

The integration of computer technology in the Namibian Education system

by

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Declaration

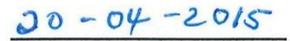
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I declare that **The integration of computer technology in the Namibian Education system** is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references.

A handwritten signature in blue ink, consisting of a circled initial 'G' followed by 'M' and 'Simataa', written over a horizontal line.

SIGNATURE

(MR. G M SIMATAA)

A handwritten date '20-04-2015' in blue ink, written over a horizontal line.

DATE

DEDICATION

This work is dedicated to my beloved grandmother, Alice Kachana Mukwenje (Bana-Monde), for introducing me to education though she was not educated herself. Despite being illiterate and uneducated, she somehow understood the importance of education and kept pushing me to go to school.

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ABSTRACT

The integration of computer technology in education has been a worldwide issue that has been supported and equally criticized by many. However, the practicability of computer technology in education cannot be overlooked, and this reality led to this study. This qualitative study aimed to explore the extents to which computer technology has been integrated in teaching and learning in Namibian schools, and three central schools in the town of Katima Mulilo (Zambezi Region) were investigated in this regard. The study explored possible benefits of computer technology in education, and sought to understand the way learners perceive computer technology. The study findings showed that teachers were unable to use computers to teach due to lack of resources and skills, whereas learners indicated willingness to embrace computer technology in education. Findings further showed greater need to equip schools with computer technology and training teachers. Based on the findings, recommendations were made to train teachers in integrating computer technology, and that schools should be provided with necessary computer technology resources.

Keywords: Information and communication technology; Software; Information technology; Educational technology; Computer simulation; Computer technology; Integration; Incorporation; Hardware.

LIST OF ACRONYMS

BIS	Basic Information Science
CBA	Curriculum Based Assessment
COL	Commonwealth of Learning
CompED	Computers in Education
DER	Digital Education Revolution
ETSIP	Education and Training Sector Improvement Plan
GeSCI	Global E-schools and Communities Initiative
ICDL	International Computer Driver's License
ICT	Information and Communication Technologies
IEA	International Association for the Evaluation of Education Achievement
IFESH	International Foundation for Education and Self-Help
IICD	International Institute for Communication and Development
IMTE	Integrated Media Technology Education
ISP	Internet Service Provider
IT	Information Technology
MBESC	Ministry of Basic Education, Sports and Culture
MoE	Ministry of Education
NAMCOL	Namibian College of Open Learning
NDP	National Development Plan
NIED	National Institute for Educational Development
NOLNet	Namibian Open Learning Network Trust
ODL	Open and Distance Learning
PIE	Plan, Implement and Evaluate

PoN	Polytechnic of Namibia
SADC	Southern African Development Community
SIDA	Swedish International Development Cooperation Agency
SNN	SchoolNet Namibia
UNAM	University of Namibia
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development

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CHAPTER 1: ORIENTATION TO THE STUDY

1.1 INTRODUCTION AND BACKGROUND TO THE STUDY

The state of education, in terms of standard and quality, keeps on changing worldwide from one country to another. The changes have so far been a result of the paradigmatic shift from the traditional teacher-centered approach to the learner-centered approach, which has further been transcended to Outcome-Based Education (OBE); with the latter being technologically advanced and improved in comparison to the preceding systems. These changes have so far been a challenge to most developing countries like Namibia. Since independence, Namibia has thrice changed its education system, all in an effort to find and ascribe quality education to the nation. The curriculum transformation started with the colonially-inspired Cape Education to Cambridge system and now has moved to a more localized education system in which the Higher International General Certificate of Secondary Education (HIGCSE) and International General Certificate of Secondary Education (IGSCE) curriculums are both imbedded in the Namibia Senior Secondary Certificate (NSSC).

There have been concerns from the Namibian public and some national leaders concerning the quality and standard of education in the country (Ipinge, 2002:4). These concerns are further exemplified in a study by Kgabi (2012:1), who stresses that Namibia's education system still shows significant frailties with regard to the provision of quality education. Kgabi (2012) further questions the superiority of instruction delivery from the teachers as learners' academic achievement levels remain questionably below expectations. Namibia's Vision 2030 clearly stipulates the kind of scientific expertise the government aims to attain and this can only be achieved through a high standard and quality of education. The vision visualizes a future Namibia that is scientifically independent and totally employs its own trained graduates and experts to make scientific and educational discoveries, as well as to explore the country's natural resources. To achieve this vision we need to start from the foundation stage, which helps in improving the teaching and learning of school subjects by incorporating computers in schools, upon which the country can build and gradually move towards a successful accomplishment of the national vision (National Planning Commission, 2004, Chapter 3, Section 3.4 (v)).

The fact that Namibia still experiences high failure rates in schools, and that Namibian students who study in the neighboring countries are mostly struggling in their studies compared to their fellow students prove to significant extents that the education quality and standard in Namibia are not what

they should be. When compared to the education systems of the neighboring Southern African Development Community (SADC) states, Namibia's education quality and standard is still not up to standard. The government has so far been trying to improve the education in the country, but more still need to be done in Namibia to attain the education standard of this dynamic country. Given these challenges, together with consideration for the availability of information and communication technology (ICT) policy for education in the country, it is assumed that the usage of computer technology in teaching and learning can improve the quality of education in Namibia. As far as teaching and learning are concerned in most Namibian schools, the methods still remain conventional and more traditional. Though Namibia recognizes the importance of computer technology through its ICT policy for education, the country lacks resources to provide the necessary training for teachers, and procure further computer technology equipment for classroom integration (Kukali, 2013:216).

This emanates from the notion that the use of computers for teaching and learning has improved the quality and standard of education in many countries (see Newby, Stepich, Lehman, Russell, and Ottenbreit-Leftwich, 2011; Manali, 2008; McDaniel, 2009). A number of schools in the US such as the Cincinnati (Ohio) Country Day School, which equipped all its learners with individual laptop and tablet computers, have experienced a lot of benefits, and learners with computers spend more time using the internet to complete their homework for a wider range of subjects than their peers who do not have computers (Newby, 2011:259). According to Manali (2008:1), the use of computers and other technologies, like the internet, hold an important position in today's advanced academic structures. The author further highlights several benefits that the use of computer technology could bring in the education sector and such benefits comprise of the effective data holding and retention capabilities, easy and timesaving manipulation of data, and above all, it helps save resources such as papers. Due to these advantages, the world, in parts such as US, UK and many more, experiences improvement in the learning processes (*ibid*). Additionally, a study by McDaniel (2009:1) revealed the importance of technology in the classroom as follows:

- technology can be used to teach important concepts in almost every subject area;
- technology can contribute to almost any lesson, and make learning more fun and engaging for students; and,
- technology can also help students make connections to their own world and open their eyes to different ideas and cultures.

In light of the above information, it is important that teachers become more acquainted with many forms of technology so that they can use them in the classroom to increase student knowledge and proficiency. This kind of expertise may be lacking from most of the Namibian teachers, as they may not have sufficient training on how they can fully use technological devices such as computers to enhance their teaching. Given this description there is a need for computer technology integration in the education system in Namibia. To successfully see the integration of computers into the education system, it is important to ensure every Namibian learner has at least the basic knowledge and skills on how to use a computer.

1.2 MOTIVATION AND RATIONALE

It has been over twenty-four years since Namibia attained its independence. The general expectation at this stage is that the country should be well advanced in almost every aspect, especially education. The fact that the quality and standard of the Namibian education are still low and that tertiary institutions along with most Namibian schools are still underperforming prompted the researcher to undertake this study in order to find ways or strategies that can help the country to improve its quality and standard of education. With this idea in mind, the researcher tried putting into perspective the role that computer technology could play in revamping the country's education if incorporated into the system, and how it could be utilized to fully sustain its possible potential in the education sector. The researcher feels that computer technology can prove a breakthrough and provide a solution to Namibia's poor quality and standard of education if it is carefully and effectively integrated. This assumption emanates from the researcher's understanding that computers which are fully equipped with appropriate educational and subject software, as well as programs, can turn out to be impeccable tools for improving Namibia's education quality and standard.

Various studies (Manali, 2008; Barrus, 2010; Rusten, 2010) show that computers have proven effective and quite efficient in most areas where they have been appropriately put to use. Additionally, several literature studies (Knezek, 1994; Collis, 1993; Goldberg, 2001) point-out that most students get excited and highly interested at the sight of a computer, and this normally arouses greater interest in them and they want to explore and know more. This postulation suggest that equipping schools with computers that have educational software appropriate to the teaching and learning of almost all subjects will definitely improve the learners' knowledge. Learners who use computer technology will not require too much assistance from the teacher because, with appropriate orientation on computer use, they can explore the programs by themselves.

This study is aimed at providing necessary information on the state of and extent to which computer technology has been integrated in Namibia and focused at three most central schools of Katima Mulilo in the Zambezi region. Hopefully the findings of this study will be able to accentuate the importance of computer innovation in Namibian education, which will, in the process, enable the government and the education ministry to come up with further innovative ideas on how to better address the issue of education quality using computer technology.

1.3 RESEARCH PROBLEM AND SUB-QUESTIONS

The problem identified for this study is the poor quality and standard of education in Namibia that has always been low and is reflected in the poor performances of students, particularly the grade 10 and 12 learners who write examinations leading to certificates. Namibia has embarked on the transformation of the education system a number of times, yet the results in terms of quality and standards still remain unchanged as noted by Kgabi (2012). This brings the researcher of this study to the initiative of computers in education, an initiative that is believed to be a catalyst to efficiency in both teaching and learning (Valdez, 2005:34). In examination of the computer integration initiative in Namibia, the researcher has set out to determine the extent to which teachers and learners have been integrating computer technology in the teaching and learning processes at the three central schools of Katima Mulilo. Therefore, based on the background to the problem, this study attempts to answer the following research question:

What is the state of computer technology integration at the three central schools of Katima Mulilo?

The breadth of this question is defined by the construction of the following sub-questions, which will collectively help provide answers to the main research question:

1. *To what extent has computer technology been integrated into teaching and learning?*
2. *What are the benefits of computer technology to education?*
3. *What are the perceptions of learners on the use of computer technology as a learning tool?*

1.4 AIM AND OBJECTIVES OF THE STUDY

The aim of this study is to investigate the state of computer technology integration in Namibia, and focuses at three central schools of Katima Mulilo in the Zambezi Region. Stemming from this aim of the study, the following objectives were created to address the main research question:

- To explore the use of computer technology in teaching and learning.
- To identify the benefits of computer technology to education.
- To understand the perceptions of learners on the use of computer technology.

1.5 RESEARCH METHOD AND DESIGN

According to Leedy and Ormrod (2005:12), research methodology is the general approach the researcher takes or uses in carrying out a research study, which, to some extent, determines the choice of particular tools the researcher is going to use to collect, manipulate and interpret data. There are three types of research methods through which a person can conduct a study and these are qualitative, quantitative, and mixed methods. The qualitative research method was selected as the approach to this study and it is further discussed in the next section. The qualitative research method as employed in this study is further informed by authors such as Savenye and Robinson (2004), McMillan and Schumacher (1993), Denzin and Lincoln (2000), and Maree (2007) in chapter four, section 4.2.1.

1.5.1 Qualitative research method

This study employed the use of a qualitative research method in order to provide answers to the research question and, thus, attain the goals and objectives of the entire study. According to Savenye and Robinson (2004:1172), a qualitative research in the education technology context is a research or study devoted to developing an understanding of human systems, be they small, such as a technology-using teacher and his or her students and classroom, or large, such as a cultural system. Leedy and Ormrod (2005:94) further explain that a qualitative approach is typically used to answer questions about the complex nature of a phenomenon with the purpose of describing and understanding the phenomena from the participants' point of view. A qualitative research is

considered to be interpretive and naturalistic in the sense that qualitative researchers, in most cases, study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them (Denzin and Lincoln, 2000:3).

Through the use of the qualitative research approach the researcher of this study was able to actively interact with the research participants in their natural environment. This interaction, in turn, helped the researcher to gain comprehensive insight into how the participants perceived and understood the issue of computer integration in Namibian schools. The kind of interaction in this approach allowed the researcher to acquaint himself with the participants through observations, semi-structured interviews and focus group interviews.

There are several designs in qualitative research methodology. These include a case study, phenomenology, ethnography, grounded theory study, and content analysis (Leedy and Ormrod, 2005:144).

A research design refers to the specification of methods and procedures through which information is acquired, and it is the overall operational pattern or framework that stipulates the information to be collected, the sources from which it should be collected and the procedure through which the information will be collected for the study (Luck and Rubin, 1987:477). For the purpose of this study case study was used as the design of this study and it is described in the next section.

1.5.1.1 Case study design

A case study is a qualitative research that follows a logical examination of a particular incident or cluster of interrelated incidents in order to understand it and be able to provide an explanation regarding the occurrence of such an incident (Bromley, 1990:302). This understanding of case study enabled the researcher to easily follow on a particular event in details and be able to examine it from all possible angles of explanations. This further enabled the researcher of this study to listen to the different explanations of the participants, whilst practically observing the real context of the phenomena so as to be able to contextualize the participants' point of view against the observed reality. Yin (2009:18) further describes case study as a practical investigation that examines an existing event or case in the margins of its natural environment or existence in order to explore and establish the correlations of the event and the circumstance of occurrence. Goddard and Melville (2012:9) substantiate that a case study research is one where a researcher studies and examines a particular event or incident in order to establish if such event can lead to verifiable theoretical conclusions or if current and previous premises on the subject are a result of a particular event.

This means that in a case study research the researcher is able to concentrate on a single case and scrutinize it in its utmost details in order to come to an agreeable conclusion. Despite this nature of a case study design, the researcher is expected to ensure that the sample that is being studied presents a competitive fraction of the target population of the study (Fox and Bayat, 2012:69). When using a case study design the researcher intends to assess an event or incidence in more detail through the use of instruments such as interviews, observations and review of documented materials (Leedy and Ormrod, 2005:144). In light of the above, the researcher opted to use semi-structured interviews, observations and focus groups to gather data for the study. In using the case study design the researcher in this study was able to establish the possible qualities that computers can bring into education, as well as how computers can improve the teachers' and learners' performances in their school work, based on the perspectives of the participants and on researcher observations. Using this approach the researcher was able to analyze the collected data by organizing and classifying it into familiar topics or ideas before synthesizing it into a general theoretical conclusion (Leedy and Ormrod, 2005:144).

1.5.2 Subjects of the study

1.5.2.1 Population

According to Hopkins (2002:10) population refers to a defined group upon which the study is focused. Gay (1987:102) further states that population is the group that is of interest to the researcher; the group to which she or he would like the results of the study to be generalized. This study is based in the town of Katima Mulilo in the Zambezi (former Caprivi) region of Namibia. The population includes learners, teachers and managers of three secondary schools that participated in the study.

1.5.2.2 Sampling and sampling procedure

According to Leedy and Ormrod (2005:144) sampling refers to the process of selecting sources such as people, objects, textual materials, electronic records or audiovisual materials from which to draw data; the selected entities are, therefore, called samples. MacDonald and Headlam (2009:69) further define sampling as a process by which you reduce the total research population for a research project to a number that is practically feasible and theoretically acceptable. Sampling in qualitative research is done purposefully, whereby researchers select those individuals or objects that will yield the most information on the topic under investigation (Leedy and Ormrod, 2005:145). According to Patton and Cochran (2002:9) purposive sampling means participants are selected because they are

most likely to generate useful data for the project. From the understanding of the sampling strategies relevant for this study, the researcher found it reasonable to strictly use the purposive sampling strategy, as it is a qualitative study.

The researcher purposively selected the most relevant participants in the education sector who are in the best position to provide the breadth of information necessary in relation to the research question (Given, 2008:697-698), which in the process led to the successful completion of the study. Three secondary schools were purposively selected in the study. Basically, all of the selected schools had reasonable access to computers, and offer Computer Studies as one of their subjects. This made the researcher believe these were the most appropriate schools that could provide enough information on the state of computer technology in education. A sample of thirty-one learners from the selected schools was selected for participation in the focus group interviews; six teachers and three school managers were also selected to participate in the semi-structured interviews.

1.5.3 Data collection strategies

According to Jackson and Verberg (2007:20) in qualitative research, a researcher can use one or a combination of two or more of the most common data collection strategies, which are participant observations, one-to-one interviews, and focus group interviews. Patton and Cochran (2002:11) further elaborate that the qualitative interviews can either be semi-structured through open-ended questions, or in-depth on a topic of which little is known, yet, important for the researcher to gain an in-depth understanding. Since this is a case study research, the researcher chose to use semi-structured interviews for school managers and teachers, observations of teachers' lesson presentations and focus group discussions for learners. Therefore, all data was collected through the three data collection strategies, and these are clarified in the next section.

1.5.3.1 *Semi-structured interviews*

According to Harrell and Bradley (2009:27) in semi-structured interviewing, a guide is used with questions and topics to be addressed in the interview organized in a standardized manner, yet open-ended to allow for probing so that the researcher is able to cover the correct aspects in regard to the research question. DiCicco-Bloom and Crabtree (2006:315) further illuminate that semi-structured interviews are often the sole data source for a qualitative research project, and are usually scheduled in advance at a designated time and location outside of everyday events. Based on this notion, the researcher in this study created semi-structured interview schedules with open-ended questions, which provided the flexibility to follow the obvious standard questions with one or more individually

tailored questions to gain substantial clarification of the participants' reasoning or perceptions (Leedy and Ormrod, 2005:184).

1.5.3.2 *Focus group*

This refers to a data collection strategy in which a group of people is asked about their perceptions, opinions, beliefs, and attitudes towards a product, service, concept, advertisement, idea, or packaging (Henderson, 2009:28). Kumar (2010:141) further describes a focus group interview as an unstructured, free-flowing interview with a small group of people, usually between six and ten, often led by a trained moderator or researcher who follows a flexible format encouraging dialogue among participants. The participants of the focus groups in this study were learners from the selected schools. There were two focus group sittings of eight learners per school.

There are numerous advantages that motivated the researcher to use this strategy, and such advantages include the fact that focus groups allow people to discuss their true feelings, anxieties, and frustrations, as well as the depth of their convictions, in their own words. In addition, focus groups are relatively fast, easy to execute, allow participants to stimulate the ideas of fellow participants, provide multiple perspectives, and have a flexibility that allows more detailed descriptions and offer a high degree of scrutiny (Kumar, 2010:141).

To further articulate on this, Leedy and Ormrod (2005:146, 149) add that for a researcher to conduct a focus group he or she needs to gather several people to discuss a particular issue for a set timeframe, and must ensure that none of the participants dominate the discussion. With this method, the researcher created a focus group schedule with topics. The researcher facilitated the discussions to ensure that all participants were accorded equal time to make their opinions heard, and the researcher made sure that none of the participants in all focus group sittings dominated the discussions.

1.5.3.3 *Observations*

According to McClure (2002:5), observation is an intuitive process that allows individuals to collect information about others by viewing their actions and behaviours in their natural surroundings in which the observer's role can either be that of no interaction or one where he or she actively becomes part of the participants. This means an observer either can choose to quietly remain in the background whilst observing the participants in their natural setting, or can become an involved participant observer. This is further verified by Leedy and Ormrod (2005:145) who explain that in qualitative research the observer is either a relative outsider or a participant observer, and observations done in a qualitative study are intentionally unstructured and free-flowing, allowing the

researcher to shift focus from one thing to another as new and potentially significant events present themselves.

Therefore, the researcher in this study opted for the more direct approach of conducting observations, which allowed him to join the participants, but not as a participant, rather as a quiet observer, a non-participant observer. The researcher used the direct observation tool because it typically does not make him a participant in the context; instead, as a direct observer he strove to be as non-obstructive as possible so as to avoid biased observations, meaning he was watching the participant in their natural environment, instead of taking part. The researcher created an observation checklist illustrating all items and areas that were going to be observed during the observation sessions in the schools. The researcher further ensured that observation sessions were accorded enough time in order to make sure that every aspect on the checklist was covered for every classroom observation at each of the participating schools. There was a single observation session in each of the three participating schools, and each observation took 40 to 45 minutes based on the time allocation for lesson periods in the participating schools. This is further elaborated in subsection 4.2.4.1 of chapter four of this study.

1.5.4 Data analysis

According to Levine (1997:1) data analysis is a body of methods that help describe facts, detect patterns, develop explanations, and test hypotheses. This basically refers to the process that the researcher has to undertake after collecting data, which would normally lead to the conclusions of the study. Kawulich (2004:96) further explains that data analysis in a qualitative study involves deep familiarization with the collected data, looking for patterns and themes, searching for various and possible relationships within the data for the researcher to know what he or she has, before actually displaying the information and writing it up.

There are principles that normally guide the researcher when doing the analysis of data in qualitative research, and in adhering to these principles the researcher should, according to Brennan (2005:14):

- Proceed systematically and rigorously (minimize human error).
- Record process, memos, journals, etc.
- Focus on responding to research questions.
- Appropriate level of interpretation appropriate for situation.

- Time (process of inquiry and analysis are often simultaneous).
- Seek to explain or enlighten.
- Define the evolution of the study and emerging information or knowledge.

To further bring the process of analysing data to the particular design of this study, Creswell, 1998 (cf. Leedy and Ormrod, 2005:136) states that data analysis in a case study research requires the researcher to track the following pattern:

- Organize details of the case through clear specification of its facts in a logical manner.
- Categorise data by clustering it into reasonable and meaningful groups that address the research questions accordingly.
- Interpret single or particular instances of the case through examination of documents, occurrences and all data for particular relevance to the case.
- Identify patterns for classification and interpretation of data into reasonable and defining themes and further patterns that expand the case into a broader scope by scrutinizing the data obtained from all research instruments.
- Synthesize and generalize the findings of the data by establishing a conclusion beyond the case that was studied to enable other researchers to further the study in the future.

Given these descriptions, the researcher in this study followed all patterns to ensure a successful analysis of the data with assurance that all aspects of the research problem had been covered and the research question answered.

1.6 LITERATURE REVIEW

A literature review is a summarized account of information obtained from journals, articles, books, and a variety of documents that provide reputable and established information from the previous and recent streams of studies on the research topic that the researcher wishes to investigate (Creswell, 2005:79). For a researcher to understand the topic or question that he or she is to work on, he or she will have to do a review of literature, which will in the process help the researcher to construct comprehensive problem and question statements. This is why it has to be the basis of any empirical study; a research needs a profound background of existing knowledge. According to Ann (2009:2), a literature review discusses published information in a particular subject area, and sometimes

information in a particular subject area within a certain period of time, enabling the researcher to understand, organize and synthesize the established information relating to the problem.

Knopf (2006:127) further mentions that conducting a literature review has several benefits to the researcher and the readers of the end product of the research and these include the facts that:

- It can give the researcher a general overview of a body of research with which he or she may not be familiar.
- It can reveal to the researcher what has already been done well, so that he or she does not waste time “reinventing the wheel.”
- It can give the researcher new ideas that he or she can use in his or her own research.
- It can help the researcher in determining where there are problems or flaws in existing research.
- It can enable the researcher to place his or her research in a larger context, so as to be able to show what new conclusions can come from his or her own research.

With all these benefits and advantages in mind, the researcher conducted a thorough review of the literature from numerous authors in order to gather adequate information about the ideas and established findings that were relevant to the problem. The researcher invested time in going through different types of literature from journals, articles and books to all other documents that could possibly contribute towards building an opposite and a well stratified summary of the reviewed literature which went on to serve as the spine of the study.

Authors such as Barrus (2010); Tinio (2003); Fouts (2000); Hirashima, Hoppe and Young (2007); Newby, Stepich, Lehman, Russell, and Ottenbreit-Leftwich (2011); Silumbe, Mukelabai and Lubunda (2010), Manali (2008); Muhammad (2011); Florian and Hegarty (2004) and many others testified to the established and potential benefits of computers in schools and further articulated a theoretical framework that informs and guides computer integration in education (chapter three). These authors also provided information on various ICT policies of numerous countries, giving a worldwide landscape of computers in education in chapter two of this study.

1.7 THEORETICAL FRAMEWORK

A theoretical framework refers to different existing theories and concepts that are defined and explained to serve as structure for the theory that constructs a particular research study (Labaree, 2013:1). A theoretical framework is important to a study because it affirms the study in a number of ways and, as such, includes (*ibid*):

- Permitting the reader of the research paper to assess the outlined theoretical suppositions.
- Connecting the researcher to established and existing knowledge, which helps the researcher to come up with a hypothesis and decide on research methods.
- Helping the researcher in addressing questions like the 'why' and 'how' of the case under investigation, leading to the generalization of different aspects of the case.
- Helping the researcher identify the possible limits to the generalization of the numerous aspects of the case.

With all the important aspects and the role of the theoretical framework in mind, the researcher in this study went through numerous frameworks that helped to position and support the examinable element of this study, which is the research topic or question. This study was, therefore, informed by the assessment of meaningful integration of computer technology through the plan, implement, and evaluate (PIE) model as stipulated by Newby, Stepich, Lehman, Russell, and Ottenbreit-Leftwich (2011).

These frameworks were selected based on their emphasis on the use of computers to improve education.

1.8 TRUSTWORTHINESS AND CREDIBILITY

Trustworthiness in a qualitative study can be defined as the demonstration that the established evidence for the reported findings is comprehensive and that the argument emanating from the results is substantial (Frank, 2010:1). This presumption of trustworthiness is further exemplified by Patton and Cochran (2002:11) who articulate that both the researchers and the readers of the research results should have assurance that the findings of the study truly reflect and sustain the outlined purpose of the study rather than reflecting bias of any kind. This means that the study and its findings should be reproducible, in the sense that, any researcher can end up with the same findings when using the same topic outline (*ibid*).

Credibility in a qualitative study sometimes is used as a substitute concept for trustworthiness, and also refers to the acceptability and authenticity of the findings of the study, which is always enhanced by evidence such as ratifying the assessment of conclusions by the research participants, merging of multiple sources of evidence, control of inappropriate bias, and relation to theories supporting the study (Suter, 2012:363). In this case, the all-out confidence in the trustworthiness or credibility of the research conclusions was established from the agreement and support of the participants, the systematic analysis of multiple data sources, the interpretation, and understanding of the readers, and extrapolations stemmed on the appropriately determined theoretical models (Suter, 2012:363). The triangulation and analysis of data in this study was supported by the employment of varied data collection tools in semi-structured interviews, focus groups and observation, which were further fortified by the data from the literature review. These data sources were all used to instil credibility and trustworthiness in the findings of this study.

1.9 ETHICAL CONSIDERATIONS

Ethical issues are an inevitable part of any research as the process of research itself normally brings tension or rigidity between the aims of generalizing the findings for everybody's benefit, and the right to maintain privacy and confidentiality of the participants (Orb, Eisenhauer and Wynaden, 2001:93). This means that participants in the study, especially human beings, should be protected from any form of harm during their participation. Orb et al. (2001:94) further mention that "since qualitative researchers heavily depend on collecting data through interviews and observations, the researcher should develop an apt social relationship with participants as this will facilitate easy or considerable access to information." This means that without a proper social interaction between the researcher and the participants, access to information can be repressed. The researcher in this study is in agreement with the stated assumption and ensured that all principles of ethical considerations, which include informed consent and assent, protection from harm, right to privacy and confidentiality, were observed. In line with these factors, the researcher also strove to create a forthcoming interactive atmosphere with the participants for their ease and comfort during their participation in the study. This was done by establishing a rapport of honesty, which in return created an element of trust between the researcher and the participants.

1.10 LIMITATIONS TO THE STUDY

As one would expect in research, this study had its own hindrances that limited its scope to reasonable extents. There are many schools in the Zambezi region that the researcher could have selected for participation in the study, yet, not all have computers, and not all are doing Computer Studies as a subject. This limited the researcher to the three secondary schools in the urban vicinity of Katima Mulilo who became obvious participants because they were most likely to have computers and were at least offering Computer Studies as a subject. In addition, the study could have been conducted on a broader scale in the region but time was a factor to be considered as learners and teachers were preparing for examinations, which limited access to the participants and further resulted in the number of participants being reduced.

1.11 CLARIFICATION OF CONCEPTS

The following concepts are key terms in this study and are, therefore, explained as they are perceived and understood in the context of this study.

1.11.1 Information and Communication Technology (ICT)

Information and communication technology (ICT) refers to anything that permits access to information, and anything that permits communication with each other or anything that has an effect on the environment by the use of electronic or digital equipment (Siraj-Blatchford and Siraj-Blatchford, 2003:4). Tongia (2005:19) further expands the definition by mentioning that ICT is today founded on four elements, which are computing, communication, content, and human capacity. This means that today ICT is more than just communication and information. ICT is also often used as an extended synonym to include information technology (IT), but this is usually a more general term that stresses the role of unified communications and the integration of telecommunications, computers, middleware as necessary software, storage and audio-visual systems, which enables users to create, access, store, transmit, and manipulate information (Wikipedia, 2011).

1.11.2 Information and Communication Technology (ICT) Integration

Integration refers to the combination of two or more components, parts, or elements into a composite but unified entity (Lloyd, 2005:5). This, therefore, means that ICT integration in the education context refers to the fusion of ICT into education by making it a part-and-parcel of teaching and learning, an element that makes ICT less peripheral in education (Lloyd, 2005:5). In simpler terms and in the context of this study it means making computers and further ICTs part of teaching, learning and school administration.

1.11.3 Educational Software

Educational software refers to most computer programs, applications or software that are specifically designed or used to facilitate teaching and learning, which can either be a computer program meant to enhance teaching in the classroom or an application to enhance self-learning of subject content, e.g. computer-based learning platforms such as micro-worlds, computer simulations, e-learning, and hypertext systems (Edutech wiki, 2009). This can be any software or program strictly meant for educational purposes such as teaching and learning.

1.11.4 Computer Simulation

A computer simulation is an effort to create and model a real-life situation on a computer so that it can be used to demonstrate how the real object operates. Using electronic stimuli, computer simulation can help make predictions on how the real object or organism may behave. This has been utilized so far in many subjects such biology, physics, engineering, and chemistry (Grove's Dictionary, 2000; Sokolowski, 2009:6).

1.11.5 The Internet

This refers to the world-wide system of networked computers comprising of millions of smaller domestic, academic, business and government networks, which are interconnected to each other to allow for transmission of various information and services, such as email, online chat, online social networking, online data storage, file transfer, search for information, e-Commerce, online banking and many other digital services (DeePak, 2009:1).

1.12 OUTLINE OF THE REPORT

The outline of this report is presented in this section, lists the chapters, and gives an overview of each chapter.

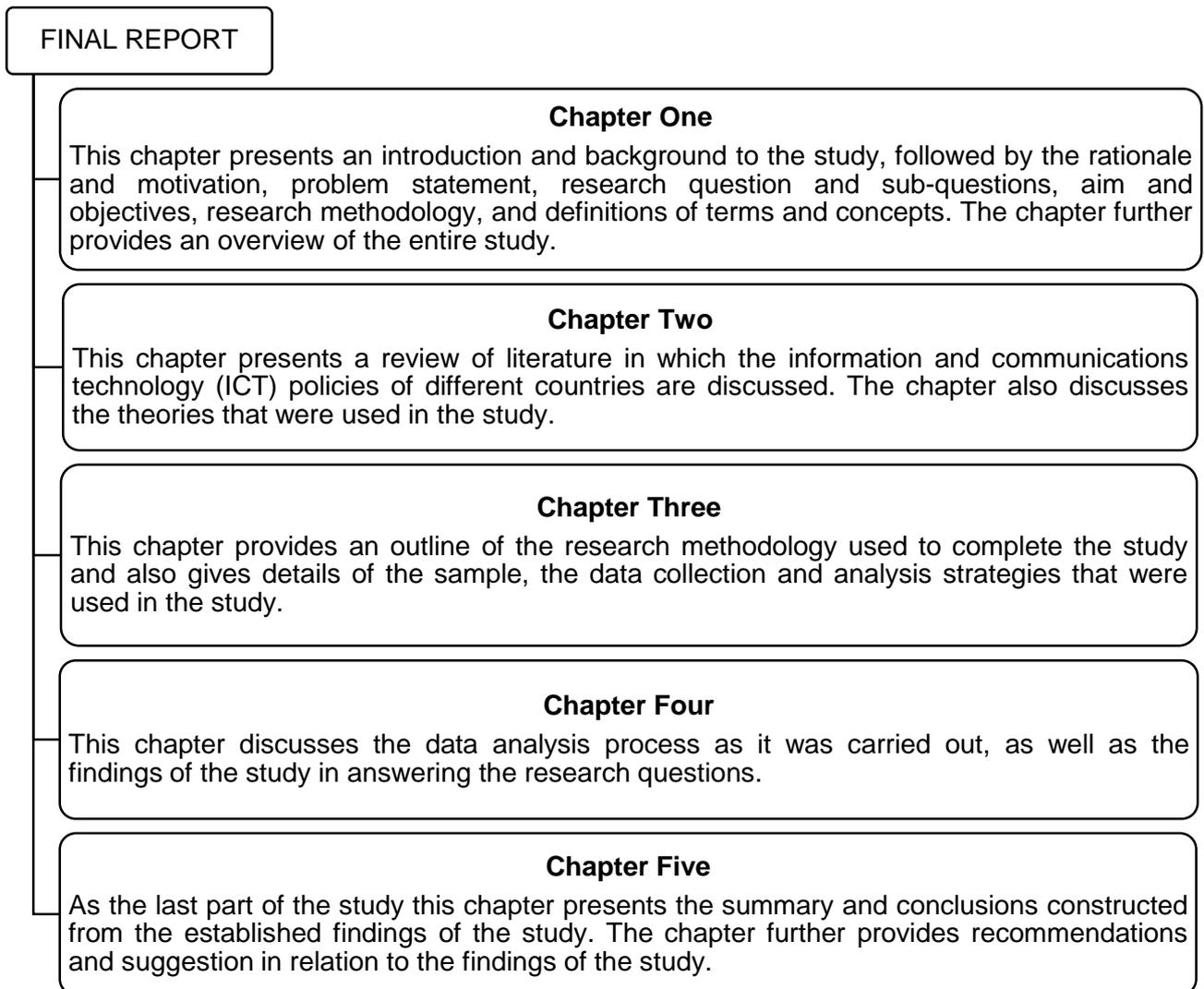


Figure 1.1 Outline of the final report

1.13 CONCLUSION

This chapter provides a detailed background to study and further gives an account of the investigated problem, which is expatiated and contextualized into the statement of the problem, the rationale and motivation, and the aims and objectives of the study. The chapter further provides an outline of the

research methodology and design through which this study was carried out. A preview to the literature reviewed for the study in chapters two of this study is also addressed under this chapter. The chapter ends with a discussion of trustworthiness and credibility, ethical considerations, the limitations to the study, the clarification of concepts, the organization of the study, and, finally, the conclusion. The next chapter presents the literature review relevant to the research question and supporting sub-questions.

