

The Implementation of Information Communication Technology in the Primary Education Curriculum in Selected Schools of Chipata District, Zambia.

BY

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A Report Submitted to the University of Zambia in Partial Fulfillment of
the Requirements for the Award of the Degree of Master of Education
(Primary Education)

THE UNIVERSITY OF ZAMBIA

2016

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DECLARATION

I, **Isabel Banda** do hereby declare that this dissertation presents my own work and that it has not been previously submitted for the award of a degree or any other qualification to the University of Zambia or any other University. All references have been adequately acknowledged.

Signature:

Date.....

APPROVAL

The University of Zambia approves this dissertation of **Isabel Banda** as fulfilling part of the requirements for the award of a Degree of Master of Education in Primary Education.

Signature

Date

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DEDICATION

I dedicate this work to my parents the late Mr. Brighton Mamboleo Banda and Mrs. Dyna Khosa Banda for the gift of formal education in helping me to realise my full potential in life, and my late daughter Mwenzi Grace Mwembela who inspired me to be what I am today.

May I also thank my sisters Sophia, Amina and Brothers Panji Waza and Jumbe not forgetting my husband Charles Mwembela, my nieces and nephew Martha, Niza and Bob for their encouragement and support in my endeavors.

ACKNOWLEDGEMENT

In the first place I would like to thank the Almighty God for his grace and love that has been upon me through and through. I would like to express my sincere gratitude to my supervisor Dr. Gift Masaiti for his tireless constructive guidance and encouragements rendered to me throughout the course of this work.

Many thanks also go to the management, staff of selected primary schools in Chipata District where data was collected from and Chipata DEBS for allowing me carry out my research in the district.

I also appreciate my course mates and lecturers in the school of Education Primary Department and other friends too numerous to mention who were so supportive during the course of study.

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ACRONYMS

AMA:	American Marketing Association
CPU:	Central Processing Unit
CD:	Cassette Decoder
CHLS-VS:	Cyber Home Learning System through Video Conferencing
DEBS:	District Education Board Secretary
DESD:	Decade on Education for Development
EFA:	Education for All
IITE:	Institute for Information, Technology in Education
ICT:	Information Communication Technology
JAH:	Journal for Arts and Humanities
MDGs:	Millennium Development Goals
MESVTEE:	Ministry of Education, Science, Vocational Training and Early Education
MOE:	Ministry of Education
MOEST:	Ministry of Education Science and Technology
NBTL:	New Break Through to Literacy
NIF:	National Implementation Framework
REA:	Rural Electrification Authority
RSNDP:	Revised Strategic National Development Plan
SFBS:	State Free Boarding and Scholarship
SNDP:	Strategic National Development Plan

UNESCO: United Nations Education Scientific and Cultural Organisation

ZECF: Zambia Education Curriculum Framework

ZNUT: Zambia National Union of Teachers

ABSTRACT

The study explored the implementation of Information Communication Technology (ICT) in the primary education curriculum in selected schools of Chipata district. This was by investigating whether or not the teachers and pupils were using ICTs in their teaching and learning, what teaching and learning materials were available in the implementation of ICTs in the primary education curriculum, what challenges teachers were experiencing in the implementation and interventions to improve the delivery of ICTs. The theories that guided the study were the constructivist learning theory and the force field theory.

The research was qualitatively conducted using a descriptive survey design. The study used purposive sampling to select respondents that included 1 Debs representative, 5 Head teachers, 20 teachers and 20 pupils. Interview guides, focus group discussions and lesson observations were used to collect the data.

The study findings were suggesting that there was low availability of ICT teaching and learning materials including poor technical and physical infrastructure in schools. Findings also suggest that there were very few teachers who have some personal ICT materials to help in teaching and none electrification of some schools was another issue. Further findings also revealed that the teachers are lacking knowledge and skills in ICT, though their perception about teaching ICT is positive. In addition the newly introduced language policy has brought more confusion in the minds of pupils in lower grades. Therefore, ICT in primary schools has not been successfully implemented because there are many variables which still need attention.

Among others, this study recommends that the ministry of education should train primary school teachers in ICT and provide suitable teaching and learning materials and ensure effective support and maintenance of the ICT infrastructure. More research and new developments should be on going to ease access of information that can assist possible interventions that can be implemented. Most importantly, the implementation should also be done in phases and that more classroom spaces should be created.

CHAPTER ONE

INTRODUCTION

1.0 Overview

The chapter presents an overview to the study. It gives the background of the study, the Statement of the problem, the purpose of the study, specific objectives, specific research questions, Significance of the study, limitations of the study, delimitations, conceptual frame work, theoretical framework, Operational Definitions, and ends with the summary.

1.1 Background

Primary education is the largest sub-sector of any education system and offers the unique opportunity to contribute to the transformation of societies through education of the young. UNESCO IITE, (2011). In order for young people to adjust to and compete in the rapidly changing environment of the contemporary world they need to have a set of life skills which includes among others, communication, analytical and problem-solving skills for creativity, flexibility, mobility and entrepreneurship, Thus an educational strategy should be oriented on the new lifestyle concept and corresponding skills development alongside technological innovations (UNESCO-IITE, 2011).

UNESCO is at the forefront of activities concerned with redefining educational paradigms to meet the needs of modern society. In particular, new approaches to education give an important role to the use of ICTs, the redrafting of curricula, a greater focus on skills and the training of a new generation of teachers for example in 2011 the UNESCO Institute for Information Technologies in Education (IITE) launched a new project which is focused on the role of information and communication technologies (ICTs) in primary education. The aim of the IITE project “ICTs in primary education” is to facilitate the policy dialogue and build a foundation for effective primary education through ICT usage (UNESCO-IITE, 2011).

