving curricular related

support in problematic subject areas. To accomplish these goals, teachers need to be involved in collaborative projects and improvement of mediation change strategies, which would take into account teaching partnerships with ICT as a tool. Zhao and Cziko (2001) states that, from a Perceptual Control Theory (PCT) viewpoint, three conditions are at play if teachers are to use ICT into their classrooms: teachers should have self-confidence in the usefulness of technology, teachers should have faith that the use of technology will not cause any instabilities, and finally teachers should trust that they have control over technology. Nonetheless, Smeets (2005) and other research studies reveal that the majority of teachers fail to take advantage of the capacity of ICT to add to the quality of learning situations, although they embrace this prospective quite considerably as a way of supporting learners' active and independent learning. Case studies on innovative pedagogical practices involving ICT done by Harris (2002) in three primary and secondary schools respectively revealed that the rewards of ICT will be achieved when motivated teachers are eager to discover new opportunities for altering their classroom practices by utilizing ICT. As a result, the use of ICT will not only enrich learning environments but also prepare subsequent cohort for future lives and professions (Noor-ul-Amin, 2008).

2.6 Challenges to effective use of ICT in classrooms

Despite the noted positive impact of ICT on human lives, teachers at the grassroots i.e. in their classrooms faces a variety of challenges in effectively using ICTS in their teaching and learning processes. A paper by Mulhim (2014) reported about some of the

factors causing a low usage of ICTs by teachers in their classroom practices. According to findings, challenges can either be at teacher and school level. The most significant and collective teacher level challenges are: teachers' unwillingness to change, teachers' negative self-assurance towards technology, limited time and insufficient knowledge and skillset in technology usage (Mulhim, 2014). The Becta report (Becta, 2003) revealed that in order to maximize and enhance the use of ICTs in the classroom, a number of challenges that impede teachers from using ICTs effectively necessitate to be resolved. The findings from this report summarized challenges under: lack of proper ICT equipment, lack of confidence, lack of technical support, lack of time and lack of effective training (Becta, 2003). A study by Brush (2003) on what teachers think are the barriers to IT associated teaching, isolated nine barriers: shortage of hardware, shortage of software, lack of internet connectivity, insufficient support from school management, lack of time to develop courses, lack of essential resources, insufficient facilities in student labs, lack of salary support during development time and lack of students' preparation to handle technology. Challenges to technology use by teachers in their classrooms are multifaceted and for them to take advantage of the benefits of ICT, appropriate intervention strategies are inevitable to ensure that teaching and learning become effective.

2.7 Computer self-efficacy

According to the PCT perspective by Zhao and Cziko (2001), a condition isolated to be significant for teachers to use technology in their classrooms is their perceived

ability to use technology. This perspective is referred to by Teo (2009) as computer self-efficacy, teachers' beliefs and judgments of their ability to use technology in teaching processes. Bandura (1986) defines self-efficacy as one's judgement of their capabilities to organize and execute courses of action in alignment with desired goals. In the context of this study, the focus was to elicit teachers' judgements they have on what they can do with whatever skills they gained from ICDL training but not the skills they has. Results of Teo's study (2009) reported a positive significant relationship between teachers' self-efficacy beliefs and their envisioned use of technology in teaching. The results of this study are referred to in the discussions of the findings of this study.

2.8 Theoretical Framework

The Educational Testing Service (ETS) ICT literacy theoretical framework grounded this study. This framework was created to form a basis for defining ICT literacy and give a base for the design and conducting of comprehensive valuations and diagnostic tests (Panel, 2002). The framework provides a model including large-scale assessments envisioned to inform public policy and diagnostic measures to test an individual's skills related with ICT (Panel, 2002). The framework was developed based on the definition of ICT literacy as agreed upon by the panel members with several assumptions attached, which is: "using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate and create information in order to function in a knowledge society" (Panel, 2002, p. 16). The panel further isolated five elements as prerequisites in a knowledge society: accessing, managing, integrating, evaluating and creating information in a technology environment. As represented in

figure 1 and explained below, these elements constituted the first schemata for the coverage of tasks forming up ICT literacy.

- **Access** - knowing about and knowing how to collect and/or retrieve information.
- **Manage** - applying an existing organizational or classification scheme.
- **Integrate** - interpreting and representing information. It involves summarizing, comparing and contrasting.
- **Evaluate** - making judgments about the quality, relevance, usefulness, or efficiency of information.
- **Create** - generating information by adapting, applying, designing, inventing, or authoring information (Panel, 2002).

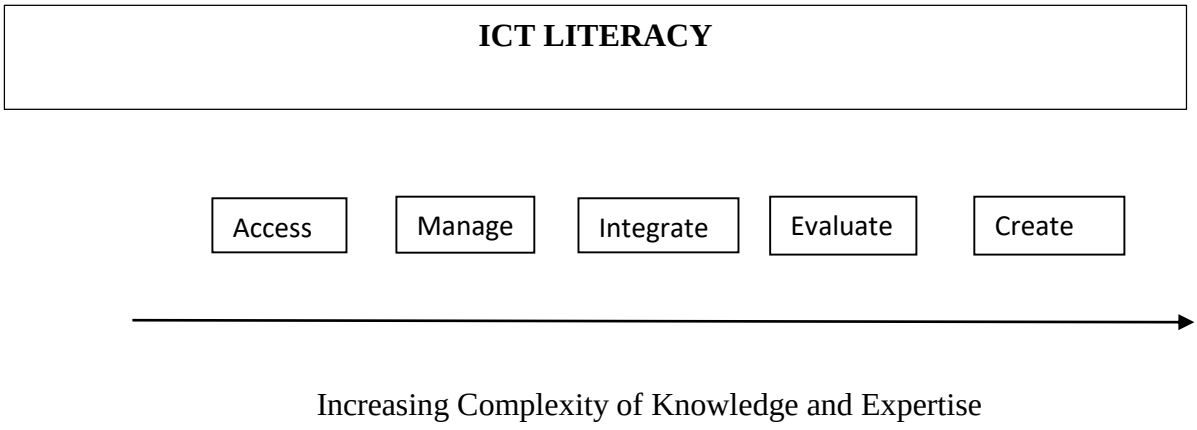


Figure 1: Components of ICT Literacy

Due to the complexity of ICT literacy, the framework was broadened to include cognitive and technical proficiencies as the introductory set of skills and knowledge that inspires ICT literacy. Figure 2 below depicts the expanded model.

ICT LITERACY

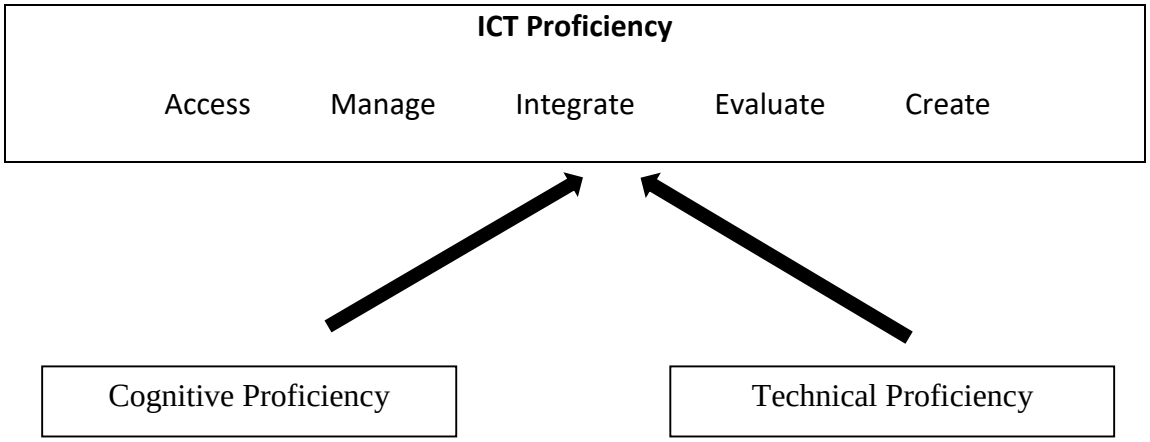


Figure 2: Expanded ICT Literacy Model: Source: Panel, 2002

This framework identifies three proficiencies defined as follows:

- Cognitive Proficiency: This area addresses desired foundational skills of everyday life at school, at home, and at work. Literacy, numeracy, problem solving, and spatial/visual literacy demonstrate these proficiencies.
- Technical Proficiency: This area covers the basic components of digital literacy. It includes a foundational knowledge of hardware, software applications, networks, and elements of digital technology.
- ICT Proficiency: This area entails the integration and application of cognitive and technical skills. ICT proficiencies are perceived as enablers; that is, they allow individuals to maximize the capabilities of technology. At the highest level, ICT proficiencies result in innovation, individual transformation, and societal change (Panel, 2002).

As understood in the framework above, ICT literacy is a combination of both cognitive and technical proficiency and despite both being essential parts of ICT literacy, they stand to be separate spheres (Panel, 2002).

Therefore, in this study the (ETS) ICT Literacy framework was be used to investigate the main question on the impact of ICDL literacy training on Zambezi teachers' use of ICTs in their classrooms. This model was be used to investigate whether ICDL empowered teachers with cognitive and technical skills to enable them to use ICTs in their classroom practices or not by using the ICT proficiency component (Panel, 2002).

2.9 Summary

The historical context of ICT literacy described testifies that ICT is an essential component of the modern world and that it has definitely, impacted on the quality and quantity of teaching and learning as reported by Condie & Munro (2007). The study by Hatmi revealed that ICDL training is effective at teaching basic skills in computer and application use but is deficient in training teachers on how to use technology in the classroom. Many studies isolated lack of proper equipment, lack of time, lack of effective training, limited time, lack of internet connectivity and shortage of hardware and software as challenges causing low usage of ICTs by teachers. Despite many challenges which are still faced by many nations in implementing or introducing ICTs in schools, research worldwide has revealed that the utilization of ICT can immensely

impact and enhance the output and value of both teaching and learning as long as the identified challenges/barriers are addressed amicably.

CHAPTER III: RESEARCH METHODOLOGY

3.1 Introduction

This study addresses how ICDL literacy training has impacted Zambezi Region teachers on their use of ICTs in their classrooms as training recipients, and curriculum implementers. This chapter discusses the methodology employed in exploring the research question, participants of the study, data collection process, data analysis and ethical considerations.

3.2 Research design

3.2.1 Mixed Methods Design

A sequential explanatory mixed methods design was employed, and it is a type of design in which quantitative survey information is collected and analyzed in the first phase, then in-depth qualitative data is collected through focus group interviews to convey expression to the findings from the quantitative results. Creswell and Plano Clark (2011), defines mixed methods designs as procedures for collecting, analyzing, and mixing both quantitative and qualitative data in a single study or multiphase series of studies to better understand the research problem. Creswell (2003) defined a mixed methods approach as one in which the researcher tends to base knowledge claims on pragmatic grounds (e.g., consequence-oriented, problem-centred, and pluralistic). McMillan (2008) defines a mixed methods study

as a formal research design that mixes or combines quantitative and qualitative research techniques at various stages of the study. The fundamental deduction is that using both quantitative and qualitative methods, in combination, offer an enhanced understanding of the research problem and question than either method when used alone (Creswell J. W., 2014).

This approach of the study offers a blend of quantitative and qualitative perspective of the data. With reference to the execution design character, the symbolization for this study as explained by Johnson (2012), can be written as "QUAN → qual = explain results" as a shorthand version of this study based on a dominant-status sequential design in which the quantitative results lead to qualitative data which eventually are used to explain the results. In phase one of the study, the adapted Becker (1998) survey was administered and collected from one hundred and ninety-eight teachers who received ICDL literacy training from eight schools in Zambezi Region where training was offered to better understand the impact of the training on teachers and their use of ICTs in their classrooms. In phase two, the researcher conducted follow-up qualitative semi-structured interviews with a convenience sample of eight teachers who completed four to seven (4-7) ICDL modules.

Guest, Bruce and Johnson (2006) suggest that 6 to 12 interviews are sufficient if the aim of study is to understand shared views and experiences amongst a similar population. Onwuegbuzie and Collins (2007) further state that a two-dimensional matrix showing sampling designs can yield statistical generalizations that are trustworthy in interpretation. The interpretive consistency may be justified if the quantitative sample is dominant or larger than the qualitative sample (Onwuegbuzie & Collins, 2007).

3.3 Justification of the Explanatory mixed research design

The mixed research approach is based on the pragmatist philosophy which states "to use what works", that is, to mix research paradigms in a way that the researcher believes will work for his research problem, research question and research focus (Johnson & Christensen, 2012). The mixed research design combines the quantitative and qualitative research methods, procedures, approaches and other paradigm features in a way that yields an inclusive design with complementary strengths and non-overlapping weaknesses. This approach to research gives the researcher an opportunity to understand the human behaviour in particular and the world at large more fully. According to Creswell (2014) , the explanatory design captures the best of both quantitative and qualitative data by obtaining quantitative results from the population in the first phase, and then refines these findings through an in-depth qualitative exploration in the second phase. McMillan (2014) further alludes that mixed methods provide a more comprehensive picture of what is being studied and enhances the credibility of findings from a single study. Despite the above advantages, mixed method designs demands more extensive data collection, time and resources (McMillan & Schumacher, 2014).

3.4 Explanatory Design Features and Practical Concerns

The implemented explanatory mixed design is the most straightforward of the mixed method designs and consisted of four steps (see figure 3 below). In step one, the researcher designed and implemented the quantitative phase in which a survey comprising of both closed and open-ended questions was administered. Data collected was analyzed by using descriptive and inferential statistics. In step two, the researcher

used the quantitative results to fine-tune and plan the protocols for the qualitative phase (Creswell & Plano Clark, 2011). Step 3 was used to collect and analyze qualitative data and lastly, step four focused on inferring to what extent and in what ways, the qualitative results helped in explaining the quantitative results (Creswell & Plano Clark, 2011).

Step 1

Design and Implement the Quantitative Phase:

State quantitative research questions and determine the quantitative approach.
Obtain the necessary permissions where necessary.
Identify the quantitative sample.
Collect closed-ended data with instruments.
Analyze the quantitative data using descriptive statistics, inferential statistics, and the effect sizes to answer the quantitative research questions and facilitate the selection of participants for the second phase.

Step 2

Use Strategies to Follow From the Quantitative Results:

- Determine which results are to be explained, such as
  - Significant results
  - Non-significant results
  - Outliers
  - Group differences
- Use these quantitative results to
  - Refine the qualitative and mixed methods questions
  - Determine which participants will be selected for the qualitative sample
  - Design qualitative data collection protocols

Step 3

Interpret the Connected Results:

- Summarize and interpret the quantitative results.
- Summarize and interpret the qualitative results.
- Discuss to what extent and in what ways the qualitative results help to explain the quantitative results.

Step 4

Design and Implement the Qualitative Phase:

- State qualitative research questions that follow from the quantitative results and determine qualitative approach.
- Purposefully select a qualitative sample that can help explain the quantitative results (sample includes teachers and principals).
- Collect semi-structured data with protocols informed by the quantitative results.
- Analyze the qualitative data using procedures of theme development using a Computer Aided Qualitative Data Analysis Software (NVIVO).

Figure 3: Flow chart of basic procedures in implementing an explanatory design: Adpated from source: Creswell & Plano,2011

3.5 Population

A research population is the entire group of individuals that a study is intended to investigate (Springer, 2010). Best (2014) defines a target population as a group of individuals to whom the research findings are generalized. Furthermore, Johnson (2012)

refers to a target population as the large group to which the researcher wants to generalize his or her sample results.

The population of this study comprised of 198 teachers from eight schools among whom 172 teachers received ICDL training from the Ministry of Education initiative through NETSS Centre between 2008 and 2011 in eight junior and senior secondary schools in the Zambezi Education Region. The other 26 teachers also received ICDL training through other means and 198 questionnaires were despatched to these schools in self-addressed envelopes. See table 2 below.

Table 2: Summary of Zambezi Region ICDL Training and questionnaire distribution

School Code	EmisCode	Year Trained	Teachers trained	Surveys distributed	Surveys returned	Completed and entered	Blanks
1	7164	2008	1				
		2010	26	37	9	8	1
2	7077	2011	19	34	30	30	0
3	7122	2011	20	19	10	9	1
4	7131	2010	23	20	13	12	1
5	7146	2010	25	25	21	10	11
6	7114	2010	16	20	14	9	5
7	7151	2010	27	22	6	6	0
8	7157	2008	15	21	17	12	5
		Total	**172**	**198**	**120**	**96**	**24**

Prior to the despatch of questionnaires, a letter requesting for permission to conduct research in the targeted schools was sent to the Regional Director of Education. After permission was granted, another letter seeking permission from principals of the target schools was sent securing entry into such schools. (Appendices G & H) This exercise prompted 120 teachers to return the surveys of which 96 were completed and 24 were blank. With the exclusion of blanks, the return rate stood at 48 percent.

3.5.1 Sample and sampling procedure

The sampling occurred at two distinct phases in a sequential order as the research approach used was an explanatory sequential design.

3.5.1.1 Sampling in the Quantitative Phase

Purposive sampling was used in the sampling for the quantitative phase of the study which is applicable when the purpose is to match the features of the participants to definite characteristics under scrutiny in the research (Cohen, Manion, & Morrison, 2011). Teddlie & Yu states that purposive sampling is undertaken when the researcher intends to achieve representativeness by selecting a sample that represents a broader group of cases as closely as possible (2007). The researcher used statistics on Zambezi Educational Region ICDL training 2008-2011 summary report and the individual school staff establishment to identify the potential respondents for the survey. The benchmarks used to choose teachers to be included in the survey sample were receiving of ICDL training and been a current teacher in those 8 junior and secondary schools where training was offered. Based on these criteria, a sample of 198 teachers was chosen and the same amounts of questionnaires were personally delivered to schools by the

researcher. This exercise prompted 120 teachers to return the surveys of which 96 were completed and 24 were blank. With the exclusion of blanks, the return rate stood at 48 percent.