CHAPTER 2

POLICIES AND STRATEGIES OF INTEGRATING TECHNOLOGY IN TEACHING AND LEARNING

2.1 INTRODUCTION

Since this study is to determine how computer technology has been integrated and incorporated into the Namibian schools and the education sector in general, it is imperative to look at ICT policies developed by other countries to advance the use of computer technology in education. This chapter, briefly discusses the established ICT policies from different countries, and further discusses in detail the introduction of ICT in the Namibian education system. The chapter goes on to discuss established theoretical strategies that constitute successful integration of computer technology in classrooms, and education at large. This chapter concludes by considering the broad spectrum of the uses of ICT in the educational context.

2.2 THE GLOBAL LANDSCAPE OF COMPUTERS IN EDUCATION

The overwhelming international acceptance and assimilation of computer technology in different aspects of life has led to the inevitable creation of a new global economy powered by technology; an economy fuelled by information, and further driven by knowledge (Tinio, 2003:3). The emergence of this new global economy has serious implications for the nature and purpose of educational institutions (*Ibid*). The enormity of influence that computer technology has on education is yet to be fully recognized on a global scale, yet we cannot deny the fact that it has become a compounding and heightening component of so many sectors and aspects of life, including education. This has been proven through literature from numerous authors Fouts (2000), Hirashima, Hoppe and Young (2007), and Barrus (2010), for example, all expound on the potency of computer technology in education. The assumption regarding the impact and influence of computer technology in education has led to the adoption of the 'educational technology' concept, which is directed towards utilizing a computer as an educational tool.

Fouts (2000) outlined the benefits of computer technology to education, which included the possible ways a computer can be used in education as will be further discussed in section 2.4 of this chapter. Hirashima, Hoppe and Young (2007) stressed the use of integrative technology to support learning

such as computer-supported collaborative learning. Barrus (2010) further pointed out the benefits of computers to both learners and teachers who use them as tools and information resources.

According to Plomp, Anderson and Kontogiannopoulou-Polydorides (1996:1), different countries were at different stages of introducing computers in their educational systems in the mid-1980s with some countries having clear policies though with different emphasis. When the trend of using computers in education was starting, some countries were already conducting pilot studies to gain a better understanding of the potential of computer technology in education, as well as establishing the reactions of both teachers and students with regard to the innovation of computer technology in education. Plomp et al. (1996:1) further add that during the international conferences and meetings of educational policy makers, it was established that countries wanted to learn from each other and this resulted in the International Association for the Evaluation of Educational Achievement's (IEA) decision to embark on an international comparative study of Computers in Education (CompEd) in 1985. This decision was also propagated by the fact that the introduction of computers in education was probably the first major technological innovation in education that could be studied systematically from its earliest state of development. The CompEd study was a two-phased effort, which allowed countries the liberty to choose whether to participate in either one or both of the two phases. These phases are further discussed in the following section.

- **Phase 1**

It was in this phase where data was collected in 1989. This was specifically aimed at collecting national, school, and teacher level data. The primary objective was to establish how computers were being used, the extent, and availability of computers in schools, the nature of instructions about computers, and the estimated effects that computers were having on students, the curriculum, and the school as an institution (Plomp et al., 1996:1-2).

- **Phase 2**

In this phase, data was collected in 1992 and divided into two parts where the first part was a follow-up on phase 1 in order to allow the study of changes over time. The second part of phase 2 was assessing the effects of school, teacher, and teaching variables on student outcomes in the domain of school computer usage (Plomp et al., 1996:2). The following section describes the ICT policies in the developed and developing countries.

2.2.1 Information and communication technology policies in the developed countries

Developed countries refer to countries whose economies are strengthened and sustained by industrial and technological advancements, and have reduced poverty levels due to higher average incomes (Mosby's Dental Dictionary, 2008). These countries have been the leaders in the initiative of integrating computer technology in education and have the economic strength to sustain the initiatives. For example, it has become a common practice that computers and other educational technologies have become common in schools in the United States (US) and many other countries. In confirmation of the mentioned fact, Newby, Stepich, Lehman, Russell, and Ottenbreit-Leftwich (2011:11) state that in typical modern schools in the US, one will find at least computers on a ratio of one computer for every three to four students on average despite varying by state and community. Still in the US, some affluent schools are launching initiatives that allow for a 1:1 ratio, and there has been a move of having one computer or more in the classroom rather than in the concentrated computer labs (Newby et al., 2011:259). Newby et al. (2011:259) further added that typical schools are dedicated to a relatively fast connection to the internet, and in most schools network connectivity extends to nearly all instructional rooms. Furthermore, interactive whiteboards are becoming common classroom fixtures in many schools. Video technologies have also become commonly evident with most schools having at least one or more video conferencing rooms (VCRs) or digital videodisc (DVD) players, and cable television (TV).

In the United Kingdom (UK), biennial surveys have been done by the Department of Education and Science (the current Department for Children, Schools and Families) from 1985 through to 2004 in order to assess the impact of government initiatives on the uptake and level of computer usage in British schools (McDougall, Murnane, Jones and Reynolds, 2010:15-16). The findings of these surveys indicated that, in spite of the government's efforts in supporting initiative to see the integration of ICTs in schools, the actual integrated use of ICTs by teachers is much lower than might have been expected from so many sustained national and international programs (McDougall et al., 2010:16).

In Asia Pacific, Coca-Cola has established partnerships with numerous organizations, including governments and the education sectors of various countries in effort to help steer computer technology into education (Tinio, 2003:27). These partnerships led to the installation of ICT training stations in a number of countries in the area since 1997, in an effort to help introduce the varied electronic or computerized means of learning and introduce electronic streams of resources to the people (Tinio, 2003:27). Australia in particular has come up with a policy called Digital Education

Revolution (DER), which was created mainly to provide computers coupled with high speed broadband connections to secondary students in the range of nine to twelve years in all Australian schools. The policy is also designed to support the continued development of online curriculum content, conferencing facilities, pre-service and in-service professional development for teachers and the development of web portals to enable community participation in education (White, 2008:4-5).

2.2.2 Information and communication technology policies in developing countries

Developing countries are countries that are primarily dependent on agriculture and still strive to establish themselves in terms of socioeconomic status (Oxford Dictionary, 2015). These countries do not yet have such an economical and financial status to easily orchestrate and initiate programs such as the integration of computer technology in education. However, in order to participate in the global economy and ensure sustainable national development, developing countries need to develop vibrant education systems (International Institute for Communication and Development (IICD, 2007:6). To balance the level of education and to ensure sustainability of each individual country's ICT integration, numerous ICT initiatives have so far been brought into place. These initiatives are discussed with regard to the following countries: Nigeria, Zambia, Kenya, and Namibia.

2.2.2.1 Nigeria

In Nigeria the National Policy on Computer Literacy at primary, secondary and tertiary education levels was launched with the assumption that computers can be used to diversify, develop and improve the pedagogical relation of teaching and learning; and that technological development can only be enhanced through proper acquisition of scientific knowledge which can only be realized through relevant training in Science, Mathematics and Computer Education (Bada, Adewole and Olalekan, 2009:1). According to Bada et al. (2009:1-2), the policy was created to lead with the following general aims and objectives:

- to transform the school system, as there is an increased merger between the computer technology and communication;
- to equip students with a thorough understanding of the concept of computers in order to fit into the next century;
- to bring about a computer literacy in each state in Nigeria;

- to develop the use of computers as teaching tools in all subject areas and to familiarize students with the use of computer technology;
- to enable the present generation of school children at the secondary school level to appreciate the potentials of the computer and be able to utilize the computer in various aspects of life and later occupations; and
- to expose the teachers and students to the latest scientific knowledge and skills.

2.2.2.2 *Zambia*

In Zambia with the support of the International Institute for Communication and Development (IICD), the Commonwealth of Learning (COL), and the United States Agency for International Development (USAID), the Ministry of Education developed an ICT policy for education, which represents an extension of Zambia's national education, and national ICT policies. The main vision that directed such development is for ICTs to contribute towards reaching innovative and lifelong education and training in Zambia by 2030. Zambia's Education Strategy intends to harness the potential of information technology to significantly improve policy formulation, planning, management, and the delivery of education services, and to provide managers, teachers and learners with the opportunity to access vast sources of information (Silumbe, Mukelabai and Lubunda, 2010:6). Further to this, the policy also provides an overview of goals, objectives and the government's commitment in key program areas of ICT infrastructure to education institutions, content development, curriculum integration, teacher training, distance education, administration and support services, and finance.

The policy also outlines the ministry's commitment to promote collaboration between the private sector and education institutions and to establish appropriate structures to facilitate the integration of ICTs in the education system. The Ministry of Education's ICT policy further provides a clear and compelling roadmap to drive the use and development of ICTs in the delivery of education and training. The policy complements and builds upon the National Vision 2030, the Fifth National Development Plan, the National ICT Policy, and the Ministry of Education Policy 'Educating our Future'. As a follow-up to the ICT policy, the Ministry of Education has identified a large number of ICT-related programs and activities to assist in achieving the goals and objectives set forth in the Ministry's ICT Policy (Silumbe et al., 2010:6-7).

2.2.2.3 Kenya

In Kenya, a National ICT policy was billed-in in January of 2006 with aims to improve the livelihood of Kenyans by ensuring the availability of accessible, efficient, reliable, and affordable ICT services. A section of this policy on information technology sets out the objectives and strategies regarding ICT and education. This particular section's primary objective is the use of ICT in schools, colleges, universities and other educational institutions in the country so as to improve the quality of teaching and learning (Farrell, 2007:3). The Kenyan government has seen it fit to revamp and boost its education system with ICT as a catalyst in the process of improvement, and is so far putting all its effort into seeing the project through. However, as is the case with most developing countries, Kenya is faced with challenges such as lack of finance, lack of ICT equipment, teachers' lack of skills and the unwillingness of the people to embrace ICT in schools (Kukali, 2013:216-217).

These and many other developing countries throughout the world have come up with different ICT policies meant to introduce and advance the integration of computer technology into schools and education at large (Kozma, 2002:6).

2.2.3 ICT in the Namibian Education System

Namibia forms part of the world's developing countries that are striving to bring computer technology and ICT at large into the education sector. The Namibian government resolved to create an ICT policy for education after international case studies on ICT integration indicated the necessity of a comprehensive national policy on ICT in education being a catalyst for successful ICT integration and training (Hesselmark and Miller, 2003:3). From as far back as 1995, Namibia became well aware of the importance of ICT when the initial ICT Policy for Basic Education was adopted by the government through the National Institute for Educational Development (NIED).

To ensure that the policy does not get outdated with the rapidly changing nature of ICT and education, the policy was revised in 2000. In 2003 an ICT Steering Committee for Education comprising of representatives from numerous sectors of the country, including the Ministry of Education (MoE) and other Ministries or offices, civil society, agencies, donors, development partners, pre-tertiary and tertiary educational institutions and volunteer organizations, was constituted to provide a contemporary and complete document. The task that the ICT Steering Committee for Education embarked on culminated in the creation of a new ICT policy for the education sector in 2004 which was approved by the Cabinet in March of 2005 and went on to be

launched in June 2005 (ETSIP, 2007:66). The 2005 policy was informed by some already existing national frameworks and blueprints which recognized the unconstrained possibilities that ICTs held in promoting sustainable national development, which were, therefore, in line with Vision 2030, the Public Service Informative Technology Policy, the National ICT Policy, the second National Development Plan (NDP2), the Strategic Plan for the Ministry of Basic Education (2001-2006) and Information for Self-Reliance and Development which basically helped creating a policy framework for libraries and allied information agencies in Namibia (ETSIP, 2007:66).

The 2005 National ICT Policy for Education outlined goals that pragmatically put more emphasis on the pedagogical use of ICT as an integrated tool in the teaching and learning process at all levels in the educational system. The ICT Steering Committee's central function was to provide the overall vision, coordination, and management of the policy as well as all ICT projects and activities supporting education in Namibia; and to ensure functionality and effectiveness of this crucial body, different working groups were established to provide specific guidance to ICT-related projects and activities (ETSIP, 2007:66). These functions included development of curricula, content, training and usage, technical support, ICT for educational management, monitoring, and evaluation. The committee further developed a detailed draft implementation schedule that articulated the timeframes and actions outlining how and when certain activities are to be conducted in pursuit of the overall national targets agreed by the stakeholders on the ICT for Education initiatives.

The Namibian Ministry of Education adopted an ICT policy for education in 2003 which is an update of the original policy developed in 1995 and revised in 2000 (Isaaks, 2007:6). The Namibian national ICT policy for Education further contextualizes ICT by making it all-inclusive in defining it as:

... all the technologies used for the handling and communication of information and their use specifically in education; which include computers, audio visual systems, broadcast receiving systems and telecommunication systems, media such as compact discs and videodiscs, microcomputer-based laboratories, the Internet, virtual learning centers, local and wide area networks (wired and wireless), instructional software, printed media, educational television, voice mail, e-mail, satellite communication, VCRs, cable TV, conventional and interactive radio (Ministry of Education, 2005:6).

In its defining character the policy rebuffs the idea that ICT may serve as a substitute for teachers and this is categorically cleared in the following statement:

ICT will not replace teachers. They [ICT and teachers] constitute one fundamental component of this education model by complementing and enriching traditional educational institutions, educational delivery systems, and instructional materials. In this sense, ICT contributes to the whole system of knowledge dispersal and effective learning (Ministry of Education, 2005:6).

This point blatantly eradicates the possibility that teachers will be no longer needed to serve their duties as teachers in classrooms; rather they will be expected to integrate and utilize ICT in their teaching processes. Developed by a mixed working group and drawn from the two streams (Basic and Higher Education) of the Ministry of Education, the policy reflects recent developments in pedagogy, research, technology, and partnerships and addresses a comprehensive and holistic range of issues in its goal to ensuring access and use of ICTs across the education sector. This clearly shows the motive behind the conception of this policy in Namibia, which is basically to improve the quality and standard of education and, in the end, meet the set objectives of Vision 2030. The policy prioritizes institutions such as colleges of education and related in-service programs; schools with secondary grades; teacher education programs at tertiary institutions; vocational training; primary schools; libraries and community centers; adult education centers; and special needs education. To further support its establishment, the policy is guided by some of the following objectives (Isaaks, 2007:6):

- To produce people capable of working and participating in the new information and knowledge-based economy and society.
- To leverage ICT to assist and facilitate learning for the benefit of all learners and teachers across the curriculum.
- To 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.
- Broaden access to quality educational services for learners at all levels of the education system and set specific criteria and targets to help classify and categorize the different developmental levels of using ICT in education.

From the given outline of the policy, one already gets a picture of how the Namibian government intends to utilize ICT with an effort to ensure improvement in education. It is clear from the minister's report that as the Namibian nation moves towards a knowledge-based development paradigm, issues of access to the local and the global pool of knowledge and information become paramount

(Ministry of Education, 2005:1). According to the minister, the National ICT policy identifies physical infrastructure as well as appropriate human capital as the basis for the development and integration of ICT in the Namibian society and culture (*ibid*). Furthermore, the policy was primarily established to enhance the use and development of ICT in the delivery of education and training (*ibid*). The Minister explained that ICT Integration is a complex process and that all education stakeholders require clear guidance throughout the integration process and further mentioned the possible advantage of ICT integration in education as follow:

ICT provides a great deal of advantage in the delivery of equitable, quality education, thereby providing an opportunity to improve the lives of our people. The need to use new technologies to raise the quality and efficiency of education cannot be over-emphasized. It is imperative for the Namibian Government to expose its children, parents, and teachers to ICT and thus improve the quality of education and technical proficiency of the country's human resources, which in the process leads to increased productivity and accelerated development (Ministry of Education, 2005:1).

The fact that a significant percentage of the Namibian population has access to telephone lines makes it easier to provide internet facilities to the country's academic organizations, including schools, colleges, and universities. Recent records indicate that the Polytechnic of Namibia (PoN), colleges of education (turned University of Namibia campuses), the Namibian College of Open Learning (NAMCOL) and the University of Namibia (UNAM), have all expanded their ICT facilities. In particular, UNAM so far has an information, learning and resource centre with video conferencing facilities, whereas the Namibian Open Learning Network (NOLNet) which serves over forty open learning centres throughout the country, supports the distance learning activities of UNAM, the PoN and NAMCOL (ETSIP, 2007:67).

In support of the adoption of ICT in education, NIED also developed a website that contains very useful resources for teachers. The subject 'Integrated Media Technology Education' (IMTE), which includes some ICT literacy, has as well been offered to trainee teachers. In the school curriculum, some technology-related elective subjects have been offered at school level, and these include subjects such as Keyboarding and Word Processing as well as Computer Studies at junior and senior secondary schools. At primary school level, the non-promotional subject, Basic Information Science (BIS), includes a minor component of ICT literacy (ETSIP, 2007:67).

A report by Trucano (2006:4) shows that Namibia was considered to be far ahead of other African countries in terms of its ICT efforts. The report further highlights factors that have been catalysts to

reaching such a leading position and thus establishing the foundation for ICT in the Namibian education system. These factors are: leadership and vision, policy, partnerships and infrastructure, absorption capacity, ICT and instructional literacy, and ICT in the curriculum. The factors are discussed in the subsequent sections:

2.2.3.1 Leadership and vision

Namibia's leadership has been greatly commended for efficiency, a factor that has enabled the establishment of an apparent vision for ICT integration in education. According to Trucano (2006:4), Namibia's impressive leadership and clear vision for ICT use in education was attributed to and inspired by the fact that the Prime Minister during the adoption of the ICT policy for education in 2005 was previously the Minister of Education, a man who is highly regarded as an educational visionary. Trucano (2006:4) further emphasizes that the Ministry of Education and NIED staff are knowledgeable, committed, and determined to use ICT to help Namibia's national development strategy. In addition to this, SchoolNet Namibia has been internationally recognized for its efforts to create an ICT policy and build capacity grounded in the needs of the country. This has installed a feeling of excitement and determination among Namibia's education sector to use ICT to enhance educational quality.

2.2.3.2 Policy

Trucano (2006:4) clearly describes Namibia as having a well-developed ICT in education policy plan that was carefully crafted in a consultative fashion by major ICT and education stakeholders. To supplement the policy's outstanding framework, its plan outlines why and how ICT should be used, and articulates the government's goals regarding ICT in education. The policy also marks the beginnings of a coherent, systemic approach to ICT use in teacher professional development (Trucano, 2006:5). The policy was drafted partly in reaction to many of the extemporized educational technology approaches that existed in the past where ICT-based teacher training projects could operate without regard for a larger structural framework. This would, however, be not the case anymore, for any such projects would now need to operate within the discipline of the government's national ICT policy. To further strengthen the country's hold on ICT, the Global E-schools and Communities Initiative (GeSCI) orchestrated a Country Program Facilitator in the Ministry of Education to help with auxiliary expansion and implementation of the national ICT Policy and, in the process, help establish local and international affiliation promoting ICT in education programs. The pioneering of the policy has so far been one of the aspects of the Namibian society that has

catapulted the uptake of ICT in the Namibian education system and other ministries at large (Trucano, 2006:4-6).

2.2.3.3 *Partnerships and infrastructure*

The government of Namibia is believed to have strived towards establishing joint ventures and affiliation with private sector companies such as Microsoft, which by the time of the compilation of Trucano's report had already provided a record of 4000 smartened-up computers in a minimum period of one year from 2004 to the end of 2005. Thereafter, the Namibian government entered into an agreement with Namibia Telecom, which, according to the government, presented a privilege to buy into ICT developments across different economic sectors of the country, an effort that has proven fruitless in other countries. To further consolidate its grip on ICT, the Namibian government has also entered into another contract with XNet, an Internet Service Provider (ISP), in an effort to ensure provision of internet services to schools for a meagre amount N\$300 per month (Trucano, 2006:5). The then Ministry of Basic Education, Sport and Culture (MBESC) also ensured that Teacher Resource Centres within or close to urban areas were modernized, and equipped with books, supplies, and resources such as laminating machines and copiers, as well as computer labs. These developments allow teachers to access ICT facilities for free when doing school related work and use the internet at low cost (*ibid*). This factor has so far been most pivotal in the integration of computers in the country's education system as well as other sectors, as most of the outlined conditions seem to be strengthened and built upon the country's acceptance of ICT's potential, which leads to the creation and sustenance of an infrastructure to support the initiative, without which the entire effort may prove impossible and futile.

2.2.3.4 *Absorption capacity*

Trucano's report recorded that Namibia was, at that particular time, second in Africa with regard to internet hosts per 10,000 people (Trucano, 2006:5). The report further stated that Namibia was also first in Africa in terms of internet availability because it had 36 personal computers per 1000 people in comparison to 10 personal computers per 1000 people on the entire African continent (*ibid*). On a broader scale of absorption, the Namibian government has made an effort to ensure the productivity of ICT in most of its ministries and so far, computers are used widely for communication, record keeping, information management, and data analysis. Organizations such as SchoolNet Namibia (SNN) and Microsoft have provided hundreds of Namibian schools with computer labs and training and have ensured that each of the four former colleges of education which have recently (2010) been upgraded to become the University of Namibia Campuses has an internet-connected computer

lab. In addition to all the mentioned positive factors, volunteer programs such as World Teach, the International Foundation for Education and Self-Help (IFESH) and the Peace Corps have provided technology trainers to help establish ICT skills in schools and teacher training institutions.

2.2.3.5 ICT and instructional literacy

Most of the Namibian education officials so far demonstrate a high level of ICT and instructional literacy. So far, most education officials appear to have a profound understanding of ICT, its margins and potential, as well as how they could make use of it in advancing learner-centered approaches and new types of knowledge. These education officials have been open in pointing out implementation failures and show positivity towards learning from their slip-ups instead of sweeping them under the carpet and pretending that everything is right (Trucano, 2006:5-6).

2.2.3.6 ICT in the curriculum

The Namibian government has brought into the education curriculum subjects such as Basic Information Science (BIS) and Computer Literacy from Grades 4-7, Computer Practice from Grades 8-10, Computer Studies from Grades 11-12, and, finally, Integrated Media and Technology Education meant for Pre-service Teachers in Colleges of Education, of which all practically serve as a foundation for ICT skills training (Trucano, 2006:6).

These outlined factors, to a reasonable extent, helped speed up the process of utilizing computers and many other ICT devices within different sectors of the country, and still serve as elements that keep the initiative going. The country's leadership seems to highly rate the possible impact that ICT can have on the country, especially in the education sector, which has further led to the establishment of the Education, and Training Sector Improvement Plan (ETSIP) in the country to strictly address issues of educational improvement strategies, which include the uptake of ICT in the sector.

In both developed and developing countries that have ventured into the initiative of computers in education, there has been one encouraging trend with regard to computer assimilation, which culminated in the development of school networks nationwide (SchoolNets). These networks have enabled sharing of information resources such as syllabuses, educational resources, tele-collaborative project offices, school and staff data, training materials, education policies, technology manuals, and beginners' tool-kits, and many other materials (Tinio, 2003:24). Several countries in Europe, Asia, Africa, and Australia, have all been beneficiaries of the SchoolNet programs (Tinio, 2003:24). Programs of the similar nature to that of SchoolNet were created in most countries in Latin

America; whereas further SchoolNet program offshoots were established in several Southeast Asian countries leading to the establishment of the ASEAN SchoolNet base (Tinio, 2003:24).

2.3 INFORMATION AND COMMUNICATION TECHNOLOGY IN THE EDUCATION PERSPECTIVE

Information and communication technology (ICT) is today a useful phrase that sums up the myriad ways in which microchip technology has permeated numerous aspects of everyday life, including education, leisure, work and homes (Florian and Hegarty, 2004:2). Loveless and Ellis (2001:2) point out that the term 'information and communication technology' describes a set of technologies that vary widely within and between subject areas, areas of application and context. For example, in England and Wales, ICT refers to a subject of the national curriculum, but it is at the same time used synonymously with terms such as 'information technology', 'computer technology' or simply 'technology' which, in turn, can include hardware, software and networks, all of which have implications for both teaching and learning (Florian and Hegarty, 2004:8).

This clearly shows the global impact that ICT is having on numerous aspects of life on the globe today. This basically means that ICT influences our lives in innumerable ways, even in circumstances where we do not even realize it and this may be in our own homes, in our workplaces or when we are having fun elsewhere. In the same vein, Kennewell, Parkinson and Tanner (2000) define ICT as:

The range of tools and techniques relating to computer-based hardware and software; to communications including both directed and broadcast; to information sources such as CDROM and the Internet; and to associated technologies such as robots, video conferencing and digital TV (p. 1).

In another descriptive perspective by Tinio (2003:4) ICTs stand for information and communication technologies which are defined as a "diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information." These technologies include computers, the internet, broadcasting technologies (radio and television), and telephone. This definition is more contextualized directly into the ICT world under which the concept is considered in its natural environment without external additives. Tinio (2003:4) adds an element for consideration by stating that upon realization of the functionalities and capabilities of computers, the world rose-up to try to find-out the ways computers and the internet could be exploited to bring about efficiency and effectiveness in the education sector. Tinio (2003:4) further argues that ICT is not just

about computers and the internet, but also about the more conventional technology devices that have been around for long, such as telephones, radios and televisions, have been sparingly used as educational instruments. For example, devices such as radios and televisions have been used in the distance education programs, the open and distance learning (ODL) education, for over four decades despite the unanimous popularity and affordability of printed materials in most countries.

2.4 THE USES OF COMPUTERS IN EDUCATION

The use of computer technology has so far been most applauded in different settings where it has been effectively employed, and the education sector has been no exception in any way. There has been so far a lot of concrete evidence on the tested impact of computers in the education sector in an effort to establish its relevance and effect on education in terms of performance, quality, and standard. Researchers and authors such as Antifaiff (2000), Tinio (2003), Manali (2008), Barrus (2010), and Rusten (2010) have all vindicated the application and effectiveness of computer technology in education. So far, it has been established from the mentioned authors that computer technology enables learners to learn in ways not previously possible. Effective integration of computer technology is achieved when learners are able to select computer technology tools to help them obtain information in a timely manner, analyze and synthesize the information, and present it professionally (Antifaiff, 2000:3). This proves that computer technology gives more power to learners and enables them to take control of their learning process to a reasonable extent, an aspect, and privilege they did not have in the traditionally known ways of learning.

In support of the above, Barrus (2010:1) ascertains that computers are today an essential tool for productive and successful learners as well as educators. He further explains that learners use computers in completing research, producing media and multi-media projects and presentations, as well as in doing classic tasks such as word processing whilst teachers, on the other hand, use computers to process grades, analyze and input learner achievement data, collaborate with peers, network with each other, and communicate information to their learners (*ibid*). In reference to the capabilities of computers in education, Rusten (2010:209) states that when computers are used effectively and integrated into schools, they can improve teaching and learning, strengthen teacher professional development, support broad educational reformation, enhance school-community partnerships, and improve school management. Rusten (2010:209) further maintains that related educational technologies would accelerate learning, bring education to those without it, improve

teaching conditions, enhance school and classroom management, encourage needed changes in pedagogy, and enrich and individualize learning.

In further broadening of the computer's capabilities in the education sector, Manali (2008:1) elucidates that computers can serve as a very resourceful and reliable information bank, with functionalities allowing innovative and interactive means of presenting data. These capabilities are made possible by computer programs such PowerPoint, and many other interactive multimedia programs that teachers can use to teach or give instructions (Manali, 2008:1). Manali (2008:1) further explains that a computer can be a very useful teaching aid or media for teachers due to their audio-visual functionalities, which make information output and presentation highly interactive captivating for learners. Manali's (2008) perspective expounds another benefit and feature that the education sector can put to better use. In the olden days filing and saving information for future use was always too tough and a time-consuming activity; presenting information in more efficient ways was also another headache for teachers who were somehow limited to certain teaching methods which may have proven unappealing to the learners. Computers cover all these mentioned aspects in the most convenient, time-efficient, and most appealing way to learners with less energy required. All that the person needs to know is how to save information on the computer, use presentation software such as PowerPoint, Flash and lot more applications and programs to present information.

Tinio (2003:3) adds that all ICT devices including radios, televisions, and the more contemporary devices such as computers and the internet, are all seen as highly useful equipment that can transform and revolutionize the education sector. These ICT tools are believed to help expand access to education, strengthen the relevance of education to the increasingly digital workplace, and raise educational quality by, among other things, helping make teaching and learning become an engaging, active process connected to real life when used appropriately (*ibid*).

This also refers to the tools found in non-educational environments such as homes and workplaces (Florian & Hegarty, 2004:14). The teaching staff and learners can all enjoy using and exploring the numerous functionalities that computers can offer, which include text-editing programs, Microsoft office packages that include programs and applications such as databases, spreadsheets, or PowerPoint, which are all useful in synthesizing data. This brings in two further advantages for both teachers and learners (Osin, 1998:4):

- Computers with all necessary software or programs will help teachers create attractive and interesting lesson contents and materials, and save such materials on the computer for easy

retrieval whenever needed. The materials prepared on the computer can easily be improved or changed any time to meet the needs of the learners.

- Learners will be able to type their given activities, and will be able to type things such as assignments, projects, homeworks, and many other things, which will not only help them submit quality work, but help them develop computer skills. This further provides the teacher with a choice to instruct learners to submit their work on external data storage devices or through e-mail, thereby allowing the teacher to insert comments and suggestions and return it to the learner for corrections until a satisfactory paper has been achieved.

In a more detailed manner, computers can be vastly used in education as a tutor and a surrogate teacher; for information and scientific exploration; as a communication tool; as an administration and management tool; and as an assessment tool. These uses of computer are further discussed in the following section:

2.4.1 Computer as a tutor and surrogate teacher

The computer as a tutor and surrogate teacher was basically one of the earliest uses of computers in the classroom. Computers were used to teach the traditional curriculum and basic skills, often operating as a means to deliver instruction, sometimes as a supplement to the teachers' classroom instruction, and sometimes in lieu of the teacher (Fouts, 2000:5). Within this context, much of the software focused on basic skills and knowledge in the various content areas, used programmed instruction, drill and practice, and was often based on behaviourism and reductionism in its instructional design (Florian and Hegarty, 2004:11).

According to Osin (1998:3), with regard to computers as tutors and teachers, learners learn by interacting with a program stored in the computer. The program is designed to react to the learner's needs according to predetermined pedagogical criteria, a case where a learner conducts a distant dialogue with the authors of the educational program, who in a well-designed program will have considered the learning difficulties involved in the topics studied, and designed within the program a set of remedial interventions. In this case, enrichment units are recommended for inclusion to ensure that the academic needs of learners that wish to learn further than the stipulated margins of the practical scope of learning are also taken into consideration to develop them further.

In the context of the computer used as a tutor and surrogate teacher, Fouts (2000) establishes and concludes:

When combined with traditional instruction, the use of computers can increase learners' learning in the traditional curriculum and basic skills area. The integration of computers with traditional instruction produces higher academic achievement in a number of subject areas than traditional instruction does alone. Learners learn more quickly and with greater retention when learning with the aid of computers. Learners like learning with computers, and their attitudes towards learning and school are positively affected by computer use. Effective and adequate teacher training is an integral element of successful learning programs based on or assisted by technology (p. 28).

2.4.2 Computer used for information and for scientific exploration

According to Florian and Hegarty (2004:12) computer technology has become more powerful and accessible, and the exploratory learning environment has been developed over time. These exploratory learning environments allow learners to interact with the material and have more control over their learning process, and therefore represent an increasingly popular contemporary use of computer technology in education. Florian and Hegarty (2004:12) strictly emphasize exploration, as opposed to drill and practice or the reinforcement of skills and knowledge, and further state that exploratory learning is mostly based on the constructivist outlook instead of the behavioural perspectives of learning.

In addition to Florian and Hegarty (2004), Means (1994) highlights the advantages of the exploratory learning environment. Means (1994:6-7) states that learners take a more active part in defining their own learning goals and regulating their own learning in exploratory learning. They explore ideas and bodies of knowledge to understand phenomena and find information they need for their given project. The fact the reliability and dependability of everything the Internet gives is not guaranteed also allows and enables learners to develop their analytical and critical skills (Osin, 1998:4). Learners cannot develop, nor enrich their analytical skills in a constrained environment of a distinctive classroom, as they need to practice and learn to analyze things on their own, and draw-up reasonable conclusions.

This happens because, when learners work on a complex task, their work often crosses over the borders of practical academic disciplines, just as real world problems often demand the application of several kinds of expertise to resolve the circumstances that life presents to us. This multi-disciplinary aspect changes the entire picture of learning context, whereas instruction becomes interactive. The nature of information and the support provided for the learners will change as the problems they work on change and evolve over time.

In the same context, Osin (1998) adds that simulations are part of exploratory learning environment. According to Osin (1998:4), it is common and normal that in an academic situation one will come across subjects or situations that examine genuine real-life systems, and such subjects are normally difficult for learners to understand, work with, or project the possible outcome. This would mean that when one wants learners to learn how to cope with such a system, the best pedagogical approach is not to provide a set of rules that describe the behaviour of the system, but rather to let them explore the behaviour, make decisions and predict their consequences or, in short, learn according to their own experience with the system. The good thing that is more assuring in regard to understanding real-life systems, the technological advancements in the world have made sure there is always a computer created prototypical version for most real systems, and in such cases the computer provides an output describing the behaviour of the system, and the changes in this behaviour are produced by the input of diverse actions through simulations.

