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DEPARTMENT OF APLIED EDUCATION

A STUDY OF THE EXTENT TO WHICH ICT IS BEING IMPLEMENTED IN THE TEACHING AND LEARNING OF ADVANCED LEVEL GEOGRAPHY IN EMPANDENI CLUSTER SCHOOLS

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RESEARCH TOPIC: **A STUDY OF THE EXTENT TO WHICH ICT IS BEING IMPLEMENTED IN THE TEACHING AND LEARNING OF GEOGRAPHY IN SECONDARY SCHOOLS IN EMPANDENI CLUSTER.**

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DEDICATION

This dissertation is dedicated to God and my entire family (Haraan)**.**

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I am indebted to my friends and colleagues in this dissertation. Special people who need mention is my supervisor Mr. E. Nyoni who provided wise counsel. His encouragement, suggestions and ideas inspired me to continue with the research. I also want to thank God who gave me time to continue with the study.

Finally I want to thank my family for encouraging me.

ABSTRACT

The purpose of this study was to study the extent to which ICT is being implemented in the teaching and learning of Advanced level Geography in schools in the Empandeni cluster. The main focus of the study was to highlight major factors affecting the implementation of ICT in the teaching and learning of Geography at Advanced level and to give solutions to address the challenges. A mixed approach design was used to get in depth detail of the extent to which ICT is being implemented in schools. In depth open ended and closed questionnaires were distributed to seven Geography teachers in the cluster schools. Interviews were administered to 37 Advanced level Geography pupils from three different schools in Empandeni cluster. The study revealed that teachers lack skills on implementing ICT in Geography lessons, the time allocated to e-learning is little, high cost, internet connectivity, shortage of infrastructure such as computer labs, computers, ICT tools are major factors affecting the implementation of ICT in Geography lessons. The study looked at solutions to improve the implementation of ICT such as training of teachers, procurement of ICT facilities such as computers, construction of computer labs, and use of alternative sources of power. The observations made the researcher to conclusively say that the integration of ICT in Geography is far much behind, hence the need for the concerned stakeholders to fully support this programme. It was recommended that the national policy on ICT must be readily available and it should be clearly communicated to schools, curriculum should be in line with e-learning facilities so that subjects can be taught through e-learning collaborative tools, schools that are not electrified to seek for help so that they can have other sources of power and schools with limited computers may allow pupils who can afford to buy their own laptops and other ICT facilities to use them.

Table of Contents

LIST OF TABLE

LIST OF FIGURES

i

CHAPTER I :THE RESEARCH PROBLEM

1.0 Introduction

The implementation of ICT continues to dominate in developed countries while most developing countries still experience a drawback in the implementation of electronic devices in the teaching and learning of Advanced Level Geography. In order to produce school leavers who perfectly fit in the labour market, learning nowadays should involve the effective use of ICT such that pupils are well prepared for real or long- life learning. Thus this calls for both teachers and learners to be well prepared to make use of these powerful tools and devices presented by ICT. In this chapter, introductory information on the research topic is highlighted through the background information to the problem, statement of the problem, aims and objectives of the study, research questions, assumptions, significance of the study, definition of key terms, limitations and delimitations of the study and finally the organizational structure of the entire research project.

1.1 Background to the study

As projected in *New Zimbabwean*, 14 July 2012, the Zimbabwean Government set a target that in year 2015 all schools around the country should work on producing school leavers with the requisite skills to play a major role in the worldwide digital economy. In its quest to achieve the target the government through the Ministry of Information and Communication Technology embarked on rigorous countrywide campaign to introduce E-learning in schools. The programme was reportedly a follow up to the school's computerization programme in which his Excellency, the president of Zimbabwe Comrade R.G Mugabe was reported to have donated at least 10 computers to some secondary and few in primary schools.

Inspired by this noble initiative by the President most schools with the help of the School Development Committee (SDC) have gone an extra mile to purchase extra computers to be purposefully used by teachers and pupils in various educational department. Moreover, pupils in some secondary schools where parents could financially afford to provide their children with laptops, permission was granted so that laptops could be brought for educational use. Furthermore, some schools introduced Internet services such as E-learning software to improve on research as far as teaching and learning process is concerned.

Therefore, the problem identified by the researcher however, originates from the fact that in spite of a large pool of ICT devices, telecollaborative projects and facilities in schools, most teachers' still use traditional or primitive methods of teaching instead of shifting towards the more advanced ICT methodologies in the teaching of Geography. Many studies revealed the failure to incorporate ICT into educational systems (Dooley, 1999). In other words, making technology available to teachers and students is not enough to achieve educational goals but requisite skills are of paramount importance. It is the researcher's feeling that the introduction of e-learning in the school curriculum can be too far from reality. The researcher feels that for the Geography subject to be well imparted ICT/ e-learning is a necessity. There are some areas and concepts which need attention in the implementation of an ICT program so as to meet the set objectives or target.

There is no doubt that most schools in our cluster are missing out on the possible benefits and advantages of ICT as both teachers and pupils are losing a lot of qualitative and quantitative education with relevant and current information. Therefore, the researcher is targeting to highlight the extent to which ICT is being implemented in the teaching and learning of

Geography and drawing out well-informed ideas that would form the base for recommendations to stakeholders for quality Geography education through E-learning.

1.2 Statement of the problem

Computers donated by the state president, non-governmental organizations (NGOs), and well-wishers were distributed in schools in Zimbabwe including the Empandeni cluster. The major aim/ objective was to improve the quality of education through the integration of ICT. It is disturbing to note that a small number of Geography pupils are benefiting from ICT thereby disadvantaging the majority of less fortunate ones by the implementers of the ICT programme. This pressurized the researcher to study the current prevailing situation in schools, identify the extent to which ICT or computer technology is being implemented in the teaching and learning of Geography. Additionally, the study also evaluated the effects of ICT to the developmental progress of learners and also determines possible solutions to overcome the problems encountered in implementation of ICT in the teaching of Advance Level Geography.

1.3 Research questions

1.3.1 Main question

What challenges affect the implementation of ICT in the teaching and learning of Geography in Secondary Schools?

1.3.2 Sub-research questions

- What curriculum development factors affect the implementation of ICT in the teaching and learning of Geography?

- To what extent do infrastructural development factors affect the implementation of ICT in the teaching and learning of Geography?

- To what extent do teacher factors affect the implementation of ICT in the teaching and learning of Geography?

- What should be done to improve the implementation of ICT in the teaching and learning of Geography?

1.4 Research objectives

-To highlight the extent to which ICT is being implemented in the teaching and learning of geography in secondary schools in Empandeni cluster.

-To suggest possible recommendations for the future to enhance full utilization of ICT in the teaching and learning of Geography in schools.

-Feature out possible solutions on how ICT can be effectively used in schools so that pupils can understand concepts taught in Geography.

1.5 Significance of the study

The significance of this study lies in establishing if pupil's performance in Geography is attributed to non-effective use of ICT. The research is based on ICT so as to reveal the extent to which ICT is being implemented in the teaching and learning of Geography at Advanced Level.

It is hoped that the study will inform and equip teachers on how they can embrace ICT in the teaching and learning of Geography. It is also hoped that Geography teachers in schools will be propelled to use ICT in their schools more purposefully and introduce a variety of methodologies

in the teaching of Geography. It is hoped that findings from the research would popularize ICT application in the teaching and learning of Geography thereby making classroom teaching and learning more innovative.

The research will also keep Geography teachers alert on the effectiveness of ICT in the teaching and learning of this subject (Geography).

1.6 Assumptions of the study

The study assumes that:

* Respondents of this study will be honest and willing to cooperate

* The samples selected will be a true and authentic reflection of the total population

* All materials needed for the research will be readily available.

1.7 Delimitations of the study

The study was carried out at three secondary schools in Empandeni Cluster under Mangwe District. The study focused on the extent to which ICT is being implemented in the teaching and learning of Geography, evaluation of the effects of ICT to developmental progress of learners and on the determination of possible solutions to eliminate hindrance factors.

1.8 Limitations of the study

The constraints that the researcher encountered are deep seated in the time frame of the research.

- The researcher had limited time to do thorough research as he studies on block release bases and the school time table was another constraining factor as it is fully packed

with school activities that left the researcher with little time to concentrate on research. Besides, the researcher had other duties to carry out in the school which was a hindrance.

- Severe power cuts slowed down the progress of the study. The researcher had problems to supplement the power cuts.

- The study was based on the assumption that the sample reflects the entire population.

- Finance

- Polarized society

1.9 Definition of terms

1.9.1 Geography Curriculum- refers to a course of study involving both practical and theoretical learning.

1.9.2 Information and Communication Technology (ICT)

refers to a computer kit connect up so it can search the internet (Petty, 2009) ICT as a kit can include electrical gadgets such as a WIFI or Internet connected computer, a printer, digital camera, video cameras, as well as an LCD projector or an overhead projector. In other words this means that ICT refers to modern technologies used for researching, storing, editing and translating information in various forms between the teacher and the learner.

1.9.3 Learning

According to Terry (2003) Learning refers the process of acquiring new or modifying and reinforcing existing knowledge behaviors', skills and values. In simple terms, learning is an

active process whereby an individual acquires relevant skills which might result in change of behavior and psychological well-being.

1.9.4 Teaching

Can be viewed as an interactive process targeting at arranging and manipulating a situation in order to facilitate the acquisition of knowledge, skills and new attitudes (Brubacher, 2013).It is interactive in that teachers are on the forefront to make sure that relevant knowledge and skills are imparted interactively in the teaching and learning process.