3.5.1.2 Sampling in the Qualitative phase

In the qualitative phase, the researcher used a purposive sampling technique by selecting all those who passed four or more ICDL modules totalling to ten (10). Creswell (2011) states that since the explanatory design intents at clarifying initial, quantitative results, the participants for the qualitative follow-up stage should be individuals who partook in the first quantitative data collection. The selected ten participants came from the initial 198 teachers who took part in the quantitative phase of data collection.

3.6 Data Collection

Data was collected at two separate but sequential phases as explained below.

3.6.1 Quantitative Data Collection

Data under the quantitative phase was collected using a paper format survey from teachers who received ICDL literacy training. (See Appendix D) The intended study was pronounced by the researcher and permission to collect data was granted by the permanent secretary and Zambezi Regional Educational Director.

The survey used was an updated version of Becker's survey of 1998 (Appendix D) employed in investigating how teachers in United States (US) used computers in their

classrooms. The researcher used the survey because it established itself to be relevant to provide the answers to the research question as it was initially developed to investigate teacher and student technology use. Furthermore, the validity and reliability of the survey instrument is well proven and instrument testing was not required. Trochim (2006), states that surveys are important measurement tools in applied social research as they are utilized to minimize bias in research and their standardized format permits for better generalizability of quantitative results.

The researcher adapted the Becker survey and only used section L on "Your computer use" relevant to the research question. Section L consist of the following classifications:

- Teacher use of and experience with computers
- Types of software used
- Student access and teacher access
- Impact of ICDL training on teaching and learning (past 5 years)
- Frequency of student and teacher computer use (past 5 years)
- Teachers skills related to computer use
- Teacher perceptions about the value, advantages and disadvantages of technology for teaching and learning.

Extra open-ended questions pertaining to the impact of ICDL training on teacher ICT skills and classroom teaching were included to elicit teachers' general opinions. Furthermore, questions about the challenges faced in effectively using ICTs, motivation for taking ICDL training as well support envisioned to fully use ICTs in their classrooms were added.

Due to time constraints, the researcher, personally visited the identified schools and administered the survey. On average, 25 copies of the survey were administered to teachers who received ICDL training at each of the eight junior and secondary schools. A letter explaining the purpose of the study with a support letter from the Ministry of Education as well as 25 self-addressed envelopes was also given to the principal of each participating school. (See Appendices B & F)

3.6.2 Qualitative Data Collection

Participants for the qualitative phase were selected from the sample that took part in the quantitative phase and had completed the survey. (See Appendix E) A purposeful sampling technique was used to choose participants for the interview based on the feature of passing four or more ICDL modules. Johnson (Johnson & Christensen, 2012), defines purposeful sampling as a sampling technique under which a researcher stipulates the features of a population of interest and then tries to find individuals with such features. A sample of eight participants was used for this follow-up phase of the study.

Participants in the second qualitative phase were offered with semi-structured interviews and their answers were recorded and transcribed. The purpose of the interview procedure was to inspire teachers' assessment on the impact of ICDL literacy training on their ICTs use in their classrooms.

3.7 ICT Literacy framework

The panel (2002) defines ICT literacy as utilising digital technology, communications tools, and/or networks to access, manage, integrate, evaluate and create information in order to function in a knowledge society. The definition is so broad that it

comprehensively covers all hardware and software products (Digital technology), products and services to convey information (communication tools), and channels for this communication (networks) (Panel, 2002). The concept further consists of five critical components representing tasks ICT literate individuals should perform in order to function in a knowledge society collectively agreed upon by the panel as follows: access, manage, integrate, evaluate and create. (Refer to figure 1 & 2 in chapter II).

This framework identifies three proficiencies defined as follows:

- Cognitive Proficiency: This area addresses desired foundational skills of everyday life at school, at home, and at work. Literacy, numeracy, problem solving, and spatial/visual literacy demonstrate these proficiencies.

- Technical Proficiency: The elementary components of digital literacy. It includes a foundational knowledge of hardware, software applications, networks, and elements of digital technology.

- ICT Proficiency: The integration and application of cognitive and technical skills. ICT proficiencies are perceived as enablers; that is, they allow individuals to maximize the capabilities of technology. At the highest level, ICT proficiencies result in innovation, individual transformation, and societal change (Graham, 2000; Panel, 2002).

Thus, this framework was used to assess the impact of ICDL literacy training in equipping teachers with both cognitive and technical skills that are a prerequisite in effectively using ICTs in their classrooms. The findings are presented in the chapter IV.

3.8 Methods for Data Analysis

3.8.1 Quantitative Data Analysis

In analyzing quantitative data, the researcher applied descriptive statistics such as means, frequencies, and standard deviation to the responses from the survey data. Descriptive statistics were found deem to describe the simple components of the research data and offered summaries about the findings. Descriptive statistics is ideal in social sciences as it permits analysis of the same across the different groups. Trochim, (2006) asserts that descriptive statistics are helpful in comprehending a phenomenon without trying to find associations that spread outside the data itself. Data was analyzed by using SPSS which is an acronym for Statistical Packages for Social Sciences, a versatile, responsive and comprehensive system designed to perform a variety of statistical processes. The software was utilized to narrate the participants in terms of gender, number of teaching experience, motivation for taking the training, current ICT skill set and ways of using computers. This resulted in the generation of frequencies and percentages for each demographic. Supplementary descriptive statistics were also produced to define the frequencies and percentages for each response relating to the participants' current ICT skills, motivation for taking ICDL training, computer use and importance of computers in their teaching. Each category of response was compared against the demographics of years of teaching experience, gender, modules completed and subjects taught. Reporting the internal consistency reliability (Cronbach Alpha) items grouped under the categories were effected in order to indicate the strength of the relationship of the survey questions.

Data collected through the survey was entered on an excel sheet which included nominal and ordinal variables. For this study raw data was collected from teachers who undertook ICDL literacy training and responses were pre-coded by the researcher for easier analysis.

3.8.2 Qualitative Data Analysis

The qualitative data from interviews were recorded with a digital recorder and transcribed and coded and themes developed. Data from interviews was analyzed by using content analysis which is an attribute of open coding wherein data was examined to isolate the general constructs as noted by participants.

3.9 Validity and Reliability of the Study

The survey instrument used in this research was an adapted Henry Becker survey (Henry & Anderson, 1998) which focused on how teachers used technology in their classrooms and work-life in order to assess whether their ICDL training had any impact. The Becker Survey is a validated survey and no pilot study was necessary as it was not necessary to test a new instrument. The Becker survey has been used successfully to assess the scope of the study.

3.10 Limitations to the study

This mixed methods approach to the study provides a stronger approach as if the study used a purely quantitative or qualitative research methodology. Approaching this research on purely quantitatively would simply provide survey data with little insight into the reasons for the outcomes of the data. A purely qualitative approach would have given perspective from a few participants, but would not be able to provide a generalization from a larger group of teachers in the region. Using of this approach was based on the fact that it provides a more complete understanding of a research problem compared to purely quantitative or qualitative approaches applied separately.

3.11 Research Ethics

Johnson and Christensen (2012) defined research ethics as "a guiding set of principles that are to assist researchers in conducting ethical research" (p. 100) . The researcher observed all ethical considerations to ensure that the participants were not harmed in any way. The researcher also asked for an informed consent from participants by attaching a cover letter to the survey asking for their permission to fill in the survey. Informed consent refers to the provision of participants with sufficiently detailed information on the study so that they can make an informed, voluntary and rational decision to participate (Kowalcxyk, 2015). Participants were informed about the purpose of the study and procedures, duration as well as their rights. Prior to embarking on this research, an ethical clearance certificate was obtained from the University of Namibia

Research Ethics Committee (UREC). Permission to administer a survey in schools was obtained from the Permanent Secretary of the Ministry of Education, Arts and Culture through the Regional Director, Zambezi Region.

The researcher protected the anonymity and confidentiality of research participants by using study codes, encrypting data and limiting access to data so that their identity and responses remained secured. Data was stored in a lockable safe place and the researcher did not engage into dishonest practices during the research process. The data will be stored for a period of seven (7) years and eventually be disposed by shredding it or transferring it to the university's archive.

3.12 Summary

This chapter covered the methodology employed to collect and analyze data for this study which adopted a pragmatic approach. A sequential explanatory mixed methods design was used and the population of 198 teachers was involved in the study. Purposive sampling procedures were used for participant sampling both in quantitative and qualitative phases. A survey and semi structured interviews were employed in data collection. Quantitative data analysis was done by using SPSS version 20 and qualitative data was recorded, transcribed and coded and themes developed.

CHAPTER IV: FINDINGS

4.1 Introduction

The purpose of this study was to investigate the impact of ICDL Literacy training on teachers' use of ICTs in their classroom practice in the Zambezi Region. Due to the study implementing a mixed method sequential explanatory design, the findings are based on the analysis of quantitative data collected from surveys completed by teachers who did ICDL literacy training as well as qualitative data collected from interviews with teachers who completed four or more (4-7) ICDL modules.

The findings of the quantitative part are presented as descriptive statistics and IBM SPSS version 20.0 was used for data analysis. Questions 22 to 27 of the survey are qualitative in nature and the analysis of this data is presented in conjunction with the qualitative part of the study. Follow-up qualitative interviews were conducted with eight teachers who completed four to seven modules of ICDL literacy training. The semi-structured interview gave teachers an opportunity to explain in their own words the impact of ICDL training in their classroom practices. The focus of the interview questions was on course expectations, impact on ICT usage, ICT skills improved, challenges faced in using ICTs and kind of support needed. Questions 2, 3, 5, 7, 11 and 12 were used to elicit more data from participants. Interviewed participants were coded with the letter "T" for Teacher, followed by an ascending alphabet, e.g. T.A for teacher A. These interviews were conducted to consolidate and clarify quantitative findings.

The chapter begins with the demographic data about the teachers who participated in the study in terms of gender, age, teaching experience, grades taught, qualifications and school profiles. This is followed by presentation of quantitative and qualitative findings which addresses the four main research questions:

- How has the ICDL training impacted teaching and learning in Zambezi Region classrooms?
- What are Zambezi Region's teachers' self-efficacy regarding their ICT skills?
- What do teachers identify as challenges affecting compliance to Goals 1 and 2 in the ICT in educational policy?
- What kind of support does the Ministry of Education give to teachers for them to realize a more successful integration of the ICDL ICT literacy training in their classroom practice?

The matrix below shows which quantitative and qualitative questions were used to elicit answers to each specific research question.

Table 3: Research question matrix

Research question	**Quantitative data** **Survey questions used**	**Qualitative data** **Interview questions used**
RQ 1	Q 1, 4, 8, 15 & 17	Q 2, 5 & 7
RQ 2	Q 5, 10, 18 & 21	Q 3
RQ 3	Q 26	Q 11
RQ 4	Q 27	Q 12

4.2 Teacher Demographics

The demographic data of teachers who participated in the study are presented below.

4.2.1 Gender of teachers and Age ranges

Teachers' gender composition and age category by gender are presented in figure 4 and table 4 respectively.

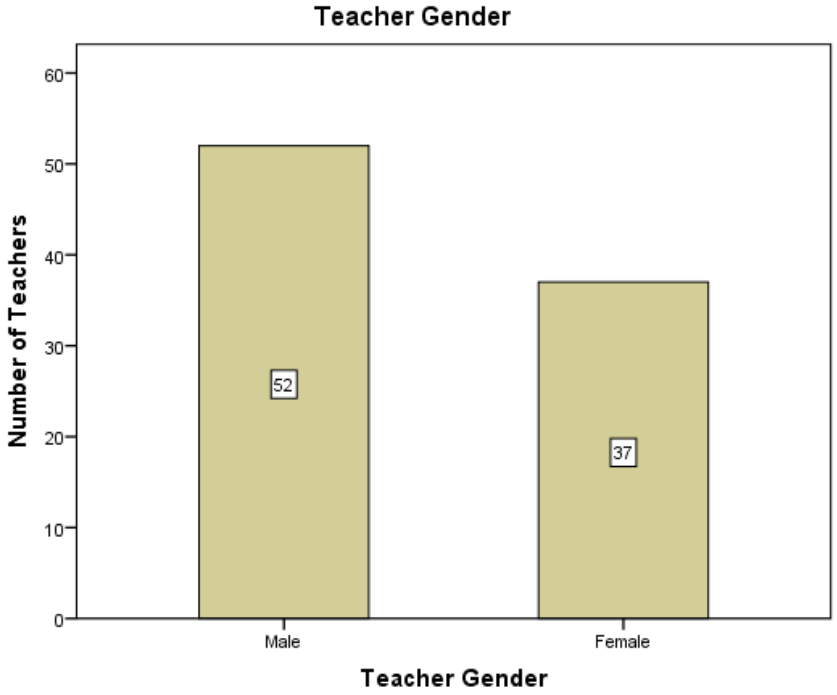


Figure 4: Gender distribution of teachers

Table 4: Gender composition of teachers

Gender	Frequency	Percent	Valid Percent	Cumulative Percent
Male	52	54.2	58.4	58.4
Female	37	38.5	41.6	100.0
Total	89	92.7	100.00	
Missing	7	7.3		
Total	96	100.0		

The data above indicates that ninety-six teachers participated in the study of which eighty-nine indicated their gender. The results show that more male teachers fifty-two (58.4%) completed and returned the survey than female teachers thirty-seven (41.6%). Seven teachers didn't indicate their gender.

Table 5: Participants' age categories by gender

Teachers' Age range by Gender					
			Gender		**Total**
			Male	**Female**	
Age Range	**20-29**	Number	10	3	13
		% Age	76.9	23.1	100.0
		% Gender	19.2	8.6	14.9
		% of Total	11.5	3.4	14.9
	30-39	Number	18	16	34
		% Age	52.9	47.1	100.0
		% Gender	34.6	45.7	39.1
		% of Total	20.7	18.4	39.1
	40-49	Number	12	7	19
		% Age	63.2	36.8	100.0
		% Gender	23.1	20.0	21.8
		% of Total	13.8	8.0	21.8
	50-59	Number	12	9	21
		% Age	57.1	42.9	100.0
		% Gender	23.1	25.7	24.1
		% of Total	13.8	10.3	24.1
Total		Number	52	35	87
		% Age	59.8	40.2	100.0
		% Gender	100.0	100.0	100.0
		% of Total	59.8	40.2	100.0

The results in table 5 depicts that thirteen (14.9%) of the teachers were between the ages of 20 and 29, of which ten (11.5%) were male and three (3.4%) were female. Thirty-four (39.1%) were between the ages of 30 and 39, of which eighteen (20.7%) were male and sixteen (18.4%) were female. Twelve (13.8%) male and seven (8.0%)

were between the ages of 40-49 constituting a 21.8% of the teachers, while the last category of the age group of 50-59 years amounting to twenty-one (24.1%), comprised of twelve (13.8%) male and nine (10.3%) female.

4.2.2 Teaching Experience

Table 6 below shows that 89 out of 96 participants indicated their teaching experience, of which twenty (22.5%) had a teaching experience between 0 and 5 years, while twenty-three (25.8%) had their experience between 6-10 years. Sixteen (18.0%), twelve (13.5%) and eighteen (20.2%) had their teaching experience between 11-15, 16-20 and 20+ years respectively.

Table 6: Teaching experience in years

Teaching Experience					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Experience (Years)	**0-5**	20	20.8	22.5	22.5
	6-10	23	24.0	25.8	48.3
	11-15	16	16.7	18.0	66.3
	16-20	12	12.5	13.5	79.8
	20+	18	18.8	20.2	100.0
	Total	**89**	**92.7**	**100.0**	
Missing	System	7	7.3		
Total		**96**	**100.0**		

4.2.3 Grade Level

Teachers' responses to the question on grades taught are presented in table 7.

Table 7: Grade level by clusters

Grade Levels Taught					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Clusters	**Missing**	14	14.6	14.6	14.6
	0-3 (Pre & Lower Prim)	9	9.4	9.4	24.0
	4-7 (Upper Primary)	15	15.6	15.6	39.6
	8-10 (Junior Secondary)	37	38.5	38.5	78.1
	11-12 (Senior Secondary)	21	21.9	21.9	100.0
	Total	**96**	**100.0**	**100.0**	

Grade levels were categorized according to phases in our formal education system ranging from pre and lower primary (Grades 0-3) to senior level (Grades 11-12). Fourteen (14.6%) did not indicate the grades taught, nine (9.4%) fell in the pre and lower primary (Gr. 0-3) category, fifteen (15.6%) in the upper primary while the majority of teachers thirty-seven (38.5%) were in the junior secondary phase (Grades 8-10) and twenty-one (21.9%) indicated teaching at senior secondary (Grades 11-12). The results in the table further indicates that the majority of teachers fifty-eight (60.4%) who received ICDL training were teaching at junior and senior secondary phases compared to twenty (25%) teachers who indicated teaching at the primary phase.

4.2.4 Teacher qualifications

Out of ninety-six teachers who participated in the survey, eighty-nine (92.7%) indicated their qualifications held while seven (7.3%) omitted the question. Thirty-six teachers (40.4 percent) indicated that they held a Basic Education Teaching diploma (BETD), while thirty-nine (43.8 percent) held a bachelor's degree. Four teachers (4.5 percent) reported having master's degrees (two male and two females), while ten (11.2 percent) had other qualifications. The other qualifications comprised of seven Advanced Certificates in Education (ACE), one Higher Education Diploma (HED), one Advanced Diploma in Education (ADE) and one Grade ten certificate. Note that figure 5 below indicates 9 teachers under other qualifications which is attributed to the fact that one male teacher did not indicate his gender though indicated having the other qualification.