From this model, one can certainly understand that an assortment of application domains can be created using modelling and simulation (Vangheluwe, 2001:1). It is important to understand that modelling and simulation have been embraced by many, and so far depending on the context under which it is applied, modelling and simulation have been considered a subclass of Systems Theory, Control Theory, Numerical Analysis, Computer Science, Artificial Intelligence, or Operations Research (Vangheluwe, 2001:1). This makes the aspect of modelling and simulation an all-inclusive and integral aspect in most academic disciplines and scientific research or investigations. In the dynamic society that we live in, modelling and simulation have been labelled to be the computing paradigm of the present and the future, in which it has been, and will be used, as a way of representing problems and thought, and as a solution method to many problems (Vangheluwe, 2001:1). This is how many computers have been positively infiltrating our lives in different aspects, and this includes schools in which numerous computer models and simulations have been used in teaching and learning without having a need to use real objects, which can be detrimental to the learners.

2.4.3 Computer for communication

Computers have been massively engulfed into society in all aspects of life so far as a means of communication, in the same way communication has grown to define success in many sectors of life today. According to Osin (1998:4) both learners and teachers can communicate with their peers and access data banks in different parts of the country and around the world in order to develop joint

projects, exchange information, or request advice. For example, groups of learners in one country can develop joint projects with groups of learners in other countries by exchanging and comparing data on similar or contrasting phenomena (Osin, 1998:4).

Despite the good that computers contribute to communication in the education sector, Means (1994:13) warns that the tools and communication devices of computer technology do not have value in and of themselves; rather, their instructional value lies in the educational activity that uses the tools and communication devices, an activity that must be planned by the teacher. This basically means the computer as a tool, as well as communication devices, can prove inefficient in education if they are just used in any uncoordinated and unplanned manner, and this will be because their usage in an unsupervised manner may not be directed towards achieving educational goals.

2.4.4 Computer as an administration and management tool

According to Fouts (2000:25), school district technology funding programs often include various types of technology designed specifically for administrative and teacher use. The relationship between computers and technology for administrative purposes and increased production and efficiency is linked to how administrative tasks such as record keeping, grades, budgeting, and parents and inter or intra-school communications are all made easy and very efficient. These have been some of the tasks and activities that computers have improved, and further imputed efficiency in the management and administration aspect of education.

2.4.5 Computer for assessment purposes

One of the major educational tasks for which computers have been used so far is that of assessment. In support of this reality, Woodward and Rieth (1997:517) argue that computer technology has so far come to be seen as a vehicle for orchestrating high-quality assessment and reducing the amount of time that humans manage the assessment process. Computer programs that offer curriculum-based assessment (CBA) provide a means for systematic and cost-effective assessment, as they replace the labour-intensive procedures normally undertaken by teaching staff. These programs are mostly based on behavioural views of learning, although some applications are based on dynamic assessment techniques which practically alert learners to different errors, as well as those that use self-monitoring, thus, encouraging learners to monitor their own progress (Florian & Hegarty, 2004:17).

In addition to the mentioned uses of computers with regard to assessment, Osin (1998:5) stresses that computers enable teachers to have easy access to learners' academic information, which eases the entire process of information searching on the learners' performances. In return, the accessibility of the information on the performances of the learners enables the teachers to come-up with the best way to help individual learners. This further encourages the pedagogical administration of subject content, and such pedagogical administration systems clearly show the topics that individual learners have mastered and topics where they may still need help. This kind of system allows the teacher to keep track of the different trajectories of all of his or her learners in the universe of knowledge defined by the curriculum. This, consequently, enables the teacher to individualize and personalize instruction for struggling learners. Furthermore, an academic and instructive systems of administering subject content does more than just showing learners' mastery of the subject, but also shows such subjects where learners may require to be assisted, ideas for the betterment of the subject and the teachings instruments that be considered during presentation, and the likely clusters of learners for group tasks, automatically choosing learners who meet the outlined prerequisites for every given task (*ibid*).

There are possibly many ways so far that computers have been utilized in an educational setting to improve all probable aspects of education, such as management, administration, lesson presentation, communication, filing, data organization and much more. Jhurree (2005:467) mentions that ICT is today a potent force in driving economic, social, political and educational reforms. This means ICT's capabilities in different economic sectors have been globally embraced to the extent that even the poorest of countries strive to establish themselves in the integration of ICT.

2.5 STRATEGIES FOR INTEGRATING INFORMATION AND COMMUNICATION TECHNOLOGY IN EDUCATION

Plomp, Anderson and Kontogiannopoulou-Polydorides (1996:10) state that in the integration part computers can be used as a tool within the curriculum in situations where a teacher uses the computer as an extra medium or as a substitute for existing media. This suggests computers may not really have to substitute the existence of a teacher or any form of media in use, just as it has been incorporated in other departments; it still can be used as a consolidating teaching and learning media or device in place of other ineffectual teaching and learning media. Defining computer integration in its broadness can prove a little tough; however, the most discussed question is whether computers in education refer to studying and learning computers or learning and teaching with the

help of computers. Integration refers to the act of combining or bringing together parts into a whole, and the term originates from the verb 'integrate' which means to make whole by bringing together or by addition of parts (Webster dictionary, 2005:660). For the purpose of this study the researcher deduces that computer integration in education means the incorporation or combining of computer-based teaching and learning with the obvious and traditional means of teaching and learning. This means making computer technology an inevitable part of teaching and learning.

To supplement this understanding of integration, Antifaiff (2000:2) adds that teachers should be encouraged to use computer technology to assist them in their roles as teachers, as this is an important step towards integrating computer technology into the curriculum. Antifaiff (2000:2) further stresses that the integration of computer technology should contribute to teaching and learning in the classroom. However, Antifaiff (2000:2-3) warns that computers should not be an add-on or used as a time filler; rather they should be a means for reaching the instructional objectives in the classroom, and the teacher, along with the curriculum, should guide the integration of computer technology and not the computer. In the process of integrating computers in education, there are so many areas that require comprehensive scrutiny in order for the entire effort to be properly executed; this is something that Newby et al. (2011:10) refer to as 'Meaningful Integration of Technology'. This aspect of integration brings in the possibility that there can be meaningless integration, which can only be that which cannot produce any desired results. Meaningful integration of technology is described in the next section.

2.5.1 Meaningful integration of computer technology

Newby et al. (2011:10) elucidate that meaningful integration of computer technology refers to knowing when, why and how specific technological tools, such as computers, should be utilized to facilitate and guide overall learning. This kind of integration requires the ability to plan, and the ability to select the optimal application tools, as well as the knowledge and skill to implement and evaluate the tools' effectiveness. In an effort to ensure meaningful integration, planning is important as it helps close up the significant differences of the situation at hand and the point of achievement to which the initiative should bring you (Henert, 2010:12). Wagner, Day, James, Kozma, Miller, and Unwin (2005:2) further suggest that having a plan, through which to observe and assess the integration process against practical and quantifiable set targets, could help ease the process. This could easily ensure the practicality of integrating computer technology into classrooms. Newby et al. (2011:10) also stress that meaningful integration means that the utilization of technology allows for a desired

experience that for some reason may not have been fully experienced; it permits something to be seen that otherwise could not have been seen. It also allows someone to participate that otherwise may have been left out; and it further allows someone to think at a comprehensively higher level than would otherwise be possible. In order to successfully integrate computers into a teaching and learning experience Newby et al. (2011:160-161) suggest tips that may obviously determine the effectiveness of such integration, thus benefiting the learners. The tips are simplified and further discussed in the next section as follows:

2.5.1.1 Consider the knowledge of your learners

Under this tip, a teacher is expected to take into serious consideration the knowledge, skills and disposition of the learners. For example, it is vital to understand that for the learners to be able to use today's computers they need to have insight into how to use a mouse, select options from different menus, and at least be able to navigate the computer interface, even if they may not have detailed knowledge of specific applications. The learners should at least know the basics of the particular software, application or program they will use in the lesson so as to be able to get started; and, in any case, if a learner does not have the necessary know-how of the software they will work with, it is necessary that the teacher plans a sufficient introduction of the software, application or program for the learners before they can carry on with the given activity (Newby et al., 2011:160).

2.5.1.2 Consider your objectives

It is important that before a teacher goes into a classroom to teach the specific reason and purpose of the lesson should be clearly outlined so that what the lesson must achieve at the end is clear (Motamedi, 2010:8). This means that the teacher should be able to project that which he or she wants his or her learners to learn, and how the computer can be of benefit in that particular lesson. It is important to note that computers can help address numerous learning objectives in different subjects, but it should also be noted that they might not be appropriate for all objectives; for example, a computer may not prove useful in helping learners distinguish a variety of fruits by their smell or estimate the size of a parking lot. This means that, depending on the objectives of the lesson, there may be some elements in it that computers may not be able to help with (Newby et al., 2011:161).

2.5.1.3 Consider the availability of computers

According to Motamedi (2010:8) it is imperative that the teachers should first take into consideration the kind of learning and teaching equipment at their disposal before planning a lesson that requires devices such as computers. This means that, if a lesson will require the use of a computer, the

teacher must understand that in order to present such a lesson accordingly there must at least be one or more computers in the learning environment. So far there has been the possibility in a school where available computer technology can range from a single computer in a classroom to clusters of computers in a classroom or library, or, even better, a computer laboratory where each learner has access to his or her own computer. Whatever the case, the teacher should effectively utilize what is at his or her disposal (Newby et al., 2011:161).

2.5.1.4 *Prepare the instructional materials and learning environment*

Whenever a teacher employs the use of computers in teaching or presenting lessons, it is of greater importance to ensure that he or she prepares the instructional materials and prepares the learning environment, as well as the learners. At the time that the teacher is preparing the learning environment, he or she must as well make certain that the computer or computers are operationally working properly and that the particularly needed software is installed. The teacher should as well ensure that he or she is familiar with the software that will be used during the lesson, knowing whether the software is a computer-aided instructional package, an office application, or a multimedia authoring tool (Newby et al., 2011:161).

2.5.1.5 *Monitor the learners*

During the implementation of a computer-enhanced lesson, the teacher should try to monitor individual learners to check and verify their understanding, thus positioning himself or herself to establish and root out any noted complexity or problem they may encounter during the activity. The teacher should also encourage learners to use each other as resources if they have questions or problems. In the same vein the teacher must also ensure that he or she integrates the use of the computer with other prepared classroom methods and media upon which the use of the computer builds and adds for consolidation of the learners' understanding (Newby et al., 2011:161).

2.5.1.6 *Evaluate the lesson or activity*

This is a normal practice for a teacher to evaluate and assess whether the lesson or activity was a success or failure, and if the objectives were achieved. This one is extra special though, on the basis that both the teacher and the learners need to take time to evaluate how well the lesson or activity went, and determine whether the computer was helpful; they should also discuss how the lesson or activity could be improved if retaken in the future (Newby et al., 2011:161). In addition to Newby et al. (2011), the Partnership for 21st Century Skills (2009:5-6) states in its *Framework for 21st Century*

Learning that the end result of a successful integration of computer technology or ICT should be that which enables learners to:

- Use technology as a tool to research, organize, evaluate and communicate information;
- Use digital technologies (computers, PDAs, media players, GPS, etc.), communication or networking tools and social networks appropriately to access, manage, integrate, evaluate and create information to successfully function in a knowledge economy; and, finally,
- Apply a fundamental understanding of the ethical or legal issues surrounding the access and use of information technologies.

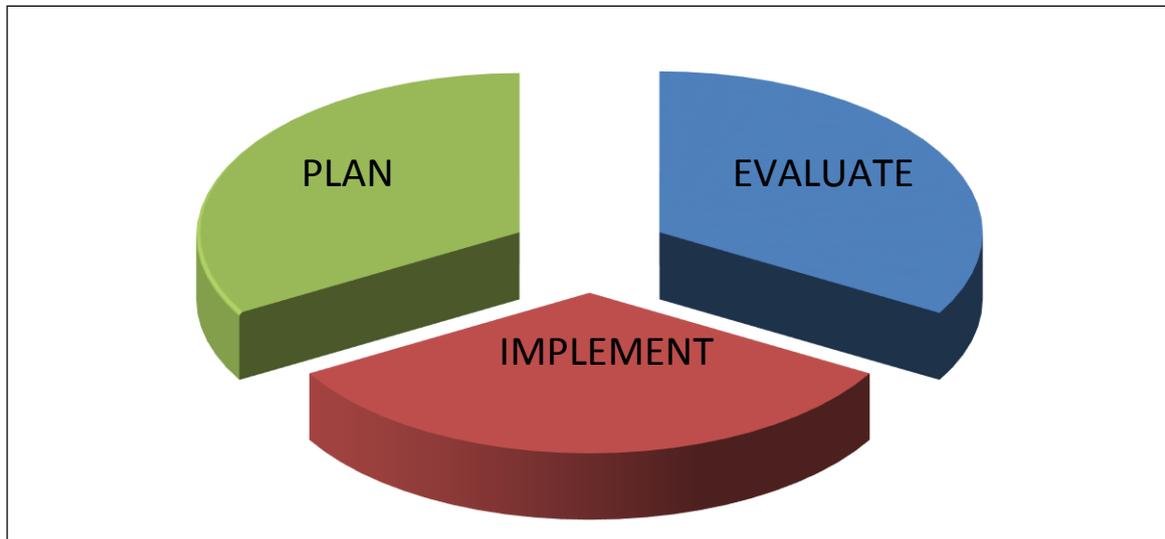
All these efforts strengthen and support the utilization of ICT in the learning and teaching process, and its ability to improve achievement and performance. To further justify the introduction of ICT in education, Tahabsem (2012:4) stated that ICT strives to triangulate the major aspects of education, which include: management and administration; planning and decision-making; and, finally, teaching and learning. This description clearly shows what the main intention of introducing ICT in education is, and that is, improving all possible aspects that constitute education. Newby et al (2011:259) mention that teachers have long been seen as the instructional experts even though many may not have viewed the instructional process from perspectives such as the plan, implement and evaluate (PIE) model. This particular model suggests strict tasks that both teachers and learners must do so as to positively influence learning and these are: (a) Planning, which requires that instructions be developed and sequenced in a manner that effectively promote learning; (b) Implementing the developed instructions, and, finally; (c) Evaluating the instruction, as well as assessing the learning process of the learners (Newby et al., 2011:11). In addition to the meaningful technology integration, is the plan, implement and evaluate (PIE) model that informs users of effective technology integration in teaching and learning. The PIE model is discussed in the next section.

2.5.2 The plan, implement and evaluate (PIE) model

Newby et al. (2011) developed a model in which they discuss the issue of integration as a step-by-step process in which the preceding stages cannot overlap the succeeding stages. The PIE model addresses the question of what teachers and learners must do to influence learning in the process of integration. According to Newby et al. (2011:11) the PIE process helps to systematically structure the approach to developing effective learning experiences. This model strictly guides both the teacher and the learner on what to do in regard to making the effective integration of computers in

the classroom possible. The three segments (See Figure 2.1) of the model are clearly outlined in the following section.

Figure 2.1: The PIE Model (adapted from Newby et al. 2011:11)



2.5.2.1 *Planning*

This phase focuses on what learners are to learn, and addresses questions such as when, why, and how such learning might or should be best accomplished. This leads to the creation of an outline or lesson plan of the learning experience that will bring about the attainment of the desired objectives of the lesson or activity. The plan clearly shows the learners' basic competencies in present knowledge and abilities, and also shows what their knowledge and skills should be. The lesson outline will also suggest strategies to reduce the difference between pre-knowledge and post-knowledge. In the end, the plan influences the manner in which the teacher develops and presents the information, as well as the way the learners relate to the information (Newby et al., 2011:11). In this phase when the teacher integrates any ICTs, he or she will have to address the following questions, which will direct him or her on how to incorporate the chosen computer technology into the lesson (Newby et al., 2011:12):

- In what ways can educational technology effectively influence how a learner addresses a learning task?
- In what ways can technologies effectively affect how a teacher designs and creates instructional materials?

- How can learners improve their attention and motivation through the use of technology, or how can teachers improve learners' attention and motivation through the use of technology?
- How can instructional technology improve the efficiency of learners' learning or teacher preparation?

These questions will definitely guide the teacher in his or her selection of teaching materials, as well as the learning instructions through which the lesson or activity to be undertaken can be done. The questions quickly require the teacher's attention to what he or she will need for the lesson or activity, what he, or she will do and how he or she will do it.

2.5.2.2 *Implementation*

This phase of implementation focuses on putting the plan into action based on the existing situational restrictions through selected instructional materials and activities. In case of the learners, this phase refers to when, where, and how they experience learning, whereas for the teacher it implies monitoring and managing the instruction, groups of learners, as well as individuals with special needs (Newby et al., 2011:11). This phase builds further on the integration questions that were addressed in the planning process, and advances them to another level, which is 'implementation'. For the teacher to fully integrate ICT under this phase he or she must address the following questions that will serve as guiding principles of implementation:

- In what ways can technology assist and influence the manner in which learners experience the given instructions?
- In what ways can the teacher's efficiency during the delivery of the instructions be increased through the use of educational technology?

These two questions send the teacher back to the planning process for he or she will need to project how they are addressed during his or her planning. The questions will be practically addressed during the lesson. Answering them will obviously position the teacher in a better place to make suitable choices of technologies that will enhance the way learners experience the given instructions, thus enhancing his or her own effectiveness in the process of delivering the instructions.

2.5.2.3 *Evaluation*

The evaluation phase exerts much emphasis on the assessment of the effectiveness of the materials employed. The phase further requires that both the teacher and the learner take time to reflect on what was accomplished in comparison to the outlined desired lesson objectives, and then suggest possible changes that could be introduced for future planning and implementation. Finally, this phase

requires suggested revisions and necessary remedial lessons be done and completed (Newby et al., 2011:11). In this phase integration of computer technology comes through the finding of solutions to the following direct questions, which also serve as a build-up to the questions discussed in the implementation process (Newby et al., 2011:12):

- How can technology be used to determine the degree of learners' learning that occurred?
- How can technology be used to generate teacher and learners' feedback?
- In what ways can technology be used to measure the effectiveness, efficiency, and appeal of the implemented instructional materials?

These three questions will seriously help the teacher during the planning process to know what technological devices he or she is going to use for evaluation purposes and how he or she is going to utilize such device(s) in the evaluation process. As the pioneer and engineer of all instructional learning processes, the teacher ought to be well acquainted with the PIE model because it basically establishes crucial elements of the lesson or activity planning, an element considered to be one of the primary duties of a teacher. As the teachers prepare the instructional materials, all angles of the PIE model must be fully taken into consideration, as overlooking any of them will render the entire activity and lesson a failure. Newby et al. (2011:11-13) further claims that it has to be realized that each of the three phases of the model is greatly interactive with each of the other phases. For example, the planning process impacts how instruction is implemented and how it is evaluated, whereas the implementation process provides feedback to the planning process for future reference and updates, as well as dictating how and when evaluations can take place. In the same manner, evaluation provides critical feedback on how future instructions are planned, and how they are best implemented.

The PIE model formed a profound element of reflection on the aspects that the researcher observed in relation to computer technology integration in schools, especially classroom. As a benchmark for observation, the PIE model was used to assess and evaluate how teachers planned for computer technology integration during their lesson preparations. The researcher also used the PIE to assess how planned aspects of the lesson presentation were implemented and then evaluated. So, in using the PIE model the researcher sought to establish how teachers planned, implemented and evaluated lessons that sought to incorporate or integrate computer technology.

2.6 CONCLUSION

From this chapter one can see how numerous countries in the world have embraced and accepted the importance of ICT in education. This acceptance and appreciation of ICT in education has led many countries throughout the world to establish policies that strive to introduce and incorporate computer technology into classrooms and education at large. From this chapter, it is also clear how much the Namibian government has tried to pioneer the integration of computer technology into the education sector. The chapter further provides background on established uses of computer technology in education, particularly in classrooms or schools. It also provides the general perspective of ICT in its complete assortment in the education sector, bringing into perspective the general applicability of ICT in education. The chapter further articulates in a strategical manner the necessary steps that need to be followed to successfully integrate computer technology in the classrooms. The chapter concludes by addressing the PIE, a theoretical model that provides a general framework that is highly applicable in the integration process regardless of the subject area. The following chapter (Chapter three) discusses the research methods and design used to complete this study.

CHAPTER 3: RESEARCH METHOD AND DESIGN

3.1 INTRODUCTION

This chapter provides an explanation of the research method and design that were employed for the successful completion of this study. The chapter also embodies a concise explanation of the researcher's role in the study and gives accounts of the data gathering techniques and data analysis procedure. The chapter further describes the population and sample used in the study, the measures used to ensure trustworthiness, and the ethical issues that were implemented to ensure successful completion of the study.

3.2 RESEARCH METHOD AND DESIGN

In the field of empirical research, there are practically three specified approaches through which most investigations are being done, and these are quantitative, qualitative, and mixed methods. According to Johnson and Christensen (2008:34), a quantitative research attempts to test hypotheses and look at cause and effect, as well as make predictions, whereas qualitative research strives to understand and interpret social interactions. Mixed method research, however, refers to a research paradigm in which both qualitative and quantitative research methods are combined simultaneously as a single research method through which a complex research question should be answered (Heyvaert, Maes and Onghena, 2011:1). This means that when qualitative and quantitative research methodologies are brought together in one study they form a mixed research method approach in which different elements from both methodologies combined as a unified research method. In light of the above, this study employed a qualitative research method to collect and analyze data. The qualitative research method is further described in the next section.

3.2.1 Qualitative research method

According to Savenye and Robinson (2004:1172) qualitative research in the education technology context is research devoted to developing an understanding of human systems, be they small, such as a technology-using teacher and his or her learners and classroom, or large, such as a cultural system. The authors further mention that a typical qualitative research method includes interviews and observations but may also include case studies, surveys, as well as historical and document analysis. To expand this understanding of qualitative research, Leedy and Ormrod (2005:94) define

qualitative as the approach that is typically used to answer questions about the complex nature of a phenomenon with the purpose of describing and understanding the phenomena from the participants' point of view. The qualitative approach is also referred to as the interpretative, constructivist, or positivist approach (Leedy and Ormrod, 2005:94). McMillan and Schumacher (1993:479) further define qualitative research as primarily an inductive process of organizing data into meaningful categories and identifying patterns or relationships among outlined categories. This suggests that when data is collected by the researcher from the investigation it comes as raw data that requires sifting, refining and clustering into meaningful themes.

This study employed the qualitative approach to investigate the extent of computer technology integration on education and explore its perceived benefits on the quality and standard of education in Namibia. Qualitative methodology is concerned with understanding the processes and the social and cultural contexts that underlie various behavioural patterns (Maree, 2007:51). According to Holloway and Wheeler (1996) (cf. Maree, 2007:51), qualitative methodology studies people or systems by interacting with and observing the participants in their natural environment and focusing on their meanings and interpretations. Qualitative methodology places greater emphasis on the quality and depth of information and not on the scope or the breadth of the information provided, as is the case in quantitative methodology (Maree, 2007:51). Denzin and Lincoln (2000:3) maintain that qualitative research involves an interpretive and naturalistic approach, which means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them. Given these descriptions, this study studied people in different settings, that is, the schools that took part in the study.

3.2.2 Research design

A research design is a plan or strategy that provides a general structure of the procedures that a researcher has to adhere to, the data that the researcher needs to collect and, consequently, the analysis of data the researcher does so as to solve the research problem (Leedy and Ormrod, 2005:85). This generally means the approach or outlined structure through which the researcher conducts research, or carries out all activities of a research study. A research design is further understood to be a plan that moves from the underlying philosophical assumptions to specifying the selection of respondents, the data gathering techniques that are to be used and the data analysis that is to be done (Maree, 2007:70). This suggests that the research design is the backbone of any empirical investigation, and, therefore, provides a pragmatic plan and strategies that the researcher

will be employing to collect information, as well as analyzing the collected data. Leedy and Ormrod (2005:85) state that the research design provides the overall structure for the procedures that the researcher follows, the data the researcher collects, and the data analyses the researcher conducts. This means that in choosing a research design to follow, the researcher outlines a plan through which the study is to be successfully completed. This plan will direct the proceedings of the study from the beginning to the end, and, in simpler terms, the research design serves as the framework that underpins the researcher's investigation.

It is of great importance to note that the primary emphasis and goal of research design is ensuring the provision of trustworthy, logical, and rational results (McMillan and Schumacher, 2006:117) which will be able to serve as the foundation for new knowledge and information in a defined field of study. McMillan and Schumacher (2001:166) further add another dimension to the definition of research design by stating that it also refers to a plan for selecting subjects, research sites and data collection procedures to provide answers to the outlined research questions. The choice of a research design also depends on the research problem, which brings about the main question to which the researcher strives to get answers (McMillan and Schumacher, 2001:166). This means that not all research designs are appropriate to all research problems but that an intended research design is appropriate to a precise research problem or case, and the more appropriate the research design to the research question the higher the possibility of the investigation being a success.

According to Ary, Jacobs, Razavieh and Sorensen (2009:420) a qualitative investigation is an inclusive concept that embraces a diversity of designs appropriated for research in the education field, and these include ethnography, case study, naturalistic inquiry, contextual studies and participant observation. For the purpose of this study, the researcher found the case study design to be most appropriate and it is described in the next section.

3.2.3 Case study

According to Yin (2011:6, 7), a "case" is normally a restricted or delimited unit, which can be anything from an incident, individual, institution, or any other societal occurrence in which the periphery of the context in relation to the incident is ambiguous and unfounded. In expansion of this definition of a case, Swanborn (2010:13) explicates that a case study is a research where a researcher studies a common incident in the margins of a particular societal organization and this may include any community or environment where the incident in focus is found. This requires the researcher to examine the case in its likely and usual setting for a considerably reasonable amount of time. In their

understanding of a case study Baxter and Jack (2008:556) state that a case study cannot by any chance be viewed as just a way examining an entity or phenomenon, but should be seen as a research design through a researcher study and explain complicated cases. Like many other qualitative research approaches, case studies also help provide answers to probing research questions such as 'why' and 'how' through its broad range of possible information sources.

According to Neale, Thapa and Boyce (2006:4) using a case study design presents a researcher with a number of reasonable benefits, of which the most important is that it brings about more comprehensive information that may not be adequately obtainable through the use of other designs or approaches. In addition to this, a case study also enables the researcher to amalgamate and synthesize information obtained different sources, through different research instruments, in a logical manner in order reach an apprehensible conclusion and explanation of the phenomenon (Neale et al., 2006:4). Upon this, in support of Leedy and Ormrod (2005, see 1.5.1.1), Lichtman (2011:110) stresses that when using a case study the researcher has a variety of data collection tools at his disposal comprising of interviews, observations and review of archived documents, which all present better chances of reaching a feasible conclusion of findings. Based on the relevance and appropriateness of a case study to this study the researcher found it most appropriate for the successful completion of this study and therefore used it to carry out the study.

3.2.4 Data gathering techniques

According to Orb, Eisenhauer, and Wynaden (2001:94) the purpose of qualitative studies is to describe a phenomenon from the participants' points of view through either interviews or observations, or both. Under this perspective, the intention of the researcher is to listen to the voices of participants or observe them in their natural environments. The researcher's interpretation of these experiences is usually described as an emic perspective or the researcher's viewpoints emanating from the collected data. This positions the research in the central position of liaising with the participants in order to get what he or she wants to help sustain the study. This study employed the most interactive strategies of the qualitative methodology which included non-participant observations and interviews (semi-structured and focus group interviews).

3.2.4.1 Non-participant observation

According to Mayoux (2002:10) non-participant observation refers to the type of observation where the observer does not become involved in the situation that is being assessed so as not to influence

it in any way. This means that, in contrast to participant observation where the observer is a direct participant and observer, a non-participant observer watches from an inactive angle as a reserved and unobtrusive individual who is not part of the participants, yet is known by the participants as an observer. Observation, whether participant or non-participant, is perceived to be an analytic portrayal or explanation of societal or common occurrences that enable the sharing of information or knowledge on the experiences and certain aspects of the people involved (Goetz and LeCompte, 1984:2-3). This strategy promotes an interactive approach to research, where the researcher interacts with participants during the investigation. In addition to this, Creswell (1994:11) states that when this strategy is employed the researcher is more of an observer or a participant observer. To understand the classroom settings of Namibia's contemporary education system and to what extent such settings are technologically equipped for both learning and teaching, the study called for classroom observations, which were conducted in the participant schools. These were carried out to see whether there were computers or computer technology devices in the classrooms, as well as establishing how such computers were being utilized by both teachers and learners alike.

An observation schedule (See Appendix V) was created stating the possible and expected computer items that should be in the classrooms, as well as examining how these items were being incorporated into teaching and learning. Despite the fact that observation might be time consuming, it enabled the researcher of this study to engage in the cultural group's natural setting, which, in return, accorded him enough time to observe, and record processes that would not be easy to learn about when using any other approach (Leedy and Ormrod, 2005:137). This aspect of observation placed the researcher of this study in a good position to interrelate and intermingle with the research participants. The interactions with the participants further helped the researcher in creating a rapport with the people being studied, and in the process gain their trust (Leedy and Ormrod, 2005:137). These observations were subsequently followed by lesson-based interviews with the teachers to establish their post-lesson views on the lesson, and the impact they thought computers contributed or could have contributed if used during the lesson presentation by either the teacher or learners, or both (See Appendix III). The subsequent interviews are discussed in the succeeding section.

3.2.4.2 *Semi-structured interviews*

According to Maree (2007:87) semi-structured interviews are commonly used to corroborate and substantiate the data emerging from participants, and rarely spans long periods of time and this type of interview normally requires the participant to answer a set of predetermined questions; however, it does allow for the probing and clarification of the provided answers. Semi-structured interviews also require the researcher to be attentive to the responses given by the participants. This is

important as it enables the researcher to pick-out new emerging lines of inquiry that are directly related to the phenomenon being studied. Semi-structured interviews enable the researcher to explore and probe those new lines of inquiry (Maree, 2007:87). When using the semi-structured interview strategy, the researcher of this study created interview schedules with the semi-structured questions, and he conducted one-on-one interviews with participants. Leedy and Ormrod (2005:184) stress that in semi-structured interviews the researcher may follow the standard questions with one or more individually tailored questions to get clarification or probe a person's reasoning. Therefore, the questions in these semi-structured interviews were outlined to obtain the personal understanding of the participants on the subject of computers in schools in terms of their use for teaching and learning (See Appendices I, VIII, and IX).

These semi-structured interviews were conducted with school managers, teachers (these included teachers who teach Computer Studies and teachers teaching different subjects). Participants were purposively selected from the three participating schools in the Zambezi Region. The semi-structured interviews lasted about forty-five minutes with each individual participant.

3.2.4.3 *Focus group*

According to Hale and Astolfi (2007:205), focus group is a discussion of about ten or less panellists that share and exchange views based on perception and experience on a particular subject topic, of which the discussions are always regulated by a facilitator over an outlined timeframe. This strategy seeks to establish what the panel members think or know of a topic or subject, and such panels are often reduced to ensure enough time for every participant to give his or her views. The focus group has its own advantages in its relevance to research and these advantages, according to Hale and Astolfi (2007:209), include its ability to:

- Effortlessly determine the defining issues of a particular topic;
- Enable the researcher to record the reactions of the participants to given research questions;
- Explore and record new information as discussions ensue; and
- Position participants to express views in their own words and understanding,
- Which enables the researcher to measure their concentration and they express themselves.

Focus groups can as well be interactive because they allow for direct discussions with the participants, thus enabling the researcher to interact physically with them, in the process gain their trust, and develop openness during the panel discussion. Just as in the semi-structured interviews with the teachers and school management, this approach strove to establish the learners' view of computer use in the Namibian schools. Focus group interviews were conducted with learners who were purposefully selected from two of the three participating schools (Schools B and C), as there were no focus groups conducted at School A due to unforeseen circumstances. The focus group discussions lasted for sixty minutes per sitting. The researcher in this study ensured that there was a reasonable gender balance in all the focus groups conducted despite the fact that one male participant dropped out during the discussions. There was also a substantial combination of all the grade levels (grades 8 – 12) in the focus group discussions.

It is highly significant to consider some elements when using focus group interviews. These include ensuring that the group is of an appropriate size (at least not more than 10 or 12) and allocation of time for the discussion (normally about 1 – 2 hours depending on the number of panel members). The researcher, who may serve as the moderator of the interview, must provide an introduction of the issues to be discussed, and should ensure that no one dominates the discussion, and that panel members stay focused on the topic at hand (Leedy and Ormrod, 2005:146).

For the purpose of this study, a schedule of topics that was fundamental to the study was created to guide the panel discussion and keep it within context (See Appendix IV). There were four focus groups, of which three were made up of eight participants and the fourth focus group ended up with seven participants due to unforeseen circumstances. Each of the focus groups was allocated sixty minutes for the discussion, and every panel member was equally given considerable time to give his/her views on the subjects during the discussions. A proper introduction of the subjects to be discussed was given to ensure that panel members were aware of what they were supposed to discuss. The researcher of this study ensured that the panel members were assured of the confidentiality issues of the discussion, and encouraged the participants to fully and freely express themselves during the discussion, and to ask questions if they were not clear on what to do, or with regard to anything else during the discussions.

The section that follows discusses the media tools that were used by the researcher to collect the data for the study.

3.2.5 Data collection media tools

For the purpose of this study, a number of media tools were used in the collection of data. These media tools included audio recording and video recordings, as well as field notes and observation schedules for easy transcription and reporting. All these tools were meant to enrich the depth of the collected information.

3.2.5.1 Audio recorded clips

The researcher used the computer recorded audio clips of all interviews to ensure that whatever information may have been missed during the interview was still available and retrievable from the clips. These audio-recorded clips were later transcribed for further use during the process of the data analysis, and all transcribed audio recordings are attached as appendices for reference purposes (See Appendix VI, VII, VIII, IX, X, XI, XII, XIII, XIV, XV, XVI, and XVII).

3.2.5.2 Video recorded clips

To substantiate and support the audio-recorded clips the researcher took video clips of the focus group interviews. The video clips complement the audio clips in a way such that they provide a certain element that cannot be found in the audio clips. The video clips clearly depicted the facial expressions of the participants, as well as the gestures they made as they answered the questions. In some cases, what may be inaudible in the audio clips could also be reviewed from the video clips, which were also transcribed into text for easy viewing.