1.10 Summary

This chapter has unearthed the major thrust of the study through problem identification, the objectives, assumptions, definition of terms, delimitation as well as the significance of the study help in the discussion of the problem. The background from chapter I introduced chapter II where the researcher is going to look at literature review.

CHAPTER 2: REVIEW OF RELATED LITERATURE

2.0 Introduction

In this chapter, the researcher discussed and reviewed at lengthy some of the views of authentic sources with regards to literature around the topic which included the implementation of ICT in the teaching of Geography in schools. Interpretation, evaluation as well as contextualization of related literature will be done with the intention of establishing gaps in knowledge and then pointing out how this research will attempt to bridge identified gaps. It is the researchers hope that the information given by other scholars will be of great help and would assist the researcher in carrying out the study at hand. Furthermore, this chapter also clearly defines both the conceptual and theoretical frameworks within which the study of ICT is of relevance in the teaching of Geography in education or schools.

2.1 Conceptual Framework

The study focuses on the extent to which ICT is being implemented in the teaching and learning of Geography in schools. For the teaching of Geography to be effective, teachers have to incorporate advanced technological methods which will create enthusiasm and better understanding of concepts in this subject area (Geography). The world we are living in is not static but dynamic; therefore, we have to resort to the ICT methodologies which are widely used by pupils in their day to day lives. For any curriculum or education to remain relevant to the people's expectations, it has to continue to serve the needs and interests of its beneficiaries (Konyana and Konyana, 2013). Therefore, ICT must serve the needs of the pupils by making them understand Geography so that in the near future, the majority of students will develop

positive attitude towards the subject. Furthermore, pupils learn on their own especially when they are exposed to modern audio-visual aids such as computers which are an eye-opener to students.

Based on the view that ICT is relative to the needs of the schools and society at large, it must be incorporated or implemented fully as the world we are living in is advancing technologically. This view provides the theoretical background of this study on the effectiveness of ICT in the teaching and learning of Geography in secondary school found in Empandeni cluster. Thus, if teaching and learning of Geography is effective and worthwhile in pupils' lives, then it should embrace the technological change in the society by equipping pupils with relevant computer skills so that they become functional citizens who will fit well in the labor market as well as in the industry and commerce where use of ICT has become the order of the day. This has yet to be realized and implemented in Empandeni cluster where pupils need to be introduced to ICT so that teaching and learning of Geography becomes easier and intelligible to them. Exposure to technological devices or methods in teaching such as global classrooms, tele-conferencing, key-pals and electronic publishing enables students to discover knowledge and learn from one another (Konyana and Konyana, 2013).

2.2Learning theories in support of ICTs

The emergence of ICTs as learning technologies has coincided with a growing awareness and recognition of alternative theories for learning. The theories of learning that hold the greatest way today are those based on constructivist principles such as (Duffy and Cunningham, 1996). They posit that learning is achieved the active construction of knowledge supported by various perspectives within meaningful contexts. In constructivist theories, social interactions seem to play a critical role in the processes of learning and cognition (Duffy and Cunningham, 1996)

.The ways pupils interact or socialize enable them to acquire knowledge either at home or schools. Therefore, the ways pupils interact among themselves enable them to gain knowledge, similarly when they interact with computers / technological gadgets on their own they will gain useful knowledge. In Geography, through the researches made on the internet, students will gain current and useful information which will make them like and understand Geography well.

In the past, the conventional process of teaching has revolved around teachers planning and leading students through a series of instructional sequences to achieve a desired learning outcome. Typically these forms of teaching have revolved around the planned transmission of a body of knowledge followed by some forms of interaction with the content as a means to consolidate the knowledge acquisition. Contemporary learning theory is based on the notion that learning is an active process of constructing knowledge rather than acquiring knowledge and that instruction is the process by which this knowledge construction is supported rather than a process of knowledge transmission (Duffy & Cunningham, 1996).

The strengths of constructivism agreement are in its emphasis on learning as a process of personal understanding and the development of meaning in ways which are active and interpretative. In this domain learning is viewed as the construction of meaning rather than as the memorization of facts (Robert, 2011). Learning in simple terms is an active process whereby pupils construct meaning from a concept rather than to memorize, students learn in order to feature out the meaning constructively rather than wrought learning. Approaches using contemporary ICTs provide many opportunities for constructivist learning through their provision and support for resource-based, student centered settings and by enabling learning to be related to context and to practice (Barron, 1998). In short, any use of ICT in teaching and learning environment can act to reinforce various aspects of knowledge construction and as more

and more students employ ICT in their learning processes, the more pronounced the impact of this will become even more advantageous.

This study attempts to explore the effectiveness of ICT to all Geography teachers/practitioners who continue to impart knowledge using traditional methods such as lecture methods where they struggle to explain abstract concepts such as examples of deserts, cyclones, climates and volcanoes. However, with the use of computers, animation soft wares have been designed which explain concepts clearly over a short space of time (Duffy & Cunningham, 1996).

Apart from that, pupils in school are very much active when they conduct lessons using audio-visual aids and in most cases they grasp the concepts better. For example, when a Geography teacher is teaching about rainfall formation there is no need for him/her to explain because pupils have different levels of understanding so thus where ICT comes in. Animation of rainfall formation visuals can be brought in the lesson and students see and listen on the process within a lesson.

2.3 Impact of ICT services on Education

The introduction of computers into the curriculum has resulted in a drastic change in the education sector. Douglas (2008) postulates that computers help pupils to visualize objects that are difficult or impossible to view or understand. Abstract or difficult concepts in Geography can be explained better using computers because students will be seeing and listening to audio explanations on these electronic devices. For example the process of volcanoes in Geography can be presented using projectors which will minimize harm even if pupils were to be taken to a real place where they can find a volcano. Use of ICT cuts on the issue of expenses and time taken to travel on excursions/field trips but instead they will be made to watch a visual of the real volcano

during the Geography lesson. In other ways, a process which occurs over many years can be explained and seen in a forty minutes lesson.

Sivin-Kachala (1998) in his research studies from 1990- 1997 to assess the effect of advanced technology on learning and achievement across all learning domains and levels of learners. Reports that students in developed countries have rich technological environments excel academically in all major subjects. Their attitudes toward learning and personal-concept improved consistently when computers were used for teaching and learning, thereby revealing the impact of ICT in education. Similarly, Oliver (1999) adds on that for many years prior to the 20st century, courses in education have been written around textbooks and documented. Teachers have consistently taught through lectures and presentations interspersed with tutorials and learning activities designed to consolidate and rehearse the content. The teaching and learning process was more teacher-centered than pupil centered; giving students little time to ask questions where they needed clarification. However, contemporary settings are now favoring curricula that promote competency and performance through the use of ICT in the teaching of subjects such as Geography in schools.

2.4 Education and ICT policy in Zimbabwe

According to Musarurwa (2011), the University of Zimbabwe unveiled a policy in which ITC education was made mandatory for every student at teacher's colleges in Zimbabwe including Hillside Teachers' College where Geography teachers are being trained. The policy makes it mandatory for the Geography teacher to use computers in the classroom. Teachers' lack of computer literacy is an obstacle in using computers of the classroom, Newhouse (1997). Evans et al (2012:90 assert that, "Teachers must have a working knowledge of computers to integrate

computer technology into the classroom effectively." It can be therefore said that, for the Geography teachers to effectively use computers in the teaching of Geography, they must be taught how to use them.

In *New Zimbabwe* (14 July 2012), Minister David Coltart suggested that Zimbabwe has set year 2015as the year for all schools to produce school leavers with the requisite 21st century technological skills to play a part in the worldwide digital economy. As further highlighted by the press in The Herald of 12 March 2012, the government through the Ministry of Information and Technology launched a countrywide campaign to introduce E-learning in schools . As the matter was deliberated on, the launch was too far from being a reality when it comes to the practicality of E-learning.

An organization known as E-Solutions, through its director Misimirembwa in July 2012 came into play when it said, "E-learning refers to making use of electronic equipment such as computers and tele-communications to facilitate effectively the learning process. Modern E-Learning is highly interactive and collaborative". A similar report (July 2012) posts that the Modern E-Learning is highly interactive and collaborative". A similar report (July 2012) posts that the above was to be made possible through the use of internet based technologies such as computers and even cell phones. Classroom learning activities and programs should not be about computer usage but should involve full pedagogy and constant practice.

Misimirembwa (2012) in the E- Solution report suggested that these activities involve creating appropriate language, public policies and curriculum issues as well as ICT hardware facilities. At this point it should be noted that devices to be used must be purposefully built and the ICT education policy must take into consideration all these important aspects.

The policy having set 2015 as a year for producing an e-wise product from schools can view their target as dream that come true but does the Government have the capacity and resources to fully implement ICT policy in schools?. The question on the ground now is, "What has been done? What is being done? What measures are being set for the fulfillment of the ICT dream in education? And to What extent is the ICT being implemented in the teaching and learning? The E- Solution report highlights that the Ministry of Information and Technology sets out objectives and strategies pertaining to ICT in education. The relevant objective in this section stats that the government will encourage the use of ICT in schools , colleges, universities and other educational institutions in the country so as to improve quality teaching and learning in schools.

2.5 ICT infrastructure

The implementation of ICT in the teaching and learning Geography works well with related electronic devices. Allen (2007) indicates that information that helps teach or encourage interaction can be presented on computers in the form of text or in multimedia formats which include photographs, videos, animation, speeches and music. The whole process incorporates the principles of education in addition to subject matter knowledge into computer programs.