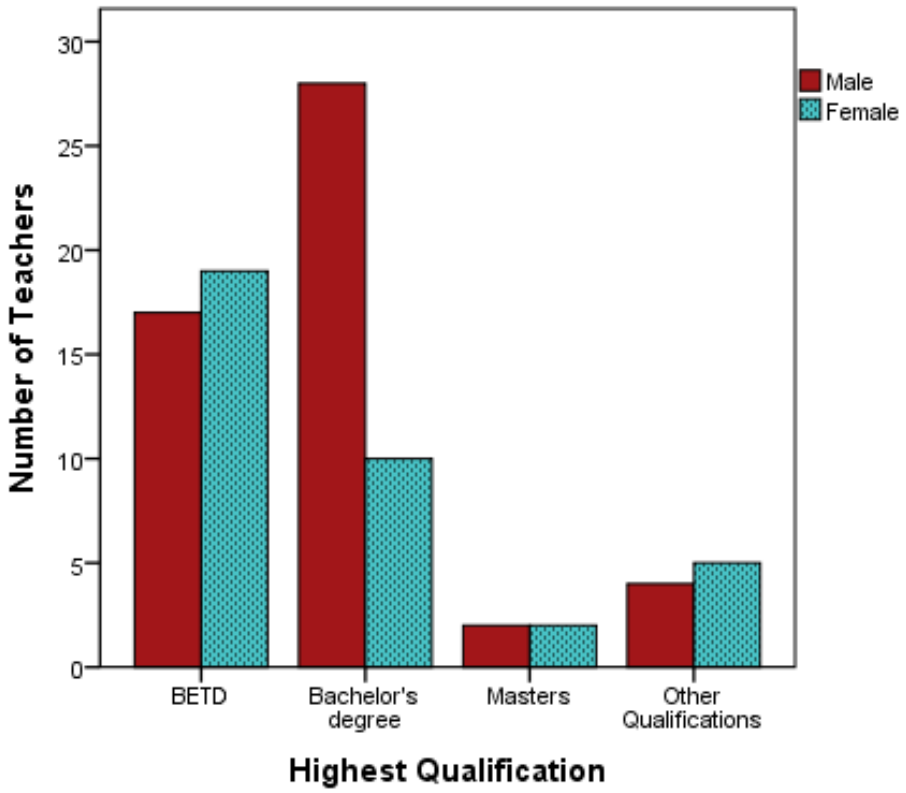


Figure 5: Teacher qualification by gender

4.2.5 School profiles

4.2.5.1 Participants per school

The study was conducted in eight rural and urban schools where ICDL training was offered between 2008 and 2011. Figure 6 below shows that forty-eight respondents (50%) were from urban schools, eight from Caprivi SSS (8.3%), thirty Katima CS (31.3%) and ten Ngweze SSS (10.4%), while the other forty-eight (50%) of respondents were from the rural schools (Dr. Sam Nujoma nine (9.4%), Linyanti CS nine (9.4%), Mafwila SSS twelve (12.5%), Sanjo SSS six (6.3%) and Simataa SSS twelve (12.5%).

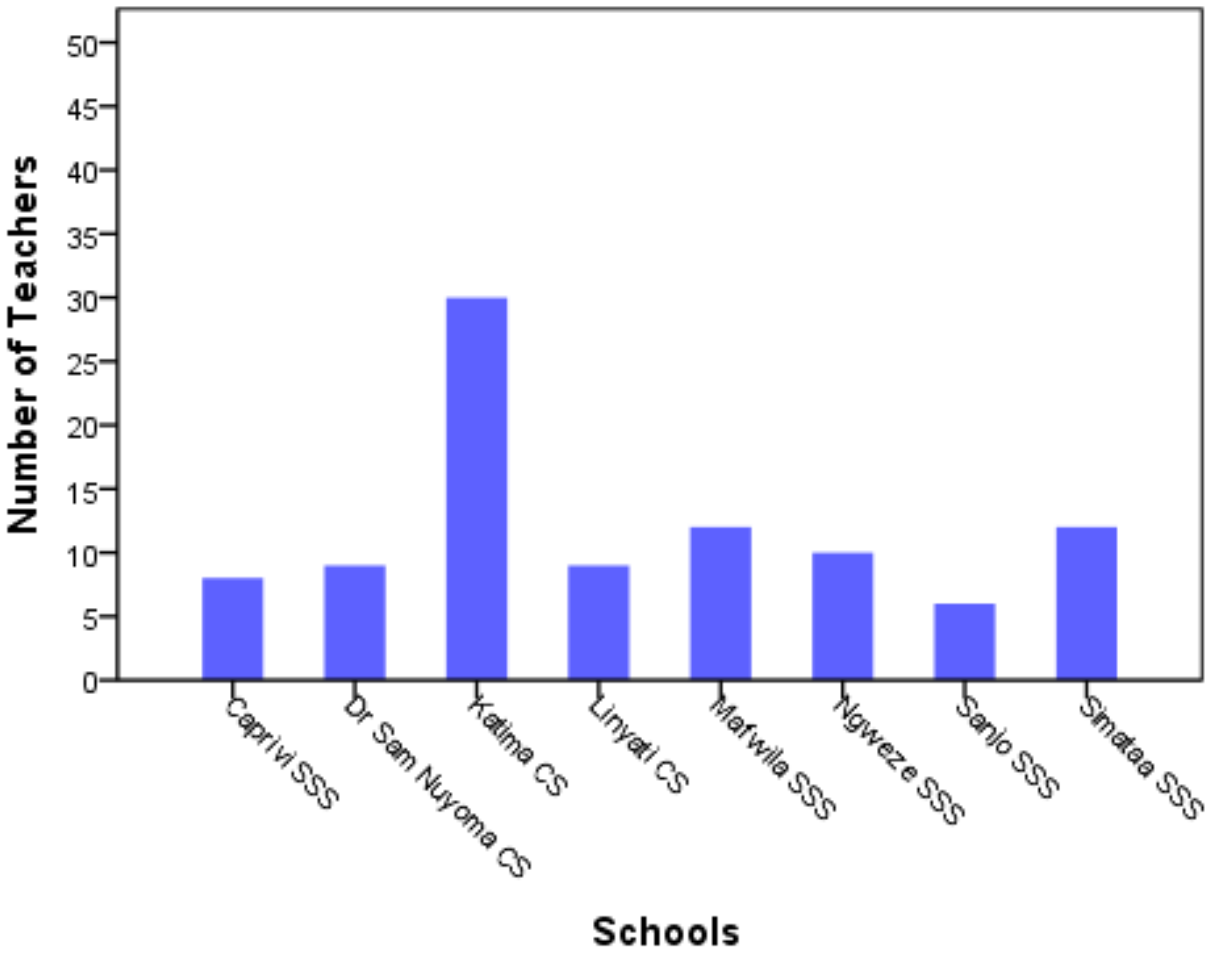


Figure 6: School profiles

4.2.5.2 Computers per school

Results show that the location of computers is dominantly in computer laboratories. Twenty out of twenty-one participants indicated that computers are located in computer labs while only one respondent stated that a single computer is located in the classroom (see figure 7). In all eight schools, the report indicated that there are no computers which are located in school libraries. Teachers and learners have access to computers when they go to the computer lab.

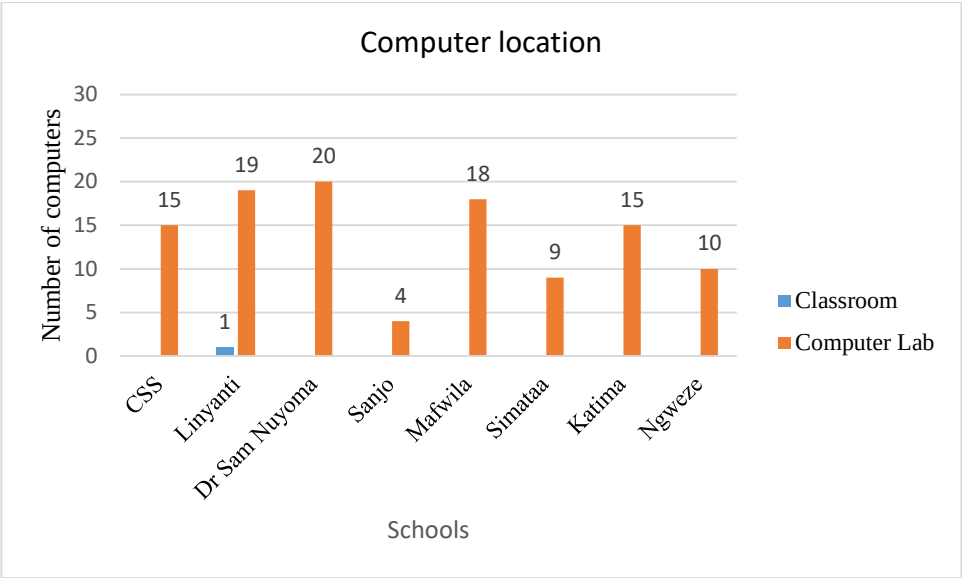


Figure 7: Location and number of computers per school

4.3 Quantitative and qualitative findings

Part of the survey data (QUAN) and specific interview questions (qual) will be composite to answer the research questions. The matrix in table 3 guided the researcher in eliciting responses to the research questions.

4.3.1 Research Question 1: How has the ICDL training impacted teaching and learning in Zambezi Region classrooms?

Specifically, the data is primarily from the survey and explicitly questions 1, 4, 8, 15 and 17 (see appendix D questionnaire). Additional data for this question came from the interview questions 2, 5 and 7 (see appendix E interview questions).

A total of thirty-three teachers (34.4%) responded to the question of learners' access to computers while sixty-three (65.6%) omitted the question (question 4). Table 8 shows that computers are located in the classrooms and computer labs only while there are no computers in school libraries or media centres. Thirty out of thirty-three teachers (90.9%) reported that their learners had access to computers found in the computer laboratories, while three (9.1%) reported that they had computers located in their classrooms.

Table 8: Computer location

Computer Access

Location	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Classroom	3	3.1	9.1	9.1
Computer Lab	30	31.3	90.9	100.0
Total	33	34.4	100.0	
Omitted question	63	65.6		
Total	96	100.0		

The impact of ICDL training on teaching and learning is also reported by focusing on teachers' description for computer use, using question one of Becker survey (see table 9).

Table 9: Teachers' description for computer use

Description of computer use	**Frequency**	**%**	**Valid %**
Option 1:Use computers in all my classes	2	2.1	2.4
Option 2: Use computers in other class I teach	10	10.4	11.8
Option 3: Use computers only for lesson preparations or other professional activities	45	46.9	52.9
Option 4: Don't currently use computers, but have in the past	15	15.6	17.6
Option 5: Have never used computers in teaching or for any professional activities	13	13.5	15.3
Total	85	88.5	100.0
Participants who omitted their description for computer use	11	11.5	
Total	96	100.0	

The analysis in table 9 above reports that eighty-five out of ninety-six participants chose their description for computer use. Two teachers (2.4%) use computers in all their classes, ten (11.8%) use computers in other classes they teach, while forty-five (52.9%) use computers to prepare lessons and professional activities. A total of fifteen teachers (17.6%) don't currently use computers, but have done so in the past and thirteen (15.3%) have never used computers in any way.

In answering the question on the impact of ICDL training on teaching and learning, the frequency use of computers by teachers was addressed by question 17 of the survey. The analysis reports that after ICDL literacy training, twenty-seven (34.6%) out of seventy-eight teachers stated that their attempt on new software or technologies is

less now than before they took the training, while fourteen (17.9%) stayed the same. Twenty-six (33.3%) indicated that their attempt is more now and eleven (14.1%) specified that they are trying out new software or technologies much more now.

Table 10 below summarizes the frequencies of teachers' use of computers for different purposes such as trying out new software, class preparations, non-work activities, assigning learners to use computers and using mobile applications/games to support learning. On average seventy-three respondents indicated their frequency use of computers. Out of seventy-three teachers, twenty-nine respondents (39.17%) indicated that their computer use after ICDL training across the five purposes is less frequent now. Thirteen respondents (17.80%) stated that the frequency of their computer use stayed the same while nineteen (25.47%) showed that their frequency is more now and thirteen (17.80%) reported that their frequency of computer use is much more now.

Table 10: Teacher frequency use of computers

Frequency	*Trying out new software*	*Using computers for class preparations*	*Using computers for non-work activities*	*Assigning leaners to use computers*	*Use mobile APPS/games to support leaning*	*Average*
Less now	27 (34.6%)	26 (34.7%)	20 (28.6%)	33 (47.1%)	37 (51.4%)	29 (39.17%)
Same	14 (17.9%)	12 (16.0%)	8 (11.4%)	18 (25.7%)	13 (18.1%)	13 (17.80%)
More now	26 (33.3%)	24 (32.0%)	16 (22.9%)	13 (18.6%)	14 (19.4%)	19 (25.47%)
Much more now	11 (14.1%)	13 (17.3%)	26 (37.1%)	6 (8.6%)	8 (11.1%)	13 (17.53%)
Total	78 (100%)	75 (100%)	70 (100%)	70 (100%)	72 (100%)	73 (100)

Figure 8 depicts that on average forty-one (56.2%) teachers are still not frequently using computers as compared to thirty-two (43.8%) teachers who indicated they now use computers much more frequently. The analysis further indicate that the majority of teachers are not accessing and managing information as evidenced by their low and unchanged frequency use of computers after receiving training when assessing their ICT proficiency with reference to the ETS ICT Literacy framework.

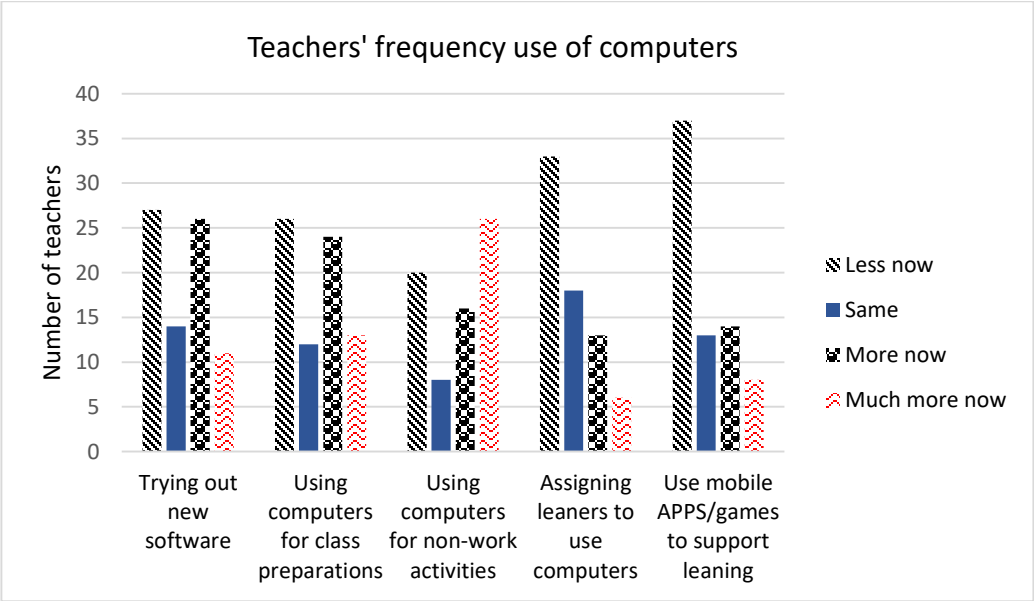
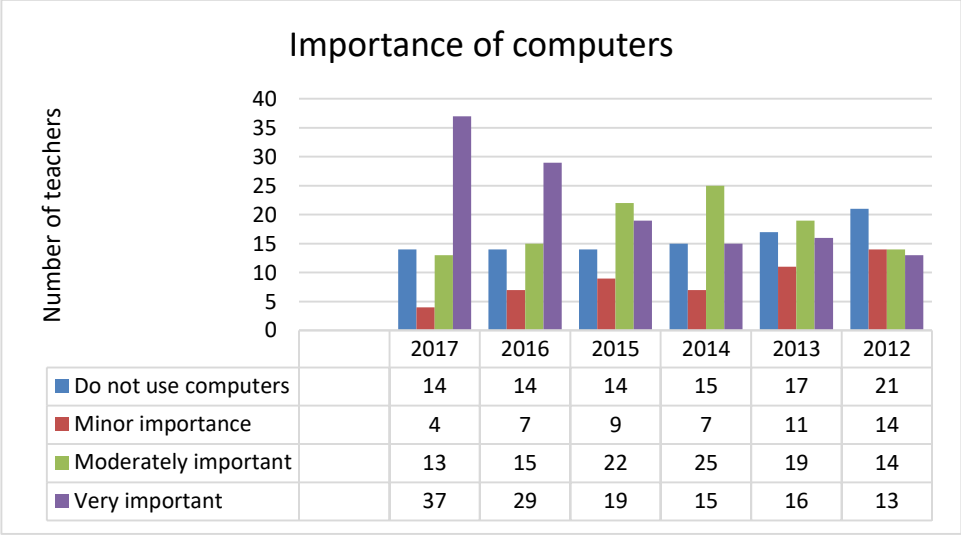


Figure 8: Teachers' frequency use of computers

In finding out more on the impact of the training on teaching and learning, teachers were further asked to rate the importance of computers by using question 15 of the survey. Teachers indicated their evaluation of the importance of computers in their classroom practice over the last six years after the termination of the ICDL literacy in 2011 (see figure 9). There was a decrease in the number of teachers who did not use computers from twenty-one in 2012 to fourteen in 2017, representing a 33.3% reduction. More teachers (fourteen) placed minor importance on computers in 2012 compared to

only four in 2017. This indicates that the mindset of teachers about the importance of computers positively changed. There has been an increase in the number of teachers placing greater importance on computers over the years from thirteen teachers in 2012, to thirty-seven teachers in 2017. This trend represents a tremendous change in teachers' perceptions about the importance of computers in the teaching and learning process.