3.2.5.3 Field notes

Field notes were taken for all the interviews, as well as observations that were conducted for accurate transcription. The three tools, which are the field notes together with the audio and video recordings, were meant to complement each other, just in case the video camera ran out of cell power, or if the audio recording device of the computer went off, the researcher would still have the notes to help him with transcription and still have reliable information at hand in the absence of any of the three devices. The field notes were all written in exam pads on a chronological basis to ensure continuity of all activities done during the study.

3.2.5.4 Observation schedules

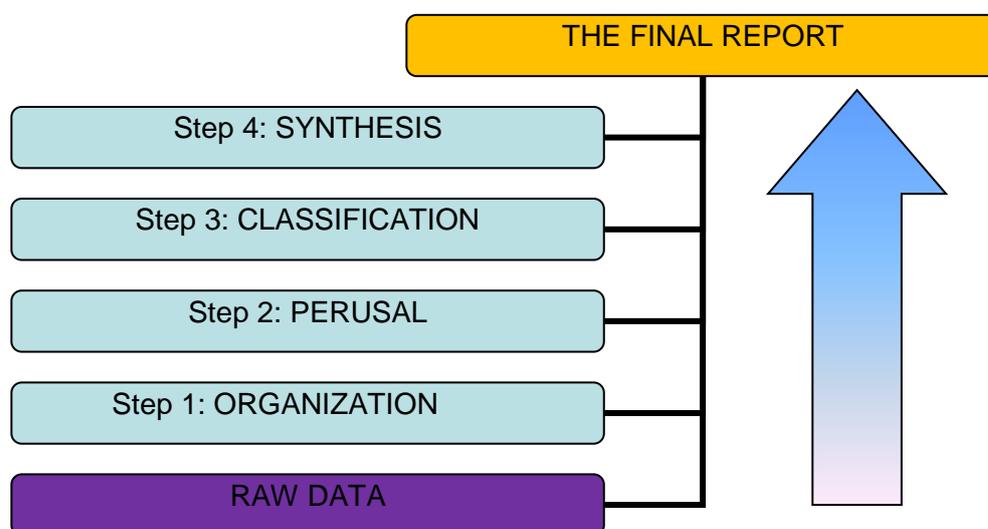
The information from the observation schedules was also used to denote the use of computers in teaching and learning (See Appendix V, XIX, XX, and XXI).

3.2.6 Data analysis

In a research study, the collected data needs to be well articulated before presentation, which will mean arranging it into reasonable segments or categories for easy understanding. According to Maree (2007:99), the analysis of qualitative data is an ongoing and iterative process that implies the interlinking of data collection, processing, analysis and reporting processes of the study. This means that qualitative data analysis is mostly based on an interpretative philosophy aimed at examining meaningful and symbolic content of the collected data. This aspect of qualitative data analysis enables the researcher to make sense of and derive conclusions from the collected data.

The fact that the study used a qualitative approach brings the researcher to Creswell's data analysis spiral, which is applicable to a variety of qualitative studies (Creswell, 1998:142). The spiral comprises four steps (see figure 3.1) through which the researcher of this study scrutinized the collected data before the final report paper was produced.

Figure 3.1: Creswell's data analysis spiral (adapted from Leedy and Ormrod, 2005:150-151)



This model of data analysis in qualitative research is fully explained as follows:

Step 1: Organization:

Under this step, the researcher broke large units of text into smaller units and organized the data onto a computer database.

Step 2: Perusal

In this study the researcher examined the entire data collection several times in order to make overall sense of what it contained as a whole, and jotted down preliminary interpretations as well as possible categories.

Step 3: Classification

After going through the collected data several times the researcher identified general categories and subcategories and classified every piece of data accordingly.

Step 4: Synthesis

In this stage the researcher integrated and summarized the data for the readers.

The section that follows addresses the research setting, and further discusses the population and sampling aspects of the study.

3.3 The research setting

This investigation was restricted to the Zambezi Region (former Caprivi Region) in the far north-eastern part of Namibia as it was convenient for the researcher of this study to collect data there. This helped the researcher to reduce possible costs and have more time to concentrate on the investigation.

3.3.1 Population and sampling

3.3.1.1 Population

According to Castillo (2009:1), a research population is a large collection of individuals or objects that become or are targeted as the focus of a scientific investigation. Upon this, Castillo (2009:1) further develops the description of the research population as a well-defined collection of individuals or objects considered to have similar defining characteristics. Polit and Hungler (1999:37) define research population as a collection and summation of all objects, subjects, or individuals that within reason conventionally meet a set of conditions and requirements. This study targeted learners, teachers, and school managers in three central secondary schools (Grades 8 – 12) in the town Katima Mulilo, Zambezi Region. These were practically the direct beneficiaries of the investigation,

and were also the subjects of the study as they were the ones who were affected by the trend under investigation.

3.3.1.2 *Sampling*

Sampling in a qualitative research refers to the process where the researcher selects a portion of the population for study. Leedy and Ormrod (2005:144) add that sampling refers to the process whereby the researcher selects sources, which may be people, objects, textual materials, electronic records or audio-visual materials from which to obtain information essential for the study to be conducted. In light of this statement, purposive sampling was selected in this study to obtain the richest possible source of information that will assist in answering the research questions. This is based on the notion that in purposive sampling participants are selected because of some defining characteristics that make them holders of the data needed for the study. It is also of greater importance to note that purposive sampling decisions are not only restricted to the selection of participants but also involve the settings, incidents, events and activities to be included for data collection (Maree, 2007:79).

Based on the given information and for the purpose of this study, the following procedure was followed in selecting the participants:

Firstly, the researcher decided to conduct the study in the schools that were located in the urban vicinity. These schools were most likely to have computers within their reach and were most appropriate to provide information most apposite to the intentions of the study. This was used as the criterion to make schools suitable for the study. Secondly, the selection of teachers who participated in the study was on the recommendation from the school principals who made sure they provided teachers with considerable knowledge of computers. Thirdly, learners were as well selected based on the recommendations from their teachers. The teachers ensured that they selected learners who could freely express themselves and had some computer insight. In cases where a recommended learner was not in class, the selected participants would help suggest the next person as a replacement for the missing learner. The researcher found it important to find participants who at least knew or understood what a computer is, and those who could freely express themselves without any sort of fear. This helped provide information that proved essential to the successful completion of the study, without which the study could have been futile as there would be no relevant data. This defined the sampling strategy that was used for this study.

The study was conducted in three secondary schools with a total number of forty individual participants, of which thirty-one were learners and nine were teachers. The thirty-one learners were

comprised of thirteen learners from Grades 8 to 10, of which the majority had Computer Studies as a subject. The remaining eighteen of the thirty-one learners were from Grades 11 and 12, and were comprised of learners who had computer insight and could freely express themselves. The nine teachers were made up of three school managers, three Computer Studies teachers and three teachers of other subjects. The biographical information of all the participants who took part in the semi-structured interviews is explained in the table (see Table 3.1).

Table 3.1: Details of participants involved in the study

Participant teachers					
Participant	Gender	Race	School	Position in school	Years in position at school
SM	Male	Black	B	Principal	3 years
SM	Male	Black	A	Deputy Principal	8 months
SM	Male	Black	C	Deputy Principal	2 years
SC1	Male	Black	C	Computer Studies Teacher	11 years
SC2	Female	Black	B	Computer Studies Teacher	4 years
SC3	Female	Black	A	Computer Studies Teacher	9 years
ST1	Male	Black	A	Teacher	8 years
ST2	Female	Black	B	Teacher	3 years
ST3	Male	Black	C	Teacher	15 years
Participant Learners					
Participant (Code)	Gender	Race	School	Grade & Class Group	
Focus Group 1					
Learner 1 (B1)	Male	Black	B	11A	
Learner 2 (B2)	Female	Black	B	11B	
Learner 3 (B3)	Female	Black	B	11C	
Learner 4 (B4)	Female	Black	B	11D	
Learner 5 (B5)	Male	Black	B	12A	
Learner 6 (B6)	Male	Black	B	12D	
Learner 7 (B7)	Female	Black	B	10B	
Learner 8 (B8)	Male	Black	B	10A	

Focus Group 2				
Learner 1 (B9)	Female	Black	B	9B
Learner 2 (B10)	Female	Black	B	12C
Learner 3 (B11)	Female	Black	B	12A
Learner 4 (B12)	Male	Black	B	12B
Learner 5 (B13)	Male	Black	B	8C
Learner 6 (B14)	Male	Black	B	12D
Learner 7 (B15)	Female	Black	B	8D
Focus Group 3				
Learner 1 (C1)	Female	Black	C	10B
Learner 2 (C2)	Male	Black	C	8A
Learner 3 (C3)	Male	Black	C	8D
Learner 4 (C4)	Male	Black	C	8C
Learner 5 (C5)	Female	Black	C	8B
Learner 6 (C6)	Female	Black	C	9B
Learner 7 (C7)	Female	Black	C	9D
Learner 8 (C8)	Male	Black	C	10D
Focus Group 4				
Learner 1 (C9)	Male	Black	C	11C
Learner 2 (C10)	Male	Black	C	11C
Learner 3 (C11)	Male	Black	C	11C
Learner 4 (C12)	Female	Black	C	11D
Learner 5 (C13)	Female	Black	C	11D
Learner 6 (C14)	Female	Black	C	11D
Learner 7 (C15)	Female	Black	C	11C
Learner 8 (C16)	Male	Black	C	11C

The codes used in the table represent the different participants who were involved in the semi-structured interviews, wherefore the code SM represents school managers who participated, SC represents all Computer Studies teachers who participated, and, finally, ST stands for the teachers who teach other different subjects.

From the outlines of the tables above it is clearly visible that, despite the researcher's effort to ensure balanced gender of the participants, it proved a challenge to ensure this, especially with the school managers who were predominantly male in that region. It is further clear from the table that there were three individual participants involved in semi-structured interviews from each of the participating

schools and they were comprised of a school manager, a Computer Studies teacher, and a teacher teaching any other subject as long it was not Computer Studies. This gave a total of nine participants involved in the semi-structured interviews. The researcher decided on the three varied participants from each school to broaden the scope of thought and diversity of the subject.

The table also shows the details of the participants from the two schools in which the researcher was able to conduct focus groups. There were two focus groups at School B, of which the first group comprised of eight participants and the second one ended up with seven participants due to circumstances beyond the researcher's control. This gave a total of fifteen participants from school B. There were two further focus groups conducted at school C, of which each focus group was comprised of eight participants, giving a total of sixteen participants from school C. This brought the total of focus group participants from the two schools to thirty-one. The total comprised of fifteen boys and sixteen girls. The codes used in the table represent the participants who were involved in the focus groups. The codes B1 to B15 represent participant learners from school B, whereas the coding number indicates the individual participant. In the same manner, codes C1 to C16 represent participant learners from school C and the attached coding number identifies the individual participant.

There was a single classroom observation conducted at each of the three selected schools. At school A an observation sitting was done for a Grade 12A class group of thirty-three learners, whereas at school B an observation sitting was conducted for a Grade 12D class group of thirty learners, despite efforts by the researcher to observe a different grade group. The last observation at school C was done for a Grade 10B class group of thirty-two learners.

The subsequent section deals with measures that the researcher used to ensure the trustworthiness of the study.

3.4 MEASURES TO ENSURE TRUSTWORTHINESS

Unlike quantitative research, which sustains credibility and legitimacy of research by determining its validity and reliability, qualitative studies focus on ensuring the legitimacy of the research through its trustworthiness. According to Stiles (1993:601), in qualitative research the concepts of 'reliability' and 'validity' are all embraced in the concept of 'trustworthiness' where they are respectively defined as the trustworthiness of observation or data (reliability) and the trustworthiness of interpretations or conclusions (validity). To this hypothesis Sandelowski (1993:2) adds that issues of validity in qualitative studies should not be linked to 'truth' or 'value', but rather to 'trustworthiness', which "...

becomes a matter of persuasion whereby the scientist is viewed as having made those practices visible and, therefore, auditable". In this context, auditability is viewed as the researcher's ability to create or outline a decision trail so that the reader would be able to track and authenticate the research process (Rolfe, 2006:305). This brings in a fundamental shift in the responsibility for judgments of quality to the consumer of the research rather than to the producer of the research (Rolfe, 2006:305).

It is clear that in research trustworthiness is ensured through the sustenance of a combination of the four principles in validity, confirmability, reliability, and credibility. According to Muhammad, Muhammad and Muhammad (2008:35) validity in qualitative research refers to the extent to which the collected data is believable, tried, and dependable to the extent that the research can be defended if it is somehow challenged. Confirmability refers the researcher's ability to demonstrate that his or her collected data and its interpretations are articulated and wholly based on circumstances and conditions emanating from the study, and are absolutely free from the influence of the researcher's own thoughts (Sinkovics, Penz, and Ghauri, 2008:699). Reliability, on the other hand, is defined as the extent to which research results are consistent over time and the results of a study can be reproduced by other researchers using the same methodology (Patton and Cochran, 2002:11).

In a further assumption on trustworthiness, Harrison and MacGibbon (2001:323) mention that the researchers are able to give something back to their participants and engage them in member checks as a means of ensuring trustworthiness by asking participants to examine field notes and early analyses. Member checking was conducted after interviews with the participants, and after the classroom observations in which participants were given a chance to go through the recorded notes and listen to the recorded audio clips for verification of the contents. With this assessment of trustworthiness in mind, Gall, Borg, and Gall, 1996 (cf. Hale, 2006:203) stress that the element or principle of trustworthiness in a study is amplified and stressed when the analysis and conclusions of the data are brought together, an aspect that is further exemplified by logical assessment and verification of the views of the participants and the evidence established thereof.

This understanding of trustworthiness brings into context the researcher's ability to follow all the necessary and required procedures and steps of an empirical study. All data from the three strategies were triangulated into different sections relevant to answering the research question in the study. The information from the observation schedules and transcribed audio and video clips was all but rounded together to create relevant themes, categories and sub-categories in which appropriate pieces of information were arranged and placed for easy sequencing and alignment of

the entire research paper which, in the process, helped induce and improve the trustworthiness of the research results. According to Stiles (1993:601), in qualitative research the concepts of reliability and validity are all embraced in the concept of 'trustworthiness' where they are respectively defined as the trustworthiness of observation or data (reliability) and the trustworthiness of interpretations or conclusions (validity). Having understood the aspect of trustworthiness through the mentioned principles, the researcher focused on the element of credibility for the purpose of the study, and this is addressed in the section that follows.

3.4.1 Credibility

According to Jackson and Verberg (2007:49), credibility refers to the level accuracy in research, in which the description of the research is acceptable and recognized by participants; and such should be enriched and enhanced through prolonged time in the field where the researcher repeatedly observes and interacts with participants, doing member checks and makes use of different data sources, methods and data types. This suggests that for the credibility of a study to be verified it should at least be assessed and subsequently recognized by the people involved in it, and the time the researcher takes doing the observation as well as the employment of various methods of collecting data help impute credibility to the study. Jeanfreau and Jack (2010:612-617) further confirm that credibility is demonstrated through the use of strategies such as data and method triangulation, repeated contact with the participants, sharing questions on the research process and findings with peers and the returning of findings to participants enabling them to determine if the research findings truly reflect their personal experiences.

With a clear understanding of what credibility is and how to ensure its practicality, the researcher in this study made sure that there was enough time for the in-field activities in which he used three data collection tools in semi-structured interviews, focus groups and non-participant observations. The researcher conducted three observation sessions, four focus group sittings, and six one-to-one interviews with school managers and teachers. To make sure the collected data in the audio and video recording as well as the written notes were an honest reflection of the experiences of the participants, the researcher did member checking with the participants so that they were able to give their approval on the content as being a genuine representation of their experiences. All these strategies brought together helped the researcher to sustain the credibility of the research.

The next section of this study deals with the issues concerning ethics as upheld in the study.

3.5 ETHICAL ISSUES

Ethical issues are elementary to the successful conducting and completion of any research. In most cases, ethical issues in research fall into four categories, namely: protection from harm, informed consent, right to privacy and honesty with professional colleagues (Leedy and Ormrod, 2005:101). For the purpose of this study, the above-mentioned categories were taken into consideration throughout this study.

3.5.1 Protection from harm

This is one of the aspects of ethical issues that the researcher must consider and ensure during the study. Researchers should not expose research participants to any gratuitous physical or psychological harm, and must ensure that the risk involved in participating in the study is not considerably greater than the normal risks of everyday living. Furthermore, the participants should not risk losing life or limb. They should not, by any means, be subjected to unusual stress, embarrassment, or loss of self-esteem (Leedy and Ormrod, 2005:101). With this knowledge in mind, this researcher made it both a personal and a professional responsibility to ensure that all the people who took part in the study were protected from possible harm. He also made sure that all aspects and implications of the study were made clear to the study participants so that they voluntarily make the choice to either participate or not, depending on how they personally felt with regard to the study. It was also a relief to note that this study carried no notable risks of any kind to the participants.

3.5.2 Informed consent

Informed consent of participants to take part in a study is fundamental in a qualitative study or any study which involves human beings. Leedy and Ormrod (2005:101) stipulate that research participants should be told the nature of the study that is to be conducted and given the option to either participate or not to participate. In this case, the researcher assumed responsibility to explain what the research was all about to the participants. The explanation of the study was made through a familiar language, and the participants decided whether to take part or not. The researcher also ought to note that participants should be informed beforehand that they have the right to withdraw from the study at any time and that any participation in the study should be strictly voluntary, not imposed (Leedy and Ormrod, 2005:101). In adherence to this area of ethical issues, the researcher created a letter addressed to the participants. The letter included a brief explanation of what the

study was about; what was expected from them; the voluntary aspect of participation; and the assurance that all responses would be treated confidentially and anonymously. At the end of the letter was the researcher's name and contact details; assurance that a copy will be made available to the participants upon completion of the study; and, finally, the place where each participant was to sign the document agreeing to participate in the study (See Appendix XXII, XXIV and XXV).

3.5.3 Right to privacy, confidentiality and anonymity

Leedy and Ormrod (2005:102) stress that any research study that is conducted must respect the participants' right to privacy. In this respect, the research report, either oral or written, should not be presented in a way that enables participants to become aware of how a fellow participant responded or behaved. This can only happen if the participant has granted permission which in that case has to be in writing. According to Kanuka and Anderson (2007:9), privacy refers to the research participants' right to control the access of others to information about them. This empowers participants to dictate whether their provided information can be disclosed to any person or participants.

On the other hand, confidentiality in research refers to an agreement as to how information collected in the study will be kept secure and private which can be done through controlled access. The terms of confidentiality are usually tailored to the needs of the participants (Kanuka and Anderson, 2007:9). This suggests that confidentiality in relation to privacy places information accessibility in the hands of the participants. This, therefore, requires the researcher to ensure that all information collected from the participants should be strictly treated as confidential and private.

Anonymity refers to the removal of any unique characteristics (e.g. names, addresses, affiliated institution, and geographical areas that would allow the identification of participants (Kanuka and Anderson, 2007:9). This refers to the researcher's ability and requirements to ensure that no distinctive and identifying characteristics of the participants should be mentioned anywhere in the research paper, i.e. no names of participants, geographical areas, the addresses of the participants, nor the institutions or organizations that can divulge the identity of the participants. The researcher ought to understand that participants' need for privacy, confidentiality, or anonymity is a way in which a researcher respects the participants and is deemed a fundamental requirement of ethical practice among education researchers. The respect of this nature is shown most clearly by allowing the participants to share in the responsibility of making decisions that affect them. This includes the

decision to either participate or not to participate in a research project (Kanuka and Anderson, 2007:9).

The researcher ensured that no such confidential and private information got disclosed at any stage in the entire outline of the research. No names of peoples were used in the study as the researcher used participant code numbers instead. The researcher made sure that no demographical characteristics were mentioned such as geographical areas. In cases where characteristic behaviours of individuals were discussed in a more detailed manner, pseudonyms were used to maintain anonymity.

3.5.4 Honesty with professional colleagues

According to Leedy and Ormrod (2005:102), researchers must report their findings back in a complete and honest fashion without misrepresenting what they have done or intentionally misleading others with regard to the nature of their findings. Under no circumstances should the researcher formulate data in support of a definite conclusion, despite the seemingly noble the determined conclusion may be. In this regard, the researcher in this study handled himself with honesty towards his fellow teaching colleagues during the study and gave them assurance that their respected schools would have copies of the final research paper on request, so that they could have feedback on the study in which they participated. This will help augment the mutual and professional relationship between the researcher and the participants, for the paper will provide a detailed account of the research findings which will make the participants and the researcher understand the studied phenomenon better. All these categories make up for all necessary ethical issues that the researcher needs to take into consideration when conducting a qualitative research. These all help determine how the researcher relates with the participants, and how free and willing they are to answer the research questions.

3.6 CONCLUSION

This chapter provides all the procedures through which the entire study was conducted. It gives detailed accounts of the methodology used, which embraces the research design, the population and sampling, and the instruments that were used in carrying out the investigation. The procedures and steps that were taken to ensure successful completion of the study are also well accounted for in this chapter.

This chapter also provides an account on why this definite methodology was chosen for this study, and further gives accounts of the strategies that the researcher employed to enhance and sustain the trustworthiness of the findings and conclusions of the study. It also provides an extensive explanation of how the collected data was be analyzed as well as the media used in the data collection process. The data analysis section of this chapter provides an account of how the next chapter gets constructed, for it gives a detailed account of how the data was organized and arranged, as well as how the results and findings of the entire study were discussed and arranged into categories, sub-categories, themes and sub-themes. The data analysis section of the chapter is essentially the defining framework of the next chapter, chapter four.

CHAPTER 4: DATA PRESENTATION, INTERPRETATION, AND DISCUSSION

4.1 INTRODUCTION

This chapter examines the findings of the study with regard to the level and state of computer technology integration in Namibia, particularly the three central schools of Katima Mulilo. Following Creswell's data analysis (see 3.2.6.), the findings of this study are derived from the three main data collection strategies: semi-structured interviews; observations; and focus group interviews in their response to the three questions of the study. Based on the employed data analysis strategy, the findings of this study are presented starting with the findings from the semi-structured interviews and followed by those from the observations and focus groups. Quotations are included from the interviews and the findings are interpreted and supported with literature as discussed in chapter two. Quotations from participants have been presented verbatim and any incorrect grammar used by participants has been left unchanged.

4.2 PRESENTATION OF SEMI-STRUCTURED INTERVIEW DATA

Nine participants were interviewed face-to-face in the individual interviews at the start of this study. The interviews are given specific identifications quotes and numbered sequentially. To be clear, quote 'SM' represents school managers; 'SC' represents Computer Studies teachers; and 'ST' represents teachers of other subjects. There are four themes that emerged in the semi-structured interviews: teaching qualifications, experience, computer knowledge and skills affect effective integration of computer technology in teaching and learning; insufficient computer technology resources and devices deprive teachers of opportunities to teach with technology; computer security risks challenge schools in the effectiveness of computer technology integration; and the general uses of computers do not imply computer technology integration in education. These themes are discussed in the next section.

4.2.1 The extent of computer technology integration in teaching and learning

In response to the question regarding the extent that computer technology has been in integrated in teaching and learning in the region, data from the semi-structured interviews generated the following themes:

Theme 1: Teaching qualifications, experience, and computer knowledge and skills affect the effective integration of computer technology in teaching and learning

It is evident from the findings that participants do not have relevant computer qualifications that can assist them to integrate computer technology in education. In the participating schools, Computer Studies was found to be the major subject wherein computers are being used by learners. Teachers who offer this subject were found to have formal qualifications for the teaching of Computer Studies. Such qualifications include certificates and the National Higher Diploma in Information Technology (IT). However, having a qualification in IT does not necessarily mean one is competent in integrating computer technology in teaching and learning. This results from the fact that IT training was not strictly meant for teaching; it was, rather, meant for prospective IT specialists.

In addition to the computer subject teachers, school managers also confirmed their lack of relevant computer qualifications that would enable them to support teachers in integrating technology into teaching and learning activities. This view was illustrated by one of the participants, SM2, who mentioned that he had acquired an International Computer Driver's License (ICDL) certificate. Acquisition of this qualification does not suffice for the requirements of technology integration in education. According to the Stratford Board of Education (2012:1) technology integration in education refers to a situation where technology is collaboratively used to introduce, reinforce, extend, enrich, assess, and remediate all necessary or possible areas in the education sector.

Computer subject teachers who participated in the semi-structured interviews had sufficient experience of teaching the subject. Their teaching experience in this field ranged from four to eleven years. In line with this finding, Sacks (2013:1) explains that 'experience' should be taken to mean a teaching aspect on which one is able to reflect on, and learn so as to improve his or her teaching practice. The fact that participants possess teaching experience in the subject Computer Studies does not confirm the effective integration of computer technology into teaching and learning. This results from the notion that there are certain aspects of learning that learners have to acquire through the subject by the end of grade 10. The following excerpts from the interview attest to this:

They are required to know the different components of the computer, the internal parts of the computer, spreadsheet, internet, programming, database, word processor... I think all the modules that are covered in the basic certificate, plus programming that we don't normally get when we go for these training programs (SC1).

It was noted from the findings that teachers have not been trained in programming. Seeing that programming is one of the toughest components in the curriculum, it is easy to believe that it has been ignored by teachers. This would suggest that learners have been progressing from grade 8 through to grade 10 without being taught anything regarding programming. This might not be the only aspect left out; there may be other aspects that have been overlooked and those which teachers are not well acquainted with. This view corroborates Robins, Rountree, and Rountree who explain:

Learning programming is hard and that programming is generally regarded as difficult, and often has the highest dropout rates in universities. It would take ten years of experience or training to turn a novice into an expert programmer (2003, p.137).

In light of the above, programming seems to be a difficult aspect of computers for teachers. If it has been dropped by university students doing computer sciences, then it should even be more difficult for a teacher who did not receive any sort of training in programming. This could also mean this aspect of learning may even be inappropriate for the grade 8 to 10 learners.

It was established from the semi-structured interviews that teachers in schools experience some difficulties in integrating computers due to lack of necessary computer knowledge and skills. Participants have acquired basic computer skills that do not provide users with relevant knowledge and skills for technology integration into teaching and learning. They could do basic operations like typing and creating documents. Surely, basic computer knowledge and skills would not enable teachers to use computers for teaching and learning, and due to the lack of competitive computer skills teachers will find it difficult to integrate computer technology in classrooms (Bingimlas, 2009:238). The following excerpts from the interview attested to this:

Um..., I have just the basics, of..., maybe opening the computer and typing (SM3).

I think the main problem that the teachers could face is their lacking of skills of using computers. Some teachers don't know how to use computers so far, some still need to learn how to use the computer. That one could be a challenge because they need to gain skills; that is when they can be able to use computers in their classes (SC2).

In addition to the views mentioned above, one of the participants (SC1) thought that teachers would experience a challenge from the learners they are teaching as many learners would have not yet seen a computer in the real world when they get to grade 8. As a point of departure, teachers in this predicament will have to make learners understand what a computer is before they are able to use it in their classrooms. To further explain the extent of the challenge, SC3 explained that other teachers are only able to switch the computer on and off, and nothing further. If such teachers were

required to go further into the computer, they would not be able to know what to do as they lack relevant knowledge and skills. This view correlates with a study by Shelly, Gunter and Gunter (2012:3) wherein it is stated that basic computer skills include, among others, turning the computer on and off, typing, saving and printing documents.

Though participants have basic computer skills, they still have some doubts about their use of computers and regard their skills as insufficient. This results from the majority of participants not being trained on how to integrate computers into teaching and learning. For this reason, participants believe that better skills could bring better education quality and standards. This notion was illustrated by SM2, who stated:

I think the quality and standard will improve significantly, though we need skills. We can have the computers, but without skills they will be useless (SM2).

As a means of reducing the challenge of teachers' lack of computer knowledge and skills, participants indicated the importance of training programs that will provide them opportunities to integrate computers in the teaching and learning activities. Participants believe that if the ministry made time for training sessions teachers would be catching up. The following excerpt illustrates the importance of training:

Unless they all do computer literacy training, and maybe introduce for all grades. I think the introduction of ICT at all levels will help. Upon this we also need qualified, trained teachers as I am not a trained Computer Studies teacher (SC1).

This would suggest that teachers in this regard might still require training to prepare them for integrating computers effectively in education. Such training cannot be offered as a short learning course done in a week, as it basically takes longer than most anticipated (US Department of Education, 1996:28). The finding is supported by Abuhmaid (2011:195) who saw training as very important and highlights that preparing teachers to utilize ICT across the curriculum is paramount to any successful ICT-related initiative. The need for training of all teachers will ensure their capability of integrating computers in the curriculum. A situation whereby only one or two teachers in a school are comfortable using a computer is very inadequate (Bingimlas, 2009:238). Additionally, the report by Camacho (2005:10) stresses continuous professional development for teachers, as they are at the centre of delivery of ICT instruction and its integration in classrooms. This is also expatiated by Buabeng-Andoh (2012:142) who mentions that teachers' professional development is a key factor to successful integration of computers into classroom teaching, and that, whether novice or experienced, ICT related training programs develop teachers' competencies in computer use,

influence teachers' attitudes towards computers, as well as assisting teachers to reorganize the importance and significance of technology as tools in student learning. For this reason, the Organization for Economic Co-operation and Development (OECD, 2001:16) believes that without sufficient investment in the professional development of teachers, effective technology integration in schools cannot be possible. The need for continuous professional development is further strengthened by Zhao and Bryant (2006:53) who state that:

Technology training that simply focuses on teaching basic computer skills is unlikely to ensure the successful infusion of technology into the classroom. To effectively infuse technology into the curriculum, teachers need to participate in intensive curriculum-based technology training that moves them beyond the attainment of basic computer skills to activities that teach them how to seamlessly integrate technology into the curriculum.

With reference to the PIE model, its application is not that evident under this theme as the theme is focused on the computer skills of the teachers. Though SC1 mentions what learners are expected to know by the time they get to Grade 10, it does not seem like there is any significant implementation of the PIE on a short-term basis by the teachers. The lack of skills to properly plan for computer use in classrooms appears to be at the root of the failure of the teachers to implement the PIE.

Theme 2: Insufficient technology resources and devices deprive teachers of the opportunity of teaching with technology

In terms of infrastructure, it was established that all the participating schools had computer labs in which most school computers are kept for use within the school premises. There were few computers that could be found in the secretaries' or the principals' offices. With regard to technology resources, all participants indicated the availability of computers in their computer labs, for example, data from the observations revealed that school A and B both had sixteen (16) computers whereas school C had thirty-one (31) computers in their school computer laboratories. This has made computer labs the strongholds of ICT in school. The idea of computer laboratories in schools is firmly backed by Hertz (2013:1) who stresses that "If a school does not have a library or can't afford to put a lot of technology into its classrooms, then a computer laboratory is a viable solution to provide access to students for digital learning."

Despite the fact that some schools are equipped with considerable numbers of computers in their laboratories, insufficient computer resources, and devices became apparent as one of the major challenges that, to a reasonable extent, proscribed the integration of computers in the teaching and learning activities. Participants collaboratively explained that they have been unable to pioneer the initiative due to lack of devices that they should use for teaching in their classrooms. The following excerpt illustrates the shortage and the need for such devices:

I think scanners, data projectors, printers, internet modems, webcams, and... I think plotters even though they are not necessary but learners learn about them (CS1).

This shows that if computers are really supposed to be more functional for teachers and learners, there is a need for more resources in the school computer laboratories or classrooms. To be in line with the requirements for being fully functional, a computer laboratory or classroom must at least have computers, a projector, a projection screen, a DVD or VHS player, a sound system, and a podium with audio-visual controls, laptop connection ports, cameras, smart boards, and other equipment relevant to the coursework or discipline being taught in the space (Seattle University, 2014:1).

The study established that the lack of technology resources impacts negatively on the quality of teaching and learning. For example, in larger schools with higher student enrolments a single data projector cannot sustain all the many classrooms. For effective teaching and learning to take place, each classroom in a school should have its own data projector. For this reason, Mumtaz (2000:336) saw the lack of computer resources as a serious obstacle in the process of computer incorporation in schools as it limits the ability of the teachers to use computers and all other ICT devices in teaching. He further mentions that limited resources normally contributes to poor computer integration, which in the process results in lack of sufficient computer experience for both learners and teachers. Devices such as a data projector and a computer per classroom can be enough for the teacher to begin integrating computer technology in lesson presentations, even if learners do not have computers in hand (Department of Education and Science, 2008:171).

Though schools experienced a challenge regarding hardware, participants indicated that the available computers have basic software installed on them, and most of them were running on Windows 7 operating system, whilst a few, mostly old computers, were still running on Windows XP. It was also captured from the participants that the computers have most of the basic programs that enable them to successfully teach Computer Studies. Such programs include versions of Microsoft Office, especially Office 7. To strengthen the availability of software, SC2 mentioned programs such

as Encarta Encyclopaedia, and the Mavis Beacon typing teacher program, necessary to address the curriculum content of the subject. Participants believe that software such as Encarta and PowerPoint can be of greater use in classrooms, because Encarta, as an offline encyclopaedia, can be accessed by learners even in schools without the internet; whereas PowerPoint makes it easy for teachers to create presentations with multimedia support of elements such as sound, graphics, animation, photos, and movies or video clips (Cavanaugh and Cavanaugh, 2000:496). One further benefit of computers to learning is illustrated in the following excerpt: “*a computer would have aroused the interest of the learners*” (ST1).

This would mean that if technology is used in teaching, learners would find learning fun. In a lesson where multimedia or computer simulations are used, learners are able to watch what they are being taught, see the complete process and hear the sounds, which allows them to process information in many ways (Najjar, 1996:4). They definitely will not miss a thing, as their concentration will be heightened by curiosity, and this helps them to pick up almost every detail of the lesson. This finding further amplifies Odera (2011:287) who mentioned that, “The use of media technology such as computers motivates students to learn various subjects effectively by making them want to learn on their own and challenges them to search information from the computer and the internet any time they are free.”

In addition to shortage of hardware and software, unavailability of an internet connection seems disturbing to schools. Participants believe the availability of the internet would benefit both learners and teachers. The following excerpts from the semi-structured interviews attest to the importance of having the internet at school:

Internet we have but our internet lines are not working, even the telephone line here, Telecom is saying they have a problem with underground cables, we were even proposing that they should bring us new cables (SM2).