Fee, (2009) highlights that in classroom optical video disks can be used which is a new interactive station to store large amounts of data such as motion pictures. The use of computers and CD-ROM, CD-10X video disks, student can see an electronic encyclopedia, a film on the subject or look at the related topics at the click of a button. These learning stations set up at the school combine advantages and disadvantages of reference materials. In addition, still-pictures, motion pictures, television and computer aided instruction can be used during leaning setups. Horton (2006) points out that optical disks can be used by the teacher to illustrate very complex

situations using the digital overhead projectiles .This helps to ease the way in which information is presented and mastered.

Hellenson (2008), states that computer labs at the school can be connected to the internet where students can download audio-visual facilities on subject in question. The author further highlights that personalized and professional research can be done through online search, the teacher will be there as a facilitator.

2.6. Challenges faced by schools relative to ICT use

The implementation of ICT in the teaching and learning of Geography is not that easy. Kiptalan, et al (2010) observes that access to ICT facilities is a major problem facing most African countries with an average of 1 computer to 150 students against the ratio of 1: 15 students in developing countries. The Kenyan National Council for Science and Technology (2012) indicates that computer uses in Kenyan classroom is still in its early phases and concluded that the perceptions and experiences of teachers and the administrators do play crucial roles in the use of computers.

Kiptalan (2010) cites challenges/ discoveries in schools as:

 lack of computers - they are very expensive, despite spirited efforts by the government agencies, NGOs, Corporate world and individuals to donate computers, in schools there still remains a bigger percentage of schools unable to purchase computers for use by pupils.

Also errant power supply- this is commonly referred to as load shading in Zimbabwe. This is a major drawback in the implementation of ICT in the teaching and learning of Geography as the electronic devices to be used require electricity supply. In Zimbabwe some schools received

computers from the president but up to now the gadgets is still lying idle due to shortage or inadequate supply of power.

Lack of qualified teachers to teach ICT in schools is another problem being encountered in the implementation of ICT in schools.

Burglary was also revealed as a common problem faced by schools in the implementation of ICT in the teaching and learning Geography.

Broken down components- while a good number of schools have benefited from donated used computers they have not been adequately equipped with the same maintenance and repair, hence it is very common to see schools computer labs full of broken down computers.

Fear by teachers- teachers may feel like computers may render them irrelevant.

Closely related to the point above is the fear by administrators- there is still a stronger perception especially by older generation thatP computers require highly skilled personnel to operate them, while this may not be the case, some school administrators fear that the students will be exposed to adult sites and undesirable site through the use of internet.

Lack of internet or slow connectivity - most schools are unable to connect to the World Wide Web due to high costs involved in the connectivity as well as lack of internet services from service providers.

Lack of initiative by community leaders- the community leaders who are charged with looking at the interest of a given community do not see the need to purchase and subsequent installation of computers to their schools as a priority. They consider health care, provision of water and other amenities as more important than buying computers for schools.

Absolute computers lower the morale of both the teacher and learner. It is very common to find some schools using old computers on windows 98 or 95.

Increased morale degradation- internet pornography, cyber bullying and other anti-social behavior is a worrying emerging problem.

Horton (2006) says that poorly designed e-learning systems can dehumanize or regiment the educational experiences and thereby diminish student and motivation.

2.7 The Curriculum

E-Solution Report (2012) cites lack of content for education, most of our education materials are yet to be digitalized so as to enable students and teachers to use computers in the teaching and learning process. According to the report many libraries are foreign and have outdated and are irrelevant to our curriculum.

2.8 Summary

The information obtained from other authorities will help to form the basis for the study. Generally the implementation of ICT worldwide experienced magnified challenges of which Zimbabwe is not an exception. The following chapter is going to focus much on data collection procedure.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction

The success of any study rests upon the choice of the methodological framework and the research design used to carry out that research (Oliver, 1999). This chapter is an outline of the research methodology. It is going to focus on the research design, population of the study, sample, the data collection instruments, and data collection procedures that are going to be used in this research. The discussion on the advantages and disadvantages of the research instruments will be highlighted. The chapter will end with a summary of the research methodology.

3.1 Research design

An appropriate design gives a strategy and a working plan for selecting and organizing the sequence of procedures and handling the evidence or information relevant to solve the research problem (Mavhunga, 2000). (Burns and Grove (2003:195) define a research design as "a blue print for conducting a study with maximum control over factors that may interfere with the validity of findings". Parahoo (1997:142) describes a research design as "a plan that describes how, when and where data are to be collected and analyzed". According to Cooper (2003), a research design is defined as a plan or structure of the investigation conceived to obtain answers to research questions. To further support that Bless and Higsonsmith (1995) postulate that it is a term referring to the guide the researcher employs in collecting, analyzing and interpreting observed facts, yet Saunders (1997) escorts that a research design is a programme that guides the investigation process of gathering data. A research design is a guideline within a choice about data collection methods has to be made. Coolican (1994) defines it as a method of gathering empirical data with which to test a hypothesis or develop a theory.

In this research, the researcher used mixed methods approach which used both qualitative and quantitative research methods. Qualitative research according to Patton quoted in Brand (2006) asserts that it is based on induction, holism, and subjectivism. Lincoln (1995) postulates that qualitative research is an emphasis on processes and meanings that are not rigorously examined or measured in terms of amounts that are different to quantity. Thus qualitative research is inductive in that the researcher will attempt to understand a situation without imposing pre-existing expectations on the setting.

Qualitative approach allowed the researcher to get personally involved in the field with the respondents thereby giving access to much hidden information and artifacts. Using this qualitative method, knowledge was constructed from the meanings and responses obtained from in-depth interviews with the participants (Mavhunga, 2000). It was expected that the resulting data would be richly descriptive and faithful to the participants' perspective. Therefore, qualitative approach allowed for deeper understanding. The in depth interviews allowed for a more rich description, people's views, experiences to the extent to which ICT is being implemented in secondary schools. In depth uncovered a particular situation rather than a sweeping statistical survey.

Quantitative research is based more directly on its original plans and its results are more readily analyzed and interpreted, it emphasizes relative on large scale and representatives sets of data according to Burns (2009). It quantifies data and generalizes results from a sample structure technique. The quantitative design generate numbers which would be analyzed statistically making comparison and correlation possible (Denscombe 2000:174).

Since the combined approach would be used, Marshal and Rossmans (2008) say an in depth interview, when combined with a questionnaire, will allow the researcher to check on reality

against description. Also it will enhance the validity of the data as triangulation is possible since more than one data collection method would be used, the findings from one data collection technique can be checked against the findings derived from the other technique.

3.2 Population of the study

According to Best and Kahn (1995) population is "any group of individuals that have more characteristics in common that are of interest to the researcher". In this study, the samples were selected in multiple steps. The first stage was based on geographical location- Empandeni cluster. Schools were selected according to subjects they offer at Advanced level- Geography.

The researcher targeted to gather information on the extent to which ICT is being implemented in the teaching and learning of Geography at Advanced level. Non probability sample (convenience sample), In this kind of a sample, the researcher selects the easiest population members from which to obtain information. In the case of this study the sample is made up of all lower six Geography pupils, all Geography teachers. There are only three high schools offering Advanced level Geography in Empandeni cluster and all were chosen. Seven Advanced level Geography teachers automatically became part of the population together with thirty seven Lower six Geography pupils at these schools were also included to give a total population of forty four.

3.3 Data collection instruments

Data collection instruments are tools used by the researcher to gather data so as to assist in finding out solutions to the identified problem. Tuckman (1994) defined research instrument as a 'measuring device that is used to gather data'. To investigate into the stated problem the researcher used document analysis, interviews and questionnaires. These data collection tools were used together data from all the possible sources of valuable information.

3.3.1   Pupils Interview

According to Cohen and Manion (1989), an interview is "a face to face conversation of two people initiated by the interviewer for the specific purpose of obtaining relevant information for a researcher". The researcher printed interview questions that were used to collect data from the targeted participants who are pupils from three selected secondary schools. Seven questions were designed in which some were seeking answers on the number of pupils who own personal computers, internet connectivity, and the use of computers in Geography lessons as well as the problems encountered.

Interviews enabled the researcher to come out with general conclusions from similar responses and there was room for elimination of irrelevant responses. The other advantage was that the interviewer was able to focus the attention of the interviewee to the main points of the interview. However, interviews lacked flexibility because they had too much formality which inhabited the interviewee. The information gathered was subjective because some respondents were telling lies. In this research the researcher had interviews with pupils. Apparently, the researcher managed to establish conducive atmosphere with the respondents and obtained reliable data.

3.3.2 Questionnaires

The researcher used questionnaires to gather information from seven Geography teachers in the cluster. The questions were divided into two major sections in which the first section was focusing on demographic data, three questions were asked in this section, the first one was asking information on gender, the second one was asking about the teachers' experiences and the last one was asking information on professional qualifications of the teachers. Section B was focusing mainly on teacher factors that affected the implementation of ICT in the teaching and

learning of Geography. Questions were asked on the level of training teachers received in the implementation of ICT in Geography lessons, rate at which teachers use ICT in Geography lessons, number of teachers with personal computers, connectivity, the benefits of ICT, and problems encountered and possible solutions to the problems. Questions were written in simple English to enable them to understand and still them without researcher's assistance. The researcher chose the questionnaires because they are cheap to administer and also easy to process the data collected. However, questionnaires maybe inadequate to understand the emotions, behavior of the respondents involved. Section A composed of demographic data and Section B factors affecting implementation of ICT in Geography lessons.