	2017	2016	2015	2014	2013	2012
Do not use computers	14	14	14	15	17	21
Minor importance	4	7	9	7	11	14
Moderately important	13	15	22	25	19	14
Very important	37	29	19	15	16	13

Figure 9: Importance of computers in teaching since termination of ICDL training in 2011

In consolidating teachers' responses to survey questions about the impact of ICDL training on teaching and learning as presented above, questions 2, 5 and 7 of the interview elicited the following qualitative findings:

When asked about their expectations from ICDL prior to the ICDL literacy training, the majority of teachers (five) said that they expected to know how to use a computer and application software such as Microsoft Word, PowerPoint, Publishing (Access) and Internet. Teacher A and C said:

"I was expecting to know more about how to use a computer, personal computer. Some of the software are more important here at school like MS Word every now and then you have to type things that's why I joined this ICDL to learn more on how to use those software and applications". (TAQ2)

"Like me I expected some skills on PowerPoint also and Internet as well because like on PowerPoint nowadays I was focusing much to see that when I teach, when am projecting something then I have a clear picture on how to use it and prepare some lessons". (TCQ2)

Teacher H expected to learn more than he already knew about the computer and said:

"My expectation was that I would learn more than I already knew about the computer but only to be disappointed that these were actually basics, so that's even what led for me to drop down not to continue anymore because I felt this is something that I already knew so I was expecting something different".(THQ2)

When asked about the impact of ICDL training on using technology in their classroom practice, all interviewed teachers alluded that the training have empowered them with skills to use technology in recording and calculating CA marks, lesson presentations and surfing the net. The teachers further indicated that teaching and learning becomes easier as learners' interest is aroused by using technology. Teacher E said:

"This course has improved a lot in my life where as am able to use the internet, I know how to use the internet, I do a lot of things on the internet, without this course I wouldn't have been able to do some of the things on a computer but just through this course, I have that access to a lot of things towards a computer". (TEQ5)

"Yes it also helped me very much in terms of resourcing you know in my classes when you get into class you need a lot of materials, resources, learning materials, it is very easy if you are skilled more specially with ICT and computers if you understand that then you don't have any problems, you can get information on internet, you have worksheets there, you can prepare your own worksheet so learning becomes easier with the skill that I got. Teaching and learning becomes easier". (TDQ5)

Teachers reported that ICDL training played a positive role in sharpening their ICT skills especially when preparing for and delivering lessons. *"Yes in the classroom as I have said for lesson preparations I can use my skills to prepare the lesson and deliver the lesson. In general yes for my further studies, for typing my assignments they will be helpful"* (TAQ7). *"I learned like to be confident when you are teaching especially the subject ICT, that skill you have to be confident like if you are explaining or in front of learners you are trying to show them something that is the skill that I got, self-confidence"* (TBQ7).

Teachers further pointed out that their Excel skills were greatly improved.

"And with excel, previously I used only to enter marks using MS word where you draw a table or insert a table you put marks there and you do manual calculations but now with excel, I learned you can just put the formula and everything is done. I also

learned the sorting of data whether numerical or alphabetical, either way that I have learned". (THQ7)

"*Spreadsheet I have to say, you know, excel it is something that I really struggled with but ever since going through the training, I can now easily do my calculations and whatsoever I can do my schedules, I can since then I can easily do school reports, enter my marks on a schedule somewhere in a list in my laptop or something, so I think that really greatly improved back there I would just ask the secretaries, perhaps because I really didn't, perhaps because of ignorance but ever since then I find it very easy to do my all things". (TGQ7)*

Teachers also mentioned internet skills to have been improved after the training.

"I can develop my own lessons, very interesting lessons, you can either and there are games now which you either find on the internet which will help motivate learners more specially in class, so we can either use that one so they are plenty, plenty seriously". (TDQ7)

4.3.1.1 Summary of findings on question one

The results point to minimum impact of ICDL training on teaching and learning with the majority of teachers indicating lack of computers in classrooms as the hindering factor. This is supported by their responses indicating that access to computers is only in computer labs and classrooms. Furthermore, 46.9% of the teachers only uses computers to prepare lessons and do professional related activities such as preparing learner activities and recording grades. The impact of the training measured in terms of the frequency use of computers indicated that over fifty percent (56.2%) of teachers are still

not frequently using computers in relation to 43.8% using computers much more frequently. Teachers indicated an increase in the importance of computers after the training was terminated. This is strengthened by their responses showing a decrease in the number of teachers not using computers from twenty-one in 2012 to fourteen in 2017, representing 33% reduction. The perception of teachers on the importance of computers also positively changed as evidenced by a change in the number of teachers considering computers to be very important in teaching and learning from thirteen in 2012 to thirty-seven in 2017. The above evidence points to the fact that the impact of ICDL training is limited to 50% of teachers using computers for class teaching preparation and administrative purposes despite majority of the teachers indicating the importance of computers in their teaching.

4.3.2 Question 2: What are Zambezi Region's teachers' self-efficacy regarding their ICT skills?

In addressing question 2 about teachers' self-efficacy regarding their ICT skills, questions 5, 10, 18 and 21 of the survey and question 3 of the interviews were used to elicit responses from teachers about their confidence in computer use as reported below (see Appendices D and E). Teachers' computer use for preparing for class teaching and other professional activities, current computer skills, effective software used and motivation for taking the course are addressed under self-efficacy.

On average fifty-nine out of ninety-six teachers indicated their own use of computers (question 10) as shown in figure 10. On average more teachers 23 (38.98%) indicated that they do not use computers to perform classroom related activities, while thirteen teachers (22.01%) stated that they occasionally use computers. Five teachers (8.49%) reported using computers on a weekly basis and eighteen (30.50%) stated that they use computers more often.

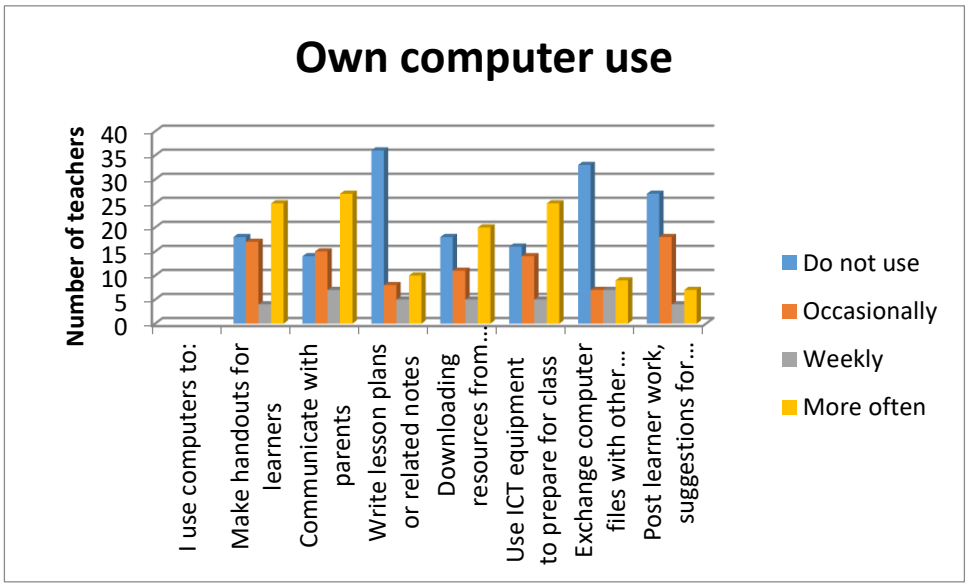


Figure 10: Description of own computer use by teachers

A total of ninety teachers reported on different current computer skills they possess after ICDL literacy training (Survey: question 18). Thirty-five teachers (38.88%) indicated that they do not possess any ICT skills as shown in table 11. Evidence shows that eleven teachers (12.22%) slightly have the listed skills and forty-five teachers (50.0%) reported that they all possess the ICT skills, i.e. they can perform all the tasks

listed in table 11 below. The top five computer skills those teachers confidently affirmed being able to possess are:

- Fifty-six teachers (62.22%) asserted being able to save files in different locations
- Fifty-four teachers (59.99%) replied positively about their ability to use a WWW search engine (e.g. Google/Yahoo etc.)
- Fifty-three teachers (58.88%) surely admitted their skill to copy files from one disk to another
- Fifty-one teachers (56.66%) indicated their ability to create a folder in any location on the computer
- Fifty teachers (55.55%) were confident in their ability to create shortcuts, simple PowerPoint slide shows with images and insert pages numbers in a word document.

Despite such confidence in the above computer skills, the majority of teachers regrettably judged their abilities to perform ICT related tasks very low. This is supported by their responses that indicated that forty-four teachers (48.88%) contrary to twenty-eight teachers (31.11%) are not having the ability to create a new database and establish fields and screen layouts. Forty-one (45.55%) compared to thirty-six teachers (39.99%) lack the ability to use sum formula and do basic calculations on Excel. On the ability to display the directory of a storage device, thirty-nine teachers (43.33%) relative to thirty-seven teachers (41.11%) reported not possessing the skill.

Table 11: Current skills possessed by teachers

Current skills	Frequency			Total
	No	Somewhat	Yes	
Display the directory of a storage device	39	14	37	90
Attach a file to a message in an email	35	9	46	90
Create shortcuts on the desktop	31	10	50	91
Create a folder in any location on the computer	32	8	51	91
Copy files from one disk to another	32	5	53	90
Create a new database and establish fields and screen layouts	44	18	28	90
Create a new blank presentation	37	9	45	91
Insert page numbers into a word-processor document	30	10	50	90
Create a simple PowerPoint slide show with text and images	33	8	50	91
Use a WWW search engine (e.g. Google/Yahoo etc.)	31	6	54	91
Use sum formula and do basic calculations on excel	41	14	36	91
Use all functions on the ribbon in all office programs	32	13	46	91
Insert graphics from various sources e.g. Clip art	35	12	43	90
Use key words in a simple internet search	35	11	45	91
Save files in different locations	29	5	56	90

Insert a new worksheet into a workbook on excel	35	15	40	90
Launch the internet explorer	33	13	45	91
Use Print Screen for Screen Captures	40	17	33	90
Use anti-virus software to scan for viruses	37	5	49	91
Set a printer of my choice as default printer	35	13	42	90
Create CA mark sheet on excel	35	11	44	90
Add animations and transitions to a slide presentation	38	11	41	90
Average	**35**	**11**	**45**	**91**

Findings regarding ICT skills report that on average across uses of a computer by teachers as shown in figure 10, teachers who lack ICT skills are the majority thirty-six (61.01%). Out of these thirty-six respondents, twenty-three (38.98%) indicated that they do use computers preparing for teaching or any other professional activity, while thirteen (22.03%) reported that they seldom use computers. Eighteen teachers (30.50%) indicated that they use computers more often in communicating with parents, making handouts for learners, preparing for class and downloading resources for use in their lessons. Five respondents (8.49%) indicated that they use computers on a weekly basis to perform various activities as shown in figure 10 above. Forty-five of ninety teachers (50%) reported having relatively strong ICT skills in saving documents in different locations, using the web search engines, creating folders and simple PowerPoint presentations. The other forty-five (50%) reported not relatively having any ICT skill at all. (See table 11 above)

Twenty-four teachers responded to the effective software they use in class (Survey: question 5). Ten (41.66%) teachers mentioned both Microsoft Word and Excel are the most effective software they use in class. Figure 11 shows that fourteen teachers (58.33%) use Microsoft Word, eleven (45.83%) isolated Microsoft Excel as the effective software they use; six respondents (24.99%) stated that they use internet effectively while five (20.83%) use Microsoft PowerPoint. Other software indicated been used by teachers are Encarta, Java, Command prompt, MS Access and educational programs respectively.

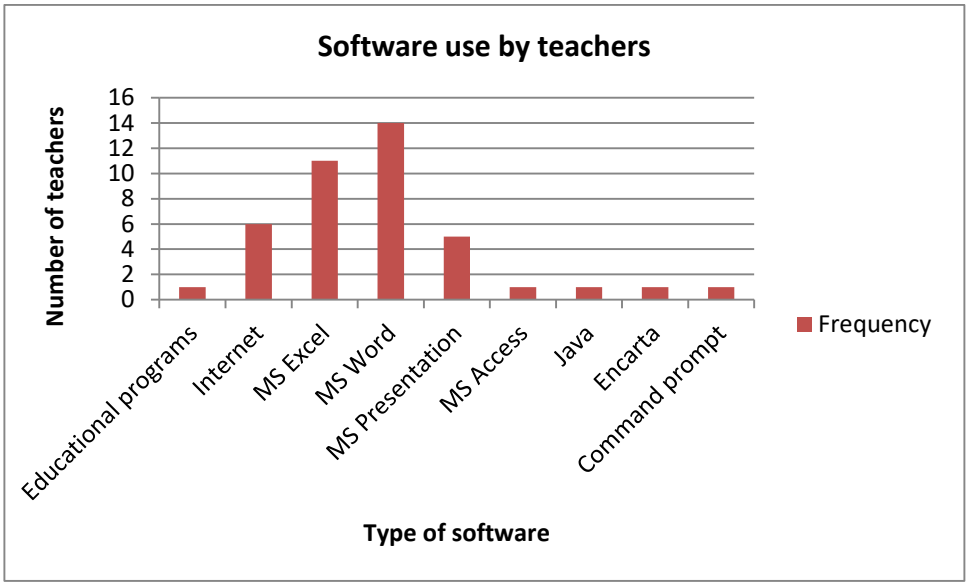


Figure 11: Effective software used by teachers

Reporting on the teachers' motivation to take the ICDL literacy training (Survey: question 21), fifty out of ninety-six stated that their motive behind taking the course was professional development. This number represented the majority of teachers (52.08%),

fifteen respondents (15.62%) indicated that they took the course based on their personal interest and four teachers (4.16%) reported that they took the course as a requirement from the employer (MoE). Ten respondents (10.41%) stated that they were not sure why they took the ICDL literacy training. Seventeen respondents (17.70%) did not indicate their motivation for taking the training (see figure 12). Professional development was found to be the strongest motivator for taking ICDL literacy training and employment requirement as the least.

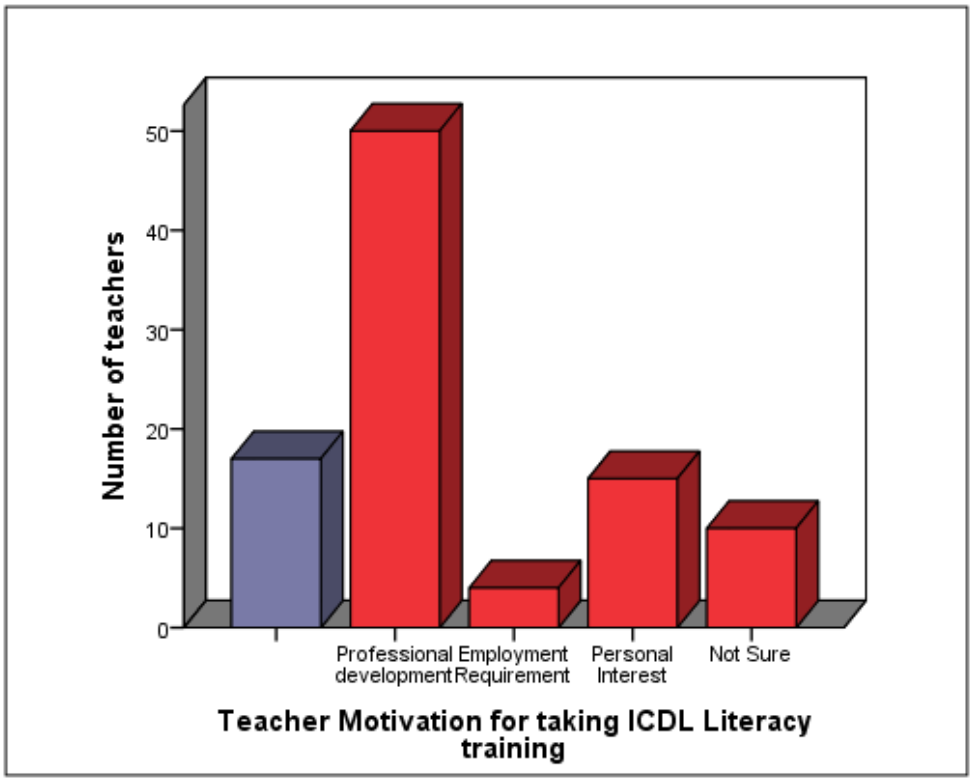


Figure 12: Teacher Motivation for taking ICDL literacy training

Teachers' responses to question three of the qualitative phase, reported that ICDL literacy training helped them in becoming confident users of ICTs in their

classroom practices. Teachers emphasized that they are able to perform much of their professional tasks independently.

"Yes very much because currently, I have some examples, currently I can type my own question papers, I cannot take my questions papers to the secretaries I can do it on my own and am sure enough that I can make some folders, some files I save them nicely and also adding I use MS Excel, Word, it is also effective because it makes you to be so independent so confident that what you are doing you feel that you are confident enough". (TFQ3)

"Very much because like now I don't depend on anyone to do anything that I want to do on the computer I can do it on my own without anyone's help". (TBQ3)

Teacher E also confirmed usage of ICT independently and said:

"Yes it did , in a sense that am now actually able to perform these other ee, just on a computer, when we talk of spreadsheet, yes for now am able to work with that application, when we talk of database I can simply work on it as well. With all these other applications that I have mentioned and a few of them that are there am now able to work on them so it was something good for me". (TEQ3)

4.3.2.1 Summary of question two

Only eighteen (30.5%) out of fifty-nine teachers feel confident when using computers and use it more often for preparing for class teaching and other professional activities. The report indicates that the majority of teachers (50.0%) acquired all ICT

skills such as copying files from one disk to another, creating folders, using search engines, creating a simple slide show, saving files in different locations etc. Though the report indicates such confidence of teachers in computers skills, on average 45.92% still reported not having the ability to use sum formula and do basic Excel calculations, and display the directory of a storage device. On average, findings indicate that despite undergoing training, the majority of teachers lack ICT skills. This is supported by teachers' responses showing that thirty-six (61.01%) out of fifty-nine teachers do not and rarely use computers for preparing for class teaching and other professional activities. The most effective software used by teachers is Microsoft Word, Microsoft Excel, Internet and Microsoft PowerPoint. Results further report that most teachers took the training on the basis of professional development. This is supported by fifty (52.08%) out of ninety-six respondents who indicated professional development as their motive behind taking the course. Teachers' judgements on their ability to use ICT in their classrooms is slightly below average as the majority of teachers' self-efficacy was affected by not benefiting much from the training evidenced by lack of skills such as inability to create a new database, using a sum function in Excel, resulting in them not effectively using ICT in their classrooms.