This view indicates how lack of internet facility deprived both teachers and learners of information that they could use for teaching and learning. There are many benefits that both teachers and learners can obtain from the use of the internet. This view corroborates the United Nations Educational, Scientific and Cultural Organization (2003:6) which states that “The internet provides students with benefits such as enhancement of knowledge bases through the use of online educational literature, encyclopaedia, references, dictionaries, and databases which are freely accessed; there are also collaborative projects with students from other schools, universities, countries wherein different problems can be discussed.”

This theme brings to the fore lack of resources to be one of the factors that fails the implementation of the PIE model by the teachers with regard to the use of computers for teaching and learning. This means there is no evidence of the PIE in this theme. Participants suggest that due to the lack of resources they cannot plan, implement or evaluate for computer integration because they do not have the resources to do so.

Theme 3: Computer security risks challenge schools in the effectiveness of technology integration

For schools that have hardware resources, they often face security risks such as theft, vandalism, and misuse of computers. Participants explained that schools had some computer equipment but this has been stolen. This view is illustrated by the following excerpts:

Since last year our computers were stolen, and since then there has been nothing, they were not replaced (SM2).

I think the biggest would be security as I already mentioned our computers got stolen, I think we will also have problems with learners who may want to be playing games on the computers instead of putting them to better use, and learners may also be bringing in liquid stuff like water which is not allowed in the lab (SC2).

What makes the situation even more incomprehensible to participants is the fact that computers were obtained through donations, and this makes it difficult to have them replaced once they are stolen. It is not yet known why schools are experiencing burglaries at high rates where computer equipment is targeted. Perhaps computers are easily and quickly sold for easy money.

To substantiate on theft as a threat to schools, SC2 further mentioned that her school computer laboratory had sixteen (16) computers of which fourteen (14) were stolen, leaving only two (2) behind. This means the school has to function with two computers, which is impossible for teaching and learning. This situation will cause overcrowding of learners on a single computer. To alleviate this situation, participants mentioned that in the worst cases the teacher would present lessons in sessions to accommodate all learners, a privilege that is simply not there, as the same learners must attend other classes. In support of this finding is Guardian (2014:1) who mentioned that schools are increasingly targeted for costly ICT equipment, as they invest in expensive devices to meet the needs of the changing curriculum. For this reason, computers are quite expensive and cannot be easily

replaced by schools once they are stolen, especially in a developing country like Namibia (Gueye, 1989:78).

Burglaries may result from the lack of security in the computer labs where most computers are being kept for use. It is evident that schools are taking some precautionary measures to ensure care and security of equipment. The following excerpt illustrates the rules that are applicable to users:

We will have to be strict with the given lab rules, remove all the games from the computers, but as for security, it should be fixed by the management. The management must ensure the lab is secured. I have already spoken to the head of department concerning the security issue of the lab, and I am sure he is working on it. However, I am struggling with teaching at the moment as it is hard to teach computer without using one. I hope the management can help recover our computers fast (SC2).

Caring for computer equipment is another area of importance. Participants mentioned the environment wherein the computers are stored as being unsuitable to house delicate equipment as computers. It was found that the computer laboratories did not have facilities such as air conditioning systems, and carpets or tiles on the floor. These facilities are very important because computers are vulnerable to dust, and a computer lab without tiles or carpets makes them even more susceptible to dust settling within the computers' central processing units (CPU). The more dust settles and clogs in the CPUs the higher the possibility of computers overheating or beginning to malfunction. It is necessary and important that computers are stored in favourable room temperatures, and well-ventilated environments to ensure their optimum operation, as well as their durability (GCSE Bitesize, 2014:1).

Schools have also been experiencing technical complexities that require technical expertise to be resolved. This is a service or provision that the participating schools do not have, and are therefore faced with a situation whereby, at certain periods of time only a few computers are found to be working. It was discovered from the participants that, as most of the computers are donated, schools also have to depend on voluntary technicians to service the computers. The challenge is that the technicians are mostly employed on contract basis and, when the contract expires, they leave without replacement arrangements. The following excerpt illustrates the shortage of technicians as a challenge to schools:

Um..., it was a bit unfortunate some time because we had a volunteer teacher from Japan and this person was able to assist us in this regard, but now this year we did

not receive any because the contract of this other person I'm talking about expired last year. But, we filled in a form to apply for a new one, but up to this time this other person to substitute the one who left has not worked, I don't know what the problem there is (SM3).

This would suggest that for the functionality of the computers, schools require the services of a full time technician. The shortage of technicians creates a serious challenge for schools, as they already do not have enough computers. In one of the schools, the participant (SM3) explained that out of twenty-four computers there would only be five or six functional computers at times, and with those few computers a full Computer Studies classroom would be expected to run as normal. This finding corroborates with the National Education Association (NEA, 2008:2-3) which saw the challenge of computer maintenance and upgrade as a worldwide problem, and further states that quality technical support for computers and other technologies should be available in every school to ensure computer functionality.

This theme does not provide evidence on the use of the PIE model as it addresses issues regarding security of computer equipment and security of computer usage by the learners in relation to things learners can do on the school computers.

4.2.2 The benefits of computer technology to education

In response to the question regarding the benefits or uses of computer technology, data from the semi-structured interviews generated the following theme:

Theme 4: The general uses of computers do not imply technology integration in education

The computers serve a number of purposes in schools. They are mostly used as information sources, used for typing information, as well as using their communication tools and storing of information. Despite the fact that the participating schools do not have enough computers, schools have managed to utilize the computers in their possession. It emerged from the participants in this study that computers have not been used effectively for teaching and learning, but rather for administrative work such as typing and printing of examination papers and tests; storage of information such as learners' details and marks; printing of school reports for learners; and the creation of timetables. The following excerpts illustrate how computers are used in schools:

Teachers sometimes used to come and type tests, exam papers, or other kind of activities, we also stored certain information on those computers, such as student marks, memos, examination marks, tests, etc (SC2).

With the administrative part, there is a new program which the ministry has introduced, the school-link, even though it's still in its infant stage, but now a lot of information about the school learners and all these other things we are now trying to store them in our computers. Even now, our time table and reports we normally use computers, we don't do them manual, but, we normally also use them to our correspondence, our tests, examinations; all these we do them on our computers (SM2).

It was also established that the school computers are being used for an Edupac program that connects all schools to a main server. Through this program, administration and connection of schools to a single regional database that is attached to a national database has been created, and it is through this similar program that schools have been able to create their timetables using computers. All these aspects of successful usage of computers have been a breakthrough for the participating schools with regard to computer use, despite the failure to diffuse them into classrooms for integration. Unfortunately, though, these means of computer use are just generally applicable in schools but not categorically for teaching and learning in the classrooms. This finding supports Balanskat who states, "Amongst all these uses, administration so far appears to be the most common area through which computers are being used in most schools" (2007:18).

From this explanation, one can tell these schools are still far-off in their efforts to succeed in integrating computers practically. In order to expand the extent of information access, the school curriculum should have standards that include technology as an instructional tool to facilitate learning through interactive, real-time, and other multimedia approaches; and require students to use technology as an integral part of their class work in a manner that enhances and encourages creativity and learning of higher-order skills (NEA, 2008:3).

Despite computers being used for administration, computers are used by individuals (teachers and learners) as an information source. This happens in cases where teachers are preparing lessons and seek extra information to expatiate on the textbook content. The learners also visit the computer lab mostly during study times to search for information on the topics they may have done in the class, or search information to complete an assignment. In complimenting this function, one of the participants (SC2) mentioned that the computer lab provides an alternative to the school library. After all, it is easier and effortless to check for information on the internet or from Encarta than getting it in a normal library.

Computer Studies as a subject came out to be the major aspect in which school computers are being used in all schools. Computer Studies is one of the newly introduced subjects in the Namibian education curriculum, and aim to prepare the country's youth for life outside the classroom. To determine the importance of this subject, data revealed aspects of the subject's application to the learners' future workplaces and skills for self-employment in the following manner:

Wherever you go... Whatever work you do or you apply for they need these computer literate people so it means one must have the basic skills at least, and almost these days everything is done by computers (SC1).

Participants believe computers are an element that has become essential in the current world's workplaces, and necessary to education, as learners will gain computer skills before they finish school. This finding is supported by Dempsey (2010:1) who articulates that:

Virtually every employer, regardless of the field, now seeks candidates with some degree of computer literacy. Even creative fields like art and design rely heavily on computer programs these days.

In the same breath, participants are positive and had a vision for the inclusion of computers in schools. The following excerpt illustrates a positive attitude on computers:

I think computers can improve the quality and standard of education because they will provide information access, computer skills, they will also make teachers' work easy, and also save time. I think they can really bring a positive change (SC2).

The participants believe that the impact of computers depends on how they are being used in the school, because if their use is not properly monitored and controlled, they can prove to be a negative distraction to both teachers and learners. This is an understandable assumption because if there is no proper control of computer usage in schools, the possibility that the distraction will negatively affect the quality of education instead of improving it is very high. Therefore, careful consideration should be given and regulative measures put in place to ensure that computers are used as they should.

For this reason, schools will develop ICT or computer policies that will support the successful integration of computers in the teaching and learning activities. Such policies are integral to the proper use of ICT devices that schools will be able to accrue. Participants also indicated that computers make the teachers' work easier, and in the process reduce the workload of the teachers. "ICTs including computers are capable of reducing the workload of teachers provided the necessary

requirements supporting the development and progression of ICT in schools are put in place. These include technical support, training for teachers, and the access to computers (Becta, 2004:3).

It is evident from the study that the participants were not aware or informed of the school ICT policies stipulating on how school computers should be used by both teachers and learners. However, participants were aware of the possibility that there were rules regulating and controlling computer usage in schools, especially in the computer lab, but they were not aware of any policy. This can only mean two things: firstly, the policies are there, but shelved in management offices, and not communicated to the teachers and learners; secondly, the policies are not drafted, and that means the rules should now serve as policies. The situation does not help schools much, and this also means that there is no fairness or equity in the use of school computers. In support of having a school computer policy, Raker (1997:1) states that schools must develop written computer policies, and these policies must clearly state that all students have equal access to computers. Raker (1997) adds further that the policies should help guide teachers in computer use.

The theme addresses the variety of ways that computers have been used in schools, which clearly shows that they have not been integrated into classrooms in practice. As part of the uses, the theme indicates that the planning phase of the PIE model is being implemented in this theme as teachers use computers to type and print materials such as tests, handouts and other classroom activities. Unfortunately the full intention of the PIE with regard to computer technology integration is not realized as computers are used only in the planning phase of the theme.

4.3 PRESENTATION OF OBSERVATION DATA

Classrooms and lesson observations were carried out in the three schools that were participating in the study. There was a single classroom observation conducted for each of the participating schools. Each observation lasted between 40 to 45 minutes, depending on the time allocation of periods in the different schools under investigation. The observations were meant to determine whether participants used computers in their lesson presentations, and whether classrooms are equipped with computers and related devices. This means that these observations were to address the first research question which seeks to explore the extent that computer technology has been integrated in the real classroom situation where teaching and learning are most likely to take place. The findings of these observations are categorized and discussed according to individual schools.

4.3.1 The extent of computer technology integration in teaching and learning

School A

With regard to computer use in classrooms, this was the only school in which a computer was used to present a lesson during the observations. As is the situation in all schools, this school has its computers in the computer lab and some in the administration office. It emerged that this school lacked ICT resources in the classrooms.

However, in a lesson presentation observed at this school a teacher presented a lesson in a Physical Science lab using his personal laptop and the school data projector. This was an effort that indicated that teachers could actually try to integrate computers in their lessons if they had some computers and related devices allocated to them. The fact that this teacher went the extra mile to bring his own laptop to the school for presenting this lesson shows that teachers are willing to go to that extent, as computers help them in many ways in the classroom context, such as teaching, record-keeping, and general administration (Beaudry, 2004:1). Apart from the data projector that he basically booked out of the computer lab, it was clear the science lab did not have any type of computer devices in it, just as it is the situation in all the other classrooms in the school.

Concerning the teachers' skills in using computers, it emerged from this observed presentation that the teacher had an idea of how a computer can be used. Seeing a computer and data projector in the classroom was very exciting for the learners, as they could not stop trying to check what the teacher was doing with the devices and kept on whispering to one another. The projector and computer were simply used as substitutes for chalkboard and chalk, not really brought in for active learning, as one would have expected.

The researcher understood, though, that with considerable skills, teachers could present very attractive and educational lessons to the learners using simulation programs and media-enabled programs that have audio-visual capabilities. Unfortunately, for this observed lesson in which a computer was used, the projected content was mostly just prepared notes, which learners copied in their summary books. The inability of the teacher to present a more appealing lesson with the use of a laptop and data projector can be highly attributed to the lack of proper computer training, as the workshops that most of the teachers have had were not sufficient to equip them with necessary skills and knowledge (Sherwood, 1993:74).

Even though the real intent of computer technology integration in the classroom was not fully realized as this was due to the choice of software used to present the lesson, there was considerable

evidence of the PIE model in the lesson. The teacher managed to plan and present (implementation) his lesson with the use of a computer. However, the teacher was not successfully able to evaluate the lesson accordingly with the use of the same tools, and did not provide a reflection on whether or not the lesson was a success and evaluate the effect of the tools used.

School B

The lesson presentation observed at this school did not yield any relevant information, as the teacher did not attempt to use any type of computer device for the lesson. It was established from the observations that there were no devices related to computers in the classroom, which actually explained why the teacher did not use any. The lesson was observed in a Biology science lab, and was based on enzymes. There were charts pasted on the lab walls, and learners were using test tubes, petri dishes, microscopes, an overhead projector, beakers, and burners, which are all normal in a Biology science lab.

It was not possible, however, to observe or tell if the teacher has the appropriate skills to incorporate computers in her lesson presentations, as she did not use any such devices in this lesson. The lesson was itself not a hindrance for the teacher to use a computer; in fact, it was very much possible that the teacher could have used a multimedia program like Encarta (Microsoft Encarta, 2001:1) to simulate the activities of different enzymes on different food nutrients. The fact that the teacher did not opt to use a computer can also still be attributed to the lack of devices and skills. The school had computers in the principal's office and the other computers, basically two computers that were left of the lab's stolen computers, were kept in the strong room for safekeeping.

School C

As at School B, the classroom observation at School C yielded little because the teacher did not use a computer in the lesson presentation. The classroom was not equipped for computer integration by any means as there was no single computer-related entity used for teaching in it. This was a Geography lesson presentation on population, and there could obviously be many choices of simulated or multimedia data the teacher could have used to present the lesson using a computer. All there was for the teacher to use in this lesson was the textbook, the chalkboard and charts; elements that make the classroom environment more traditional and less appealing for most learners in the contemporary world (Ang and Wang, 2006:8). It was, as well, not possible to determine the

computer skills of this teacher through observations as he did not use a computer in his lesson presentation. The school computers were also located in the school's management offices and in the computer lab.

Though there was evidence of the PIE model used in the sense that the lesson was planned and implemented through successful presentation and evaluation in a normal Biology lab circumstance, the implementation of the PIE in regard to computer technology was not there. There were no computer devices used in the lesson.

4.3.2 Observation summary

In analyzing the data from the observation, it emerged that in all of the participating schools, computers were located in two common places, which were the computer labs for Computer Studies and the administration block where they are being used by the secretaries and the school management teams. This means that there were no computers in classrooms in all of the participating schools, and in some infrequent cases, teachers used their personal computers with a school data projector to present lessons. This showed that, if provided with the equipment, teachers could really be doing a great job in steering the integration of computers straight into the classrooms. It also became clear from the teachers' failure to use computers for lesson presentations that they needed adequate training that would practically enable them to use computers effectively in the classrooms. Based on the observations, it remains a profound need that teachers are trained in using computers for teaching. This would really help the course of integrating computers in the classrooms, and in the process pave the way to the country's better future. It is not an easy thing for teachers to do away with the traditional or familiar ways of teaching if they are not acclimatized into the new methodologies and practices of teaching using computer technology (Poole, 1995:198).

As it was with school B and C, the general implications of the PIE in terms of lesson planning, presentation and evaluation were fully sustained in the lesson. However, the use of the PIE in terms of computer technology integration was not applied in the lesson as there was no computer equipment used in the lesson apart from the normal items such as the chalkboard and charts.

4.4 PRESENTATION OF FOCUS GROUP DATA

Focus group discussions were conducted in two schools (School B and C) where there were two sittings of seven to eight participants in each of the focus group discussion. The focus groups lasted

for approximately 60 minutes per sitting. These focus groups were intended to establish from the participants how computers are being used in their schools by both teachers and learners. The analysis yielded three themes: learners are capable of learning new skills; shortage of technology devices affects learning; and technology benefits learning. The analysis is further discussed and presented in the next section through befitting themes.

4.4.1 The extent of computer technology integration in teaching and learning

In response to the first question, which enquires of the extent that computer technology has been used and incorporated in the teaching and learning processes, analysis of the data from the data from focus groups culminated into the following theme:

Theme 5: Shortage of computer devices affects learning

Shortage of computer devices for learning became a concern to the participants in all the focus groups. Participants explained that there were no computers or computer-related devices in their classrooms. The absence of computers in classrooms, as confirmed by a participant at School B, is demonstrated in the following excerpt:

We don't have any computers in the classrooms. The computers are only found in the computer lab, and sometimes in the staffroom or the office of the principal, but not in the classrooms. Unless, if a teacher brings his own laptop for a certain lesson (B7).

The participants' strong criticisms of the lack of computers in the classrooms and their vehement requests for computers in the classrooms summed up the situation of classrooms with regard to incorporation or integration of computers in teaching and learning in these schools. This concern is further echoed by Simataa (2013:1) who mentioned that it has been over two decades since the first Namibian ICT policy for education was adopted, yet computers and other ICT devices are still seen only in principals' offices, secretaries' offices, or school computer labs in just a number of urban schools.

This further vindicates the assumption concerning the absence of computers in Namibian classrooms, and strengthens the postulation that, if urban schools are faced with problems of lack of resources, then the situation should be worse in remote areas. Participants further pointed out that the computers in the schools were normally kept in the computer lab, where they are primarily

used for Computer Studies and in most cases by the learners doing the subject, despite it being intended to be a computer centre for all learners and teachers. This idea is illustrated by a participant at School C in the following excerpt:

Yes we have a computer lab though the computers are not enough. Both teachers and learners go there at different times. It is meant computer learners but. Learners use the internet to complete assignment or homeworks, I think some teachers too search for information (C8).

This finding is supported by Trucano (2011:1) who mentioned that the school computer lab is often the locus for technology use in schools. Participants, however, even those who are not doing Computer Studies, indicated that they had access to the computer labs, even though it was limited because some learners play games on the computers. The fact that some learners play games in the lab makes the computer teachers or coordinators to come up with tight rules to be applied in the lab.

This means that both teachers and learners have been equally using the school computer labs, especially for the internet. It is also interesting to note that participants recognize the fact that learners have been using the computer lab to complete their given tasks such as assignments and homework (Miller, 2009:4-5).

It is an indication that, despite the limited number of devices in the computer labs, both teachers and learners have been benefiting from them, and such benefits have not gone unnoticed by the participants. The benefit of computers to teaching and learning is illustrated in the following excerpts:

Yes. Mostly it is used for researches since it has internet. Both teachers and learners have access (C2).

Yes, teachers use it to search for information on the lessons, but it is not easy for us learners who are not doing computer to go there (C15).

It also gives an idea that the computer labs could really be overhauling and boosting school performances if they had all the necessary equipment needed to further the learning process and understanding of the learners. Apart from the computers being used for searching for information, the basic use that emerged from all participants was that computers were primarily used for administrative purposes. The administrative purpose of computers is demonstrated by a participant at School C in the following excerpt:

I only see that computers are being used for typing and printing of exams, tests, projects, school reports, handouts and I think letters to parents. If there are other uses maybe those that we cannot see. As for classrooms, it is not common to see a computer there being used for teaching, maybe in the future (C5).

This finding is verified by Devi (2014:1) who explains that computers in schools are mostly used for keeping records of registration figures, attendance, examination grades for learners, admission, registration scheduling, dropouts and additions, class rosters, student aid, fees and scholarship, testing and evaluation, and enrolment. The finding is further supported by section 2.4 of chapter two (cf. 2.4.2 and 2.4.5), which elucidates the use of computer technology for administration and assessment purposes.

4.4.2 The benefits of computer technology integration to education

Analysis of data from the focus group discussions in relation to the question regarding the benefits of computer technology to teaching and learning yielded the following theme:

Theme 6: Technology benefits learning

Despite the lack of technology resources and related devices participants indicated that most of them had mobile phones that had internet connections, and they used these gadgets to complete their school tasks such as assignments, homework, projects, and investigations by using online tools such as Wikipedia, online libraries and dictionaries. This notion is supported by Purcell, Heaps, Buchanan and Friedrich (2013) and Barseghian (2013). According to Barseghian (2013:1) cell phones, when best used, can seamlessly facilitate the activities of learners and teachers in thriving classrooms. Although mobile phones are banned in most schools, they play a critical role in teaching and learning. Smart phones provide both teachers and learners access to the internet at all times, inside and outside the classroom. This notion is supported by Higgins (2013:1) when explaining that:

With mobile apps and the internet at their fingertips, teachers and students are now using phones as clickers to answer questions, providing feedback on student progress, and also to document labs, collaborate on group projects and capture teachers' notes.

Participants felt computers brought information closer to them through the internet, as well as offline encyclopaedias, and for these reasons participants felt that computers could serve as alternatives and solutions to the lack of textbooks in schools. This point was made in reference to the element of information accessibility that comes along with technology, especially the internet, as a search tool.

This idea is illustrated in the following excerpts by a participant at school C and further supported by a participant at school B:

With all the information a person can get on the internet, I believe computers can really help our education standard (C5).

I think it can improve teaching and learning because it does not make the teacher talk a lot which can be boring sometimes. If teaching and learning, improve, then the quality will also improve (C13).

These ideas were verified by Webb (2001:1) who explained that, when using technology, learners are able to charge forward, plan their own projects, ask their own questions, and check for authentication by the teacher, which helps change the role of the teacher to that of a constructive facilitator instead of an expert. This finding is profoundly supported by Rusten (2010, cf. 2.4) who stresses that when computers are used efficiently and effectively they can improve and accelerate learning.

4.4.3 Learners' perception on computer technology in education

In regard to the third research question, which explores and assesses the perception of the learners in the use of computer technology as a learning tool, analysis of data from the focus group discussion generated the following theme:

Theme 7: Learners are capable of learning new skills

Participants from the two schools were found to be computer literate as they indicated that they were able to use the computer. It also emerged that participants with basic computer skills were able to do advanced operations such as downloading music, searching for information on the internet, downloading and playing games. Participants further indicated that they could create documents using Microsoft Office applications, type and save documents, mix sounds, paint, draw, record sounds, print, use the computer media, and data projector, and communicate through Facebook. It was also discovered during the discussions that most of the participants that could perform these advanced computer operations had computer access in their homes, which helped improve their skills, as well as through their exposure to Computer Studies as a taught subject in their schools. This finding concurs with Roberts (2006:3) who states that students who are exposed to computer technology on a daily basis become accustomed to and familiar with basic operations and are most likely to go beyond basics. Surprisingly, participants could do a lot more than their basic computer

skills, a situation that can be highly linked to the curious minds. The aspect of curiosity as crucial to the participants' acquisition of basic computer skills is illustrated by Arnone (2011:1) who explicated that:

When students are magnetized by a new idea or a new situation and are compelled to explore further, regardless of external rewards, they can be said to be truly motivated.

Computers are new things to most learners, and the eager learners are highly motivated to try to explore and understand how they work; in the process, they develop skills some of which they are not taught in school. The finding suggests that most of the participants would not struggle to use computers to their advantage for schoolwork if they had computers in their classrooms, as is evident from a participant at school B and C, who explained:

Yes, I can get information from the net (internet); I can create documents and a lot of stuff. I got computer skills through BIS and I have a computer at home (B7).

Yes. I can download music, mix audio sounds, type and I also know how to use a projector (C2).

In terms of both knowledge and skills, it cannot be denied that participants who have access to computers in their homes have the advantage over other participants who only get to touch a computer at school. These participants have time to explore the computer without limits and can even use these computers to study, especially if they have an internet connection. They stand a better chance of performing a lot better as compared to those who do not have computer access at home, as home computers and internet access have now become integral to the way learners study at home (The Guardian, 2012:1).

4.5 CONCLUSION

This chapter discussed the analysis and interpretation of results in the study. The analysis was discussed under the data collection strategies used in the study: semi-structured interviews, non-participant observations and focus group interviews. Quotes were used to verify the findings, and interpretations were supported with literature. It was strongly established from the research that computers have great influence on the standard and quality of education. Participants made reference to the vital part that the internet plays, and that which it can play in the academic structure of the Namibian education system and there is clear willingness and disposition to embrace ICTs in schools.

However, there were challenges that proved to be substantially impeding the integration of computers in schools. Participants, especially school managers and teachers, cited the issue of lack of proper training regarding how they could use computers and other ICTs for teaching.

The chapter that follows discusses the summary and conclusions of the study, as well as recommendations that emanated from the study.

5.1 INTRODUCTION

The use of computers in teaching and learning in the classrooms of the three concerned schools is practically not effective. This study sought to explore the state and level of computer technology integration in Namibia and investigated three central schools of Katima Mulilo, and in the process it assesses the extent to which computers are used in different schools in the country (see 1.3 and 1.4). The study established that schools that have computers use them specifically for administration purposes rather than for teaching and learning. This chapter presents the summary of the findings of the study. These findings relate to the objectives of the study, which were:

1. To explore the use of computer technology in teaching and learning.
2. To identify the benefits of computer technology in education.
3. To understand the perceptions of learners on the use of computer technology.

5.2 SUMMARY OF THE MAIN FINDINGS

The study generated themes in response to the research questions and trends from the three main data sources: semi-structured interviews; non-participation observations; and focus group discussions that investigated the impact of computer integration on the quality and standard of education in Namibia. The themes were explored in the previous chapter (chapter four) and they are now summarized. Findings from the participant observations are also summarized. In addressing research questions 1 and 2 six themes were generated. Themes 1, 2, 3, and 5 address the first research question while themes 4 and 6 address the second. The main findings of this study are summarized according to the research questions as outlined in chapter one, paragraph 1.3.

5.2.1 The extent that computer technology has been integrated in teaching and learning

According to theme 1, teaching qualifications, experience and computer knowledge and skills influence effective technology integration in teaching and learning. The lacks of proper computer qualifications, computer experience, and exposure all of which lead to computer knowledge and skills have made it difficult for teachers to integrate computers for teaching. This has led to the failure

of learners to use computers as learning tools. Themes 2 and 5 indicate that insufficient technology resources and devices deprive teachers of the opportunities of teaching with technology. Schools do not have enough technology resources such as computers with necessary hardware and software to enable them to use computers as teaching tools. This confirms the assumption that Namibia still lacks resource to classroom integration of computer technology (Kukali, 2013, cf. 1.1). According to theme 3, computer security risks have been a challenge for schools due theft, vandalism, and misuse by learners, which affects the effective integration of technology in schools. A key finding from the non-participant observations was that computers were mostly used for the teaching and learning of Computer Studies, and for administration purposes in schools. This means that computers were primarily not used as teaching or learning tools in other subjects, except Computer Studies, a subject that learners cannot learn without a computer. The non-participant observations also indicated that school computers were stationed in computer labs and administration offices.

With regard to the PIE, findings from the observations indicate that, though teachers strive to plan for lessons that may require integration of computer technology; they lack the technical skills to ensure practical integration once in the classroom. The main finding deduced from the observation is that, despite having well outlined lesson plans, teachers still fail to ensure implementation of the components that require the use of computer technology. This failure to ensure successful implementation means the final stage of evaluation is just as much overlooked in the process, and this is as well related to the lack of computer skills and lack of resources. It was further observed that in some rare cases teachers may have access to computers but do not really have the skills to use them for teaching in the classrooms. Another key finding was that teachers who brought computers to teach used programs that are not interactive in the lesson presentation instead of using interactive programs that allow simulation, and support audiovisual functionalities in order to ensure explorative learning (Osin, 1998, cf. 2.4.2). Findings further showed that though there was the conventional implementation of the PIE through lesson planning, implementation and evaluation, there was no apparent usage of the PIE with regard to computer technology integration in classrooms.

5.2.2 The benefits of computer technology to education

Theme 4 identifies the uses of computers, which do not necessarily imply technology integration in education. The main finding was that schools use computers as information resources, typing, communication, information storage, and further administration purposes, which do not have direct

implications on integration of computers in classrooms. Theme 6 stresses the use of technology with regard to cellphones as beneficial to learning. The major finding was that both teachers and learners used internet-enabled cellphones as sources of information when preparing tasks or completing school tasks. Teachers and learners appreciated the contribution that cellphones have made to their professional and academic lives. These findings largely collaborate with section 2.4 of chapter two, which clearly articulates the possible uses of computer technology.

5.2.3 The perceptions of learners in using computer technology as a learning tool

Theme 7 explains learners' capabilities of learning new skills. The major finding indicates that learners have welcomed and embraced computers, and are willing to learn how to use computers as learning tools. Learners who had access to computers at home seemed to have been using computers to complete school tasks and were able to do other advanced computer operations, which showed their willingness to explore the computer and use it to better their learning.

5.3 RECOMMENDATIONS

The following recommendations are made with a view to improving the quality and standard of education in Namibia:

5.3.1 Provision of training for teachers

Teachers play a major role in the integration of technology in teaching and learning and this they cannot do without the relevant technology, knowledge, and skills. As verified from the literature (see Rusten, 2010; Tinio, 2003), computers have proved to be a very effective tool in inducing quality in teaching and learning. Yet, for teachers to be able to take advantage of the potential of the computers, they need to have knowledge of how computers have to be used. The need and importance of training for teachers in the use of computer technology is further stressed by Fouts (2000, cf. 2.4.1). This is the reason for the government to come up with a training program that will be efficient enough to develop teachers' technology knowledge and skills. Once teachers are trained on this aspect, they will be embracing the initiative. It will be in the best interest of the government and the country's future if the teachers are professorially equipped for the integration of computers in classrooms. The easiest way to prepare teachers for integration of computers in schools would

be to provide them with the appropriate level of training, so that they do not find it hard to implement the initiative. The best way that the Ministry of Education can go about this training is by making Computer Studies or Educational Technology a compulsory promotional subject in the teacher-training curriculum at the university level. The government through the education ministry needs to create or establish a system through which computers can get into schools and be effectively used for both teaching and learning. The idea of a systematic approach to integration, mostly at school level, is informed by the classroom implementation theories of Newby, Stepich, Lehman, Russell, and Ottenbreit-Leftwich (2011).

5.3.2 Provision of computers to schools

The initiative of computers in education was not initially established by individual schools or donor organizations such as NGOs. However, it now appears as if schools must make efforts on their own to have computers, and such efforts have always included soliciting donations of either money or computers from private organizations. The fact the country adopted an ICT policy for education is a clear indication that the government, in effort to coagulate with UNICEF's ICT regulations for education, authored the initiative in the country. This means that the government must take responsibility to equip schools with the necessary ICT devices, including computers, which are necessary for the advancement of computers and ICT in education. The issue of computer technology infrastructure is also mentioned as an influential factor in the process of integration (see 2.2.3.3), which also includes training of teachers. With trained teachers and substantial access to devices, there is no way the country's education will not be brought up to the competent standards and quality that the government seeks to attain. Therefore, the government, through all possible means that can be employed and engaged in this regard, must provide schools with all the devices they need for the practical integration of ICT and computers in education. The government in its effort to pioneer and foster a successful integration of computers in education, especially in schools, must ensure that every school that has computers should as well have an internet connection. This suggestion is further stressed by Newby et al. (2011, cf. 2.2.1) who mention that modern countries should at least have computers in classrooms.

5.3.3 Ensuring security of school computers

Most of the computers that schools have were acquired through donations from NGOs and missionary organizations around the country and only a very few computer sets, or none in some

schools, have come from the government. Yet, these computers are not safely secured in the schools as they have become increasingly targeted by thieves who are easily broken into the school computer labs. The government needs to help secure the school computers by all possible means such as installing efficient security alarm systems, installation of security doors and windows, or even placement of security guards onto schools to keep watch of school property, including computer labs.

5.3.4 Equal access to resources

It has been discovered that only a certain fraction of learners in the three schools has been given the privilege to use computers whilst the majority have to progress without such a privilege. The government must, therefore, come up with a strategy to ensure that every Namibian learner has the same privilege to use computers, just as they all have the right to education. All of the Namibian learners must have had the same opportunity to computer access by the time they reach grade 12, and this can only be possible if the government makes it a priority for the Namibian learners (see 2.2.3).

5.3.5 Make Computer Studies a subject in upper primary

It is proving a challenge for teachers that learners only start learning Computer Studies when they get to grade 8 after having gone through seven years of primary education. It would be more appropriate that, at least by the time they get to grade 8, they have already been introduced to computers and have understood basic computer terminology and concepts so that the computer would no longer be such a new thing for them. This is why the researcher recommended that the government introduced Computer Studies at least from grade 5 in the primary education curriculum. This would help learners get accustomed to computers at an early stage of their education with levels of competencies improving as learners keep on progressing from grade to grade.

5.3.6 Establishment of a systematic approach to integration

Many of the failures of integrating computers in the Namibian education system, particularly in schools, have been due to the approach through which the initiative has been implemented. There do not seem to be a well-founded structure through which computers or ICTs should be integrated

in schools. In fact, most schools that recognize the dynamism of a computer just come up with a means of obtaining one or two, mostly to be utilized for administration purposes in the school, but not for teaching and learning purposes. This is basically why there are a number of schools in the country with computers that serve no purpose with regard to the practices of teaching and learning. The government through the education ministry needs to create or establish a system through which computers can get into schools and be effectively used for both teaching and learning. The system should be able to prepare schools, especially teachers, on how they are going to use the computers once they are brought into schools, instead of just dropping computers in the mere hope that they will be integrated in teaching. The idea of a systematic approach to integration, mostly at school level, is informed by the PIE and the classroom implementation theories of Newby, Stepich, Lehman, Russell, and Ottenbreit-Leftwich (2011, cf. 2.5).