3.3.2   Document analyses

Warton (2013) defines document analysis as a form of qualitative research in which the researcher interprets documents in order to give meaning around assessment topic as a form of qualitative research method. In this study the researcher used the school timetable, the principle director's circular number 46 of 2010, the national and school syllabuses, schemes of work and record of marks, registers. Time table spells out the school curriculum that is all the lessons and activities to be done by children during the week as well as the time to be taken doing such activities. A circular is a policy that is binding. A register shows all the children who attended school on daily basis stating the reasons for absenteeism, dropouts and reasons for dropping school, transfers and reasons for transfers.

3.4 Data collection procedures

The researcher printed interview questions that were used to collect data from the targeted participants who were pupils from three selected secondary schools. The researcher sought permission from the Faculty of Education at Midlands State University.

Letters to ask for permission to carry out the study were written, one to the District Education Officer (DEO) and others to heads of schools involved. Permission was granted to the researcher and research was done in three secondary schools in the Empandeni Cluster. Having formulated the research design, constructed the research instrument and selected the sample, the researcher then started collecting data from which inferences and conclusions were made. From a sample of three schools under study, a total of seven questionnaires were issued to all the selected teachers, pupils were interviewed and four documents that is National syllabus, Scheme books, circulars and text books were analyzed.

3.5 Data presentation and analysis

Tables, bar graphs and pie-charts were used in the presentation of data and brief qualitative and quantitative analysis were made.

3.6 Summary

This chapter looked at the research design and methodologies used to gather data for this study. The research design and data collection tools were discussed by describing their advantages and disadvantages. In the next chapter, the researcher will present and analyze data, making use of tables and graphs and pie charts on findings from the research.

CHAPTER4: DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.0Introduction

This chapter focuses on presenting, analyzing and discussing data obtained from research documents, questionnaires and interviews. The analyzed data is presented in the form of tables and graphs and pie charts as well as in a qualitative nature.

4.1 Response rate

The researcher gathered information using questionnaires, documents and interviews. The response rate is tabulated below according to each research instrument.

4.1.1 Interview Response Rate

The researcher interviewed a total of 37 pupils from 3 different secondary schools in Empandeni cluster. The response rate is summed up as shown in the Table 4.1 below.

Table4.1: Personal interviews response rate

Respondents	Target schedule	Number of respondents interviewed	Response rate
School A	17	17	100%
School B	12	12	100%
School C	8	8	100%
Total	37	37	100%

The total response rate was 100%. Aaker (2000) says that a response rate which is above 50% enables the research to draw conclusions about the topic under study. The booking of appointments by the researcher with the Geography Head of Departments in schools helped and contributed to the 100% attendance by the interviewees.

 In light of these acceptable rates, the researcher drew meanings from the outcomes.

Table 4.2 Questionnaire Response Rate

Respondents	Target schedule	Number of respondents interviewed	Response rate
School A	3	3	100%
School B	3	3	100%
School C	1	1	100%
Total	7	7	100%

The table clearly shows that of all the questionnaires sent to teachers all were returned, thus a 100% response rate was achieved. The high response rate by teachers can be attributed to the good relations that exist between the researcher and his peers who understand the significance of the study in the field of research. Also, the researcher used very simple and clear questions that encouraged participants to fill in.

4.1 Demographic Data

The following pie chart shows the distribution of Geography teachers by gender.
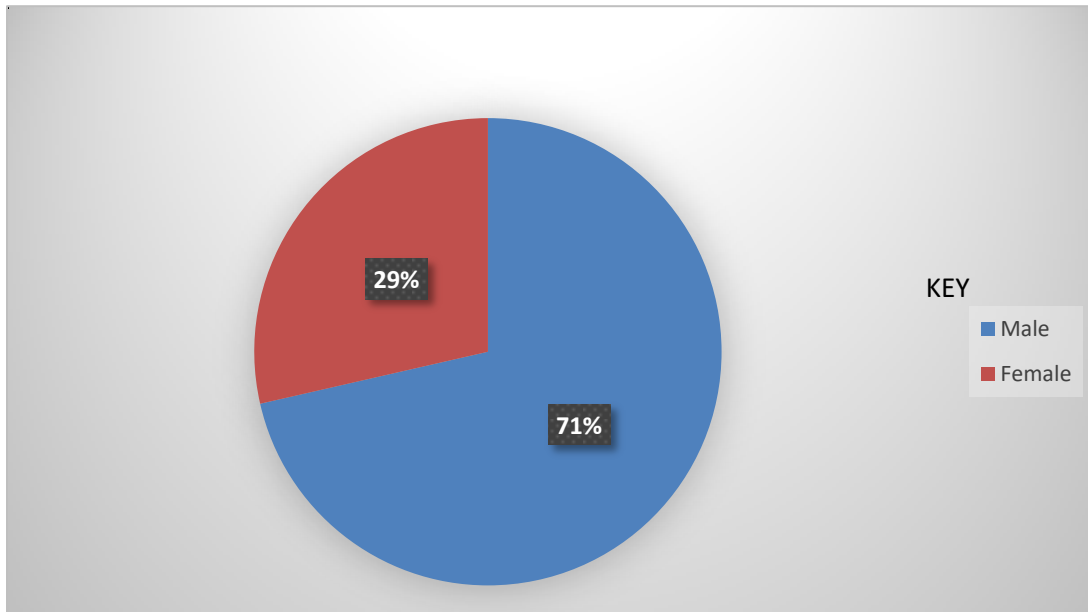
Fig4. 1: Sample Population

The fig4.1 shows the sample which was used in the study. From diagram above it can be observed that the number of males far outweigh the number of females as they constitute 71% of the total population sampled. It means there were more males in this department. It indicates that more males are going for Geography may be females are going for arts subjects and also male teachers are more positive about ICT in school while their counterparts are neutral or negative. This helped the study in that the information revealed a large population of male teachers who are involved in the study and the results are likely to be biased towards males. Since their views are highly expressed.

Fig4.2 **below** **shows** **the** **distribution** **of** **pupils** **by** **sex**
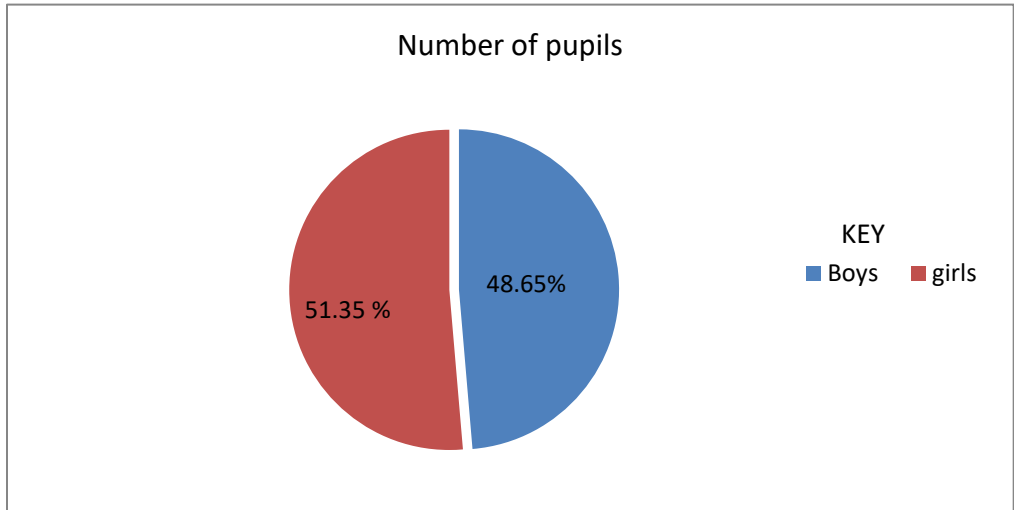
Fig4.2: distribution of pupil's population by sex

Fig2 is a summary of pupils who were doing Lower six in Empandeni Cluster Schools. Girls are 51.35% and Boys constitutes 48.65% of the total population. It can be observed that girls who were doing Lower six Geography were more than their counterparts. It means that girls have been empowered towards geography. This helped the study in that participation would be dominated by girls. More information would be obtained from girls' population.

Fig4.3: **Years** **of** **experience** **of** **the** **sample** **population**
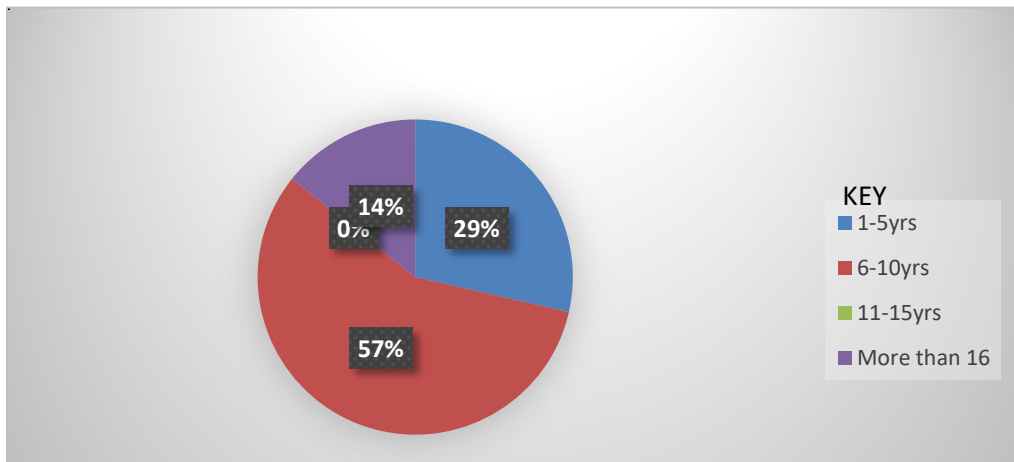
Fig 4.3: Experience in teaching Geography

The experience of the teacher is shown above, it can be depicted that vast experience is available in the area among the Human resource available. Seventy one percent of the population has over six years of experience in the subject, these are the people who have seen and gone through a lot in the subject. It shows that these people are qualified to teach the subject. They know very well how it should be taught. This helped the study in that the researcher got most valuable information from a very experienced population of teachers which added value to the study.