4.3.3 Question three: What do teachers identify as challenges affecting compliance to Goals 1 and 2 in the ICT in educational policy?

The ICT policy for Education aims at preparing all current Namibian citizens for the world economy of tomorrow with an understanding that they will be able to meet the

challenges of the 21st century. Teachers as custodians of such a desired state, were offered ICDL literacy training as a policy intervention strategy to produce ICT literate citizens (goal one) and people skilled to labor and partake in the new economies and societies emerging as a result of ICT advancements (goal two) (GRN., 2005).

In response to the above question in context to their teaching, question 26 of the questionnaire and question 11 of the interview schedule were answered by participants. Respondents reported that they experience critical challenges in effectively using ICTs in their classrooms. Thirty-six of the ninety-six participants responded to this question. Challenges mentioned ranges from lack of, or no computers in schools, no, or lack of internet connectivity, lack of facilities like Liquid Crystal Display (LCD) projectors, whiteboards, furniture, no technicians, to lack of integration skills. Teachers also mentioned time as a hindering factor in effectively using ICTs in their classrooms (see table 12 and figure 13 below). These findings correlate with findings from studies done by Abuhmaid and Hatmi (2009; 2011) where similar challenges were reported.

Table 12: Challenges in effectively using ICTS in classroom practices

Challenges	Frequency
1. No internet connectivity (lack, no WIFI, unreliable, we use cellphones	7
2. Computers (No. lack of, not enough, dysfunctional, freezing)	14
3. Time (I don't have much time to use computers because of too much work at school, Time was too limited, Time for connecting the equipment, Time of preparing lessons and marking learners' books	6

4. Lack of facilities (projectors, conducive rooms for computers, furniture, outdate equipment, whiteboards)	7
5. No power at times	1
6. Difficulty using Excel	2
7. Lack of ICT basic knowledge & experience	1
8. Outdated software on computers	2
9. Training program good but not successful	1
10. Lack of ICT integration knowledge/skills	2

The most common challenge mentioned is computers wherein fourteen teachers indicated no or lack of computers, dysfunctional and freezing computers. Lack of/no internet connectivity and lack of ICT facilities are other challenges mentioned by seven teachers. Six respondents stated that time is another challenge impeding their effective use of ICTs in their classrooms. Two respondents identified lack of ICT integration knowledge and skills as another challenge.

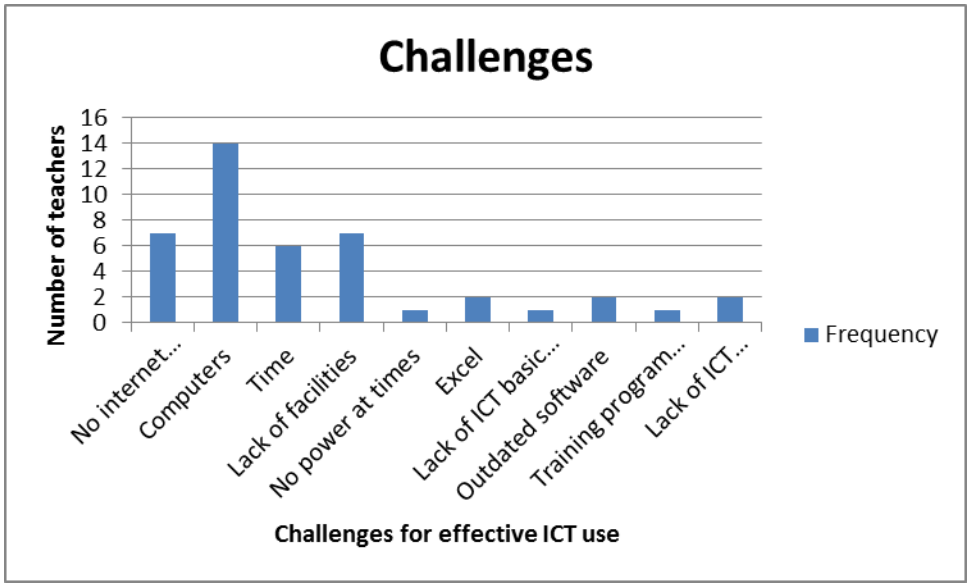


Figure 13: Challenges for effective use of ICTs

When asked during an interview session about the challenges they face in successfully using ICTs in their classroom practices, teachers echoed the challenges mentioned under quantitative data. They mentioned lack of computers, equipment, and internet as well as classroom setup as the common challenges. Teacher E said:

"I have a problem with computers, it is not really updated with the latest versions, the operating system (OS) that we use, it is an old version so it becomes a problem for me to perform these other tasks with these old versions of computers because it is very different, there are these tasks that should be performed in these latest versions whereas these outdated versions cannot perform, so it is a bit challenging and yes and then maybe the other thing I will add on is to say like in our case we right now only have few computers whereas learners they are more learners that ah, wants to use these computers and for them it is a big challenge because they cannot learn properly

whereas 5 groups on 1 computer, I mean 5 learners on 1 computer then it is not proper for learners to learn new skills yes". (TEQ11)

"Currently now the difficulties that we are facing is on the computers themselves, they are not functioning, sometimes the thing is that what the learners should be able to learn, they are not learning them like for printing, learners should be able to know how to print, we don't have a printer in the lab, yes, those are the challenges that we are facing currently now". (TBQ11)

Teachers said the following on internet as a challenge:

"Been a rural school, I would say sometimes we have, back there we didn't even have Wi-Fi, so internet was the biggest challenge even if you wanted to use ICT at school because we are living in a world where internet is something important, so internet is the biggest challenge up to this time". (TGQ11)

"Yes, the other thing is the issue of resources, you see we have our computer lab there, at least we need to train our learners also how to search for information, for example, you give a topic that tomorrow we will come and talk on this and this, at least them they can start going there on the internet they can go on the computers but now our computers are here but they are free but there not connected to the internet. You can see that our learners are also behind at least if they were, our computer lab could be resourced of course there are computers there but though they are few, if they could be connected to the internet, then now our learners could be also searching for their own information". (TCQ11)

"One, our classroom environment is not conducive for these ICT tools, sometimes the power lines are not working, the electricity cables. Second, the equipment themselves, they are expensive they are nowhere to be found if you get one it may be used by a lot of people, so the chances of using it is very rare". (TAQ11)

4.3.3.1 Summary of question 3

Teachers indicated finding it difficulty in becoming ICT literate and capable of working and participating in new economies of a result been trained in ICDL. Teachers mentioned challenges such as lack or no computers in schools, lack of internet connectivity, and lack of equipment such as LCD projectors, furniture and whiteboards. Fourteen (38.88%) teachers out of thirty-six mentioned no, lack of, not enough, dysfunctional and freezing computers as the major challenge. Challenges faced also range from lack of integration skills to lack of technical support. Becta (2003) and Hatmi (2009), supports dysfunctional and freezing computers, lack of equipment and computers identified in this study as obstacles to the impact of ICDL training and as well as to the subsequent use of ICT in the classroom.

4.3.4 Question four: What kind of support do teachers expect from MOE in realizing a more successful integration of the ICDL ICT literacy training?

Teachers responded positively to this survey question 27 and interview question 12, and isolated the kind of support expected from Ministry of Education in realizing a

more successful integration of the ICDL ICT literacy training in their classroom practices. Thirty-one out of 96 respondents provided answers to question four above. Support identified falls in seven categories as depicted in figure 14 below. Nineteen out of thirty-one teachers (61.29%) identified computers as the support needed for both teacher and learner use. Sixteen teachers (51.61%) isolated training as support needed to be provided by professional trainers as an on-going program. Fifteen of the thirty-one teachers (48.38%) mentioned facilities as support needed in the form of projectors, screens, whiteboards, computer labs and ICT user friendly classrooms. Seven teachers (22.58%) indicated internet connectivity to be expanded to cover wider areas as another support needed. ICT integration training and technical support are equally identified by five teachers (16.12%) as support needed to fully use ICTs in their classroom practice. Only two teachers (6.45%) isolated updated software and modern software for self-training as critical for their full utilization of ICTs in their pedagogical interventions.

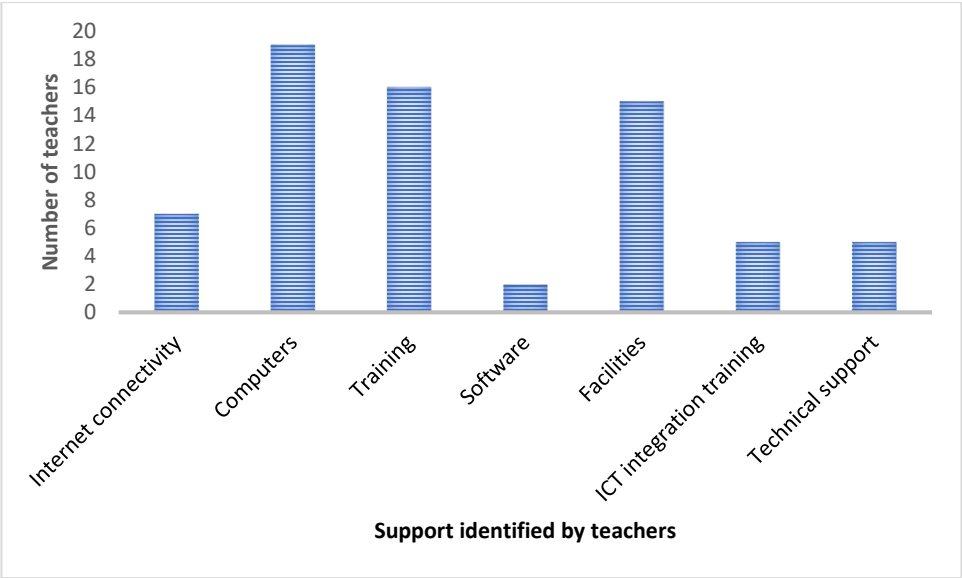


Figure 14: Kind of Support identified by teachers

Teachers responded this question and said:

"Definitely unlimited Wi-Fi, that would really help because it will also help us connect with, not only with the information one find but can help us interact as teachers from other schools or in another places where you can create a platform that would make it easier for us to discuss on challenges we that we face in the classrooms, so I think for me internet and a platform that will be created through that, that teachers can easily interact, for me that would be a definite advantage". TGQ12)

"I think they should develop a special class for ICT tools so that whenever you want to use ICT tools you can move learners to that class, then it will be much better rather than moving them from one place to another, they can get broken they are very expensive to maintain". (TAQ12)

All teachers identified computers as support needed to fully utilize ICTs in their classroom practice.

"*we rely mainly on our own personal laptops, personal computers although the school has personal computers, there are always breaking down, out of 20 computers that I think we have in the computer lab, perhaps less than 10 are currently working and, if only people were supplied with computers at least every office had a computer so that everybody had access to a computer, every classroom at least had a computer in it or if the computer lab was bigger because out of 500 plus learners that are relying on only less than 10 computers, it is just a disaster"*.(TDQ12)

Teacher B said:

"In case of computers, those computers I think they need a technician to come and fix them or maybe if we can be provided with new computers for the learners or for the lessons to be fully developed or taught otherwise for now we can have maybe 3 or 4 lessons per week and then the computers get shut without even knowing what happened because they are very old. So, if we can be able to be provided with new computers at least the lesson will be taught nicely".

4.3.4.1 Summary of question 4

Teachers' responses to question 4 on support identified indicated that computers for teacher and learner use are needed. Support needed falls in seven categories as depicted in figure 14 above with computers been the commonly mentioned support followed by training, facilities and internet connectivity consecutively.

4.4 Overall Summary

This chapter presented data gathered from ninety-six participants who responded to the research questions by using an adapted Becker survey and interviews. Participants were selected from eight schools in the Zambezi Region where ICDL training was offered between 2008 -2011. Five of these schools are senior secondary schools and other three are combined schools. Fifty-two of the ninety-six teachers were male and thirty-seven female while, seven did not disclose their gender.

The results indicate that the impact of the training was minimal due to lack of, or no computers in classrooms/schools. Only one respondent indicated that a computer was available in the class, while twenty confirmed computers been located in computer labs. Due to the above scenario in schools, teachers' use of computers is limited to preparing for teaching their classes, preparing activities for learners and recording grades. After the training, teachers indicated that computers are very important in realizing effective teaching and learning.

Teachers in Zambezi Education Region who did ICDL training only improved in using PowerPoint, Excel, Word processing and Internet. The majority of participants did not acquire any ICT skills from the training. Although teachers indicated that their confidence was boosted, this was only evident among teachers who completed ICDL modules between four and seven. A lack of skills in some areas such as creating a new database, using the sum function and doing basic Excel calculations are evident among

the participants. Many teachers used ICTs outside the classroom for lesson preparation and other professional activities compared to only fourteen percent who used these tools in their classroom practice. The use of ICTs, however pointed to been limited to lesson preparation and administrative purposes only, i.e. recording of grades.

Challenges such as lack of /no functional computers, lack of internet connectivity and lack of equipment were isolated. Participants identified support needed in form of more computers in schools, basic ICT training, unlimited wide internet connectivity, ICT integration training, facilities and technical support.

In the next chapter, the researcher presents a discussion of the findings in relation to the main research question of the study.

CHAPTER V: DISCUSSION OF FINDINGS

5.1 Introduction

Many teachers in Zambezi education region and in other educational institutions have realized the significance of using ICT tools in teaching and learning in order to stay abreast with changes happening around them especially within the ICT revolution. Embraced by fast growing technological advancements, ICT usage in the classroom is becoming a household phenomenon. This study has investigated the impact of ICDL literacy training as an ICT literacy chosen by the Government of the Republic of Namibia to empower teachers with the appropriate knowledge, skills and attitudes to use ICTs in their classroom practices. The direction of discussion in this chapter stresses the concerns related to the research questions on four areas; impact of the ICDL training, efficacy and improved ICT teacher skills, challenges to effective ICT usage in classroom practices and envisaged support. Results are further discussed with reference to the ETS ICT literacy framework and will highlight the ability of ICDL training in developing cognitive and technical proficiencies of the participants. Furthermore, the discussions in this chapter will focus on the mixed methods question of how the quantitative results are confirmed by the qualitative results and highlights the limitations experienced in this study.

5.2 Impact of ICDL training

The quantitative findings from the survey indicated that the impact of ICDL on respondents' use of ICTs in their classrooms is still minimal after receiving ICDL training. Empirical evidence indicated that after ICDL training, 14.2 % of the teachers reported having used computers in their classrooms while, 52.9 % used computers outside the classroom for class preparations and other professional activities. Such findings correlate with the findings in the study by Hatmi (2009), wherein 41.1 % of respondents reported no change in their ICT competencies after ICDL training. The low rate of computer usage in classrooms may be attributed to the factor of lack of computers and the location of available computers. The findings further indicated that on average there are fourteen computers in schools in Zambezi region where research was conducted and all computers are located in the computer labs. Teachers and learners only have access to these computers when they visit the labs. Of the one hundred and eleven computers found in schools, only one computer is located in the classroom. This situation makes it difficult for teachers to make use of computers despite having set skills as learnt from the training. The findings further indicated that on average, a significant number of teachers (17.53%) reported having used computers more frequently after the training as shown in table 10 under findings. However, empirical evidence attested that the majority of teachers (56.2%) are still not frequently using computers after receiving training. Findings further revealed that the lack of change in the frequency use of computers or ICTs by teachers in their classroom practices may be linked to the fact that the majority of teachers did not pass the ICDL course. Only ten teachers out of ninety-six who participated in the study passed four to seven modules.

The qualitative findings from interviewees tend to contradict quantitative findings by showing that the ICDL training had empowered them with skills to use technologies in their classrooms especially in Microsoft Excel, MS PowerPoint and Internet. This disparity is attributed to the fact that the interviewees were those who were purposively selected for the follow-up interview because they had passed between four and seven ICDL modules during the training. This group of participants included in the qualitative component of the study may have experienced a greater impact of the ICDL literacy than the overall experience of the majority of the participants. The impact could be more if all teachers could have met the minimum requirement (passing four modules) for ICDL starter certification. However, the teachers' responses to the impact of the training on technology use in the classroom revealed an overall view that they have been empowered with skills to use Microsoft Excel, Microsoft PowerPoint, Microsoft Word and Internet for administrative and classroom purposes. These finding correlates with findings in a study conducted by Hatmi (2009) wherein respondents indicated that PowerPoint and other presentation software was the portion of ICDL training that they would possibly use in the classroom. Findings from a study conducted by Careemdeen & Nonis (2015) on the impact of ICDL training on classroom computer use by secondary school teachers (special reference on Badulla district in Sri Lanka), also pointed out that fifty-five percent of the participants stated that PowerPoint was the element of ICDL training that they would most likely be able to transfer into their classrooms because of its applicability. A research conducted by Abuhmaid that investigated the effectiveness of ICT training courses with the Jordanian education system, reported that 76.5% of teachers who took ICDL training acquired computer

skills in word processing, presentation and retrieving information (Abuhmaid, 2011). Therefore, findings of this study affirm the results of the three studies above.