5.4 LIMITATIONS

Despite the fact that the basic objectives of the study were all achieved and healthily sustained, there were a few obstructions that were also endured and the researcher recognizes these as follows:

- 5.4.1 There were possibly many participants who should have taken part in the study, who are all stakeholders in education; however, due to the element of time and resources, parents, education inspectors, and ICT technicians could not be included among the participants as initially intended.
- 5.4.2 There were primarily six intended focus group sittings spread over the three participating schools where each school would have two sittings; unfortunately because learners were beginning to prepare for examinations, there were no focus groups conducted at School A.
- 5.4.3 The researcher intended to interview at least five teachers at each participating school, but time could not permit this; therefore, there were only three teachers including a school manager interviewed per school.

In spite of all the mentioned limitations, the study still went ahead and it is fairly judged from the findings that it was still a success in the end.

5.5 SUMMARY

The overriding purpose of this study as described in chapter one (see 1.4) is to investigate the state of computer technology integration in Namibia's education system, particularly at school level. This was done through the use of semi-structured interviews, focus group discussions, and non-participant observations. The study was completed using a qualitative research approach as described in chapter three. To achieve this goal a literature review on (1) the global landscape of computers in education; (2) information and communication technology policies in the developed countries; (3) information and communication technology policies in developing countries; (4) information and communication technology in the education perspective; (5) the uses of computers in education; and (6) strategies for integrating information and communication technology in education, was undertaken. The literature review as discussed in chapter two did not only identify themes that emerged in previous studies and gaps that need to be filled, but also helped to locate the study within relevant educational theories. Data analysis was discussed in chapter four. This chapter (chapter five) discussed the main findings in relation to the objectives of the study, organized and placed within the context of a theoretical framework. The limitations of the study were also discussed. The chapter further discussed the conclusions that have resulted from the study, and it ended by addressing recommendations for policy and practice, and future research.

5.6 CONCLUSION

The findings established in relation to the main aim of this study indicate that there is still much that needs to be done with regard to the practical integration of computer technology in teaching and learning. This is because the study established that computers in schools were not used for teaching or learning, which means they have not been integrated. This further means that more traditional means of teaching are still common in many schools in Namibia. The study also established that there were challenges that schools faced with regard to integration of computers in the classrooms. These challenges include the lack of resources such as computers, computer hardware, and software, and the lack of knowledge or skills by the teachers. This means that if teachers had the skills and were equipped with the necessary computer skills, they could help the integration of computers in teaching and learning with ease. Despite the challenges that schools are faced with, the study indicates that both teachers and learners are willing to see computers brought into classroom and be used for teaching and learning, especially laptops, which they believe are most portable and can be easily taken to and from the classrooms for security reasons.

Data from the study also shows that both teachers and learners have been using cellphones to do school work, a development that gets support from Higgins (2013), who articulates that cellphones have become an element that cannot be overlooked in education. The aspect of cellphones cannot be denied because internet-enabled cellphones are just more like a computer connected to the internet and can be just as useful. This brings into perspective the question of whether cellphones should be permitted in classrooms, as this proves it is a learning tool with practical benefits. Cellphones have become a part of everyday life today, and almost all learners have cellphones, especially those in urban schools as verified by this study; yet, their presence in schools has always been questioned by detractors who are not in support of having cellphones in school.

The study also indicated that both teachers and learners recognized and appreciated the expanded usefulness of a computer in teaching and learning. Data further showed that both teachers and learners recognized other benefits that computers bring into the sector even though such benefits do not have direct implications on the classroom integration of computers. With regard to the uses of computers in teaching and learning, the study indicated that using computers to teach empowers learners to learn on their own, and most of the things that teachers used to do before computers came into classrooms are reduced, and learners begin to do more. For example, teachers would have to write on almost every inch of the chalkboard in the past to provide learners with notes, summaries, instructions and tasks, but this is no longer the case in these schools as they can pre-type and print notes.

Teachers were, before computers, required to manually create learners' school reports or progressive reports, something that required too much time and energy; however, the study indicates that in modern schools teachers are simply required to enter the marks and details on the computer and the school reports are automatically created and printed for the learners. The study shows that, though teachers have not been able to use computers as teaching tools directly in the classrooms, their workload still were reduced significantly with the introduction of computers. The study also indicates that teachers who have basic skills and have computer access at home or at school, have been using computers to prepare their teaching and learning materials; after preparing the materials they print them and make enough copies for learners. When these teachers come to the classrooms, they do not have to write all notes or instructions on the chalkboards as these are already prepared. They simply do examples and give a few explanations, and then disseminate handouts to learners. This enables teachers to have more time attending to learners' learning needs and retain enough energy to give them more tasks and provide feedback timely. When the aspect of reduced workload is put into perspective one cannot help but wonder how much attention teachers would be able to

give to their learners if they were already using computers as teaching and learning tools in the classrooms.

The study further indicates that learners are ready for computers in schools, and show indications that they want to learn using computers. Learners with access to computers and with considerable skills to operate a computer indicated to have been using computers to conduct school research and complete school tasks. However, though the issue of computers in classrooms received overwhelming support, there are learners and teachers who are sceptical about it as they feel computers can also turn out to be a distraction to learners. This is a very feasible presumption because it is highly possible and practicable that, if computer usage in classroom is not well guided and monitored, both users and non-users can seriously get distracted from their school work (Montgomery, 2013:1).

A close scrutiny of the disruptive concerns of computers in classrooms brings to light a situation that can easily be overlooked when we talk about computers in education. It is a viable possibility in the sense that, as much as computers can help learners improve their performances; they can equally make learners fail if they are not used as they should be. For example, games and social networks are such addictive computer features for teenagers, who can easily get carried away with them to an extent that whenever they see a computer the first thing that comes to their mind is games or Facebook (Kuss and Griffiths, 2011:1). This means that strict control measures should be put in place to ensure computers are not abused by both teachers and learners, or possibly block access to social networks, and delete or uninstall all games from the school computers. These are just a fraction of possible solutions to combat the abuse of school computers.

5.7 REFLECTION ON THE RESEARCH

The researcher feels the research was a success, despite a few shortcomings, and this he determines was based on the fact that he was able to achieve the basic aim and objectives of the study as stipulated from the beginning of it. However, the researcher feels that, with more time and adequate resources, the study could have been broadened to a wider scale, so as to cover all the intended participants of the study and cover more schools in the region. Nonetheless, with the positivity and support the researcher received from all participants, as well as the willingness of the participants to share their experiences and knowledge, the researcher feels the study went smoothly and did not have many hindrances, which led to the successful completion of it all. The findings and results of the study provide a profound background as to how computers have, so far, been generally

used in Namibian schools, and it further provides details on how computers have been used to advance teaching and learning in other countries. Finally, the study comes with recommendations on what the country has to do in order to successfully integrate computers in its education system and be able to impute quality and high standards to the sector.

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APPENDIX I

INTERVIEW SCHEDULE FOR SCHOOL MANAGEMENT

1. How long have you been in the teaching profession?
2. What subject(s) and grade(s) do you teaching at this school?
3. How long have you been principal or HOD at this school?
4. What is it that you can do on a computer?
5. What formal qualification/training do you have in computers?
6. How are computers being integrated into teaching and learning at this school?
7. Have there been workshops or training seminars arranged to train teachers on how to integrate computers in their classroom?
If yes, how have the teachers responded to programs?
8. How has the school computer lab been useful to both teachers and learners?
9. What problems have you encountered so far in regard to computer integration, security and management of the school computers?
How have you addressed such problems?
10. Apart from normal computer sets what other computer technology devices do you wish to have at your school that you do not have at the moment?
11. What do you think is the impact of computers in regard to overall performance of your school in all aspects?

12. How are computers being used in all possible areas of the running of your school?
Where do you see your school in regard to computer integration in classrooms three-five years from now?
13. What negative impacts you have observed so far related to computers in your school?
14. What is your general perspective of computer impact on the quality and standard of education in Namibia?
15. How is your school computer or ICT policy been implemented?
16. What is your view in regard to computers in schools?
What recommendations or requests can you make to the Ministry in regard to computers in school?

APPENDIX II

INTERVIEW SCHEDULE FOR COMPUTER STUDIES TEACHERS

1. How long you been the teaching profession so far?
2. Apart from computer studies, what other subject(s) and grade(s) do you teaching at this school?
3. How long have you been teaching computer studies at this level?
4. What level of qualification do you have in computer studies?
5. What are the basic components of the computer studies curriculum that learners must do at the level you teach?
6. How many computers are there in your school computer lab? And how many learners normally use them for computer studies?
7. Apart from normal computer sets, what other computer technology devices are there in your school computer lab?
8. What other computer technology devices do you think you should have that are not in the school computer lab at the moment?
9. What difficulties have you encountered in the management and handling of the computers in the school computer lab?
10. How did you fix such difficulties or how do you think such difficulties can be addressed?
11. What are the attitudes of the learners towards the subject (computer studies)?
12. How are other learners and teachers within the school utilizing the school computer lab?

13. What specific programs, software and applications are on the computers in the lab and how are they beneficial to learners?
14. How do you use these computers during your lesson presentations?
15. What other computer programs, software or applications do you think you could use to improve your teaching and preparation of learning activities and instruction for learners?
16. How else do you use these computers in regard to school work?
17. What difficulties do you think other teachers could encounter in the process of integrating computers in classrooms if they had any? How do you think such problem(s) could be resolved for effective integration?
18. Are there any plans for your school to get more computers?
19. What do you think is the importance of computer studies to learners?
20. What do you think can be the impact of computers on education in regard to quality and standard in Namibia?
21. Does your school have an ICT policy?
If yes, how is it being implemented?

Where do you see your school in regard to computer integration?

APPENDIX III

INTERVIEW SCHEDULE FOR TEACHERS FOLLOWING CLASSROOM OBSERVATIONS

1. What is your name?

2. What subject(s) and grade(s) do you teach at this school?

3. Do you have any computer skills or knowledge, and how comfortable can you operate or work with computers?

4. Did you get any formal computer training at any level (school, college/university or any institution)?

(Depending on whether there are computers or not in the classroom the following questions will be asked)

Answer to Question 5	
Computer(s) present in classroom	No computers in classroom
5. What programs, software or applications are installed on them that you think are helpful in an educational setting? How many learners do you have on average in all classes you teach?	Would you want to have a computer or some computer technology devices in your classroom(s), and (if yes) What specific devices will they be?
6. How do you normally use or integrate the computer technology devices in your classroom(s) to enhance your teaching process?	How would you integrate a computer or use the devices you mentioned in question 6 to enhance your teaching?
7. Do you think the computer technology devices in your classroom(s) have been effectively helpful in passing the instruction or information to the learners?	
8. Let's take look at the lesson you just had with your learners; do you think that lesson could have been better presented and understood if there was some computer or any technology devices used?	
9. What specific computer program(s), software or application(s) do you think you could use to improve the presentation of that particular lesson?	
10. What further hardware in addition to a computer set would you need to make that lesson presentation easier and most appealing to learners?	

<p>11. What else do you use computer technology for at your school? How do you use computer technology during activity/lesson planning?</p>	<p>What else do you think you could use computer technology for at your school?</p>
<p>12. Does your school have a computer lab? How often do teacher and learners use it? Do you think the school computer lab has been helpful to both teachers and learners, if yes, How?</p>	
<p>13. What difficulties or problems have you encountered so far in your effort to integrate computer technology in your classroom? What do you think can be the solution to that particular problem?</p>	<p>What difficulties do you think you could encounter in the process of integrating computers in classrooms if you had any? How do you think such problems could be resolved for effective integration?</p>
<p>14. Are there any plans for your school to get more computers?</p>	<p>Are there any plans for your school to get computer sets?</p>
<p>15. In general, what do you think can be the impact of computers in education in regard to quality and standard?</p>	
<p>16. Where do you see your school in regard to ICT integration in the future? Does your school have an ICT policy? If yes, how is the policy being implemented?</p>	

APPENDIX IV

FOCUS GROUP INTERVIEW SCHEDULE FOR LEARNERS

TOPICS

1. Introduction of participants.
2. Computer skills and knowledge.
3. Computer equipment of school (Tell us the type of computer devices present in your classrooms).
4. Computer use in teaching and learning (Tell us how computer devices in your classroom have been used for teaching and learning).
5. Computer laboratory (Explain for us how the school computer lab has been used by both teachers and learners).
6. Mobile phones or cellphones in school work (Tell us if you have an internet-enabled cellphones, and explain how you use their internet facility).
7. Computers in education (Tell us what your perception of computers in education is).
8. School computer policies (Tell us if your school has a computer policy, and explain how you think such a policy is being implemented).
9. Perceptions of computers (Explain what you think of computers in general).
10. Perceived future of computers in school (Explain where you see your school with regard to computer technology integration in five years from now).
11. Recommendations on computers (Explain what you think should be done concerning computer technology in schools).

APPENDIX V

CLASSROOM OBSERVATION SCHEDULES

SCHOOL: _____ CLASSROOM: _____

School Background

School name	
School Code	
Date	
Grade	
Period	
Time/Duration	
Teacher's name	
Subject	
Theme	
Topic	

Observed Aspect

Aspect	Object/Activity			Remarks
Location	Where is/are the computer(s) placed?	Options		
		Yes	No	
	In the classroom			
	In all classrooms			
	In some classrooms			
	In the library			
	In the computer lab			
	In management offices			
ICT/Digital learning and teaching Devices and computer hardware	What ICT/Digital learning and teaching devices are in the classroom?	Options		
		Yes	No	
	Computer set(s)			
	Digital projector			
	Overhead projector			
	Microscope			
	DVD/CD Player			
	Others (specify)			

ICT/Digital devices' usage for teaching and learning	How are the ICT/Digital devices in the classroom used during the teaching and learning process?	Options		
		Yes	No	
	Devices are incorporated as consolidation tools			
	Computer(s) is/are used for completion of assignments/tasks/activities by learners			
	Computer(s) is/are used by teachers as teaching tool(s) and used for information searching during lesson/activity planning			
	Computer(s) has/have internet			
	Devices are used as instructional aids			
	Others: _____ _____ _____			
Teacher skills and knowledge on computer technology/ICTs	Does the teacher demonstrate the following skills and knowledge?	Options		
		Yes	No	
	Knowledge of giving instructions with digital aid/computers			
	Provides extra work for learners to work alone using the computer(s) in the classroom			
	Guides the students in exploratory activities on the computer(s)			
	Helps, monitors and assesses students' progress and work while they are using digital devices			
	Organize clear instructions to be used during the activity			
	Uses the devices he/she has to their utmost capabilities			
	Help students that are struggling to work on the computer devices			
Others: _____ _____ _____				
Programs, applications, and software	What program, application and software are installed on the computer(s)?	Options		
		Yes	No	
	Spread sheet (Excel) Word processor (Word) Database (Access)			

APPENDIX VI

Transcribed Interview (Deputy Principal)

Management Interview: School A

SCHOOL A

July 14, 2014

Deputy Principal: Mr. Roberto Maxis (PSEUDONYM)

Key:

R – Researcher

DP – Deputy Principal

R: Good morning Mr. Roberto, I don't know if you can still remember me but I was once a student at a school where you also served as deputy principal in 2000. I am pleased to meet you again.

DP: I remember the face but not can't recall the name as it has been really long. What, is that name again?

R: Given, though I was known by my surname Simataa.

DP: Yes, now I remember you were one of the most troublesome and you were always in my office, (laughs), I hope years have made you better.

R: (Laughs), yeah, a lot has changed, I guess parenthood has taught me some responsibility.

DP: Yeah, it is always like that. So, how do I help you this time?

R: Well. I am currently completing my master of education with the University of South Africa and as a major part of the entire program I am here to conduct an investigation on the usage or integration of computers in the Namibian education system. This is why I am conducting these interviews.

DP: Alright then, I am all yours...

R: Ok, let's start with the name. Your name is Mr. Roberto Maxis...?

DP: Yes, I will always be that.

R: True. So, what subjects do you teach at this school?

DP: I teach Accounting grade 8, and Business Studies grade 11.

R: Ok..., for how long have you been an a deputy principal at this school?

DP: Just some months, 8 months to be precise. I have been an HOD for 19 years so far in other schools.

R: Whoa, that's quite some time. Tell me, do you have any computer skills?

DP: Yes, I have. I can at least type, save, surf the internet, and I can print.

R: Ok, do you have formal qualification or formal training in computers?

DP: Yeah, when I was doing my second degree, one of the subjects was computer literacy, though it was just theory.

R: Ok. How are computers being integrated into teaching and learning at this school?

DP: They are just used specifically for Computer Studies only.

R: Alright. Has there been workshops or training seminars to train teachers on how to integrate computers in their classrooms?

DP: Um..., from my observation, no, I haven't seen any teacher going out for such a workshop.

R: Ok. Do you think the school computer lab has been useful and helpful to both teachers and learners?

DP: I think it has only been useful and helpful to the learners doing Computer Studies. I think the teachers could be using it if we had a internet connection there.

R: Alright. What problems have you encountered so far in regard to computer integration, security and management of the school computers?

DP: So far security is the main problem. Earlier this year the lab was broken-in, but now there are burglars on windows and door now.

R: Ok. So, apart from normal computer sets, what other computer technology devices do you wish to have at your school that you do not have at the moment?

DP: Um..., I think an internet connection for information, a data projector, power-pointers, as well as webcams.

R: So..., what do you think is the impact of computers in regard to overall performance of the school in all aspects?

DP: So far, learners don't have enough information since they have no internet, this means they have not had impact on much aspects. They are mostly in management offices or administration.

R: And how are these computers being used?

DP: So far they are being used for storing information, typing exam papers, tests, class-works, communication or correspondence to parents and official documents.

R: Ok, are there any negatives negative issues you have so far observed related to computers in school, for example, teachers spending too much time on the computers and neglecting their duties to learners or learners playing games on the computers?

DP: Um..., none so far. Like I said before, only the Computer Studies teacher and learners have access to these computers.

R: So, what is your general perspective of computer impact on the quality and standard of education in Namibia?

DP: Um, in terms of information accessibility computers would seriously improve performance, quality and standard of education in the country. But then, this can only happen if all learners have access.

R: Ok, does you school have a computer policy or ICT policy, or just a set of rules set on how computers should be used?

DP: Yeah, we have computer lab rules.

R: Are they being implemented?

DP: Yes they are implemented.

R: OK. So, what is your views in regard to computers in school, do you think the government or the ministry should bring more computers into schools.

DP: It is possible the government must ensure that all departments in school have a computer with internet for teachers to get information from.

R: If you were to make any request or recommendation to the government concerning computers in schools, what would you tell them?

DP: The government should make Computer Studies compulsory for all schools, and provide more computers to schools.

R: Do you think teachers have skills to use these computers?

DP: Many teachers have skills, and what they need is just an in-service training or workshops on computers just to upgrade their skills.

R: Alright. We have come to the end of this discussion, and I thank you so much for your time. In case you need a copy of the final paper there will be a copy made available to the ministry, and upon request your school can also have its own copy. Thanks a lot

APPENDIX VII

Transcribed Interview (Principal)

Management Interview: School B

SCHOOL B

July 16, 2014

Principal: Mr. Basilia Bruce (PSEUDONYM)

Key:

R – Researcher

P – Principal

R: Let's start with your name, what is your name?

P: My name is Bruce, Mr. Basilia Bruce.

R: And do you teach any subjects at this school?

P: Yes, I teach Geography.

R: And at what level is that?

P: Grade 10,

R: Is it only Geography?

P: Yes, only Geography.

R: Ok, how long have you been principal at this school?

P: Three years now.

R: And do you have any computer skills?

P: Basic,

R: So, what can you do on the computer?

P: Just to type and do some few things.

R: Alright, do you have any formal qualification/training in computers?

P: No,

R: How are computers being integrated in the teaching and learning at this school, is there any way that teachers are using computers in their teaching process?

P: Not necessarily only the computer as a subject, we are still lacking some devices to be used together with the computers.

R: Have there any workshops or training seminars arranged to train teachers on how to integrate computers in their classroom?

P: No,

R: Ok, Do you think the school computer lab has been useful to both teachers and learners?

P: Not necessarily since last year our computers were stolen, and since then there has been nothing, there were not replaced. So, if we could have those computers there could be very much useful both for learners and teachers, more specially using internet to get access to certain information.

R: What problems have you encountered so far in regard to computer integration, security and management of the school computers? And how have you addressed the problem or problems?

P: Security is the only problem, but we are trying to secure our places, we are shifting it where it is because it's a big distance from here we are relocating it here and also there will be an alarm system installed so that we can at least monitor and control the break-ins.

R: Apart from normal computer sets what other computer technology devices do you wish to have at your school that you do not have at the moment?

P: A projectors, I think they will make lessons more interesting for learners instead of traditional chalkboard and charts system.

R: Do you have internet?

P: Internet we have but our internet lines are not working, even the telephone line here, Telecom is saying they have a problem with underground cables, we were even proposing that they should bring us new cables.

R: Ok, what do you think is the impact of computers in regard to overall performance of your school in all aspects?

P: I think it will enhance the performance of our school, basically because learners they could have access to computers and the internet. They will be able to search latest information with regard to their different specific subjects; also when we give, you know nowadays as textbooks are a problem so if we could have these computers learners could get most of the information on the internet.

R: Alright, how are computers being used in all possible areas of the running of your school, let me say managerial, administration, academic and all other areas?

P: See, now with the administrative part, there is a new program which the ministry has introduced, the school-link, even though it's still in its infant stage, but now a lot of information about the school learners and all these other things we are now trying to store them in our computers. Even now, our time table and reports we normally use computers we don't do them manual, but, we normally also use them to print our correspondence, our tests, examinations, all these we do them on our computers.

R: So, the teachers can also make class activities from there?

P: Umhu, that's what they normally, and the only advantage we have is that most of the teachers they have got their own laptops, so they are able to use these laptops.

R: Where do you see your school in regard to computer integration in classrooms three-five years from now?

P: We plan to have computers in most classrooms; we have only one projector at the moment but when we have enough we want them in classrooms.

R: Are there any negative impacts you have observed so far related to computers in your school?

P: No,

R: What is your general perspective of computer impact on the quality and standard of education in Namibia?

P: I think the quality and standard will improve significantly if schools will have access to computers, though we need skills. We are lacking a lot of thing which can access through internet, but we also lack the basic skills. We can have the computers but without skills they will be useless.

R: Does your school have a computer or an ICT policy?

P: When we had a lab we had rules.

R: Were the rule implemented,

P: Yes,

R: What is your view in regard to computers in schools, do you think it's a good thing to have computers in school?

P: For sure, with the world we are living in today computer is a must-have thing in schools.

R: What do you think about the idea of computer studies ending only in grade 10, do you think it's a good idea?

P: No, I we need to further it to grade 12 for learners to get more and better skills; because if you just do computer up to grade 10 level, will you qualify because of those basic skills to further study it at university, polytech? I think we should upgrade it up to grade 12.

R: So, if you were to make recommendations to the ministry, what recommendations or requests can you make to the Ministry in regard to computers in school?

P: The first thing I will say the training of teachers in basic computer skills, secondly, the provision of more computers to schools, the training of few individual teachers on the maintenance of computers because if you how to use it, and if a simple thing happens to it you are stuck and it will start gathering dust, it will not serve any purpose. The final one is the one we were just talking now, that all schools which are offering computers we should offer it up to grade 12, not only up to grade 10.

R: Alright, that was wholesome discussion and we have just come to the end of it, and I would like to officially thank you for your time. I won't be coming back to disturb your school, (P: Laughs – no it's not a disturbance we also learn from these things in one or another.), when the final paper is ready and published you will be privileged to receive a copy of it as it will on the ministry's archive. Thank you once again.

P: Thank you very much too.

APPENDIX VIII

Transcribed Interview (Deputy Principal)

Management Interview: School C

SCHOOL C

July 18, 2014

HEAD OF DEPARTMENT: Mr. Haris Kabanda (PSEUDONYM)

Key:

R – Researcher

DP – Deputy Principal

R: Good morning Mr. Kabanda, how are you?

DP: Well I am ok, how are you?

R: I am good so far. I don't think I need to introduce myself, I am sure you can still remember this face.

DP: Of course, how can you forget a trouble-maker, (Laughs). You really gave me trouble you, know that?

R: I know, I just didn't think I was that bad, thank God I've grown now, (Laughs).

DP: So what are you doing now?

R: Well..., I am teaching but that's not why I am here. I am here as a student, I am doing my master of education with the University of South Africa and I am here conducting an investigation as the major part towards completing my course. That's where I need your help.

DP: Ok..., that's good you're really pushing the ladder. It's good for you young people to keep going than settling for less, you know.

R: Yeah, I guess so. Well, let's get started and see how we can progress. The name is Mr. Kabanda Haris. So, do you still teach any subject or subjects at this school?

DP: Yes, I am teaching Geography, grade 12.

R: Ok. So how long have you been a principal at this school because I remember the time I was here you were an HOD?

DP: Um..., it's now 2 years..., deputy principal so to say.

R: And do you have any computer skills?

DP: Um..., I have just the basics, of..., maybe opening the computer and typing.

R: Ok, do you have any formal qualification or training in computers?

DP: No.

R: And..., how are computers being integrated into teaching and learning at this school?, are the teachers able to use computers in any way to teach?

DP: Am..., the only way so far is extracting information from the internet, but we are not using computer as a teaching aid. We also use them for printouts and handouts.

R: Alright. So..., have there been any workshops or training seminars arranged to train teachers on how to integrate computers in their classrooms?

DP: Not necessarily. There was some training from NIED just for computer literacy, basically just open and extract information. That was the training that was there.

R: Ok. How did the teachers respond to that effort?

DP: It was a training for all teachers, so, because we are too many the people who came to train now have a problem of time, that's why a lot of us we just had this basics and we couldn't go into the other things.

R: Do you think the school computer lab here has been useful to both teachers and learners?

DP: So far, yes, it has been useful because as I am saying teachers are getting information from there, even learners, they are extracting things from internet if they are given any homework of any kind. So, we find it useful.

R: Ok, so what problems have you encountered so far in regard to computer integration, security and management of the school computers?

DP: The..., the biggest problem sometimes is the question of..., these computers need to be serviced, at times it takes too long for anyone to be sent to come and service here. As a matter of fact you will find that eh..., we have, there are 24 computers, and one other time you will find that only 4 or 5 computers are now working.

R: So..., what has been so far to fix the issue of service?

DP: Um..., it was a bit unfortunate sometime because we had a volunteer teacher from Japan and this person was able to assist us in this regard, but now this year we did not receive any because the contract of this other person I'm talking about expired last year. But, we filled in a form to apply for a new one but up to this time this other person to substitute the one who left has not worked, I don't know what the problem there is.

R: Ok. Apart from normal computer sets what other computer technology devices do you wish to have at your school that you do not have at the moment?

DP: Um..., things like those of the power-pointers, and the projectors which can be connected to laptops. At least these are easy to take to class.

R: Alright. So what do you think is the impact of computers in regard to the overall performance of your school in all aspects? Do you think the availability of computers has been able to improve the performance of the school in every aspect?

DP: Yes, because..., it has because it provides a lot of information to learners and in most cases this sharpens the..., the..., knowledge of current issues that learners can now even be able to know what they were unable to know, and they can also still gather a much more information on top of what they covered during lessons. They can also still access some other past papers and solution to these questions which were asked there. This is why we believe, since the reception of computers at our school there has been progress in results. The only problem is that a handful of learners are able to do that while a number of them are unable to use it.

R: OK..., so how are computers being used in all possible areas of the running of your school?

DP: We normally have a program of saying, now we want to introduce a program of saying the computer should be used in sessions, like some other sessions are learners, some other sessions must be for teachers. But now you see there are 24 and we have 1110 learners, so a lot of them might not even have an access even when a program is drawn, only those who are doing computers, just (grade)10A, 8A and then 9A.

R: Ok. So, are these computers used in any way for administration work like official letters, correspondence with parents, and ah..., other things?

DP: Seriously we normally use them for..., during exam periods, yeah for the production of school reports and these other things; yeah, because for correspondence mostly use the computers which for secretaries.

R: Alright. Where do you see your school in regard to computer integration in classrooms in the next three, four, five years? Do you think computers may be brought into classrooms or they will just be in the lab as such?

DP: Ah..., it's a bit difficult but all-in-all what I'm seeing is that gradually ah..., computers are becoming integrated in the sense that eh..., we have one laptop which is now for hostel, so we have computers, ah..., laptops, two of them which are for the school, basically used in languages. So, gradually, as they become more teachers will have access, because this is a gradual process but we hope for some time somewhere somehow we may have more.

R: Alright. Are there any negative impacts you have observed so far related to computers in your school? Let me say on the learners or on the teachers.

DP: Um..., not really but because you know we have computers which are linked to internet, so, if not controlled learners can browse through these unnecessary pictures of pornography. That is the only negative thing I can foresee. But we are trying to ensure strict control in the sense that there's always a teacher with the learners there, though a human being is just a human being.

R: Ok. What is your general perspective of computer impact on the quality and standard of education in the country, do you think computers are capable of improving the quality and standard of education, or do you think the quality and standard will just stay the same like before we didn't have computers?

DP: No, the quality may improve, but as I'm saying the only stumbling block there is the question of accessibility of people to computers. Are they readily available? Now that they are not readily available that's why their impact also is less than when they were (to be) made readily available. So people were going excel much more because what they don't know they can easily access.

R: Ok. So availability may be the key here?

DP: Yeah, otherwise then when they are there we must have a way and modalities of to train people to be able to operate the things. So, because some other people even in some houses you will find there is no computer there, so, a child who is coming from such a home, even when computers will be available in schools this person still needs training because it is an asset he doesn't even use at home.

R: So it's a new thing?

DP: Yeah, it's new thing.

R: Ok. Does your school have a computer or an ICT policy, or just rules set to regulate the usage of the computers?

DP: Yeah we have.

R: And has it been implemented?

DP: Yeah, it is.

R: So, what is your general view in regard to computers in schools, do you think they should bring more, the ministry or the government should bring more computers to schools, or how?

DP: My only personal thing to say is if the government is able, even the private companies if they are able to, please they can donate these things to schools. But if we seriously depend on the government sometimes it'll take years for them to be able to cover all schools. Sometimes even donors can come in, because the new sets of things which we have they were donated by Germans I think, because they were here for some time I two or three years back.

R: Alright. Any further recommendations that you can make to the ministry?

DP: Um..., the ministry should have an integrated program for training of teachers to use computers, especially during vacations or holidays, if they can have a mini workshop of such kind maybe for a week or so every term. Many teachers will be able to familiarize with computers and use them. And even the question of training teachers as for now I believe ministry should integrate the training of teachers together with computer that at the end of the training this teacher is

computer literate. Unlike in our case when we were trained computers were not there, so it is taking us time now to be able to articulate well with computers.

R: Alright Mr. Kabanda, that was the last question on my schedule. Please thank you so much for making yourself available for this investigation. Your participation and contribution is highly appreciated. Once the final paper is released a copy will be made available to the ministry if there will be need for your school to get one as a participant school, provisions will be made. Thanks a lot and have a good day.

APPENDIX IX

Transcribed Interview

COMPUTER STUDIES TEACHERS' Interview: School A
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SCHOOL A

May 21, 2014

Interviewed Teacher: Ms. Anelda Buso (PSEUDONYM)

Key:

R – Researcher

T - Teacher

R: Let's with finding out who is who if there has been any name changes, my name is Given Simataa, I am sure you can remember me from college since we were there the same time.

T: (Laughs) Of course I remember you though I knew you by a certain name.

R: I am sure I don't want to know what name that was (laughs). Well, I am still a teacher like you but also studying. So at the moment I am doing my Master of Education degree with the University of South Africa, which is basically why I am here today.

T: Ok...

R: Yes, so do I get your name?

T: Yes, my name is Miss. Buso Anelda.

R: Alright, so, what subjects and grades do you teach at this school?

T: I teach Computer Studies grade 8-10, and Life Science grade 8.

R: Ok..., how long have you been teaching these two subjects?

T: Um..., Life Science since 2004 up to now, and I started teaching Computer Science in 2010.

R: Alright, so...what level of qualification do you have in Computer Studies?

T: I only did a certificate in Computer Studies through Techna when they were training teachers on ICT and integration of computers.

R: Alright, so what are the basic components of the Computer Studies curriculum that the learners must do at the levels that you teach?

T: They are required to know the different components of the computer, the internal parts of the computer, spreadsheet, internet, programming, database, word processor ...I think all the modules

that are covered in the basic certificate, plus programming that we don't normally get when we go for these training programs.

R: Ok, how many computers are there in your computer lab so far?

T: Currently we have...about 16 computers.

R: And on average how many learners can use the computers at once?

T: Unless they share since they are too few...if they share it means every time there are about 5 or more learners without computers, and that is when they are in pairs. If we say it is one learner per computer then it means 20 learners will be without computers because classes go up 36 learners.

R: Ok, so...apart from the normal computer sets, what other computer technology devices are there in your computer lab?

T: Nothing, we only have computers.

R: Alright, so what other computer technology devices do you think you should have that are not in the computer lab at the moment?

T: Um...I think scanners, data projectors, printers, internet modems, webcams, and...I think plotters even though they are not necessary but learners learn about them.

R: So far what difficulties have you encountered in the management and handling of the computers in the computer lab, issues like security, management, and handling?

T: Yeah...though our computers were only installed last month we have not encountered a lot of problems because they are only a month there, so we were not having, from 2010 when I came here we were computers. So maybe we will start encountering problems in months to come.

R: Ok, since you said you have not encountered problems yet, it means my next question will be irrelevant, so we will jump to the further question. So what are attitudes of the learners towards the subject Computer Studies, do they love it, do they enjoy or to they hate it?

T: They love the subject but they are kind of afraid of it, they also don't understand computer terminology because it only starts in grade 8. The other challenge is that they will do the subject only from grade 8 up to 10, but it is not there in grade 11 and 12, so they are reluctant towards it. Most of our learners are only seeing the computer for the first time in grade as they didn't have the subject at the primary school, so it seems difficult for them to understand the computer terminology, so they kind of pull back.

R: Alright, so, how are learners and teachers within the school, utilizing the school computer lab?