Table 4.3: Professional Qualifications

Highest Professional Qualification	C.E	DipEd	BED	Med	Other
Teacher		4	2		1

Table4.3 shows that from respondents' four accounts for respondents who had a Diploma in Education, two constitutes those with BED, while one respondent with non-teaching qualification. This indicates that the investigation was done to the correct subjects who have knowledge in the teaching field and give the researcher adequate information about the subject under study.

4.2 To what extent do infrastructural development factors affect the implementation of ICT in the teaching and learning of Geography?

FIG.4.4 Infrastructural factors
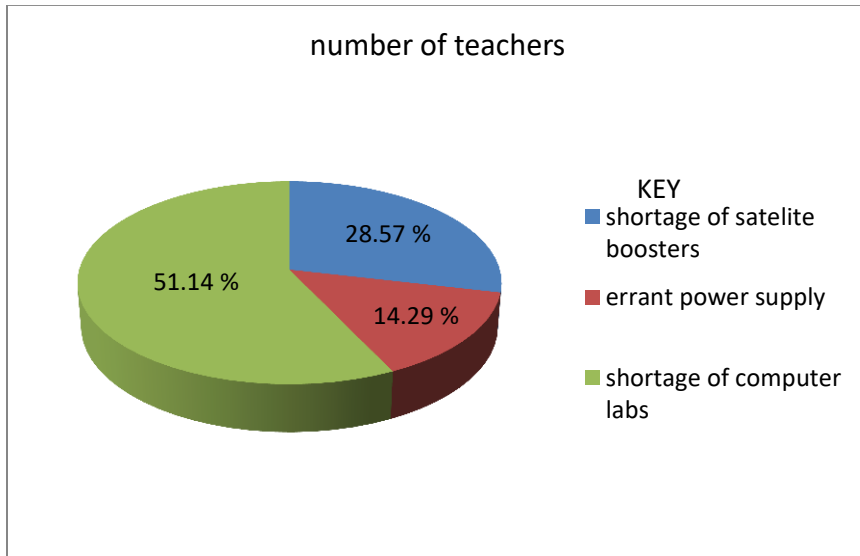
Fig4.4 infrastructural development factors affecting the implementation of ICT.

The fig4.4 above indicates infrastructural factors that affect the implementation of ICT in the teaching and learning of Geography. It can be seen from the diagram that two teachers attribute the shortage of satellite boosters in Empandeni cluster as the major hindrance in the implementation of ICT in Geography lessons; teachers were of the view that satellite boosters are insufficient to promote the connectivity of computers to the internet. Shortage of boosters in schools in the cluster makes it difficult for teachers to bring about ICT in the teaching and learning of Geography. They further indicated that with limited number of boosters the scope of research is narrow, giving pupils and teachers limited room for research thus drawing back the implementation of ICT in Geography lessons.

 One teacher commented on the shortage of boosters in the area and she said, "*This area is remote and boosters are very few and our computers are not connected, network is very bad in this area that makes the implementation of ICT in the teaching and learning of Geography*

impossible…" The researcher discovered that the integration of ICT in the teaching and learning of Geography goes beyond the mere provision and distribution of computers in schools. Factors such as Infrastructure play a pivotal role in the implementation of ICT in the teaching and learning of Geography. According to Dzidonu (2010) high cost of ICT equipment, maintenance and internet services constrain the adoption and integration of ICT in education. He also confirms that most school shave inadequate technological infrastructure, such as lack of hardware, software and internet, limited individual and community access to ICT and also poses a barrier to its implementation in schools.

One teacher emphasized on the issue of errant power supply. The teacher believe that shortage of power, power cuts all contribute to the low rate of ICT implementation in the teaching and learning of Geography. The teacher of school C pointed out that, "*a lot of computers that were donated are stocked in the storeroom; once in a while only one computer is used when the generator is on. The school does not have electricity therefore we are behind in terms of implementation of ICT in our Geography lessons.* This shows that the issue of power supply is a critical issue that is drawing back the full implementation of ICT in the school.

Four (57.14%) teachers raised the concern that the computer labs are too small that they cannot accommodate large numbers of pupils. Thus more pupils will be highly concentrated on a single computer thus reducing the willingness of both teachers and pupils to use computers in their Geography lessons.

4.4.1 Pupil's responses on infrastructural factors
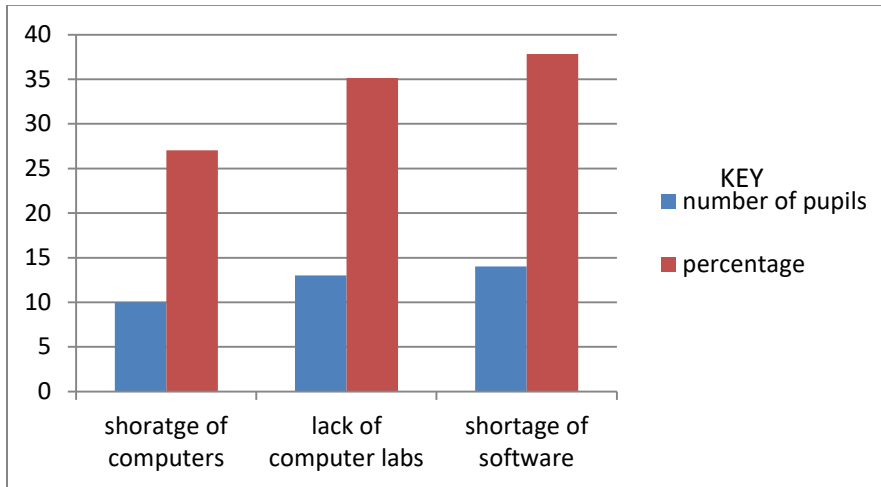
FIG.4.4.1 Infrastructural factors

The fig above shows that pupils had mixed feelings on infrastructural factors, some of which are in line with their teachers, 37.84% attribute shortage of software as major infrastructural factor affecting the implementation of ICT in the teaching and learning of Geography. 35% of the pupils concur with their teachers on the issue of lack of computer labs as infrastructural factor that affect the integration of ICT in the teaching and learning of Geography. Pupils agreed with what they teachers as they also highlighted congestion as the problem faced in the implementation of ICT in Geography lessons.

The documents revealed the same information on computer pupil ratio. The researcher analyzed the registers and discovered that the population of pupils doing research on computers is very high in relation to available computers in schools. One of the schemes analyzed indicated that the computers available are not enough for pupils.

27.16% of the pupils concur with their teachers on the shortage of computers as the major drawback of ICT in the implementation of ICT in Geography lessons. The high level of pupil

computer ratio in schools signifies the problem encountered by teachers and pupils in Geography lessons.

All in all the results showed that teachers' responses were in line with pupils views as well as what was obtained from the documents.

4.4. *To what extent do teacher factors affect the implementation of ICT in the teaching and learning of Geography?*

Fig 4.5 ICT tools skill rate
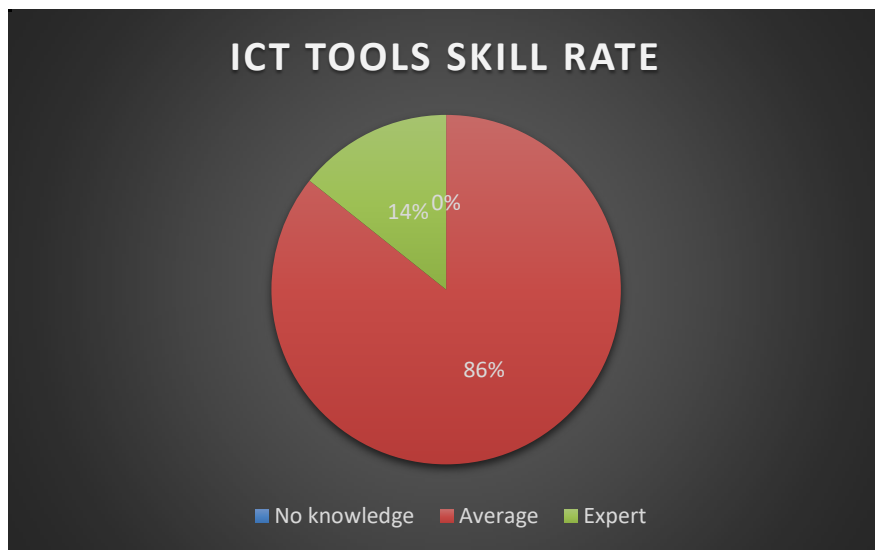
Fig 4.5: ICT tools skill rate.

From the sample population surveyed on ICT tools skill rate shown above in **Fig 4.5**, it is clearly illustrated that a large number of the Geography teachers in the area have average skills as far as the use of the technological tools is concerned. This result has a double outcome to say that there is a potential of implementation of the ICT tools as the vast average skill can be improved to expert level and the other effect is to say that the skill available is not sufficient for the use of the ICT in teaching the subject.