5.3 Self-efficacy and improved ICT teacher skills

The respondents both in the quantitative and qualitative components of the study indicated that the training improved their confidence in much of the ICT skills ranging from saving files in different locations to creating file shortcuts, simple presentation shows and inserting page numbers in word documents. Conversely quantitative empirical evidence revealed that there are still teachers who lack basic skills in Access, Excel and file management after ICDL training. This evidence consolidates the findings by Careemdeen (2015) where seventy-five percent of the teachers who received ICDL training still mentioned that Access was the application they would least use in their classroom practice and twenty-five stated that they would be utilizing MS Excel to record marks and prepare other learners' activities. The results further denote the low use of these software packages by participants.

The quantitative findings of the study further give confirmation that 60.98% of teachers do not and seldom use computers for classroom practice. Contrary 38.9% of the respondents use computers weekly and more often. Factors contributing to insufficient use of computers/ICTs by teachers in their classroom practices are further discussed under the theme on challenges.

5.4 The ETS ICT Literacy framework

The Panel (2002) defines ICT literacy as the ability to use digital technology, communication tools and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society. Based on this definition, the panel adopted an ICT Literacy framework for measuring ICT literacy and which further defines the skill set and knowledge needed by individuals to function daily in the 21st century. For individuals to operate commendably in an international market which is so immersed with ICT, technical and cognitive skills are necessary. Cognitive proficiency as defined by Panel (2002), are the preferred initial skills of daily livelihood in all spheres of human nature and are literacy, problem solving, numeracy and spatial literacy. Technical proficiency is a fundamental element of digital literacy which incorporates basic competences of hardware, software applications, networks and components of digital technology (Panel, 2002). These skills are the basis of ICT proficiency that can enable a person to exploit the competencies of technology and eventually contribute to societal change. Since the assessment of the impact is limited to ICDL training rather than individual skills attained by participants in particular, only the cognitive and technical proficiencies of the model were used to evaluate the training effectiveness.

With reference to this ETS ICT framework and with focus on the two proficiencies, empirical evidence from quantitative results shows that ICDL literacy training did not do much to empower participants with cognitive and technical skills to become ICT proficient but rather focused on theoretical fundamentals of ICT. Though

teachers indicated that their ICT skills improved, these skillsets are limited to basic operations in PowerPoint, MS Excel, Internet, and MS Word and file management. According to the ICT literacy framework, deficiencies in knowledge and skills expected from ICDL training are evident. The training did not develop foundational skills of application of the software within everyday life at school, home and work in teachers such as problem solving, numeracy and spatial literacy. Evidence further shows that only eleven teachers (23.91%) out of 46 teachers who indicated the number of ICDL modules passed qualified for certification. This may be the reason why the use of ICTs by teachers in their classroom practice is low. Factors relating to the above evidence are discussed below under challenges to effective use of ICTs. Technical proficiency which is the basic component of digital literacy also was not fully achieved by participants from the training. Despite some teachers confirming acquiring foundational knowledge and skills in using software applications such as MS Word, MS Excel, MS PowerPoint and Internet, technical knowledge of hardware is minimal among teachers evidenced by their inability to troubleshoot non-functional computers. This might be the case as ICDL training is more geared on imparting knowledge and skills on software application usage than technical aspect of ICT literacy.

This framework was used as it would provide a foundation for the design of instruments including large-scale assessments intended to inform public policy and diagnostic measures to test an individual's skills associated with ICT (Panel, 2002). For this study, assessment by using the framework was limited to the impact of ICDL training on teachers and their use of ICTs in their classrooms.

5.5 Challenges to effective ICT usage in classroom

The findings furthermore identified some challenges experienced by teachers in effectively using computers/ICTs in their classroom practices. Mulhim (2014), Becta (2003) and Hatmi (2009) supports lack of time, lack/no computers, lack of facilities and no internet connectivity indicated by respondents as challenges to effective use of ICTs in their classroom practice. Empirical findings from both quantitative and qualitative components of the study revealed that not having or lack of computers was the greatest impediment identified as in some schools only four computers are available for use for both teachers and learners. These findings are supported by Pelgrum's study which reported that seventy percent of the participants isolated 'Insufficient number of computers as a great challenge (2003). Some available computers were reported been dysfunctional or freezing of which many were infected by viruses as reported by respondents. Respondents further identified insufficient ICT equipment (LCD projectors and whiteboards) and improper maintenance (obsolescence of software and hardware) as a challenge to using ICTs in their classroom practice.

Lack of internet connectivity was another challenge isolated as respondents indicated that it was difficult working in environments without internet and some ended up using cell phones in downloading materials for classroom use. Internet was reported as been unreliable in some schools to completely no connectivity in some, making it a big challenge especially for schools in rural areas where 3G WI-FI is not available. As per participants' responses, time was also not enough for them to use computers because of too much administrative work at school. Much of their time was used for lesson

preparation and marking learners' work. Lack of self-confidence was also mentioned as some respondents felt that much time was wasted on connecting the equipment in their classrooms.

Insufficient use of ICTs is also attributed to challenges experienced during ICDL training that might be enhanced to magnify the impact of ICDL training on teachers' use of ICTs in their classrooms. The proposed intervention strategies might be deliberated as options to the latest ICDL or any other ICT literacy training. Respondents indicated that trainers were unreliable with their attendance as they were coming from Windhoek. They missed scheduled sessions and when present, failed to exercise patience with beginners. The shortcoming of trainers of failing to group trainees according to their level of prior knowledge and skills, i.e. beginners, intermediate and expert levels, caused beginners to quit the training earlier as they felt neglected. As alluded to by Mulhim (2014), the shortcomings of ICT training can be summarized under lack of time, lack of access to ICT and lack of training as evidenced by various literature reviewed by him. There are many challenges that could prevent teachers in using ICTs in their classroom practices. Literature reveals that such challenges/barriers can be categorized as external (first order) and internal (second order). First order challenges comprise insufficient equipment, lack of technical maintenance, undependability and other resource-related matters. School-level factors such as structural philosophy and teacher-level factors such as convictions about teaching and technology, and willingness to change fall under second-order challenges (Becta, 2003).

Identified support to curb the challenges experienced in successfully using ICTs in teachers' classroom practices are outlined under recommendations in chapter six.

CHAPTER VI: SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

The purpose of this study was to offer empirical evidence on the impact of ICDL literacy training on the use of Information and Communication Technologies in the classrooms by teachers in the Zambezi Region. The study further investigated teachers' self-efficacy in using ICTs in their classrooms and challenges that prevented them from effective use of ICTs.

6.2 Summary of findings

Findings revealed that the majority of teachers who undertook the ICDL literacy training still do not use ICTs in their classrooms and preparation after receiving the training. Only fourteen percent of teachers indicated using ICTs in their classrooms compared to fifty-three percent of teachers who use computers for class preparations and other professional activities outside the classroom. This finding matches the finding from Hatmi study (2009) in which forty-one percent of respondents indicated no change in their ICT competencies after ICDL training. Furthermore, the findings revealed that those who used ICTs frequently in their classrooms are teachers who had passed between four and seven ICDL modules during the training as well as those who had prior knowledge, skills and experience with ICT usage.

The findings from qualitative interviews in contrary to quantitative findings, revealed that ICDL training had empowered participants with knowledge and ICT skills in MS Excel, MS PowerPoint and Internet usage. The impact is attributed to fact that those who experienced it, are teachers who qualified for certification though skills gained were limited to administrative and classroom use. These findings further affirms the results of studies by Abuhmaid (2011), Hatmi (2009) and Careemdeen & Nonis (2015) whose findings indicated that ICDL and other ICT training only empowered participants with skills in PowerPoint, word processing and retrieving information because of their applicability.

With reference to self –efficacy, findings revealed that participants' judgement on their abilities to use ICTs are positive. They are now able to confidently save files in different locations, create shortcuts, use search engines, copy files from one disk to another and create folders in any location. However, the findings furthermore revealed that over forty-five percent of participants reported having insufficient skills in Access, Excel and file management. This finding is supported by findings of Careemdeen (2015) study wherein seventy-five percent of ICDL training recipients indicated database as the least they would use in their classrooms. Although findings revealed that some teachers developed ICT skills in using some software, quantitative findings showed that sixty-one percent of teachers don't and rarely use computers for classroom practice compared to thirty-nine percent who frequently use computers.

The study also focused on challenges that could prevent teachers from effectively use ICTs in the classroom practices. Findings of the study revealed the following challenges as obstacles for teachers' use of ICTs in their classroom practices: lack/no

computers, lack of ICT equipment, lack of internet connectivity, lack of time, lack of self-confidence and training related issues. The fact that most of participants in this study failed to pass the minimum of four modules, indicates that ICDL training failed to empower teachers with anticipated cognitive and technical skills to enable them to operate effectively in a digital world.

Though the deficiencies of ICDL training are outside the scope of this study, it is worthwhile mentioning them as they directly impact on the effectiveness of the training in empowering teachers with the required skills. The general course outline of ICDL is crafted for certification rather than training participants to acquire awareness of how to apply ICTs in their classroom practices. Perry and Murray (2006) states that ICDL appraises desired and valuable IT skills but represents only one side of computer literacy. Its emphasis is on the practical use of computers; it does not attempt to assess the investigative abilities students need to be able to use computing technologies to complement critical thinking undertakings (Perez & Murray, 2006). Time invested in the training program was not sufficient for participants and the trainers to exhaustively go through all the modules materials. ICDL training is limited in its scope to training individuals with foundational skills to operate basic computer applications, and not as a holistic assessment tool of ICT proficiency (skills and knowledge). This finding supports Hatmi (2009) who concluded that apart from improved self-confidence and ability to use presentation software gained from ICDL training by the participants, the course is inadequate in the scope of what it trains. Lack of applicability of training is another identified deficiency. Inability of the training to align to respondents' exact educational situation may be the reason for fifty percent of participants reporting not having any ICT

skills at all. One can question whether ICDL is the right tool to deliver the ICT Literacy to Namibian teachers.

On the basis of support identified for participants to effectively use ICTs in their classroom practices, both quantitative and qualitative analysis pointed to provision of more computers to schools, more training on computer basic skills (ICDL), adequate IT equipment in schools (LCD projectors, screens & whiteboards), internet connectivity, ICT compatible classrooms, professional and technical support.

The impact of ICDL literacy training to be felt, require alterations to the training to suit individual ICT needs and be more applicable to classroom use. ICT equipment, computers, updated software, unlimited internet connectivity and ICT integration tailored trainings must be provided.

6.3 Recommendations

6.3.1 Provision of computers and ICT equipment

Training teachers without providing them with computers and IT equipment to practice and implement learned skills defeats the entire purpose of training them. The findings of this study recommend that the Ministry of Education, Art and Culture must budget for the provision of computers, whiteboards, laptops and LCD projectors to all schools for effective use of ICTs to be achieved and teaching and learning to be improved. Though this recommended strategy is very expensive, it is the right way to go as technology comes with a cost. The strategy that was embarked upon by the Ministry

of giving a laptop as an incentive to every participant who completed a full ICDL certification was commendable but it was unexpectedly stopped (Cocklin, 2012). If such a move could be reinstated, as commonly known as “The Laptop Incentive Training Programme (MoEAC, 2015), the shortage of computers in schools could be alleviated and at the same time motivating teachers to integrate ICTs in their teaching processes and appreciate the relevance of the training to their profession.

6.3.2 Fully furnished ICT facilities

Since teaching and learning occurs in classrooms, it is imperative that such classrooms are turned into ICT complaint learning environments. Teachers isolated classrooms without proper ICT peripherals such as whiteboards, projectors and screens as well as PCs or tablets as a challenge to effective use of ICTs. It is recommended that such equipment be installed in classrooms to save time spent on connecting equipment and eventually enhance teaching and learning. Though some schools have computer laboratories, computers and software are outdated and need to be replaced with latest computers and application software if they are to be used for the purpose intended for. Since we are living in a global world, it is further recommended that schools be connected to reliable internet.

6.3.3 On-site Technical support services

The proper maintenance of ICT equipment is critical in ensuring that teachers effectively uses them to promote and enhance educative learning. Training one staff member as an IT support technician with minimum knowledge of computer maintenance, troubleshooting, installation of hardware and software, and setting up

computer security issues will be an advantage to schools as the life cycle of ICT equipment will be prolonged. Teachers will also have someone to rely on when technical problems arises in their classrooms and this will reduce anxiety levels and fear of technology.

6.3.4 Relevant training for teachers

Teachers are the critical elements in the process of successfully using ICTs in their classroom practices. While encouraging them to obtain ICDL certification, the training must be offered with a view of learning how to apply it in their classrooms and subject contexts. The content of the modules need to include activities portraying the actual classroom scenarios in a practical way. Further modifications in the course may include requiring course participants to plan and present a lesson using ICTs.

6.3.5 Continual Professional Development Support

ICDL training alone is not sufficient to equip teachers with technical and cognitive skills to become ICT proficient in Zambezi schools. Upon completion of ICDL training, teachers must be advised to further enroll for courses tailored to assist them to use ICTs in their classrooms. As the results of this study revealed, a professional ICT literacy training is recommended that takes into account the entry skill levels of teachers such as beginner, intermediate and advanced levels so that all teachers of different entry

abilities are accommodated. Such an approach to training will take into account teachers' ICT needs and equip them with appropriate ICT skills to turn their classrooms into powerful learning environments. Through such a hand-on approach and learning by doing methodology, course takers will develop ICT skills relevant to classroom use.

6.3.6 ICDL training timing

Teachers felt that the timing of the course was not favorable. Attending the course on a Sunday afternoon caused inconveniences, tiredness and lack of concentration as well as absenteeism. It is recommended that training be run during holidays to apportion more time for participants to master the content. As a form of motivation, incentives can be attached to successful attendance of such organized professional development initiatives.

6.3.7 Competent Trainers

Evidence from findings revealed that trainers lacked knowledge transferability skills. It is recommended that experienced trainers in ICT integration be used and receive appropriate training to impart knowledge and skills to trainees.

6.4 Recommendations for future research

6.4.1 Teachers' negative attitudes toward ICT usage in classrooms

Teachers who embraced ICDL training enthusiastically registered their concern about the negative attitude of other teachers toward using ICTs in their classrooms and taking ICDL training seriously. Finding out reasons behind such negativity would be an important area of research.

6.4.2 Alternative ICT integration training options

As ICDL training is limited in its scope to train teachers in developing integration skills, a need arises to develop a more practical training package suitable to equip teachers with required technical and cognitive skills for practical classroom application. This area is worth researching for more relevant integration approaches to emerge.

6.4.3 Extension of the current study

For the fact that this study was limited to Zambezi Education region, extending it to the entire Namibian nation would yield generalizable findings.

6.5 Conclusion

The impact of any ICT training to be felt requires training participants beyond technical skills to enable them to function effectively in a global economy reliant on ICT. Technology skills without been accompanied by cognitive skills and overall

literacy, will just widen the digital divide. More attention should be directed towards preparing citizenry for the technology age. It is imperative that any ICT training offered should include both technical and pedagogical skills needed to use and integrate ICTs in teaching and learning. This should start with teacher training institutions to revisit their ICT curricula and ensure that a convincing display of both technical and pedagogical skills becomes a pre-requisite for teacher certification. The recommendations above could help in ensuring that ICT proficiency is achieved by teachers in Zambezi Education Region.

Furthermore, these results from this study could question the appropriateness of ICDL as the vehicle in preparing ICT literate teachers in Zambezi. Future studies should focus on whether such low impact of ICDL is experienced across Namibian teachers. Studies should investigate and pilot other ICT literate tool to establish what would work best in creating a more cognitive output while at the same time teach ICT literacy skills.

7 REFERENCES

Abuhmaid, A. (2011). I*CT training courses for teacher professional development in jordan.* Turkish Online Journal of Educational Technology, 10(4), 195-210. Retrieved 08 2017, 20, from https://www.researchgate.net/publication/289678199_Ict_training_courses_for_teacher_professional_development_in_jordan

Aczel, J., Peake, S., & Hardy, P. (2008). *Designing capacity-building in e-learning expertise:Challenges and strategies*. Computers and Education, *50*(2), 499-510.

Bandura, A. (1986). *Social foundations of thought and action: A Social Cognitive Theory.* Englewood Cliffs, New Jersey: Pentice-Hall.

Baubeng-Andoh, C. (2012). *Factors influencing teachers' adoption and integration of information and Communication Technology*. International Journal of Education and Development using *ICT, 8*(1), 136-155. Retrieved August 23, 2016, from http://ijedict.dec.uwi.edu//viewarticle.php?id=1361

Becta. (2003). *What the research says about the barriers to the use of ICT in teaching.* Retrieved 08 21, 2016, from http://www.mmiweb.org.uk/publications/ict/Research_ClassroomOrg.pdf

Best, J., & Kahn, J. (2014). *Reseach in Education* (10th ed.). Harlow, Essex: Pearson Education Limited.

Boer, P. (2012). *Implementation of an Education Technology Policy in Namibia's High Schools: Through the Eyes of the Teacher:*(Doctoral Dissertation, Teachers College, Colombia University 2012). Dissertation Abstract International (UMI No. 3545628).

Brannigan, N. (n.d.). *Namibia TECN/NA! :GeSCI*. Retrieved 09 19, 2016, from Unesco.org: http://www.unesco.org/iiep/PDF/pubs/NamibiaTechNa.pdf

Brush, T. (2003). *Preparing tomorrow's teachers to use technology (TP3).* Educational Technology Research & Development, 51(1), 39-128.

Careemdeen, J., & Nonis, P. (2015). *The impact of international computer driving license (icdl) training on classroom computer use by secondary school teachers (Special Reference on Badulla District in Sri Lanka)*. Sai On Journal of Commerce & Management: A Peer Reviewed International Joutnal, *2*(12), 23-27. Retrieved 03 16, 2017, from http://ir.lib.seu.ac.lk/handle/123456789/1300

Christensson, P. (2010, January 4). Retrieved 03 26, 2016, from http://techterms.com/definition/ict#

Cocklin, R. (2012). *ICDL Report statistics.* Windhoek: Ministry of Education. Retrieved 03 10, 2015

Cohen, L., Manion, L., & Morrison, K. (2011). *Research Methods in Education* (7th ed.). Abingdon, Oxon: Routledge.