T: Ah...as I said we only installed these computers last month, so I haven't seen any teacher who went there to use a computer, and we are only allowing learners who are doing Computer Studies to use these computers. For others, currently we are not allowing them.

R: So..., what specific software, programs or applications are installed on the school computers so far?

T: What is installed there is...we have got this operating system, like Windows 7, there are few application and programs installed there.

R: Do you have Microsoft Office programs installed?

T: A..., a a that one is not installed, it was not bought. So, currently when they type they only use WordPad which is having limited functionalities.

R: Ok...games?

T: Yeah, games are there.

R: And do you think these current programs that are there are beneficial to the learners?

T: No, they are not, we really need Microsoft Office because they do Spreadsheet also, that one is not there, they do Database which is not there, so it's a challenge.

R: Ok, how do you use these computers during lesson presentations, do you sometimes use them or what?

T: Yes, like for now they are busy with word processing, so they are busy typing newsletters, they insert pictures even though some of the features are not there. We don't have many programs installed.

R: Alright, so what other computer programs, software or applications do you think you could use to improve your teaching, and preparation of the learning activities and instructions for the learners?

T: Um...we also need this other program where learners can type like Mavis Beacon program, we also need simulation programs, we need automated marking programs also, and many others that we do not have.

R: So how else do you use your school computers in regard to school?

T: For now we don't have the right programs, so it is limited and teachers are not using the lab though it was on the plan that teachers could use the lab to type and print exams, tests, and activities but at the moment we don't even have a printer.

R: Alright, so, what difficulties do you other teachers could encounter in the process of integrating computers in classrooms if they had any computers?

T: The difficulties will be with the learners, not all learners have seen a computer before, so, teachers will have to explain the computer from scratch.

R: And are all teachers able to use computers?

T: Um...I think so...nearly all teachers are able to use computers.

R: Ok, how do you think you could fix the learners' problem of lack of computer skills?

T: That one, unless they all do computer literacy training, and maybe introduce for all grades. That way it will be better in BIS (Basic Information Science) they don't do most of these things. That way they will all have access to the computers. I think the introduction of ICT at all levels will help. Upon this we also need qualified trained teachers as I am not a trained Computer Studies teacher.

R: Ok, are there any plans for your school to get more computers so far?

T: Um...I'm not sure but I think we surely need more computers because the computers that we have are not enough for learners, I have to use my own laptop because we only have 16 computers and it is difficult.

R: Ok, so what do you think is the importance of computer studies to learners?

T: Computer Studies is very importance because wherever you go. Whatever work you do or you apply for they need these computer literate people so it means one must have the basic skills at least, and almost these days everything is done by computers.

R: Alright, what do you think can be the impact of computers on education in regard to the quality and standard in Namibia? So far we have been experiencing a high failure rate for many years and teachers have been stressing here and there to work hard but do you think computers can be used to help out?

T: Yes, because if a learner is seated with a computer and the teacher is there just helping here and there, it means the teacher is only a facilitator whilst activities are done by the learner, the computer will do the marking, so the workload of these teachers will be reduced. So, with less stress it means more work will be given to learners and the pass rate will improve.

R: Ok, do your school have a computer policy or an ICT policy on how computers should be used?

T: Yes I drafted those rules, there are just rules that I drafted together with other teachers.

R: And are the rules being implemented?

T: Yes,

R: So, where do you see your school in regard to computer integration in the next three to four years, do you think computers can be diffused into classrooms or in the meantime they will just be in the computer lab?

T: Um..., I think they will still just be in the computer lab from the look of things, maybe if there were laptops.

R: So, if you were to make any recommendations or any requests to the ministry what will you tell the ministry?

T: I think, um..., most schools, especially those that are doing Computer Studies should be given these computers, and for us we did not receive a computer from the government, even a single

one from the ministry, those ones are donations from good Samaritans. So, if not all schools, at least those that are doing computer as a subject must be given computers and other computer-related devices. The government must also offer training to teachers who are teaching the subject because currently teachers don't go for further studies in this subject, so, they are reluctant. We also don't have a field of study that trains teachers to teach computer studies.

R: Alright Ms. Buso, we have come to the end of this short interview, so, I would like to thank you for your time and patience to help me carry out this part of my investigation. I thank you very much.

APPENDIX X

Transcribed Interview

COMPUTER STUDIES TEACHERS' Interview: School B
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SCHOOL B

May 27, 2014

Interviewed Teacher: Ms. Benson Celine (PSEUDONYM)

Key:

R – Researcher

T – Teacher

R: Alright, let's get started. My name is Given Simataa, I am doing a Master of Education degree with the University of South Africa, specializing in computers in education, which is why I am here today. So, I am truly hoping you will help me finish my task successfully. Can you start by telling me who you are?

T: Ok..., that's good, I am Celine Benson. I am a computer teacher here (school name withheld), teaching Computer Studies grade 8 to 10.

R: Ok, so, how long have you been teaching Computer Studies at this level?

T: Um..., this level, this should be my 4th years, I started 2010, but actually I am not a permanent teacher, I am just temporary teacher since I have got a diploma in another area instead of computer studies.

R: Alright, do you have any other subject that you are teaching?

T: Besides that subject, only these other subjects like non-promotional subjects like BIS grade 8, 9 and 10.

R: Ok, what level of qualification do you have in Computer Studies?

T: I have a diploma in information technology.

R: Ok, so far what are the basic components of the Computer Studies curriculum that the learners are expected to cover from grade 8 to 10, the components of their syllabus?

T: The main components are the viruses in computers, operating systems, programming, database, application software, spreadsheets, internet and communication. I think those are the main ones.

R: Ok, how many computers are there in your school lab so far?

T: So far there is none. We had 16 computers but unfortunately 13 of them were stolen, and 2 are in the strong room as we are still fixing the room from they got stolen.

R: So, how many learners were using those computers you had, on average, how many learners would be using a single computer at once in a full class?

T: Normally we accommodated 16 learners at a time a class of 32 whilst the other 16 learners wait.

R: Alright, apart from the normal computer sets, what other computer technology devices are there or were there in the school lab?

T: Um..., we have a data projector that we normally use, we have an internet modem though it is not working at the moment.

R: Ok, what other computer technology devices would you love to have in your lab that you don't have at the moment?

T: I think we obviously need computer sets since the ones we had got stolen, we also need internet, digital board, movable chairs, air-conditioners, alarm system for security, carpet and tiles on the floor to avoid dust from getting into computers. We also need computer books.

R: Alright, what difficulties have you encountered in the management of school computers so far in the lab? Or let's say what difficulties do you think you might encounter if you have computers in your computer lab?

T: I think the biggest would be security as I already mentioned our computers got stolen, I think we will also have problems with learners who may want to be playing games on the computers instead of putting them to better use, and learners may also be bringing in liquid stuff like water which is not allowed in the lab.

R: Ok, so what do you think you could do to fix or address such problems?

T: We will have to be strict with the given lab rules, remove all the games from the computers, but as for security, it should be fixed by the management. The management must ensure the lab is secured. I have already spoken to the head of department concerning the security issue of the lab, and I am sure he is working on it. However, I am struggling with teaching at the moment as it is hard to teach computer without using. I hope the management can help recover our computers fast.

R: So, how are the learners and teaching within the school utilizing the school computers, especially those that are not doing computer studies?

T: Some teachers as well as learners would normally come in when we had computers to search for subject information on Encarta, but not all are interested.

R: Ok..., so what specific software, programs and applications were installed on the computers in the computers?

T: Um..., we had Microsoft Office applications, Encarta, Mavis Beacon typing teacher, and..., but we didn't have any programming programs installed.

R: Um..., how were these programs beneficial to learners?

T: They were beneficial in such a way that the learners were developing skills on how to work with the programs. After learning the thing theoretical they would be required to do it practically on the computers.

R: So, how do you use these computers during lesson presentations?

T: During the lesson presentation we use them for practical activities where learners would use different applications, the shutting down and switching on of computers, do spreadsheets, and some other tasks.

R: Alright, what other computer software, programs or applications do you think you could use to improve your teaching, preparation of learning activities as well as instructions for learners?

T: Um..., I am not sure, I can't think of anything because the ones that we have are better for that level.

R: So, how else do you use these computers in regard to school work?

T: Teachers sometimes used to come and type tests, exam papers, or other kind of activities, we also stored certain information on those computers, such as student marks, memos, examinations marks, tests, etc.

R: So, what difficulties do you think other teachers could encounter in the process integrating computers in their classrooms if they had any computers at their disposal?

T: I think the main problem that the teachers could face is their lacking of skills of using computers. Some teachers don't know how to use computers so far, some still need to learn how to use the computer. That one could be a challenge because they need to gain skills that's when they can be able to use computers in their classes.

R: But, how do you think such a problem could be fixed?

T: That one could be fixed by a..., maybe..., giving lessons to teachers so that they can be able to know how a computer is and how it can be used.

R: Ok, so far do you have any knowledge of any plans through which your school should get any computers? Is there any plans to get more computers?

T: Um..., I think there must be a plan since we don't have computers. The computers that were stolen need to be recovered or replaced. But for more computers..., maybe in the future. Our lab is also not big enough to accommodate more computers unless we have it enlarge or extended, or build a bigger room.

R: Ok, what do you think is the importance of Computer Studies to learners?

T: Um..., to improve their skills in computer as they might have to use such skills in tertiary schools or workplaces in the future.

R: So, what do you think can be the impact of computers on education in regard to the quality and standard of education in Namibia?

T: A..., I think computers can improve the quality and standard of education because they will provide information access, computers skills, they will also make teachers' work easy, and also save time. I think they can really bring a positive change.

R: Alright. Tell me, does your school have an ICT policy or computer lab rules to regulate the usage of computers in school?

T: Not the policy, I have not seen one yet, but we have computer lab rules.

R: Are they implemented?

T: Somehow yes, but sometimes no, you know learners are difficult.

R: So, where do you see this school in regard to computer integration, do you think at a certain stage computers will be diffused to classrooms or managerial offices in the future?

T: Yes, I think the possibility is there that they may reach classrooms overtime in the future.

R: Ok, so if you were to make any special request or recommendations to the ministry in regard to computers in schools and education at large, what would you tell the ministry?

T: I think I would ask the ministry to provide more teachers trained in Computer Studies, bring in more computer labs, and if possible make Computer Studies compulsory from grade 8 to 10. I also think the ministry should introduce Computer Studies in primary schools as well since some learners don't have computer access at home. Some of them are seeing computers for the first time in secondary school.

R: Alright, I believe that is a very good suggestion. Ms. Benson, we have come to the end of this interview and I would like to thank you for your time and effort to avail yourself for this investigation. I am very grateful for your help with my studies, please have a good day. Once the final paper of this study is released there will be a copy made available to the ministry and possibly to your school so you see the final findings of the study. Thank you so much.

APPENDIX XI

Transcribed Interview

COMPUTER STUDIES TEACHERS' Interview: School C

SCHOOL C

June 02, 2014

Interviewed Teacher: Mr. Salom Kudzai (PSEUDONYM)

Key:

R – Researcher

T - Teacher

R: My name is Given, I was student here before you came to teach here, but when I came for my school based studies you were here. I am currently doing my Master of Education degree with the University of South Africa.

T: Ok...

R: So, your name is....

T: Mr. Kudzai,

R: Ok..., so what subjects do you teach at this school, and grades?

T: Computer Studies and Mathematics

R: And the Grades..?

T: Computer Studies 8-10, and Mathematics 8-10

R: Alright..., how long have you been teaching these two subjects at this level?

T: Um....., this is the eleventh (11th) year.

R: Ok, what level of qualification do you have in Computer Studies?

T: A National Higher Diploma,

R: That's a Zimbabwean one, right?

T: Yes, it's Zimbabwean.

R: And what is that here in Namibia?

T: Level 7,

R: Oh, that's a Bachelor's degree...

T: Yes,

R: Um..., so what are basic components of the Computer studies curriculum that the learners must do at the level that you teach?

T: Ee..., they must cover the...architecture of the computer, ah..., then... the computer application programs, then programming, and also internet.

R: Ok, so..., how many computers are there in this computer lab at the moment?

T: There are thirty-nine (39), a...a, not thirty-nine, there are thirty-one (31).

R: Alright, and...how many learners normally use them for Computer Studies?

T: Aa..., average of fifty (50).

R: Ok, so..., apart from normal computer sets, what other computer technology devices are there in this lab?

T: We have this....tripod screen together its..., a projector.

R: Ok ...and what other computer technology devices do you think you should have that are not in this lab at the moment?

T: Aa..., this webcam,

R: So...you don't have webcams at the moment?

T: Yeah...

R: Alright, anything else?

T: Um..., for the level we are I think that's all,

R: Ok, um...so far what difficulties have you in the management and the handling of the computers within the school?

T: Um..., the computers are fewer than learners, so when you want learners to be doing practicals on their own they have to be in groups and have to wait for one another. So, it also disturbs. And also, to maybe, if we could have someone who is a computer technician, who is there to be always servicing them when there's a problem, sometimes you will find that you need to arrange when you are just coming from another subject in another class. It becomes a problem.

R: Ok, so...how did you fix such difficulties and how do you the difficulties can be addressed, you just mentioned of the computer technician, and...?

T: To bring more computers and also to have a permanent computer technician who will be servicing this system, and to set-up the gadgets like this, say more, like webcam if it's there it needs someone who have set it already for you, this screen (tripod screen), we need it to be there already.

R: Ok, so what are the attitudes of the learners towards the subject, towards computer studies, are they positive, are they negative, do they love it?

T: They... love it so much, when it is computers everyone feels... 'we were waiting for it', although they only enjoy it when it is practicals. The theory part of it, a a, the interest is not there.

R: Ok, how are other learners and teachers within the school using the school computer lab?

T: They normally come afternoon during studies and in the evening studies when these other ones are not having lessons, normally they would be coming for internet. Teachers can in even during normal school time when they are free and the lab is free.

R: Ok, what specific programs, software and applications are installed on the computers in the lab so far?

T: Um...Microsoft office 2007, and the internet.

R: How do you think those programs are beneficial to the learners?

T: They are beneficial because that's what they are asked even in their exams, word, spreadsheet, database, and also...internet.

R: So, how do you use these computers during your lesson presentations?

T: I use them...when it is practical, each one they sit on their computers and then we give them the practical assignments to do or activities to do, so they will be working on their workstations. Sometimes I'd also be demonstrating on my laptop while I'm projecting it so they can also see and do it on their own.

R: Alright, what other computer programs, software and programs do you think you could use to improve your teaching and lesson presentations, preparation of learning activities and learners' instructions?

T: We don't have programing software, the one that we used to have, but it was my personal, is no longer compatible with the new windows systems which we have.

R: So..., how else do you use these computers in regard to school work?

T: They are also used for this..., school-link.

R: Ok, I have been hearing about school-link and I even tried to do a little dig on it as it forms part of my research.

T: Oho...there are two guys who are working on it, one teacher and the secretary they will be able to help.

R: Ok, what difficulties do you think other teachers could encounter in the process of integrating computers in classrooms, if they had any computers in their classrooms?

T: Yeah, most of them they don't have the basic knowledge of computers, others can just switch on, off and then that's all, but to really use it they cannot use it.

R: Ok, so how do you think you can fix the issue of the lack of basic knowledge in teachers?

T: They need to have time to be taught, there was a program whereby they were supposed to be taught how to.., use computers, but you know, because of this too much work that we have, really sometimes we don't have time for that, but they need to have lessons.

R: We have been complaining about that with our regional office, most of us, the new teachers have experience to work with computers but the old teachers it's just a problem.

R: Are there any plans for the school to get more computers?

T: Aa...I'm not sure, because like these ones they were just given by the government, so acquiring on our own, a a.

R: Ok, so what do you think is the importance of Computer Studies to learners?

T: The world now is just computer technology, you cannot do any course which does not require you to use computer. Even for your own basic information that you need to research on you need that knowledge. For you to understand a lot of things really you need computers, for news, for whatever.

R: Ok, so...what do you think can be impact of computers in education in terms of quality and standard in Namibia?

T: Yeah, computers will be able to improve our education very much, we will get more information even as teacher, as learners, you can get as much information as you may need in your education.

R: Ok, on the last question, does this school have an ICT or computer policy?

T: Aa...that one I'm not sure,

R: Or maybe there's just rule on how the computers should be used?

T: Oh yeah, the rules are there.

R: Are they are implemented?

T: Yes, we are trying although sometimes it's a problem, but we are trying.

R: Ok, so where do see your school in the future in regard to computer usage, do you think it'll be diffused to classes or it'll just remain here (in the lab)?

T: I think it'll be diffused in classes, because they have been talking about, that no we need another lab, so if we can have another lab really it will diffuse to other classes. And maybe, almost everyone will be able to access it, because if you look in this lab, only thirty-one computers but we are one thousand and something.

R: Alright, this was the quickest interview I've had so far, but nonetheless I got what I wanted. Thank you so much for your time and effort to help me in this investigation.

APPENDIX XII

Transcribed Interview

Post-Observation Teachers' Interview: School A

SCHOOL A

May 22, 2014

Grade 12A

Interviewed Teacher: Mr. Osaka Bennett (PSEUDONYM)

Key:

R – Researcher

T - Teacher

R: My name is Given, Simataa, I am student from the University of South Africa. I am here in effort to complete my research master's degree in education and need your help to see it through. Can you please tell me your name to start with.

T: My name is Mr. Bennett Osaka

R: Alright. Mr. Osaka, what subjects do you teach at this school?

T: I teach Physical Science, grade 11 and 12, ordinary and higher level.

R: Do you have any computer skills or computer knowledge?

T: I have basic skills.

R: Ok..., Did you get any formal computer training at any level, at school, college, university or any institution?

T: Not really, but computer was a core subject that I did for one semester at Unam (university of Namibia).

R: Alright, that's great. So, are there any computers or computer related devices in your classroom?

T: No, there's nothing there.

R: What specific computer technology devices would you like to have in your classroom?

T: I think I would need a computer set with an overhead projector. Um..., internet also. Projector, speakers.

R: Ok. How do you think you would integrate a computer or use the devices you mentioned in the previous question(question 6) to enhance your teaching?

T: Internet for information research, typing tasks, and instructions.

R: Let's take look at the lesson you just had with your learners; do you think that lesson could have been better presented and understood if there was some computer or any technology devices used?

T: Yes, a computer would have aroused the interest of the learners.

R: Okay..what specific computer program(s), software or application(s) do you think you could use to improve the presentation of that particular lesson?

T: I think, ah..., Encarta, PowerPoint, um..., that should be it.

R: What further hardware in addition to a computer set would you need to make that lesson presentation easier and most appealing to learners?

T: I think a projector and speakers.

R: Alright. What else do you think you could use computer technology for at your school?

T: Um..., maybe some administrative work like typing and printing.

R: Does your school have a computer lab? How often do teacher and learners use it?

Do you think the school computer lab has been helpful to both teachers and learners, if yes, How?

T: Yes, though to say the truth it is still new, so it's not much in use yet. But I believe it will be helpful to both teachers and learners.

R: What difficulties do you think you could encounter in the process of integrating computers in classrooms if you had any? How do you think such problems could be resolved for effective integration?

T: Maybe only learning other programs, it will not be easy for of us. If he school can organize a computer expert to help out for a while, it will solve the problem.

R: In general, what do you think can be the impact of computers in education in regard to quality and standard?

T: It will definitely induce quality, and we must have computers considering the world we live in.

R: Alright. Where do you see your school in regard to ICT integration in the future? Does your school have an ICT policy? If yes, how is the policy being implemented?

T: I think it will be advancing into the integration of computers in classrooms. With the policy I don't know, the management must know.

R: Alright Mr. Osaka. We have come to the end of this interview. Thank you very much for your contribution towards this study. Please have a good day.

T: No problem, I may be the one needing your input someday (Laughs off).

R: Very true, but yet again, thank you for your time.

APPENDIX XIII

Transcribed Interview

Post-observation Teachers' Interview: School B

SCHOOL B

May 27, 2014

Interviewed Teacher: Ms. Vayal Mercy (PSEUDONYM)

Key:

R – Researcher

T - Teacher

R: Good afternoon Ms. Vayal, I hope is well so far.

T: Good afternoon indeed. So far no complaints, the day has been well.

R: That's great. Well, I am Given Simataa, a master student from the University of South Africa and I am with you today following up on the lesson you had earlier where I was an observer. Your contribution will be very vital to the successful completion of my research, therefore, I would like you to freely express yourself and feel free to ask me.

T: I will try my best if I can be of any help. Let's see how goes.

R: Alright, since I already got your name in the morning, let's proceed to next question. Please tell me, what subjects do you teach at this school?

T: I teach Biology, grade 11 and 12, ordinary and higher level.

R: Do you have any computer skills or computer knowledge, basically what you do on a computer?

T: Um..., yeah. I can type and do some few things.

R: Alright, do you have any computer qualification or did you receive any formal computer training at school, college, university or any institution?

T: Um..., yes, at the college level for a year.

R: Ok. Do you have any computers or computer related devices in your classroom?

T: No I don't have.

R: Ok. What specific computer technology devices would you like to have in your classroom?

T: I think, a computer set would be good to have.

R: A computer you say, how would you integrate that computer to enhance your teaching?

T: To type my tests, and also to..., my class works, tests, to research for information on the internet and store some information like marks.

R: Ok. If we go back to the lesson you had earlier; do you think that lesson could have been better presented and understood if there was a computer or any technology devices used?

T: Ah..., I really don't know.

R: Okay..what specific computer program(s), software or application(s) do you think you could use to present that particular lesson in a more effective way?

T: Um..., maybe Encarta.

R: Alright. So, what further hardware in addition to a computer set would you need to make that lesson presentation easier and most appealing to learners?

T: A projector.

R: What else do you think you could use computer technology for at your school?

T: I am not sure.

R: Does your school have a computer lab? How often do teacher and learners use it?

Do you think the school computer lab has been helpful to both teachers and learners, if yes, How?

T: Um..., yes. We don't use it, the teachers don't use it, and for learners am not so sure. Yes, because they search information there, though I heard that computers there got stolen.

R: Oh..., that should be bad for the school. Have they been recovered so far?

T: Ah..., I don't think so. I have not heard much so far.

R: Okay, let's hope for the better that they are recovered.

However, what difficulties do you think you could encounter in the process of integrating computers in classrooms if you had any?

T: Um, um..., I am not sure. But I think lack of computer skills and knowledge may be an issue.

R: How do you think such problems could be resolved for effective integration?

T: Invite computer teachers to train the teachers on how to operate computers.

R: In general, what do you think can be the impact of computers in education in regard to quality and standard?

T: I think it would improve the quality and standard of education.

R: Ok. Tell me where you see your school in regard to ICT integration in the future? Does your school have an ICT policy? If yes, how is the policy being implemented?

T: Am..., this one I'm not so sure. Concerning the policy, I think, no, I don't have a copy of such policy.

R: Alright Miss Vayal, we've come to the end of this interview. Thank you for your effort and time towards my investigation. I really appreciate it.

T: You're welcome.

APPENDIX XIV

Transcribed Interview

Post-observation Teachers' Interview: School C

SCHOOL C

June 03, 2014

Interviewed Teacher: Mr. Augustus Mateu PSEUDONYM)

Key:

R – Researcher

T - Teacher

R: Good afternoon Mr. Mateu, I believe I do not need to go through the introductory formalities since I already did that in the morning, right?

T: Right, I know you now and I understand why you're here (Laughs off).

R: (Laughs off) Alright, in that case then we can proceed from where we left in the morning. Please tell me the subjects you teach at this school.

T: I teach Geography, grade 8 to 10.

R: Do you have any computer skills or computer knowledge, what can you do on a computer?

T: I have knowledge on basics, but not skills.

R: Do you have any computer qualification or did you get any formal computer training at school, college, university or any institution?

T: No,

R: What about computers in your classroom, do you have any computers or any related devices there?

T: Na...., nothing.

R: Alright. If you to get such devices, what specific computer technology devices would you like to have in your classroom?

T: A computer and printer.

R: And how will you use that computer and printer to enhance your teaching?

T: Normally..., some information can be stored in that computer, and I can use it for summaries; and the printer for summaries.

R: Ok. Let's take a quick look at the lesson I observed in your classroom; do you think that lesson could have been presented a lot better and apprehended by learners if there was a computer or any technology devices used?

T: Yes, it definitely could have changed the complexion of the lesson in a positive manner.

R: And what specific computer program(s), software or application(s) do you think you could have used to present that particular lesson in a more effective way?

T: I'm not sure but, ah..., maybe looking for information on the internet.

R: What further hardware in addition to a computer set would you need to make that lesson presentation easier and most appealing to learners?

T: Maybe some overhead projector.

R: What else do you think you could use computer technology for at your school?

T: Storage of information, and serve as an archive.

R: Does your school have a computer lab? How often do teacher and learners use it?

Do you think the school computer lab has been helpful to both teachers and learners, if yes, How?

T: We have. Mostly since, computer is one of the subjects through which learners use the computer lab regularly. Yes, it also has been very much useful because the learners are getting knowledge on how to use computers and browse information.

R: Ok. What difficulties do you think you could encounter in the process of integrating computers in classrooms if you had any?

T: Um..., Security

R: How do you think the problem of security could be resolved for effective integration?

T: Maybe involving the ministry to bring in security forces.

R: In general, what do you think can be the impact of computers in education in regard to quality and standard?

T: It will bring the quality up.

R: Ok. Where you see your school in regard to ICT integration in the future?

T: As time goes on I think each class will have a computer.

R: Does your school have an ICT policy? If yes, how is the policy being implemented?

T: Ah..., not, I haven't seen it, maybe the computer teacher knows about it.

R: Alright Mr. Mateu. We have come to the end of this interview, I thank you for the effort and the time you've dedicated to helping me with this research. Thank you very much.

T: I am just to be helpful and wish you all the best in your studies.

R: Thank you Mr. Mateu, have a blessed day.

APPENDIX XV

Transcribed Interview

Focus Group Interview: School B

SCHOOL B

May 29, 2014

NB: All name used are pseudonyms

Researcher	Learner 1 (Boy)	Learner 2 (Girl)	Learner 3 (Girl)	Learner 4 (Girl)	Learner 5 (Boy)	Learner 6 (Boy)	Learner 7 (Girl)	Learner 8 (Boy)
Please start by telling me your name, the grade you are doing and the class in which you are.	Liben Asad, Grade 11A	Them bani Lisa, Grade 11B	Martha Eugene, Grade 11C	Mkamba Ariela, Grade 11D	Luka strauss, Grade 12A	Thabo Mason, Grade 12D	Mukita Liona, Grade 10B	Leon Masika, Grade 10A
Do you have any computer skills? If yes, what can you do on a computer?	No, I do not know how to use a computer.	Yes. I can type and I can use internet.	I only know how to switch on and switch off.	Yes. I can go on the internet and search some of the information.	Well, I do not have but I just have little bit of knowledge because we have a computer at home. My mom bought a computer just like yours.	Yes, I can type using Microsoft office, and I can also do audio things.	Yes. I can get information from the net, I can create documents and a lot of stuff. I got computer skills through BIS and I have a computer at home	No. Current I don't have any skills.

Is there a computer(s) or any computer technology devices in your classroom? If yes, how is it or are they used by both learners and teachers?	No, so far we have none.	No.	No we don't have.	There is none.	No, there are not computer technology devices there.	No.	No, there is none.	Ah ah, not even a single one.
What is your favorite subject and how do you think computers can be used to improve the teaching and learning of that subject?	English. Yes, I think computers can be used to teach English and maybe use the internet also to improve our language skills.	Mathematics. I think they could be used to teach Math by searching the information on the internet.	Life Skills. Yes, I think the internet could be used to further improve the teaching and learning of Life Skills.	Biology. The internet can be used for pictures and for further explanations.	Biology. Computers can be used for imitation of real processes that learners can visibly see. This can make us understand more.	Physical Science. I think we could use computers to show some of the experiments we do in the lab. It would be like doing the experiment.	Life Science. I am not sure but I think computers can give more information on the topics that we do in Life Science. Some processes we can watch on computers.	English. Computer could be used to show things like debates, plays, and other things we can learn English from.
Does the teacher normally use computers or any computer technology devices to teach your favorite subject?	No.	No.	No.	No.	No there aren't any computers in the class.	No.	No, there is no computer there.	No.

Does your school have a computer lab? If yes, how do both teachers and learners use it? Do you have access to it?	I don't know, I just came this year at this school.	Yes we have, but the computers were stolen last year. They were using it last year.	Yes there is, but I don't there are computers there. The learners doing Computer Studies are using it, Grade 9 and 10.	Um..., I don't know.	Yes it does have a lab. It's only used by junior grades, 8 to 10, because they have computer classes.	Yes. I heard the computers were stolen last year, so I don't know what goes on there. We are not doing computer at senior level.	Yes we have a computer lab but there are no computers in it.	Yes we do, but it's just a class without computers. The teacher normally uses her laptop sometimes.
In what other ways are computers used at this school?	I think maybe to print.	To find-out more information on other subject and typing of reports and letters.	They print exams and some tasks sometimes.	I think the computers used by the secretaries are being used mostly for typing and printing.	Type examination papers, I think keep records, print reports and letters to parents.	Um..., I am not sure.	The one in the secretary's office it's used to type timetables, letters, exam papers, and reports.	They are used for school reports and other documents.
Do you have a mobile phone with internet? If yes, how do you use its internet in regard to your school work?	No, I don't.	Yes I have. I use it to search information for assignments, tasks and Facebook.	Yes. I use it to download lyrics, to check for information on questions and Facebook.	Yes I have a phone that has internet. I use it to download songs and videos, reading celebrity news, and to search for information for tasks.	Yes. I use it, for example, when I am doing a research or searching other stuff. I also use it to download music and for Facebook.	Yes. Most of the information is on the internet, like most of the difficult words I log on the net and get information.	Yes. I use it to download information and for Facebook.	Yes I have one. I usually search for information when I have an assignment, and I use it for Facebook, downloading music and pictures.

<p>What do you think can be the impact of computers on teaching and learning? What can be the impact of computers on the quality and standard of education in Namibia?</p>	<p>In my view I think it will improve our English language and skills such as pronunciation. I think it will improve our education quality very much.</p>	<p>It will influence education in a good way and help teachers improve their teaching methods which means it will improve education in all.</p>	<p>I think it's good for both teachers and learners since other teachers are slow and learners can find information by themselves. It will improve and will help us with computer skills.</p>	<p>It will be a good motivation to learners, and I think that can lead to improved standard of learning.</p>	<p>I think they can bring up the quality and standard of education in the country, as well as the performance. I think it is possible that if used well we can see improved performances from both teachers and learners.</p>	<p>Computers can act sources of information which means both teachers and learners will have access to information which can help improve their performances and then with improved performance comes the quality now.</p>	<p>Of course it can improve the quality of education because we will have access to more information.</p>	<p>They make work easier for both teachers and learners, and this can help improve the quality and standard of education in the country. It will also depend on how they are being used.</p>
<p>Does your school have an ICT policy or policy on how school computers should be used? If yes, how is the policy being implemented?</p>	<p>I don't know.</p>	<p>I also don't know. I have not of it yet.</p>	<p>No.</p>	<p>Maybe, I am not sure.</p>	<p>I think there are just rules on how computers should be used.</p>	<p>I don't know, maybe rules, just rules to make computers are not misused.</p>	<p>I don't know it's a policy. I just know that there are lab rules on how we should use the computers.</p>	<p>Just rules I think. I have not heard of any policy.</p>
<p>What is your view of computers in classrooms at your school in the future?</p>	<p>I would like to see computers in all classrooms if that's possible.</p>	<p>At the moment I am not sure, I want to see computers in classrooms but I am not</p>	<p>The government should try bringing computers to classrooms,</p>	<p>I would like to see computers brought to classrooms, even laptops, or</p>	<p>I don't if it is good idea to have computers in classrooms as the result can be both</p>	<p>I want to see computers in the classrooms. I don't know what the school must</p>	<p>We need computers in the classrooms because they can really help.</p>	<p>I think if we are able to get more computers we could have one or two in each</p>

What do you wish to see at your school in regard to computers?		sure if it's possible since we don't even have some in the lab at the moment.	we really should have some. I don't think this school can afford computers on their own.	just one for the teachers with a projector.	good and bad depending on how it is used. But having at least one for teacher can be better.	do but I wish to have computers being used for teaching in the classrooms.	But I think at the moment the school must be trying to get computers for the lab because there are no computers there.	class. At the moment I don't think that is possible since we don't have a single computer in the computer lab.
If you were to make recommendations to the Government or the Ministry of Education in regard to computers in education, what would you say?	I will ask the ministry to provide us with more computers, at least 20 computers because we don't have computers at this school. A big school like this cannot have two or three computers.	I would recommend that the government must provide computers to all schools and install computer labs at all school to improve the learners' computer skills.	The government should provide computers to all schools and this will help improve computer skills. Learners should also pay computer fee that can be used to fix broken computers.	I also think the government should provide computers to all schools, so that learners can study on their own without the help of the teachers.	The ministry must provide schools with enough computers. The computers must be connected to the internet.	The government must build us a bigger lab and put in enough computers for both teachers and learners.	We need computers, so I think the government should bring in more computers. And maybe make sure that this time they are not stolen.	The ministry bring more computers to schools. Almost all people in the world use computers today, we also need computer skills. To get this skills we need to have computers.

Alright, this marks the end of this discussion. I would like to thank you all for your participation in this investigation. Your contribution will play a very big part for the success of this entire study. Thank you very much and have a blessed day.