Overall, all the respondents have knowledge on the use of at least one ICT tool. This implies a fertile ground for the implementation of ICT in the teaching and learning of Geography in secondary schools in the Empandeni cluster. The orientation process is likely to be easier, based on the results of this research project, because most teachers already know how to use ICT tools.

4.6 Access to ICT tools
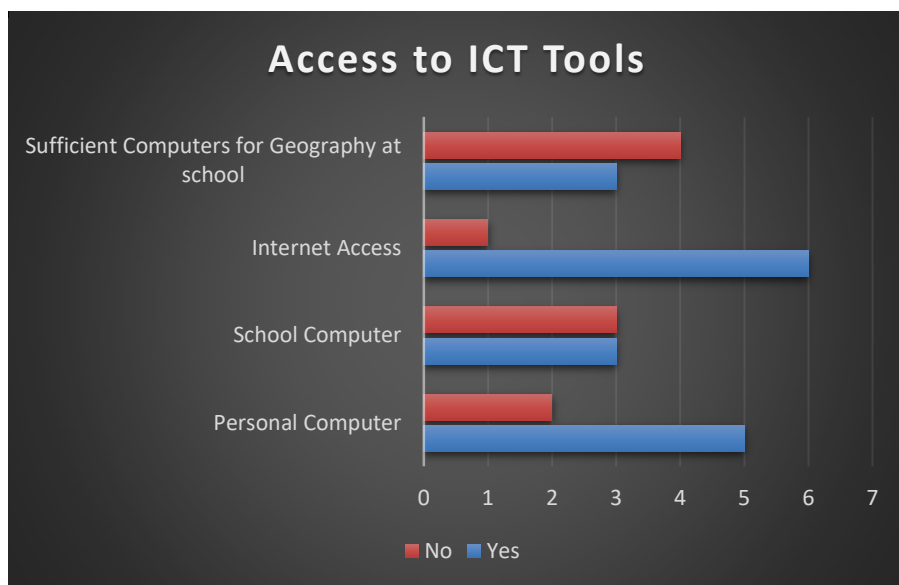
Fig 4.6: Access to ICT Tools

The access to the ICT tools is another critical factor which will affect the extent at which the ICT tools are being implemented in the area under study. In **Fig 4.6** above it is systematically depicted how the ICT resources are available in the area. To begin with computers are not sufficient in schools and the computer pupil ratio is high that becomes difficult for teachers to use computers in conducting day to day lessons.

Availability of internet in two of the schools in the cluster is a positive point in this quest. The researcher discovered that two schools have internet facilities that can be used by both teachers and pupils. A significant number of teachers indicated that they do have access to the internet

facilities. Thus with high levels of internet the implementation of ICT in the teaching and learning of Geography becomes easy.

A large number of respondents acknowledged that they own personal computers. The researcher attributed this to the availability of technological gadgets in the market and stiff competition amongst teachers that makes it a necessary for teachers to own computers. This can help in the implementation of ICT in Geography lessons. The researcher however discovered that the implementation of computers in Geography lessons is very low despite the fact that the majority of teachers do own computers.

Low number of teachers attributes shortage of boosters to be the problem of ICT implementation in Geography lessons.

Fig 4.7 shows the tools used in teaching Geography lessons
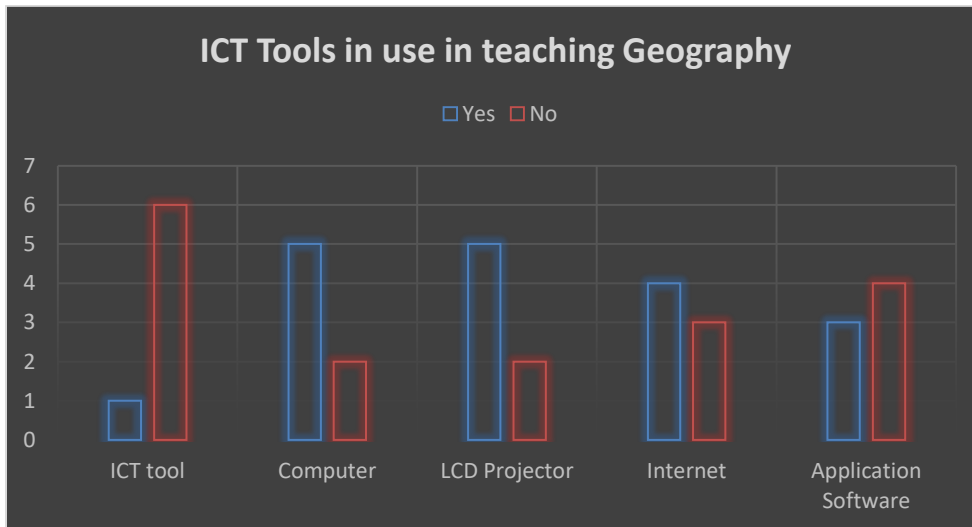
Fig 4.7: ICT Tools in the use in teaching Geography

The figure 4.7 above shows how the ICT tools are being used in Geography lessons, Large number of the sampled population have little appreciation as to what is being referred to when

we talk about ICT tools, this is illustrated by a large number of the sample responding by a no when asked on whether they use the tools or not. The use of computers and LCD Projectors seem to be wide spread in the area this might not be in the everyday running of the lesson it might be for demonstration and research purposes as the sample population earlier stated that the tools are not sufficient. Due to high enrolments in these schools, it is clear that the distribution of computers is not favorable.

Table4.4. Allocation of time for Geography lessons.

School	A	B	C
No. of lessons	10	10	10
Theory	4	6	4
Practical	4	4	4
E-Learning	2	0	2

The table clearly shows that pupils in schools are given little time to e-learning if at all they do allocate ICT slots. It appears that theory is ranked high on the allocation. This implies that pupils and teachers spend more time on theory, followed by practical and very little time is allocated to e-learning in Geography. There is an agreement between the views of the teachers and their pupils regarding the time allocated for ICT. Both teachers and pupils acknowledge the fact that e-learning is given little time on the time table. This makes it difficult for the implementation of ICT. The researcher analyzed the Geography school time table and established the same information regarding time allocation.

4.5 Pupils' exposure to ICT in their Geography lessons

Furthermore, the lower 6 pupils were also interviewed on their level to ICT use in Geography lessons. Table 6 below depicts the results obtained.

Table4.5. Pupil's exposure to ICT in their Geography Lessons

ICT tool used in Geography lesson(s)	YES	NO
Computer	83.78%	16.22%
LCD projector	0%	100%
Internet	5.41%	94.59%
Application software	10.81%	89.19%

The table above clearly depicts that a sizeable number of pupils who have used computers in their Geography lessons. Only 6 students indicated exposure to internet and application software in their lessons. The researcher attributed that to the digital divide that is still dominant in most developing countries.

Eight four percent of respondents have an experience in using computers during Geography lessons. The researcher attributed that to the rampant exposure to films among most youths.

Overall, the implementation of ICT facilities in the teaching and learning of Geography is limited as teachers make use of computers more often. There is therefore a need for the school administration to widen the application of ICT in the delivery of lessons rather than basing on

computers only. Variety is of paramount importance in the implementation of ICT in the teaching and learning of Geography

4.5 *What should be done to improve the implementation of ICT in the teaching and learning of Geography?*

Fig 4.8 below shows ways to improve the implementation of ICT in Geography lessons
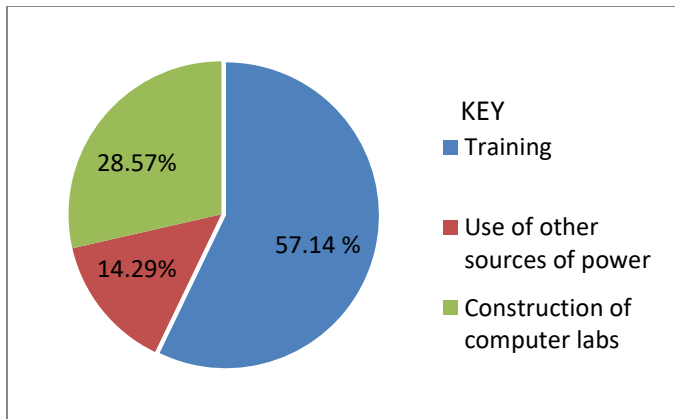
FIG 4.8 Ways of improving implementation of ICT in Geography learning

A high number of teachers about 57.14% highlighted massive training as a measure that can be put in place to improve the implementation of ICT in Geography lessons. The study revealed that a significant number of teachers left college before they received ICT training therefore the need for training. Furthermore most of the teachers own personal computers but the study indicated that the implementation of ICT in Geography lessons is low. The researcher attributed this to lack of training amongst teachers. Teachers do not know how to implement computers in lessons. This calls for a massive training of both teachers and pupils through organized workshops.

About 28, 57% believe that there is need for the construction of larger computer labs so that large numbers of pupils are absorbed this help to reduce congestion thereby reducing computer

pupil ratio. This was seen to improve the implementation of ICT in the teaching and learning of Geography.

14.29% of the teachers agreed that there is need to make use of alternative sources of power to deal with the problem of power cuts and shortage of power in schools. A Geography teacher of school C pointed out that, "*electricity is not the only source of power, schools can purchase generators and use computers to keep pace with technology rather than waiting for ZESA to install electricity facilities*" it takes time for ZESA to complete the installation electricity facilities therefore the respondents suggested the use of other sources of power which help at least to implement ICT in schools and keep pace with technology.