Commission, E. (2010, May 19). *Communication from the Commission to the Europian Parliament, the Council, the Europian Economic and Social Committee and the Committee of Regions.* A Digital Agenda for Europe. Brussels: EUROPEAN COMMISSION.

Commission, E. (2014, November). T*he International Computer and Information Literacy Study (ICILS): Main findings and implications for education policies in Europe.* Education and Training. Retrieved from https://ec.europa.eu/education/library/study/2014/ec-icils_en.pdf

Condie, R., & Munro, B. (2007). *The impact of ICT in schools – a landscape review.* Coventry: Quality in Education Centre, University of Strathclyde. Retrieved 09 08, 2016, from www.ibertic.org/evaluacion/sites/default/files/.../33_impact_ict_in_schools.pdf

Creswell, J. W. (2014). *Educational Research: Planning, Conducting and Evaluating Quantitative and Qualitative Research* (4th ed.). Harlow, Essex: Pearson Education Limited.

Creswell, J., & Plano Clark, V. (2011). *Designing and Conducting Mexed Methods Research* (2nd ed.). Thousand Oaks, California: Sage Publications.

Creswell, J., & Plano Clark, V. (2011). *Designing and Conducting mixed methods research.* Thousands Oaks, CA: SAGE.

Daniels, J. (2002). *Foreword" in Information and Communication Technology in Education–A Curriculum for Schools and Programme for Teacher Development.* Paris: UNESCO.

Division, U. P. (2014). *UN Population Division database.* New York: UN Population Division. Retrieved August 29, 2016, from http://www.un.org/en/development/desa/population/

DoE. (2003). *Draft White Paper on e-Education: Transforming learning and teaching through ICT*. Pretoria: Government Printer.

Easton, A., Easton, G., & Addo, T. (2006). *But I am computer literature: I passed the test.* Journal of College and Training, *3*(2), 39-44.

Esselaar, S., & Sebusang, S. (2013). *Understading what is happening in ICT in Botswana: A supply- and demand side of the ICT sector.* International Development Research Centre. Retrieved August 28, 2016, from http://www.researchictafrica.net/publications/Evidence_for_ICT_Policy_Action/Policy_Paper_1_-_Understanding_what_is_happening_in_ICT_in_Botswana.pdf

Farrell, G., & Isaacs, S. &. (2007). *Survey of ICT and Education in Africa.* Washington, DC: infoDev/World Bank. Retrieved 08 24, 2016, from http://www.infodev.org/en/Publication.354.html

Garnett, F. (2008). *Six ICT literacies.* Working paper.

Gordon, N. (2007). *Experiences of embedding information technology into discipline based teaching.* Retrieved 08 16, 2016, from http://www.ics.heacademy.ac.uk/italics/Vol4-1/gordon.pdf

Government Republic of Namibia, M. O. (2006). *TECH/NA! Implementation Guide.* Retrieved March 14, 2014, from http://www.tech.na/plan.htm.

Government Republic of Namibia, M. O. (2007). *Education and Training Sector Improvement Programme(ETSIP).* Retrieved March 14, 2014, from http://www.tech.na/etsip.htm.

Graham, S. L. (2000, 05 11). *Media/Tests/ETS_Literacy/ICTL_FRAMEWORK.pdf*. Retrieved 03 14, 2014, from www.ets.org.

GRN. (2012). *Ministry of ICT: Universal Access and Service Policy for ICTs.* Windhoek: Ministry of Information and Communication Technology.

GRN. (2005). *ICT Policy for Education*. Okahandja, Namibia: NIED.

Harris, S. (2002). *Innovative pedagogical practices using ICT in schools in England.* Journal of Computer Assisted Learning, 18: 449–458.

Hatmi, F. (2009). *How effective is ICDL Training for Omani teachers?* A dissertation submitted to the University of Machester for the degre of Master of Arts in "Digital Technologies, Communication and Education" in the Faculty of Humanities. Manchester: School of Medicine: University of Machester.

Henry, J., & Anderson, R. (1998). T*eaching Learning, and computing: A National Survey of Schools and Teachers Describing Their Best Practices, Teaching Philosophies, and Uses of Technology.* Technology Specialist's Survey Booklet. Irvine: U.S Department of Education.

Higgins, S. (2003). *Does ICT improve learning and teaching in schools?* Retrieved April 18, 2015, from A BERA Professional User Review: http://dysgu.llyw.cymru/docs/learningwales/publications/121122ictlearningen.pdf

Howie, S., Muller, A., & Paterson, A. (2005). *Information and Communication Technologies in South African Secondary Schools.* Cape Town: Human Sciences Research Council.

Iipinge, S. (2010). *The Integration of the Information and Communication Technology (ICTs) in preparation of teachers at Colleges of Education in Namibia*. Retrieved May 16, 2014, from University of Namibia: http://repository.unam.na/bitstream/handle/11070/476/iipinge2010.pdf?sequence=1

Isaaks, S. (2007). *Survey of ICT in Education in Botswana.* Washington, DC: infoDev/World Bank. Retrieved 08 24, 2016, from http://www.infodev.org/en/Publication.354.html

Johnson, B., & Christensen, L. (2012). *Educational Research: Quantitave, Qualitative and Mixed Approaches* (4th ed.). Los Angels: Sage Publications, Inc.

Kennewell, S. (2002). *The nature of ICT as a subject.* In S. Kennewell, Learning to Teach ICT in the secondary schools (pp. 18-36). London: Routledge Falmer.

Kowalcxyk, D. (2015). *What is Informed Consent in Research? - Definition and Purpose.* Retrieved July 29, 2015, from http://study.com/academy/lesson/what-is-informed-consent-in-research-definition-purpose.html

Lubbe, M., & Benson, S. (2010). *International Computer Driving License (ICDL)- The Practical way.* Cape Town: Let's Do It. Retrieved 04 18, 2014, from Namibia College of Open Learning: http://www.namcol.edu.na/professional.php

McMillan, J., & Schumacher, S. (2014). *Research in Education: Evidence-Based Inquiry* (7th ed.). Harlow, Essex: Pearson Education Edition.

Mdlongwa, T. (2012, August). *Information and Communication Technology (ICT) as a means of enhancing Education in schools in South Africa: Challenges, Benefits and Recommendations.* Retrieved September 05, 2016, from http://www.ai.org.za/wp-content/uploads/downloads/2012/10/No.-80.-ICTas-a-means-of-enhancing-Education-in-Schools-in-South-Africa.pdf

Mevarech, A. ,., & Light, P. (1992). *Peer-based interaction at the computer: Looking backward, looking forward.* Learning and Instruction, *5*, 275-280.

MoEAC, G. O. (2015, November 9). *State of Education,Art and Culture Address by Honourable Katrina Hanse-Himalwa.* Retrieved from Commentary: https://www.moe.gov.na/files/downloads/784_HON%20MINISTER%20STATE%20OF%20EAC%20ADDRESS%20%209%20NOV%202015.pdf

Mpoeleng, D. (2016). *ICT Literacy Policy - BOTSWANA.* Paris: UNESCO.

Mulhim, E. (2014). *The Barriers to the use of ICT in Teaching in Saudi Arabia: A Review of Literature.* Universal Journal of Educational Research, *2*(6), 487-493. doi:10.13189/ ujer.2014.020606

Noor-ul-Amin, S. (2008). *An effective use of ICT for Education and Learning by drawing on Worldwide Knowledge, Research, and Experience: ICT as a Change Agent for Education.* Retrieved August 25, 2016, from http://www.nyu.edu/classes/keefer/waoe/amins.pdf

NPC. (2004). *Namibia Vision 2030.* Retrieved April 13, 2016, from http://www.npc.gov.na/?wpfb_dl=36

OECD. (2011). *PISA 2011 Report: Students on Line.* Retrieved May 12, 2016, from Digital Technologies and Performance: http://archivos.agenciaeducacion.cl/Volumen_VI_Informe_Internacional_version_ingles.pdf

Panel, I. I. (2002). *Digital transformation- a framework for ICT Literacy.* Retrieved 08 16, 2016, from Educational Testing Service:

http://www.ets.org/research/ictliteracy/ictreport.pdf. http://www.ets.org/Media/Research/pdf/ICTREPORT.pdf

Pelgrum, W., & Law, N. (2003). *ICT in Education around the World: Trends, Problems and Prospects*. Retrieved 08 22, 2016, from UNESCO-International Institute for Educational Planning: www.worldcatlibraries.org/wcpa/ow/02d077080fcf3210a19afeb4da09e526.html.

Perez, J., & Murray, M. (2006). *Journey to the Center of the Core: Computers and the Internet in the Core Curriculum*. Issues in informing Science and Information Technology, *3*, 489-497. Retrieved 02 17, 2016, from http://proceedings.informingscience.org/InSITE2006/IISITPere195.pdf

Republic of Namibia, M. O. (2005). *ICT Policy for Education.* Retrieved March 14, 2014, from http://www.tech.na/download/ICTPolicy2005_15March2005.pdf.

Rockman, I. (2004, March 03). *Introduction: The Importance of Information Literacy.* Retrieved 07 23, 2016, from http://media.wiley.com/product_data/excerpt/78/07879652/0787965278.pdf

Shafika, I. (2007). *ICT in Education in South Africa.* Washington, DC: InfoDev/World Bank.

Shafika, I. (2007). *Survey of ICT and Education in Africa: Namibia Country Report.* Washington, DC: Infodev.

Smeets, E. (2005). *Does ICT contribute to powerful learning environments in primary education?* Computers and Education, *44*, 343-355. Retrieved 03 18, 2016, from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.534.7082&rep=rep1&type=pdf

Springer, K. (2010). *Educational Research: A Contextual Approach.* New Jersey: John Wiley & Sons.

Teddlie, C., & Yu, F. (2007). *Mixed methods sampling: a typology with examples*. Journal of Mixed Methods Research, 77-100.

Teo, T. (2009). *Modelling technology acceptance in education: A study of pre-service teachers*. Computers & Education, *52*(1), 302-312.

Tomei, L. (2005). *Taxanomy for the technology domain.* USA: Information Science Publishing.

Tornero, J. M. (2004). *Understanding digital literacy.* Barcelona: Universidad Autónoma de Barcelona.

Trochim, W. (2006). *Research Methods Knowledge Base:Survey Research.* Retrieved July 13, 2017, from http://www.socialresearchmethods.net/kb/survey.php

Wallet, P. (2014). *INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN EDUCATION IN ASIA: A comparative analysis of ICT integration and e-readiness in schools across Asia.* Montreal: UNESCO Institute for Statistics.

Yusuf, M. (2005). *Information and communication education: Analyzing the Nigerian national policy for information technology*. International Education Journal, *6*(3), 316-321. Retrieved 09 08, 2016, from http://files.eric.ed.gov/fulltext/EJ854985.pdf

Zhao, Y., & Cziko, G. (2001). *Teacher adoption of technology: A perceptual control theory perspective*. Journal of Technology and Teacher Education, *9*(1), 5-30. Retrieved 06 18, 2016, from http://leegreen.wiki.westga.edu/file/view/Teacher+adoption+of+technology-+A+perceptual+control+theory+perspective.pdf

8 APPENDICES

8.1 Appendix A: Ethical clearance

UNAM
UNIVERSITY OF NAMIBIA

ETHICAL CLEARANCE CERTIFICATE

Ethical Clearance Reference Number: FOE/161/2017 **Date: 20 February, 2017**

This Ethical Clearance Certificate is issued by the University of Namibia Research Ethics Committee (UREC) in accordance with the University of Namibia's Research Ethics Policy and Guidelines. Ethical approval is given in respect of undertakings contained in the Research Project outlined below. This Certificate is issued on the recommendations of the ethical evaluation done by the Faculty/Centre/Campus Research & Publications Committee sitting with the Postgraduate Studies Committee.

Title of Project: The Impact of the International Computer Driving License Literacy Training On the Use Of Information And Communication Technologies In The Classrooms By Teachers in the Zambezi Region

Nature/Level of Project: Masters

Researcher: P. Kacelo

Student Number: 9003991

Faculty: Faculty of Education

Supervisors: Dr. P. Boer (Main) Mr. A. Chainda (Co)
Take note of the following:

(a) Any significant changes in the conditions or undertakings outlined in the approved Proposal must be communicated to the UREC. An application to make amendments may be necessary.
(b) Any breaches of ethical undertakings or practices that have an impact on ethical conduct of the research must be reported to the UREC.
(c) The Principal Researcher must report issues of ethical compliance to the UREC (through the Chairperson of the Faculty/Centre/Campus Research & Publications Committee) at the end of the Project or as may be requested by UREC.
(d) The UREC retains the right to:
(i) Withdraw or amend this Ethical Clearance if any unethical practices (as outlined in the Research Ethics Policy) have been detected or suspected,
(ii) Request for an ethical compliance report at any point during the course of the research.

UREC wishes you the best in your research.

Prof. P. Odonkor: UREC Chairperson

Ms. P. Claassen: UREC Secretary

8.2 Appendix B: Permission letter from Zambezi Education Directorate

REPUBLIC OF NAMIBIA
ZAMBEZI REGIONAL COUNCIL
DIRECTORATE: EDUCATION, ARTS AND CULTURE

Tel: +26466261902/964 | *Ngoma Road* | *Private Bag 5006*
Fax: +26466253187 | *Govt Building* | *Katima Mulilo, Namibia*
Enquiries: Adrenah Mukela | ***Our Ref:*** | ***Date: 28 March 2017***

University of Namibia
Katima Mulilo Campus
Private Bag 1096
Katima Mulilo
Namibia

Dear Mr. Kachelo

PERMISSION TO CONDUCT RESEARCH IN EIGHT SCHOOLS IN ZAMBEZI REGION: YOURSELF

1. Reference is made to your letter dated 27 March 2017 in the subject context above.

2. Permission is hereby granted to you to conduct your research in the schools in Zambezi Region which are: Caprivi Senior Secondary School, Ngweze Senior Secondary School, Katima Mulilo Combined School, Linyanti Combined School, Mafwila Senior Secondary School, Sam Nujoma Combined School, Sanjo Senior Secondary School and Simataa Senior Secondary School.

3. However, you are advised to liaise with the Principals concerned in order for them to allocate time for you on their activities schedule before the date of your intended interview. Your presence to those schools you intend visiting should not disrupt the normal teaching and learning process/activities.

4. Ministry of Education, Arts and Culture hereby would like to request you to share your findings with the Directorate.

5. **NB! By a copy of this notice the Inspectors of Education are informed accordingly of your presence in those schools.**

6. Thanking you in advance and wishing you all the best in your research.

Yours in Education,

MINISTRY OF EDUCATION ARTS & CULTURE
Zambezi Regional Directorate

MR AUSTIN M SAMUWPA
REGIONAL DIRECTOR: EDUCATION, ARTS AND CULTURE

8.3 Appendix C: Research Permission letter from Centre for Postgraduate Studies

CENTRE FOR POSTGRADUATE STUDIES

University of Namibia, Private Bag 13301, Windhoek, Namibia
340 Mandume Ndemufayo Avenue, Pioneers Park
☎ +264 61 206 3275/4662; Fax +264 61 206 3290; URL.: http//www.unam.edu.na

UNAM
UNIVERSITY OF NAMIBIA

06 February 2017

RESEARCH PERMISSION LETTER

Student Name: **Patrick Kacelo**
Student number: **9003991**
Programme: **Master of Education**

Approved research title: The impact of the International Computer Driving License Literacy training on the use of information and communication technologies in the classrooms by teachers in the Zambezi Region.

TO WHOM IT MAY CONCERN

I hereby confirm that the above mentioned student is registered at the University of Namibia for the programme indicated. The proposed study met all the requirements as stipulated in the University guidelines and has been approved by the relevant committees.

The proposal adheres to ethical principles as per attached Ethical Clearance Certificate. Permission is hereby granted to carry out the research as described in the approved proposal.

Best Regards,

DR. SETH J. EISEB
ACTING DIRECTOR: CENTRE FOR POSTGRADUATE STUDIES
Tel: +264 61 2063414
E-mail: seiseb@unam.na

Centre for Postgraduate Studies
Office of the Director
2017 -02- 06
University of Namibia
UNAM

8.4 Appendix D: Questionnaire for teachers

QUESTIONNAIRE
ASSESSING YOUR USE OF COMPUTERS

1. Please check (√) the one description of computer use that most closely applies to you.

1. I (or my learners) use computers in all my classes.	☐	Continue at #2
2. I use computers in other classes I teach	☐	Continue at #2
3. I use computers only to prepare for classes or in other professional activities	☐	Skip to #10
4. I don't currently use computers either with my learners or for professional activities but have done so in the past	☐	Skip to #11
5. I have never used computers in teaching or for any professional activities	☐	Skip to #18

2. **On how many days since 2012 has a typical learner in this particular class used a computer while you were teaching their class? Check (√) *one choice.***

• 1-5 times	☐
2. 6-10 times	☐
3. 11-20 times	☐
4. 21-40 (weekly).	☐
5. 41+ (twice/week)	☐

3. Typically, how many learners operate any one computer at one time during this class? Check (√) the most common arrangement, or Check (√) two if two are equally common.

1. One learner	☐
2. In pairs (2)	☐
3. In groups of 3-4	☐
• Other (Please specify):	☐

4. Where do learners use computers during this class and how many computers are available in each room? Check (√) the most common arrangement, or check (√) two if two are equally common.