APPENDIX XVI

Transcribed Interview

Focus Group Interview: School B

SCHOOL B

May 30, 2014

NB: All name used are pseudonyms

Researcher	Learner 1 (Girl)	Learner 2 (Girl)	Learner 3 (Girl)	Learner 4 (Boy)	Learner 5 (Boy)	Learner 6 (Boy)	Learner 7 (Girl)
Please start by telling me your name, the grade you are doing and the class in which you are.	Masi Lafoe, Grade 9B	Friedah Gabi, Grade 12C	Faith Sabiso, Grade 12A	Rudolph Pit, Grade 12B	Seidu Bill, Grade 8C	Kani Berlin, Grade 12D	Musadi Tomasi, Grade 8D
Do you have any computer skills? If yes, what can you do on a computer?	A little. I can play games, type, and use the internet.	Yes, I can open files, play games and can search information on the internet.	Not much, but I can at least open a computer, play music and games.	I can open a computer and I can do a bit of typing though not fast enough.	Yes, I can play games and use the internet.	Just little knowledge. I can use it to search information.	I can play music and I can also type.
Is there a computer(s) or any computer technology devices in your classroom? If yes, how is it or are they used by both learners and teachers?	Only in a Computer Studies classroom for Computer Studies lessons.	No	No	Nothing	No	We don't have.	We don't have any computers in the classrooms. The computers are only found in the computer lab, and sometimes in the staffroom or the office of the principal, but

							not in the classrooms. Unless, if a teacher brings his own laptop for a certain lesson.
What is your favorite subject and how do you think computers can be used to improve the teaching and learning of that subject?	Maths, if you need more information from the internet.	English and History. By using computer videos that are on the computers or the internet.	Development Studies, through the internet to search for information.	Biology, through the use of simulation programs and videos.	Physical Science, the teacher can show us pictures and some of the processes using the computer.	Geography. I think computers can be used to stimulate concentration.	Mathematics. Computers provide more information on topics.
Does the teacher normally use computers or any computer technology devices to teach your favorite subject?	No,	Yes, a laptop with a digital projector.	No,	Yeah, sometimes, a laptop and projector.	No,	Only laptop sometimes.	No,
Does your school have a computer lab? If yes, how do both teachers and learners use it? Do you have access to it?	Yes. It is used by learners doing computer.	Yes we have. Only learners doing computer are using the computers.	Yeah there is a computer lab. It is mostly used by learners doing Computer Studies.	Yes. It is only used by that Computer teacher, and the computer students.	Yes, but we only use it for Computer Studies.	Yes we have but it is just a classroom. Those learners doing computer always go there.	Yes we have a classroom for Computer Studies but I have not seen computers there. I only the teacher's laptop.4e
In what other ways are computers used at this school?	To store names of the learners.	I don't really know how are being used. I just see them.	I think they type letters and other things.	To print learners' reports, and exams.	To print examination papers, letters,	To store information and printouts.	I am not really sure but sometimes we receive typed

					class activities, and tests.	Maybe for internet also.	assignments, and our exams are also typed.
Do you have a mobile phone with internet? If yes, how do you use its internet in regard to your school work?	Yes. I normally use the internet to search for information.	Yes, I just use it mostly to download music.	Yes, but it does not have internet. It is just a simple phone.	Yes, but I don't use its internet.	Yes. I download music, videos and pictures.	Yes, but I don't use the internet because it is too expensive.	No, I don't have.
What do you think can be the impact of computers on teaching and learning? What can be the impact of computers on the quality and standard of education in Namibia?	On teaching, I think teachers could use computers to search for information very quickly. For learners they could get any missed information from the internet.	They can have a good impact on teaching because teachers won't write a lot on the chalkboards and learners can find information on their own.	It will improve the quality because it highly promotes learner-centered learning.	I think computers can have a good impact because they provide information.	Good impact, it will reduce the teacher's work and learners can easily understand the teacher.	I think it will have both bad and good impact. Good in terms of information since we lack textbooks. Bad because there's more entertainment on the computers.	They will help improve our learning, and I think teaching too because at least they provide information in the absence textbooks.
Does your school have an ICT policy or policy on how school computers should be used? If yes, how is the policy being implemented?	I don't think so.	I am not aware of any so far.	I am not sure.	No.	I haven't seen it.	I don't know, we only know that computers are used by learners doing Computer Studies.	I have not heard of it.
What is your view of computers in classrooms at your school in the future?	I think they will be coming to classrooms in the future.	I think they will just be in the computer lab.	I wish there were some in the classrooms, but I am not	Somehow I feel maybe there will be some computers in	I think there will be computers in classrooms, maybe it is just	I wish there will be computers in the classrooms because we	Maybe they (Ministry) will bring more computers so that we can

What do you wish to see at your school in regard to computers?			sure if that will happen any time soon.	classrooms, especially laptops. Even for teachers only.	a question of time.	really need them.	have some in classrooms.
If you were to make recommendations to the Government or the Ministry of Education in regard to computers in education, what would you say?	I would suggest they make Computer Studies compulsory.	I think they should bring more computers to schools so that all learners get access to computers.	Bring more computers to schools so we gain more skills. Provide each learner with a computer.	Bring more computers into school for us to get skills and expand our knowledge.	Bring computers to each classroom.	Give access to all higher schools to have computers. There are computers in most offices, so we need computer skills.	They should bring more computers for all learners, and make Computer Studies compulsory for all grade.

Let me thank you all for your participation in this investigation. Your willful participation makes this study possible and I so much appreciate your contribution. I thank you all for your time; please have a good day out there.

APPENDIX XVII

Transcribed Interview

Focus Group Interview: School C

SCHOOL C

June 05, 2014

NB: All name used are pseudonyms

Researcher	Learner 1 (Girl)	Learner 2 (Boy)	Learner 3 (Boy)	Learner 4 (Boy)	Learner 5 (Girl)	Learner 6 (Girl)	Learner 7 (Girl)	Learner 8 (Boy)
Please start by telling me your name, the grade you are doing and the class in which you are.	I am Lina Bheka, Grade 10B	Dennis Lineka, Grade 8A	Borac Simake, Grade 8D	Lucious Madaka, Grade 8C	Delice Imaka, Grade 8B	Lucia Ndaba, Grade 9B	Alina Mshakeni, Grade 9D	Nathan Mase, Grade 10 D
Do you have any computer skills? If yes, what can you do on a computer?	No, I don't.	Yes. I can download music, mix audio sounds, type and I also know how to use a projector.	No.	No.	A little. I can type, paint, draw and use the internet.	No.	No.	A little bit. I can record and play games.
Is there a computer(s) or any computer technology devices in your classroom?	No.	No.	None.	Nothing so far.	None.	None.	None.	No sir, we don't have any computers in the calssrooms.

If yes, how is it or are they used by both learners and teachers?								
What is your favorite subject and how do you think computers can be used to improve the teaching and learning of that subject?	Life Science. I am not sure but I think somehow computers could be used to improve teaching or learning of the subject.	Physical Science. I think so because computers provide information on the newest chemicals and lab instruments.	Computer Studies. It could be improved even more through the use of the internet.	Agriculture. Yeah, I think we could use computers to keep records.	Mathematics. Computers normally have mathematics quizzes which can really help us with math.	Entrepreneurship. I don't know if computers can be used in this subject, but..., maybe.	Life Science. I think it (Computer) could be used just a bit because you can investigate things you don't know about in Life science.	Mathematics. Computers can act like a teacher, so I think in that sense it could be used to improve the teaching and learning of the subject.
Does the teacher normally use computers or any computer technology devices to teach your favorite subject?	No really, no.	No, he is using head.	Yes, always for Computer Studies. We have desktops in the computer lab.	No.	Sometimes, yes, he uses his laptop.	No.	No.	Yes, sometimes he uses his laptop to print diagrams.
Does your school have a computer lab? If yes, how do both teachers and learners use it? Do you have access to it?	Yes, but then some of us are not using it.	Yes. Mostly it is used for researches since it has internet. Both teachers and learners	We have a lab. We use the internet to search information though learners are kind of having	Yes there is a computer lab. It is usually used for Computer Studies. Other learners and	Yes we do have a computer lab for Computer Studies. Sometimes other learners and teachers go	Yes. I think it is accessible to both teachers and learners. But it is for those learners doing computer.	Yes there is one. I don't how the rules are but I mostly see computer learners there. I	Yes we have a computer lab though the computers are not enough. Both teachers and learners go

		have access.	limited access.	teachers also go there sometimes.	there when it is not busy, or when there is no class in it.		have also seen teachers, especially in the afternoon. I think they use the internet	there at different times. It is meant computer learners but. Learners use the internet to complete assignment or homeworks, I think some teachers too search for information.
In what other ways are computers used at this school?	They are used to set tests and examinations.	I think they are mostly used for typing and printing.	They are being used sometimes for drawing and printing.	They are used for printing and typing of things.	I only see that they are being used for typing and printing of exams, tests, projects, school reports, handouts and I think letters to parents.	They have been used for practicals for learners doing Computer Studies.	So far I think for printing of reports, and they are also being used as storage for certain information.	I am not really sure but as other have said, they are mostly used for printing and tying of things.
Do you have a mobile phone with internet? If yes, how do you use its internet in regard to your school work?	Yes. I use it for Facebook and emails. Sometimes when I am stuck I use it to search information	Yes. I normally use it for downloading music and Facebook, school work information sometimes.	Yes. I download games and music.	Yes. I go on Facebook, download music, videos, and games.	No. I use my mother's phone. I use it for researches when studying.	No, I don't have a phone.	No. I have been struggling to get one.	Yes I have. I download music, read news and sometimes I use it for researches.

	for assignments.							
What do you think can be the impact of computers on teaching and learning? What can be the impact of computers on the quality and standard of education in Namibia?	I believe they can improve the quality of education in the country.	They can improve the quality, very much.	They can really improve the quality and standard of education.	They are capable of improving the education quality if they are used the right way.	With all the information a person can get on the information I believe computers can really help our education standard.	I think they can improve education. With computers I don't think textbooks will be an issue since we can get all the information we need from computers.	We have textbooks, sometimes we have to share. Computers can help in this regard, students without textbooks can get information on the internet. I think they can really improve the quality.	I think for some learners they can really help, but not for some learners because some learners will misuse computers.
Does your school have an ICT policy or policy on how school computers should be used? If yes, how is the policy being implemented?	No.	Yes. Yes it's been implemented because the computers will require a password for you to go on social networks like Facebook.	No.	No.	No.	No. I have not seen or heard of it so far. Maybe there is.	No.	Yes. There are rules set for the computer lab, and I think they are being implemented.
What is your view of computers in classrooms at your school in the future?	I am not sure.	I feel there will be more computers coming because we pay a lot of money.	They should come to classroom I think, maybe three or	Personally I want computers in classrooms, I just don't know if we	They must bring even laptops to classrooms. Computers are very	The school fund we pay is very high, I think we should buy more computers so that we can have	I am not sure, but I hope that one day we will have computers	I want to see more computers, more computers that we can

What do you wish to see at your school in regard to computers?			four years from now.	will have enough.	important today.	some in the classrooms.	even one in each class.	have some in classes.
If you were to make recommendations to the Government or the Ministry of Education in regard to computers in education, what would you say?	I think all learners must do Computer Studies from grade 8 to 12.	They ministry must provide free internet to all schools.	They should make Computer Studies compulsory from grade 11 to 12.	The government should bring Computer Studies, at least from Grade 6 to 12.	They should introduce Computer Studies in primary schools.	They should provide more computers to schools.	Learners should start using computers from grade 6.	All learners should do Accounting on computers, and all Accounting learners must do Computer as well.

Well, I am really impressed with your thoughts and ideas on this issue. We have come to the end of this discussion, and that should be it. Thank you all very much for your contribution to this study. I appreciate your effort so much, you may go back to your designated classes.

APPENDIX XVIII

Transcribed Interview

Focus Group Interview: School C

SCHOOL C

June 04, 2014

NB: All name used are pseudonyms

Researcher	Learner 1	Learner 2	Learner 3	Learner 4	Learner 5	Learner 6	Learner 7	Learner 8
Please start by telling me your name, the grade you are doing and the class in which you are.	Desin Sango, Grade 11C	Slyn Castil, Grade 11C	Rudolf Alba, Grade 11C	Selina Mukabi, Grade 11D	Felicia Marsha, Grade 11D	Betha Balow, Grade 11D	Elina Karol, Grade 11c	Jita Oscar, Grade 11C
Do you have any computer skills? If yes, what can you do on a computer?	Yes, I can play games, internet, typing, watch videos, and play music	Yes, Typing, games, creating documents, using media, and internet.	Yes, Communicating, store documents, play music, and the internet.	Yes, I can use the internet.	Not much, but I can play games and music.	Not really but I do, I can use the internet and play music	Yes, I can type, print, and, can use the internet, and play music.	Yes, I can do Microsoft programs and the internet.
Is there a computer(s) or any computer technology devices in your classroom? If yes, how is it or are they used by both learners and teachers?	No	No, there's not a single one	No,	No,	We don't have.	No,	No,	No,

What is your favorite subject and how do you think computers can be used to improve the teaching and learning of that subject?	Maths and Biology: By the printing of pictures, information, and use of Encarta.	Maths; we could download information, and print-out.	Biology; by the use of internet for information, and use a projector in presentations.	English; we will download information from internet, and print for studying at home.	Biology and English; by the internet downloads.	Silozi; I'm not sure.	Biology: if we use a projector, the internet and print-outs for learners.	Physical Science; some experiments can be dangerous to do for learners, but that they can do on computers with no harm.
Does the teacher normally use computers or any computer technology devices to teach your favorite subject?	No,	No,	No,	No,	No,	No,	No,	No,
Does your school have a computer lab? If yes, how do both teachers and learners use it? Do you have access to it?	Yes we have, it is used by computer students, and few teachers for information.	Yes, teachers use it a lot, learners only those doing computer studies.	Yes there's a computer lab. Yes we use it sometimes and teachers too. It is used a lot by the junior secondary learners.	Yes, it is used by the computer science teacher and computer students.	Yes, we have but we don't use it a lot because it is for computer studies.	We have, but we don't have access to it except grade 8s to 10. Some teachers go there too but are not sure what they are doing there, maybe to look for information.	Yes; teachers use it to search for information on the lessons, but it is not easy for us learners who are not doing computer to go there.	Yes, we have access but restricted because we are not doing computer studies, and others just go there to play games.

In what other ways are computers used at this school?	For making timetables.	To make hand-outs.	For printing rosters like sweeping, and terrain duties for teachers.	For typing question papers, and tests.	Searching for information, and typing documents.	They are used for internet, and typing papers and presentations.	Printing the school news paper though it has not been seen for a long time now.	(Learner excused himself).
Do you have a mobile phone with internet? If yes, how do you use its internet in regard to your school work?	Yes; it has internet, and I use it to download music and videos, I also use it for facebook.	Yes I have; it has internet. I use it to download games, dictionaries, and music videos.	Yes I have a cell phone with internet. I download movies, music,, and goggle for information.	No,	No,	Yes. I download dictionaries, videos, and go on facebook.	Yes I have. I just download applications such as Wikipedia, Bible, and I use it for Skype.	###
What do you think can be the impact of computers on teaching and learning? What can be the impact of computers on the quality and standard of education in Namibia?	They can improve teaching though some teachers might become addicted. For learner, I'm not sure, but the serious learners can really benefit.	Yes, it can improve teaching but some teachers will end leaving teaching to computers. But it depends on how the teachers use it.	It will depend on what learners and teachers can do on the computer to improve. But, computers can improve the quality and standard if they are used well.	It will improve our learning as we will surf for information, if the teacher did not explain well I can search for information in my own time.	I think it can improve teaching and learning because it does not make the teacher talk a lot which can be boring sometimes. If teaching and learning, then the quality also.	I am not sure but it can serve as an extra teacher, which will make teaching and learning easier; this can improve the quality and standard as time goes on.	Computers can do more for us if they are used in the right. They can improve our education quality so that we can study abroad without problems.	###

Does your school have an ICT policy or policy on how school computers should be used? If yes, how is the policy being implemented?	I don't know, but I think there are just rules in the lab.	Yes, we have. It is implemented because we are not having freedom to use the computer lab whenever we want.	I think we just have computer room rules explaining what we must do there, and what we must not take to the lab.	Yes, it is implemented.	I there is, but I have not heard of it. I just know there are rules in the computer lab.	There must a policy, but I have also not seen it. Maybe it with the principal, or maybe the computer teacher.	Yeah there is policy, otherwise we could go into the computer lab any time we want.	###
What is your view of computers in classrooms at your school in the future? What do you wish to see at your school in regard to computers?	It will be good if we have if it is possible the computer, it will help us learn better. Learners will not miss school	We want computers in the classroom, but I'm not sure there will bring computers to classrooms because they are expensive.	Computers in classroom will make learners fail; they will just be playing games on them. Unless if they take out the games.	Maybe they must make computer studies compulsory in all grades, that way we will all have access to the computer.	There might be more computers coming, but am not sure if they will come to classroom. We want them in classrooms.	We want computers in to be brought to classroom, they are not just for teachers, we also need them.	Maybe some lucky classes will have computers though I'm not sure, when they are more computers they will have no choice but to put in classes.	###
If you were to make recommendations to the Government or the Ministry of Education in regard to computers in education, what would you say?	Bring more computers to schools	Bring computers to classes.	Bring computers for every learner.	Bring in more computers to schools.	Make computer studies compulsory in secondary school.	Provide schools with enough computers.	Bring computers and laptops to learners to make work easier.	###

Alright guys and girls we have come to the end of this group discussion, I thank you for the effort you made to avail yourself for this study. You practically make my investigation possible and I appreciate it so much. Thanks a lot, you may go back to your classes

APPENDIX XIX

CLASSROOM OBSERVATION SCHEDULES

SCHOOL: School A

CLASSROOM: Grade 12A

School Background	
School name	School A
School Code	School A
Date	May 22, 2014
Grade	Grade 12A
Period	3
Time/Duration	45 Minutes
Teacher's name	Mr. Osaka Bennet (Pseudonym)
Subject	Physical Science.
Theme	Organic Chemistry
Topic	Homologous Series

Key: Shaded spaces represent the classroom situation

Observed Aspect

Aspect	Object/Activity		Remarks
Location	Where is/are the computer(s) placed?	Options Yes No	Computers are in the computer lab and one in the principal's office.
	In the classroom		
	In all classrooms		
	In some classrooms		
	In the library		
	In the computer lab		
	In management offices		
ICT/Digital learning and teaching Devices and computer hardware	What ICT/Digital learning and teaching devices are in the classroom?	Options Yes No	The teacher used his laptop and a school data projector for the lesson.
	Computer set(s)		
	Digital projector		
	Overhead projector		
	Microscope		
	DVD/CD Player		
	Others (specify) _____ _____ _____		

ICT/Digital devices' usage for teaching and learning	How are the ICT/Digital devices in the classroom used during the teaching and learning process?	Options		The teacher used the computer and data projector as a teaching tool in giving instructions and for consolidation to help learners understand more.
		Yes	No	
	Devices are incorporated as consolidation tools	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Computer(s) is/are used for completion of assignments/tasks/activities by learners	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Computer(s) is/are used by teachers as teaching tool(s) and used for information searching during lesson/activity planning	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Computer(s) has/have internet	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Devices are used as instructional aids	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Others: _____ _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	
Teacher skills and knowledge on computer technology/ICTs	Does the teacher demonstrate the following skills and knowledge?	Options		The computer was being used strictly by the teacher. Learners didn't touch it. The given instruction were well prepared and the teacher showed he knew what he was doing.
		Yes	No	
	Knowledge of giving instructions with digital aid/computers	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Provides extra work for learners to work alone using the computer(s) in the classroom	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Guides the students in exploratory activities on the computer(s)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Helps, monitors and assesses students' progress and work while they are using digital devices	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Organize clear instructions to be used during the activity	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Uses the devices he/she has to their utmost capabilities	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Help students that are struggling to work on the computer devices	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Others: _____ _____ _____	<input type="checkbox"/>	<input type="checkbox"/>	
Programs, applications, and software	What program, application and software are installed on the computer(s)?	Options		The laptop the teacher was using had Microsoft Office 2007 installed with no further dictionaries
		Yes	No	
	Spread sheet (Excel) Word processor (Word) Database (Access) Presentation (PowerPoint)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	Dictionaries	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Encyclopedias	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
	Encarta	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

	Calculators			installed except Office's natural thesaurus. The calculator was one that comes naturally with the Operating System, no further lesson enhancing programs were installed.
	Periodic tables			
	Time tables			
	Internet			
	Simulation programs			
	Others: _____ _____ _____			
Learners' understanding of the computer and other digital devices	What skills do learners demonstrate?	Options		Learners seemed excited seeing a computer and projector in the lesson, but were mostly spectators expected to copy information and answer questions.
		Yes	No	
	Learners show understanding of the digitally given instructions			
	Learners know their way around a computer and operate the computer with ease			
	learners know how to use the internet			
	Learners are fully involved in the activities			
	Learners enjoy using the devices			
Further observed areas and aspects				
Despite the fact there was a computer in the classroom it simply served as a substitute for the chalkboard, and the lesson was more teacher-centered. The teacher was simply presenting arranged non-interactive pictures and notes that learners were copying in their books. The teacher did most of the talking and manipulation of the information on the computer as learners watched. The classroom has a broken Cathode Ray Oscilloscope, and Science Kit with Circuit Board. There are some beakers, tripod stands, and few science objects meant for a Physical Science classroom.				

APPENDIX XX

CLASSROOM OBSERVATION SCHEDULES

SCHOOL: School B

CLASSROOM: Grade 12D

School Background	
School name	School B
School Code	School B
Date	May 27, 2014
Grade	12D
Period	8
Time/Duration	45
Teacher's name	Ms. Vayal Mercy (Pseudonym)
Subject	Biology
Theme	Enzymes
Topic	Enzymes

Key: Shaded spaces represent the classroom situation

Observed Aspect

Aspect	Object/Activity		Options	Remarks
Location	Where is/are the computer(s) placed?	Options		The computers in the computer lab and the office of the secretary and principal
		Yes	No	
	In the classroom			
	In all classrooms			
	In some classrooms			
	In the library			
	In the computer lab			
	In management offices			
ICT/Digital learning and teaching Devices and computer hardware	What ICT/Digital learning and teaching devices are in the classroom?	Options		The class has an overhead projector and a microscope but not a computer.
		Yes	No	
	Computer set(s)			
	Digital projector			
	Overhead projector			
	Microscope			
	DVD/CD Player			
	Others (specify)			

ICT/Digital devices' usage for teaching and learning	How are the ICT/Digital devices in the classroom used during the teaching and learning process?	Options		
		Yes	No	
	Devices are incorporated as consolidation tools			
	Computer(s) is/are used for completion of assignments/tasks/activities by learners			
	Computer(s) is/are used by teachers as teaching tool(s) and used for information searching during lesson/activity planning			
	Computer(s) has/have internet			
	Devices are used as instructional aids			
	Others: _____ _____ _____			
Teacher skills and knowledge on computer technology/ICTs	Does the teacher demonstrate the following skills and knowledge?	Options		There is no computer in the classroom.
		Yes	No	
	Knowledge of giving instructions with digital aid/computers			
	Provides extra work for learners to work alone using the computer(s) in the classroom			
	Guides the students in exploratory activities on the computer(s)			
	Helps, monitors and assesses students' progress and work while they are using digital devices			
	Organize clear instructions to be used during the activity			
	Uses the devices he/she has to their utmost capabilities			
	Help students that are struggling to work on the computer devices			
Others: _____ _____ _____				
	What program, application and software are installed on the computer(s)?	Options		Question not

Programs, applications, and software		Yes	No	applicable as there is no computer in the classroom.
	Spread sheet (Excel)			
	Word processor (Word)			
	Database (Access)			
	Presentation (PowerPoint)			
	Dictionaries			
	Encyclopedias			
	Encarta			
	Calculators			
	Periodic tables			
	Time tables			
	Internet			
Simulation programs				
Others:				
Learners' understanding of the computer and other digital devices	What skills do learners demonstrate?	Options		No computer in the classroom.
		Yes	No	
	Learners show understanding of the digitally given instructions			
	Learners know their way around a computer and operate the computer with ease			
	learners know how to use the internet			
	Learners are fully involved in the activities			
	Learners enjoy the using the devices			
Further observed areas and aspects				
The classroom has a few science items like beakers, petri-dishes, spatulas, a microscope, an overhead projectors, burners, and a few other items for Biology.				

APPENDIX XXI

CLASSROOM OBSERVATION SCHEDULES

SCHOOL: School C

CLASSROOM: Grade 10B

School Background	
School name	School C
School Code	School C
Date	June 03, 2014
Grade	Grade 10B
Period	5
Time/Duration	45 Minutes
Teacher's name	Mr. Augustus Mateu (Pseudonym)
Subject	Geography
Theme	Population
Topic	Population

Key: Shaded spaces represent the classroom situation

Observed Aspect

Aspect	Object/Activity		Remarks
Location	Where is/are the computer(s) placed?	Options	The computers are in the computer lab and in the principal's office.
		Yes No	
	In the classroom		
	In all classrooms		
	In some classrooms		
	In the library		
	In the computer lab		
	In management offices		
ICT/Digital learning and teaching Devices and computer hardware	What ICT/Digital learning and teaching devices are in the classroom?	Options	There is completely no single computer technology teaching device in the classroom except the chalkboard, and notice board.
		Yes No	
	Computer set(s)		
	Digital projector		
	Overhead projector		
	Microscope		
	DVD/CD Player		
Others (specify)			

ICT/Digital devices' usage	How are the ICT/Digital devices in the classroom used during the teaching and learning process?	Options	Question not applicable

for teaching and learning		Yes	No	since there are computer devices in the class.
	Devices are incorporated as consolidation tools			
	Computer(s) is/are used for completion of assignments/tasks/activities by learners			
	Computer(s) is/are used by teachers as teaching tool(s) and used for information searching during lesson/activity planning			
	Computer(s) has/have internet			
	Devices are used as instructional aids			
	Others: _____ _____ _____			
Teacher skills and knowledge on computer technology/ICTs	Does the teacher demonstrate the following skills and knowledge?	Options		Question not applicable since there are computer devices in the class.
		Yes	No	
	Knowledge of giving instructions with digital aid/computers			
	Provides extra work for learners to work alone using the computer(s) in the classroom			
	Guides the students in exploratory activities on the computer(s)			
	Helps, monitors and assesses students' progress and work while they are using digital devices			
	Organize clear instructions to be used during the activity			
	Uses the devices he/she has to their utmost capabilities			
	Help students that are struggling to work on the computer devices			
	Others: _____ _____ _____			
Programs, applications, and software	What program, application and software are installed on the computer(s)?	Options		Question not applicable since there are computer devices in the class.
		Yes	No	
	Spread sheet (Excel)			
	Word processor (Word)			
	Database (Access)			
	Presentation (PowerPoint)			
	Dictionaries			
	Encyclopedias			
	Encarta			
	Calculators			
Periodic tables				
Time tables				

	Internet			
	Simulation programs			
	Others: _____ _____ _____			
Learners' understanding of the computer and other digital devices	What skills do learners demonstrate?	Options		Question not applicable since there are computer devices in the class.
		Yes	No	
	Learners show understanding of the digitally given instructions			
	Learners know their way around a computer and operate the computer with ease			
	learners know how to use the internet			
	Learners are fully involved in the activities			
	Learners enjoy the using the devices			
Further observed areas and aspects				
The teacher used the normal classroom environment and the chalkboard mostly. There are no particular computer devices used. The class has some few charts on the wall charts on the wall and notice board that have been possibly used as teaching aids in previous lessons.				

APPENDIX XXII

CONSENT FORM FOR PARENTS OR GUARDIANS

Dear Parent or Guardian:

My name is Given M. Simataa, a teacher at Omulunga Primary School in Grootfontein, and a master student at the University of South Africa (UNISA). I write this letter requesting for your permission to allow your child _____ to participate in my project. As a major part of my master degree study I am required to conduct a research for me to successfully complete the course. I am basically investigating the possible impact that the integration of computer technology in education can have on the quality and standard of education in Namibia. While computers have so far been effectively used in different economical sectors such as banks, telecommunication, aviation and many more in the country, its impact on education has not been fully realized in the Namibian society which is why I conduct this kind of study.

With your permission your child will join a group of fellow learners who will also be taking part in the investigation. These learners, including your child will be interviewed by me either as a group. The interview/discussions will be conducted on _____ (date) during study time so as to ensure that the normal school time is not in any way interrupted, and it will take about 55 to 60 minutes. I also would like make it clear that your child's participation in this investigation is strictly voluntary and may quit at any time by indicating so prior or during the investigation. The investigation does not involve any practical risks, and therefore there is no provision for compensation of any kind for the child's participation in it. Your child's name will also not appear on any documents used during the discussion sessions for confidentiality and any information collected from your child will not be shared with any person unless required by law. All collected information from your child, which will be audio-recorded and video-recorded where possible and all information collected from other learners will be maintained and managed by me and my course supervisor, Dr. MZ Ramorola at UNISA.

This letter serves as a consent form for your child's participation in this investigation and it shall be retained for safe-keeping by UNISA. If you need clarity on any aspect of the investigation or have any questions in regard to the investigation and your child's participation, and if you would like to have a copy of the final report of this investigation please contact me at 081 238 1929 or 081 482 0167. You can also contact my supervisor at UNISA, Dr. Ramorola at +27 (0)12 429 6965.

If you agree and permit the participation of your child in this investigation, please sign this consent form and have your child return it to the class-teacher, who will pass it over to me.

Consent Statement:

I hereby declare that I have read the above consent form and therefore understand the nature of the project as explained to me. I understand that I have the opportunity to ask questions about the project. I also understand that I have the right to withdraw my consent and thus terminate my child's participation in the project at any time without any fine and also that my child has to personally agree to participate in the project. I hereby give permission for my child to participate and be audio-recorded in the research project conducted by Mr. Given M. Simataa, entitle *The Integration of Computer technology in Namibian Education System*.

Name of Parent or Guardian

Parent's or Guardian's Signature

Date

Certification Statement:

I, Given M. Simataa (Researcher), hereby confirm that I have explained to the above named parent or legal guardian as well as the participant the purpose and nature of this research project. I have also mentioned to the parent or guardian that he or she is free to ask any possible questions that he or she may have in regard to the project and the participation of his or child. I also submit to taking responsibility of any possible risks that may arise during the project. I also certify to have provided the participant's parent or legal guardian a copy of this signed consent form.

Researcher Signature

Date



Research Ethics Clearance Certificate

This is to certify that the application for ethical clearance submitted by

Simataa GM [47187751]

for M Ed study entitled

**The integration of computer technology in the Namibian
education system**

has met the ethical requirements as specified by the University of South Africa
College of Education Research Ethics Committee. This certificate is valid for two
years from the date of issue.

A handwritten signature in black ink, appearing to read 'CS le Roux'.

Prof CS le Roux
CEDU REC (Chairperson)

lrouxcs@unisa.ac.za

Reference number: 2013 November/47187751/CSLR

27 November 2013

APPENDIX XXIV

PERMISSION TO CONDUCT RESEARCH

March 11, 2014

THE PRINCIPAL

SCHOOL NAME: _____

MINISTRY OF EDUCATION

RE: REQUEST FOR PERMISSION TO CONDUCT RESEARCH

DEAR SIR/MADAM

I hereby with permission from the Regional Directorate's Office write to request for assistance and permission to conduct a research at your school as part of my Master of Education degree study that I am doing with the University of South Africa (UNISA). I am conducting a study on the Integration of Computer Technology in the Namibian Education System, and my study is particularly based on secondary schools (Junior and Senior). The study is motivated in effort by Vision 2030 which articulates building an information society that is scientifically stable, as well as a knowledge-based economy for Namibia.

The study is with intent to establish how the integration of computer technology in schools can help improve the standard and quality of education in terms of performance and delivery, and your school is one of the schools I chose to assist me in completing this study because of its urban locale in the Region. The study is of a qualitative methodology, and will be subdivided into two phases in which the responds who are the principal, heads of departments, teachers and learners will participate in either one-to-one interviews, focus group interviews, or observations. Phase I will be of lesson observations and interviews with subject teachers and individual learners; and this will span from _____ to _____, 2014 for your school in Phase I. Phase II will be of interviews with Heads of Departments and School Principals; this will run from _____ to _____, 2014 for your school.

UNISA highly upholds that participants of this study be informed of what the study is all about, and that their identity be kept anonymous for their safety and protection, and the divulged information be kept confidential thereof. Upon completion feedback will be provided to all participants of the study. This study will enable the Ministry to; a) establish the extent to which ICT has been integrated into classrooms, b) identify areas that have so far been hindering factors in the process of integration, c) bring in new strategies through which ICT integration can be fully realized in classroom situation, and finally, d) establish whether ICT integration has so far been effective in imputing quality and standard in regard to learners performance and teachers' lesson delivery in classrooms.

I sincerely hope my request will be granted in this regard and therefore count on your support as we strive towards advancing education in Namibia as a whole.

Yours in academic studies,

Given M. Simataa (Mr.)
Contact №: 0812381929/4820167
Grootfontein

Date

If you consent to this study request please sign under the consent statement and send back a signed copy of this letter to the researcher.

Consent Statement:

I, _____ (name in full), principal of _____ (school name) certify that I have read and understood the content of this letter and therefore understand the implications of its content upon our school. I therefore officially give my consent to the researcher, _____ (Name) to feel free to come and conduct his investigation at our school.

Principal's Signature

Date

APPENDIX XXV

LETTER TO PARTICIPANTS

_____ 2014

Dear Participant

This letter serves as an invitation for your participation in a research study directed towards establishing the impact of computer integration on the quality and standard of education in Namibia. The primary objective of this study is to determine the extent to which computers have been used in the Namibian schools, how both teachers and learners have been employing computer technologies in their teaching and learning process.

The study will also determine the extent to which Namibian schools are furnished with computer technology devices, and also help assess the computer skills of both teachers and learners; which can be a very determining factor on whether and how computer technology gets used in schools. This study will as well focus on determining what teachers and learners think of computers in education.

The information that will be yielded by this study will be made available to the Namibian Ministry of Education in order to provide the insight on the up-to-date state of computer integration in Namibian schools from which the Ministry can come up with innovations to advance the process.

I therefore ask for your cordial assistance in making this study a success by being part of the interview so as to fully establish the state computer integration in our education system. The interview will be of about 30 to 60 minutes depending on the activity in which your participation will be required. I would like to ask you try answering all questions as honestly and accurately as you can. You are also informed that your participation in this study will be treated confidential and voluntary. Your name and that of your school or organization will not at any point be mentioned anywhere in the resulting report of the study. If you are not clear on any question during the interview please do not hesitate to ask for clarity.

I _____ (the participant) have been fully informed of the research and understand what is required of me. I consent to participating in the study.

Participant's Name: _____

Signature: _____

Date: _____

Sincerely yours,

GM Simataa (Researcher)