Pupil's responses on ways to improve the implementation of ICT in Geography lessons

Fig 4.9: shows ways of improving implementation of ICT in the teaching and learning of Geography

number of pupils

29.73%

51.35%

18.92%

KEY
- procurement of ICT facilities
- qualified teachers
- internet connectivity
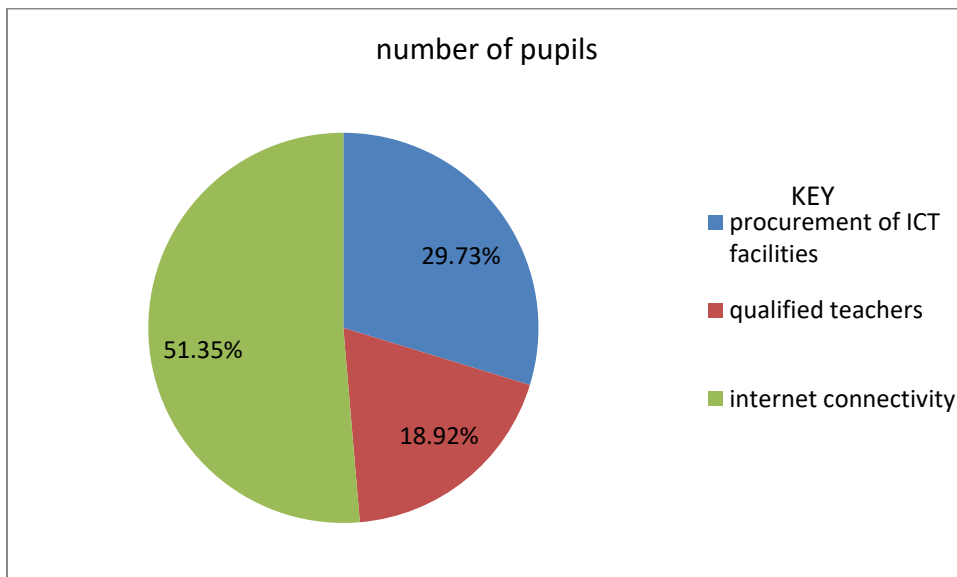
Fig 4.9 ways to improve the implementation of ICT.

On the other hand pupil's views were contrary to their teachers 29.73% suggested that the procurement of ICT facilities is the best way of improving the integration of ICT in Geography lessons. They advocated that the solution is in the ability of schools to procure state of the art ICT facilities such as computers, software, and hardware, repairing of malfunctioning devices, and establishment of e-labs and the installation of internet services.

18.92% suggested that they prefer to be taught by qualified teachers with knowledge on how to implement ICT in Geography lessons.51.32% suggested that computers need to be connected to interne so that they can be able to research and submit their work electronically online. Pupils from school B acknowledged the fact that their school has internet facilities but not all computers are connected to internet. One pupil of school B said, "*Working with a computer is good, but the one connected to the net is more interesting".* This clearly shows that internet is very important in motivating pupils to make use of ICT.

The documents analyzed, schemes of work and record of marks revealed that a large number of teachers do not use computers when scheming and for the two teachers who had their schemes typed, their presentation was poor which reflect that a lot of training is required to improve the situation.

The researcher noted that the provision of the mentioned measures will to a greater extent improve the implementation of ICT in the teaching and learning of Geography as both teachers and pupils freely expressed their feelings on the implementation of ICT in Geography lessons.

4.6 DISSCUSION

4.6.1 Curriculum

For any curriculum to remain relevant to the people's expectations, it has to continue to serve the needs and interests of its beneficiaries (Konyana and Konyana, 2013). Therefore, ICT must serve the needs of the pupils by making them understand Geography so that in the near future, the majority of students will develop positive attitude towards the subject. If the curriculum is effective and worthwhile in pupil's lives, it should by all means embrace the technological change in the society by equipping pupils with relevant computer skills. The researcher discovered that the curriculum was very shallow when it comes to ICT. This was discovered to be the major problem in the implementation of ICT in Geography lessons. The researcher discovered that teachers are reluctant to implement ICT in Geography lessons due to the fact that the curriculum does not offer much in this regard. Oliver (1999) adds on that contemporary settings are now favoring curricula that promote competency and performance through the use of ICT in the teaching of subjects such as Geography. This implies that it is very crucial for the curriculum to integrate ICT so as to tackle contemporary issues.

The researcher discovered that teachers and pupils are ready to implement ICT in Geography lessons. Findings indicated that a large number of respondents own personal computers which they use mainly in research and for teaching purposes and this makes the implementation process easy, in schools A and B computers were connected to internet though they face challenges with signal strength. This was seen as a positive move towards the implementation of ICT in Geography lessons.

Making technology available to teachers and students is not enough to achieve educational goals but requisite skills are of paramount importance. The researcher discovered that the implementation of ICT can only be possible if the implementers receive training. A significant number of teachers pointed out the fact that training is needed so that ICT can be fully implemented. Teachers' lack of computer literacy is an obstacle in using computers in the classroom, Newhouse (1997).The researcher discovered that the ministry of education is doing little to upgrade teachers so that they acquire the much needed 21st century skills, some of whom learnt long back when the chalk board was the only medium for teaching. Many of these teachers were affected by insufficient computers, where one connected computer is allocated to the department. This would affect research, teaching and exposure.

According to Musarurwa (2011), the University of Zimbabwe unveiled a policy in which ICT education was made mandatory for every student at teachers colleges in Zimbabwe where teachers are being trained. The policy makes it mandatory for Geography teachers to use computers in the classroom. It came out that if this is fully implemented and strongly monitored in colleges and universities the implementation of ICT in Geography lessons in schools will be realized.

The other problem discovered was that all the schools do not have e-lab facilities. These were supposed to be purchased as software. The researcher discovered that very little is being done if at all there is something being done to that effect. Schools believe that they can only do that online, yet even purchasing loaded discs and video tapes with electronic laboratory activities can help a lot.

4.6.2 Infrastructural factors

It was discovered that infrastructure plays a crucial role in the implementation of ICT in the teaching and learning of Geography. The implementation of ICT in the teaching and learning of Geography works well with related electronic devices. Allen (2007) indicates that information that helps teach or encourage interaction can be presented on computers in the form of text or in multimedia formats which include photographs, videos, speeches and music. The other problem is the issue of insufficient ICT tools such as computers. In all the schools it was discovered that computers are not enough to cater for large numbers of pupils and teachers at the same time. Pupil computer ratio is very high and this is slowing down the implementation pace of ICT in Geography learning. Results showed that there was an agreement between the responses obtained from interviews from pupils and findings from teachers.

Both teachers and pupils prefer the use of computers in their Geography lessons at Advanced level. The researcher discovered that even though they abuse the use of internet, they can research online and present their work properly that is if objectives are clearly outlined to them. This was supported by Hellenson (2008), when he said that computer labs at the school can be connected to the internet where students can download audio-visual facilities on subject in question. The author further highlights that personalized and professional research can be done through online search, the teacher will be there as a facilitator.

 The only problem discovered was that they are not familiar with e-lab facilities which are a very crucial ICT tool in the learning of Geography.

4.6.3 Teacher factors

The researcher discovered that the time allocated to e-learning on the school timetable affect the implementation of ICT in the teaching and learning of Geography. This implies that pupils and teachers spend more time on theory, followed by practical and very little time is allocated to e-learning in Geography.

4.6.4 PROBLEMS FACED BY SCHOOLS

1. **Few Computers**

Many schools have very few computers and they are centralized in the computer laboratory. The major problem is in purchasing these machines which are extremely expensive compared to the schools' funding.

2. Internet slow connectivity

The schools that are connected to the internet discovered that there is slow response online and as a result it waste a lot of time on the part of the pupil and demoralizes the will to research online (Allen 2007).

3. Cost of maintenance and repair out of order computers

All schools that were consulted indicated that they have a problem on maintaining and fix broken down computers due to financial problems. As a result they just stock up the computers. There is seldom free rooms and in some schools, no suitable building at all. For these schools, the implementation of ICTs often requires the construction of special ICT rooms which can be costly (Hennessy, 2010).

4. Errant power supply

An unavoidable problem in all schools, two of the schools indicated that they have standby generators, although they may at times face problem of fuel shortages. Research has shown that electrical energy is intrinsically linked to development and use of ICT in developing countries due to inaccessibility to good quality electricity. Lack of other infrastructures like roads constructions and transportation has barred the extension of power grid to remote rural school. Even where these schools have access, actual power use is unreliable especially if not accompanied by generator. In such schools the idea of implementing ICT will require more financial backing from the government and donors. In recent studies done in Kinya (Aguyo, 2010) it is apparent that providing electricity is a major challenge to implementing ICT in schools.

5. Misuse of internet

Many schools authorities highlighted that both teachers and pupils do not use the facility totally for academic purposes. There are some parallel activities such as pornography and cyber bullying.

6. Lack of expertise

Many schools are being manned by old teachers who trained before colleges had computer courses. As a result they rarely assign pupils to research and submit their work electronically. They are also resistant to change.

4.6.5 Ways to improve the implementation of ICT in schools

Research revealed that a lot can be done to improve the implementation of ICT in the teaching and learning of Geography. A significant number of teachers highlighted that training is very important in the implementation of ICT in Geography lessons. According to Musarurwa (2011), the University of Zimbabwe unveiled a policy in which ICT education was made mandatory for every student at teachers colleges in Zimbabwe where teachers are being trained. The policy makes it mandatory for Geography teachers to use computers in the classroom. It came out that if this is fully implemented and strongly monitored in colleges and universities the implementation of ICT in Geography lessons in schools will be realized.