	# of Computers
• Classroom..... ☐	_____
• Computer Lab ..... ☐	_____
• Media Center ..... ☐	_____
• Other: (Please specify). ☐	_____

5. In your opinion, what are the effective application software learners in this class have used? Indicate the titles of these software (including word processing, spreadsheet, email and Internet, presentation and educational program**s) and what your learners used the software to do.** ***(Stress those that you believe are most useful to most learners.)***

What software do you as a teachers use in the class	What learners used the software to do
1.	**1.**
2.	**2.**
3.	**3.**
4.	**4.**

6.

a. Which of the following are among the objectives you have for learner computer use? *Check (√) ALL that apply*

1. Mastering skills just taught..... ☐
2. Remediation of skills not learned well..... ☐
3. Expressing themselves in writing..... ☐
4. Communicating electronically with other people..... ☐
5. Finding out about ideas and information..... ☐
6. Analyzing information..... ☐
7. Presenting information to an audience..... ☐
8. Improving computer skills..... ☐
9. Learning to work collaboratively..... ☐
10. Learning to work independently..... ☐
11. Other (describe): _____ ☐

b. Which 3 objectives from the list above have been your most important ones? *(Write 3 numbers from above list.)*

a. _____
b. _____ and
c. _____

7. **Whether or not learners use computers during class time, some learners may use computers to do work for this class at other times. How many learners in this class have done work for this class using computers in each of these settings on at least several occasions?**

	None or Few	¼	½	¾	All learners
a. At other times while at school (lunch, before or after school, etc.).	☐	☐	☐	☐	☐
b. At home (or outside of school).	☐	☐	☐	☐	☐

8. **How many computers are available for your learners in each of these locations, and which type of computer operating systems (O/S) do they use?**

Answer only for locations where learners use computers for this class or computer lab. Write "NA" if location not used.

Location	Number of computers present	Which type of computer operating system do learners use most? *(check √ the predominant type of computer in that room)*			
My own classroom		Windows	Mac	Linux	Other
		☐	☐	☐	☐
School library or media center		☐	☐	☐	☐
Computer lab		☐	☐	☐	☐

9. **The remaining questions refer to ANY of the classes that you teach. For each of the following types of software, please indicate for how many lessons your learners have used that type of software this year in ANY of your classes**.

	No Lessons	1-2 lessons	3-9 lessons	10+ lessons
a. Games for practicing skills	☐	☐	☐	☐
b. Encyclopedias and other references on CD-ROM	☐	☐	☐	☐
c. Word processing	☐	☐	☐	☐
d. Software for making presentations (e.g., PowerPoint).....	☐	☐	☐	☐
e. Graphics-oriented printing (e.g., Print Shop).....	☐	☐	☐	☐
f. Spreadsheets or database programs (creating files or adding data).....	☐	☐	☐	☐
g. Facebook or WhatsApp for sharing educative information	☐	☐	☐	☐
h. World Wide Web browser.....	☐	☐	☐	☐
i. Electronic mail.....	☐	☐	☐	☐
j. E-books and online libraries	☐	☐	☐	☐

10. In which of these ways do you use computers in preparing for teaching your classes or in other professional activities?

I use computers to:	not use	Occasionally	Weekly	Do More often
a. Record or calculate learner grades	☐	☐	☐	☐
b. Make handouts for learners	☐	☐	☐	☐
c. Communicate with parents	☐	☐	☐	☐
d. Write lesson plans or related notes	☐	☐	☐	☐
e. Get information or pictures from the Internet for use in lesson	☐	☐	☐	☐
f. Use video cams, digital cameras, or scanners to prepare for class	☐	☐	☐	☐
g. Exchange computer files with other teachers....	☐	☐	☐	☐
h. Post learner work, suggestions for resources, or ideas and opinions on the World Wide Web (internet)	☐	☐	☐	☐

11. How many years ago, if at all, did you first use computers in the following ways?

	Never	In the last 2 years	3-5 years ago	6-9 years ago	10+ years ago
a. For assigning computer tasks to learners in your Classes	☐	☐	☐	☐	☐
b. For your own work (e.g., grading, handouts, presentation slides, etc.)	☐	☐	☐	☐	☐
c. For other activities (e.g., personal e-mail, word processing, games)	☐	☐	☐	☐	☐

12. In what setting did you *first* become reasonably comfortable with using computers?

√ only one

1. While I was a learner in high school or earlier ☐
2. While in college or getting first teaching qualification ☐
3. While working in another job, outside of teaching ☐
4. During my first 3 years in teaching ☐
5. More recently during my teaching career ☐
6. Other (describe):_____ ☐
7. I am still not reasonably familiar and comfortable with using computers ☐

13. How much experience have you had with each of the following types of computers?

	None	A little	Moderate Amount	Very Experienced	Expert Level
a. Windows	☐	☐	☐	☐	☐
b. Mac(Apple)	☐	☐	☐	☐	☐
c. Linux	☐	☐	☐	☐	☐

14. For how many years, if at all, have you had a computer at your home? Internet? If you don't have a computer or internet at home, please write "0"

a. Computer at home ..... _____ Years
b. Internet at home ..... _____ Years

15. A central aspect of this study is learning how the ICDL training has impacted on teaching and learning over the last six years after the termination of the ICDL literacy training in 2011 in response to the" ICT Education policy" and "TECH/NA! Implementation guide".

How important were computers in your teaching in each of the past five academic years?

	Did not use Computers	Minor Importance	Moderately Important	Very Important
This Year: (2017)	☐	☐	☐	☐
Last year: (2016)	☐	☐	☐	☐
2015	☐	☐	☐	☐
2014	☐	☐	☐	☐
2013	☐	☐	☐	☐
2012	☐	☐	☐	☐

16. Over the past five years, have your learners ever used computers in the following ways?

	No	Partly	Yes
a. Collect data from people, newspapers, or the environment, enter the results into the computer, and present conclusions using excel	☐	☐	☐
b. Collaborate with classes in other schools and compile information for a project directed by teachers or by outside scientists	☐	☐	☐
c. Write a story, then illustrate it with scanned images or digitized pictures, record sounds for the story, and make a multimedia presentation.	☐	☐	☐
d. Become proficient about a topic and publish text and pictures on the Web	☐	☐	☐
e. Write a computer program to control a robotic device that they built	☐	☐	☐

17. Compared to five years ago, are you using computers more frequently or less frequently in these ways?

		Less Frequently Now	More stayed the same	Much frequently more now	
a.	Trying out new software or technologies	☐	☐	☐	☐
b.	Using computers for class preparation (e.g., handouts, slides)	☐	☐	☐	☐
c.	Using computers for non-work activities	☐	☐	☐	☐
d.	Assigning learners to use computers	☐	☐	☐	☐
e.	Suggesting that learners use computers in their project	☐	☐	☐	☐
f.	Use mobile APPS /games to support learning	☐	☐	☐	☐

18. I would like you to assess your own current skills related to using computers.

I know how to:		No	Somewhat	Yes
a.	Display the directory of a storage device	☐	☐	☐
b.	Attach a file to a message in an email	☐	☐	☐
c.	Create shortcuts on the desktop	☐	☐	☐
d.	Create a folder in any location on the computer	☐	☐	☐
e.	Copy files from one disk to another	☐	☐	☐
f.	Create a new database and establish fields and screen layouts	☐	☐	☐
g.	Create a new blank presentation	☐	☐	☐
h.	Insert page numbers into a word-processor document	☐	☐	☐
i.	Create a simple slide show with text, images using presentation software	☐	☐	☐
j.	Use a World Wide Web search engine (e.g. Google, Yahoo, Bing etc.)	☐	☐	☐
k.	Use sum formula and undertakes basic calculations on excel	☐	☐	☐
l.	Use all functions on the ribbon in all office programs (e.g. Word processing	☐	☐	☐
m.	Insert graphics from various sources e.g. Clip art, digital image	☐	☐	☐
n.	Use key words in a simple internet search	☐	☐	☐
o.	Save files in different locations	☐	☐	☐
p.	Insert a new worksheet into a workbook on excel.	☐	☐	☐
q.	Launch the internet explorer	☐	☐	☐
r.	Use Print Screen for Screen Captures	☐	☐	☐
s.	Use anti-virus software to scan for viruses	☐	☐	☐
t.	Set a printer of my choice as default printer	☐	☐	☐
u.	Create CA mark sheet on excel	☐	☐	☐
v.	Add animations and transitions to a slide presentation	☐	☐	☐

19. Which of these are advantages of using computers in teaching? ***If you haven't had enough experience with computers to have an opinion, check the "don't know" box.***

		Not true, not an advantage	Somewhat true, a mild advantage	True a modest advantage	True strong advantage	Don't know
a.	Learners create better-looking products than they could do with just writing and other traditional media.....	☐	☐	☐	☐	☐
b.	Computers provide a welcome break for learners from more routine learning activities.....	☐	☐	☐	☐	☐
c.	Learners help one another more while doing computer work.....	☐	☐	☐	☐	☐
d.	Learners take more initiative outside of class time--doing extra research or polishing their work.....	☐	☐	☐	☐	☐
e.	Learners' writing quality is better when they use word processing.....	☐	☐	☐	☐	☐
f.	Learners work harder at their assignments when they use computers ...	☐	☐	☐	☐	☐
g.	Learners are more willing to do second drafts.....	☐	☐	☐	☐	☐
h.	'Average' learners are communicating and producing in ways only 'gifted' ones did before.....	☐	☐	☐	☐	☐
i.	Learners are able to find information quickly	☐	☐	☐	☐	☐
j.	Computers serve as a tutor for learners when on educational websites.	☐	☐	☐	☐	☐
k.	Online tools make learning more fun, interesting and easy to understand.	☐	☐	☐	☐	☐
l.	Offer more engaging activities for learners	☐	☐	☐	☐	☐
m.	Internet enables teachers to access plagiarism checkers	☐	☐	☐	☐	☐

20. Which of these are disadvantages of using computers in teaching?

		Not true, not a disadvantage	Somewhat true, a mild disadvantage	True, a modest disadvantage	True, a strong disadvantage	Don't know
a.	Computers are too unpredictable – they "crash," or the software doesn't work right.....	☐	☐	☐	☐	☐
b.	Computers are hard to figure out how to use	☐	☐	☐	☐	☐
c.	Many learners use computers in order to avoid doing more important school work	☐	☐	☐	☐	☐
d.	Many learners are not careful enough with this expensive equipment.	☐	☐	☐	☐	☐
e.	It is difficult to integrate computer activities into most of my regular lesson plans	☐	☐	☐	☐	☐
f.	Often too many learners need my help at the same time.....	☐	☐	☐	☐	☐
g.	Learners often get so frustrated, I can't get them to settle down afterwards.....	☐	☐	☐	☐	☐
h.	A teacher has to give up too much instructional responsibility to the computer software--I feel I'm not really "teaching"	☐	☐	☐	☐	☐
i.	Learners can cheat easier—copying work and turning it in as their own	☐	☐	☐	☐	☐

21. What was your motivation for taking the ICDL literacy training course?

a) Professional development ☐

b) Employment requirement ☐

c) Personal interest ☐

d) Not sure ☐

22. Which of your ICT skills were improved upon and which were not improved upon while attending the ICDL training?

_____
_____
_____
_____
_____
_____
_____

23. **How has ICDL training helped you to become a better teacher?**

_____
_____
_____
_____
_____
_____

24. **Has the training changed your confidence or comfort level in using ICT in the class and if so, how?**

_____
_____
_____
_____
_____
_____
_____

25. **What challenges did you encounter during ICDL Literacy training?**

_____
_____
_____
_____
_____
_____

26. **List the challenges you face in effectively using ICTs in your professional activities/classroom practice.**

_____
_____
_____
_____
_____
_____
_____

i. **What kind of support would you identify in order to fully use ICTs in your classroom practice?**

_____
_____
_____
_____
_____
_____
_____

27. Please tell me about yourself

a. Gender: Male ☐ Female ☐

b. Age: 20-29 ☐ 30-39 ☐ 40-49 ☐ 50-59 ☐

c. Name of your current school: _____

d. Total years of teaching experience: _____

e. Highest qualification (include current enrolment)

- ☐ Diploma
- ☐ Bachelors
- ☐ Masters
- ☐ Doctorate
- ☐ Other, specify_____

f. Which grades and subjects do you currently teach?

_____

_____

g. When did you start ICDL training?

_____

h. When did you complete/stop ICDL training?

_____

i. Which of the required 7 modules did you pass?

_____

_____

_____

_____

Thank you for your participation

8.5 Appendix E: Interview questions

Teachers' Interviews Questions

1. In which year did you start and complete the training?
2. What did you expect from the ICDL training prior to the ICDL course?
3. Do you think that the training helped you learn ICT usage independently?
4. Has the training changed your attitudes toward the use of technology and if so, how?
5. Has the training changed your confidence in using ICT in the class and if so, how?
6. What are the areas of weakness in the training and how can they be improved?
7. Which of your ICT skills where improved by the training?
8. Has the training helped you to use the skills you learned in unpredictable situations in the future?
9. How are you using the skills you learned from the training? (classroom & life)
10. How has ICT Literacy training helped you develop pedagogic knowledge and skills regarding using ICTs effectively in teaching and learning?
11. What difficulties/challenges do you face in using ICTs in your classrooms?
12. What kind of support would you identify in order to fully use ICTs in your classroom practice?
13. What word of encouragement will you give to those not using ICTs in their classrooms?

Course evaluation

14. What went well in the training?
15. What went badly?
16. How can the course be improved to be more effective?

8.6 Appendix F: Cover letter for the questionnaire

COVER LETTER

Dear Participant

I invite you to participate in a research study entitled: "**The impact of international computer driving licence literacy training and use of information and communication technologies in the classrooms by teachers in the Zambezi region"** I am currently enrolled in the (*Master of Education: CIAS*) at University of Namibia and am in the process of writing my (Master's Thesis). The purpose of the research is to determine: the impact of ICDL training on teachers' use of ICTs in their classrooms.

The questionnaire herewith has been designed to collect information on: **your use of computers**.

Your participation in this research project is completely voluntary. You may decline altogether, or leave blank any questions you don't wish to answer. There are no known risks to participation beyond those encountered in everyday life. Your responses will remain confidential and anonymous. Data from this research will be kept under lock and key and reported only as a collective combined total. No one other than the researchers will know your individual answers to this questionnaire.

If you agree to participate in this project, please answer the questions on the questionnaire as best you can. It should take approximately *(30 minutes)* to complete. Please return the questionnaire as soon as possible in the same business reply envelope to the principal.

If you have any questions about this project, feel free to contact *INVESTIGATOR Patrick Kacelo* at *0811249596/0813777888*.

Thank you for your assistance in this important endeavor.

Sincerely yours,

Patrick Kacelo

PRINCIPAL INVESTIGATOR

8.7 Appendix G: Request for permission to conduct research in eight schools

University of Namibia

Katima Mulilo campus

P/Bag 1096, Katima Mulilo

The Permanent Secretary

Ministry of Education, Arts and Culture

Via: Regional Director: Directorate of Education, Arts and Culture

Zambezi Regional Council

Private Bag 5006, Katima Mulilo

27 March 2017

Dear Ms/Mr

Request for permission to conduct research in eight regional schools

I am a registered Master's student at the University of Namibia in the faculty of Education and on staff development. My main supervisor is Dr Perien Boer.

The proposed topic of my research is "**The impact of international computer driving licence literacy training and use of information and communication technologies in the classrooms by teachers in the Zambezi region**". The objectives of the research are:

a. To investigate the influence of ICDL training on teachers' use of ICTs in their classrooms.
b. To find out teachers' self-efficacy regarding their ICT skills.

I am hereby seeking your consent to conduct research in the below- mentioned schools in the Zambezi Region in which teachers received ICDL literacy training from 2008 t0 2011.

The schools targeted are: Caprivi Senior Secondary school, Ngweze Secondary school, Caprivi Senior Secondary School, Katima Combined School, Linyanti Secondary School, Mafwila Senior Secondary School, Sam Nujoma Combined School (Former Kabbe CS), Sanjo Senior Secondary School and Simataa Secondary School.

To assist you in reaching a decision, I have attached to this letter:

a. A copy of an ethical clearance certificate issued by the University
b. A copy of the research instruments which I intend using in my research

Should you require any further information, please do not hesitate to contact me or my supervisor. Our contact details are as follows:

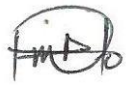
Dr Perien Boer: Cell: 0816517342 Email: pboer@unam.na

Patrick Kacelo: Cell: 0811249596 Email: pkacelo@unam.na

Upon completion of the study, I undertake to provide you with a bound copy of the dissertation.

Your permission to conduct this study will be greatly appreciated.

Yours sincerely,



Patrick Kacelo

8.8 Appendix H: Request letter for permission from school principals

University of Namibia

Katima Mulilo campus

P/Bag 1096, Katima Mulilo

The School Principal

Simataa Senior Secondary School

03 April 2017

Dear Ms/Mr

Request for permission to conduct research at your school

I am a registered Master's student at the University of Namibia in the faculty of Education and on staff development. My main supervisor is Dr Perien Boer.

The proposed topic of my research is "The impact of international computer driving licence literacy training and use of information and communication technologies in the classrooms by teachers in the Zambezi region". The objectives of the research are:

- To investigate the influence of ICDL training on teachers' use of ICTs in their classrooms.
- To find out teachers' self-efficacy regarding their ICT skills.

I am hereby seeking your consent to conduct research at your school as it benefited from the ministerial initiative of training teachers in ICDL literacy training between 2008 t0 2011. The research will constitute collecting data by administering a questionnaire to teachers with a follow-up interview. The requested timeframe is from 10 April to 21 April 2017.

To assist you in reaching a decision, I have attached to this letter:

- A copy of an ethical clearance certificate issued by the University
- A copy of the permission letter from the Regional Director: Education, Culture & Arts.

Should you require any further information, please do not hesitate to contact me or my supervisor. Our contact details are as follows:

Dr Perien Boer: Cell: 0816517342 Email: pboer@unam.na

Patrick Kacelo: Cell: 0811249596 Email: pkacelo@unam.na

Upon completion of the study, I undertake to provide you with a bound copy of the dissertation.

Your permission to conduct this study will be greatly appreciated.

Yours sincerely,

Patrick Kacelo