Both pupils and teachers suggested the construction of more computer labs as the key to the implementation of ICT in the teaching and learning of Geography in schools. They strongly believed that with more computer labs at school pupil computer ratio decrease. This was supported by Hellenson (2008), when he said that computer labs at the school can be connected to the internet where students can download audio-visual facilities on subject in question. The author further highlights that personalized and professional research can be done through online search, the teacher will be there as a facilitator.

Pupils revealed that the procurement of ICT facilities helps a lot in the implementation of ICT in the teaching and learning of Geography. For the full implementation of ICT schools must be prepared to part with large sums of money.

4.6.6 ICT policy

Zimbabwe has a national policy on ICT implementation for academic institutions and the researcher discovered that none of the schools had it postured on notice boards or school offices. This indicated that the policy was not yet on the ground.

4.7 Summary

This chapter has looked at data collection, data presentation as well as data analysis. Data collected from survey as well as interviews was presented in form of tables; bar graphs as well are line graphs. The next chapter will focus on summary, conclusions as well as recommendations made by the researcher with regards to the extent to which ICT is being implemented in the teaching and learning of Geography at Advanced Level in Secondary Schools in the Empandeni Cluster.

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 **Introduction**

The previous chapter looked at presenting, analyzing and discussing data obtained from documents, questionnaire and interviews. This chapter looks at the summary, conclusions, and recommendations made by the researcher on the problem under study.

5.1 Summary

Chapter one looked at the background to the study or what necessitated this study. It also focused on the statement of the problem which is the study of the extent to which ICT is being implemented in the teaching and learning of Geography. The following research questions were used in the study

- *What challenges affect the implementation of ICT in the teaching and learning of Geography in Secondary Schools?*
- *What curriculum development factors affect the implementation of ICT in the teaching and learning of Geography?*
- *To what extent do infrastructural development factors affect the implementation of ICT in the teaching and learning of Geography?*
- *To what extent do teacher factors affect the implementation of ICT in the teaching and learning of Geography?*
- *What should be done to improve the implementation of ICT in the teaching and learning of Geography?*

Significance of the study was also discussed and also the delimitations and the limitations of the study were discussed in this chapter.

Chapter two discussed the review of related literature to the study. The related literature was discussed under the headings as informed by the research questions. In this chapter the researcher looked at what other scholars say about the topic under study. The researcher also looked at other research findings on the topic.

Chapter three looked at the research methodology and research design used by the researcher. In this case mixed methods approach which uses both qualitative and quantitative research methods were preferred. It highlighted the target population. The chapter also focused on the research design. Data collection methods and procedures were discussed in this chapter. The researcher used questionnaires; interviews and document analysis to gather data. Questionnaires were designed for Geography teachers, the structured interviews for pupils while scheme plans and records for Geography teachers were analyzed.

Chapter four presented analyzed and discussed data collected from Geography teachers through questionnaires, data collected from pupils' heads through interviews and data collected through document analysis. The research used triangulation to analyze and present data gathered. The presentations, analysis and discussion to answer research questions were done with the aid of tables, pie charts and bar graphs. Data was presented per each research question discussing findings based on all the research techniques.

5.2 Conclusions

- **What challenges affect the implementation of ICT in the teaching and learning of Geography in Secondary Schools?**

The researcher found out that computer pupil ratio is too high. Schools have very few computers and they are centralized in the laboratory. The major problem is in the purchasing these machines which are extremely expensive compared to the schools funding. The other challenge was that of connectivity. Schools that are connected to the internet revealed that there is slow response

online and as a result it waste a lot of time on the part of the pupil and discourage the will to research online.

- **What curriculum development factors affect the implementation of ICT in the teaching and learning of Geography?**

It was noted that the curriculum was very shallow when it comes to ICT. This was discovered to be the major problem in the implementation of ICT in the teaching and learning of Geography. The researcher noted that teachers are reluctant to implement ICT in the teaching and learning of Geography due to the fact that the curriculum does not offer much in this regard. This implies that it is important for the curriculum to integrate ICT so as to tackle current issues.

- **To what extent do infrastructural development factors affect the implementation of ICT in the teaching and learning of Geography?**

The major infrastructural factors that were highlighted are insufficient ICT tools such computers, shortage of computer labs, shortage of software and errant power supply. In all the schools it was discovered that computers are not enough to cater for large numbers of pupils and teachers at the same time. Pupil computer ratio is very high and this is slowing down the implementation process. As a result the benefits of ICT on quality education, is not very visible as pupils and teachers rarely use the e-learning facilities.

- **To what extent do teacher factors affect the implementation of ICT in the teaching and learning of Geography?**

The researcher noted that a significant number of teachers need training in order for them to implement ICT in the teaching and learning of Geography. There is however a resistance to change, especially on majority of teachers who either did not train in computers or have a slight exposure to ICTs. The researcher also discovered that the time allocated to e-learning on the school timetable affect the implementation of ICT in Geography lessons. This implies that teachers spend more time on theory and little time is devoted to e-learning in Geography thereby drawing back the process of ICT implementation.

- **What should be done to improve the implementation of ICT in the teaching and learning of Geography?**

Research revealed that a lot can be done to improve the implementation of ICT in the teaching and learning of Geography. A high number of teachers believe that if proper training is conducted to both teachers and pupils the implementation of ICT would be easy. It came out that a national policy on ICT should be made available to schools. Both teachers and pupils suggested the construction of computer labs as the key to the implementation of ICT in the teaching and learning of Geography in schools. They strongly believe that more computer labs at school reduce computer pupils' ratio. It was also highlighted that the procurement of ICT facilities helps a lot in the implementation of ICT in the teaching and learning of Geography. It came out that if this is fully implemented and strongly monitored the implementation of ICT in Geography lessons will be realized.

5.3 Recommendations

➢ The Curriculum Development Unit through the Ministry of Education and Information and Technology must roll out a curriculum that is in line with e-learning facilities so that subjects can be taught or learnt through e-learning collaborative tools.

➢ The researcher recommends that internet facilities should be provided in schools. This calls for the Ministry of Education to work hand in glove with service providers for the provision of internet in schools.

➢ Schools that are not electrified to seek for help through so that they can have other sources of power like solar power plants. This calls for schools through the fund raising committee setting begging bowl to the society, financial institutions, NGOs and business community and well wishers.

➢ Since schools have limited computers, it can be a noble idea if school authorities and responsible authorities may allow pupils who can afford to buy their own laptops and other ICT facilities to use them in the learning process. The Ministry of Education can effect this idea in schools.

- The government should train more geography teachers so as to improve the skills of ICT implementation especially in rural areas.
- The Ministry of Education should organize staff development courses should for geography teachers to allow the recap and also learn new teaching techniques.
- The researcher recommends that some form of monitoring and restrictions of some web sites must be implemented so as to prohibit un-welcome sites where pupils will end up diverting to dangerous information.

5.4 Further research

There are vast areas of research needed with the use of the potential of ICT tools and it is the researcher's hope that this study may form the strong basis for further exploration into the field of ICT in learning Geography in Zimbabwean schools.

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Appendix A.Teacher questionnaire

My name is Sibahle Harani, a student at Midlands State University doing a bachelor of Education Degree in Geography. I am carrying out a study of the extent to which ICT is being implemented in the teaching and learning of Geography in secondary schools in Empandeni cluster. Feel free to add any relevant information pertinent to the topic.

Your name and the name of the school will not be required hence the information provided will be confidential and anonymous.

You are further asked to respond to all questions below by ticking in the appropriate box or writing in the spaces provided.

SECTION A. Personal details

1. Gender male ☐   female ☐

2. Experience teaching Geography

   1-5yrs ☐ 6-10yrs11 ☐ 5yrs   r☐than 16   ☐

3. Highest professional qualification

   C.E ☐ DipEd ☐ BED ☐ Med ☐ other   ☐

   SECTION B. Teacher factors

4. Rate your skill in using the following ICT tools

   No knowledge ☐ Average ☐ Expert   ☐

5. Complete the following table

Access to ICT tools	YES	NO
I own a PC (personal computer)		
I use school PCs		
I have internet		
School has enough PCs		

6. Have you attended a Geography lesson where the following tools were applied?

ICT tool	YES	NO
Computer		
LCD projector		
Internet		
Application Software		

7. Explain how computers were used with each tool………………………………………

………………………………………………………………………………………

8. How often do you use ICT in the teaching and learning of Geography……………....

……………………………………………………………………………………..

9. What training have you received to use computers in teaching Geography…………...

…………………………………………………………………….

10. To what extent are you able to integrate computers in your Geography curriculum?...........

…………………………………………………………………………………

11. What in your opinion, are the benefits of ICT in the teaching and learning of Geography?..

....

12. Does your school have computer policy in the teaching and learning of Geography?..........

……………………….

13. What do you think should be done to improve the use of ICT in the teaching and learning of Geography? …………………………………………………………………….......

………………………………………………………………………..

Appendix B. Interview guide for pupils

1. Do you own a personal computer?

2. Are your computers online?

3. What do you use computers for in Geography lessons?

4. How helpful is the use of computers in learning Geography?

5. Have you ever been assigned to research and or submit Geography work electronically?

6. How often do your teachers use computers in Geography lessons?

7. What problems do you face when computers are being used in Geography lessons?

8. Suggest possible solutions to the problems.

Appendix C. Document analysis

The following documents are going to be analyzed:

Timetable

The national Geography syllabus

The school Geography syllabus

Circulars for Geography

The documents are to be examined to see whether they reveal and promote use of ICT in the

teaching and learning of Geography at Advanced level.