Up-to-now the world has embraced Information and Communication Technology (ICT) as an enabler of social and economic development. A growing number of studies in developing countries contexts indicate that using computers can improve learning outcomes and can do so in primary schools specifically. A consultative meeting that was held in Saint Lucia in 2002

confirms to say, throughout the world, information and communications technologies (ICTs) are changing the face of Education. It is believed that, fundamentally, there are two distinct factors propelling this change, ICTs are changing the nature of work and the workplace. Plummer (2002) states that, this “knowledge revolution”, combined with economic globalization, and has created conditions in which countries that have focused on knowledge-based industries to reap significant rewards. The international community such as UNESCO has included ICT as one of the skills that must be acquired by primary pupils in the 21st Century. However, much focus has been on the secondary schools as established by Vital Wave Consulting (2009).

In Zambia, ICTs in schools like elsewhere in Southern Africa, has been affected by lack of adequate international communications infrastructure. The problem is particularly acute for Zambia because it is a landlocked country, which has had to rely on satellite links or interconnection agreements with neighboring countries to gain access to international telecommunications networks, (Panos 2014). This means that internet use in particular has been expensive in comparison with other parts of the world. However, this means that the Zambian government as well as other countries in sub-Saharan Africa need to rise up to the challenge as ICTs is invaluable the drivers for effective learning in schools. Mndzebele, (2013) also submitted that, lack of infrastructure, time, qualified teachers and financial resources are among the challenges faced by schools when introducing ICT in developing countries.

Apart from ICT infrastructure challenge, some issues that the government has been responding to revolve around access to education, improvement of quality and efficiency, ensure equity and equality of education provision of relevant education via curriculum change at the dawn of the third republic. However, according to MOE (2010) access to grade 8 still remains a challenge. Progression from grade 7 to 8 still remained static at 54 percent. This is a clear indication that places are still inadequate to meet the existing demands for grade 8.

In response to the above, the of Ministry of Education in the third republic decided to adopt liberalization which allowed private organizations, individuals, religious bodies and local communities have the right to establish and control their own schools and educational institutions as a way of contributing to the expansion of educational opportunities in Zambia. However, not much attention was accorded to the promotion of ICTs in the education system especially the public schools. Furthermore, the government, among other major reforms that

were made was to start upgrading basic schools into secondary schools and phasing out the basic schools in the education structure. The government further attempted to increase access to education by introducing free education in February 2002. Under this policy all user fees were abolished from Grades 1-7 and uniforms were no longer compulsory. Education Boards and Parents Teachers Associations were allowed to raise funds through various activities, but no child could be denied access to school on account of financial costs. However, neither the education policy of 1996 nor the free education policy realized the importance of integrating ICTs at primary level.

However, some break-through in the education sector was registered when the National ICT Policy was instituted. The Zambia National ICT Policy has seen the embracing of ICTs in education as a strategic issue for national development and this has been reflected in the goal of the education sector during the 2012-2015 National Implementation Framework III in support of Strategic National Development Plan (SNDP), as both sought to increase equitable access to quality education and skills training to enhance human capacity for sustainable national development. In the context of this goal, the strategic focus of the education and skills sector, as specified in the SNDP.

As a way of fulfilling the plan for curriculum review at primary level, the government decided to integrate ICTs in the primary education curriculum in 2014. The move to integrate ICTs in primary schools by the government is as a realization of ICTs as a tool for effective teaching and learning in schools. Indeed one cannot refute the fact that ICT can play an important role in the educational sector by improving the access to information (one of the major problems in the Zambian education), the quality of education and its management.

According to MOE (2010) a very pertinent tool in realizing the educational needs of every nation is the curriculum, however, the Zambian primary education system curriculum did not support ICTs at primary level until 2014. Therefore, adopting and integrating ICTs into primary school curriculum, has potential to offer high quality education that will enable Zambia as a country to realize the objectives in the vision 2030. In support, MOE (2010) report on ICTs pointed out that *“our society is being transformed by continuously evolving technologies that are changing the way we do things at the most fundamental levels. ICT can help in fostering the goals of the Ministry of Education that are encouraging learner centered methods of teaching”*.

While ICT is a necessity to Zambian Education; implementation is another issue, because if not correctly implemented, the whole purpose of the Programme would not be achieved. Vital Wave Consulting (2009) observes that, introducing technology into primary schools involves the coordination and participation of many stakeholders over a multi-year period. When considering a technology deployment, it is helpful to think of the process in terms of the plans, phases and participants encompassing all of the elements needed to make the deployment successful. Acquah (2012) observed that a subject like ICT requires facilities such as computers, internet connectivity, projectors, relevant textbooks and other peripheral devices to be in place to enhance implementation.

Furthermore, integrating ICT into the educational system of Zambia requires financial and human resource investment. In addition, the cost of implementation of technologies and the expansion of existing infrastructures, such as internet service and electricity, should not be overlooked. Therefore, being committed towards achieving the “Education for ALL” initiative, the government of Zambia decided to explore the option of integrating ICT into the primary public school system in order to foster innovative teaching approaches. According to Asare (2013), the integration of ICTs in primary education not only improves the learning process but also enables the Zambian government to overcome some of the difficulties it’s facing with the current education policy. In particular, ICT will improve the quality of information sharing between various stake holders and at the same time minimize the poor learning condition currently in places. ICT would serve as a tool to bridge the achievement gap between urban and rural public schools by enhancing the communication system between the two regions, and by enabling a better distribution of educational resources.

1.2 Statement of the Problem

This study assessed how the implementation of ICT in the primary education curriculum is being conducted in selected primary schools of Chipata district. Previous studies done by UNESCO so far concentrated on “ the role of ICT in primary education” and have shown that it brings academic achievements in terms of higher scores, improved ‘soft skills and teacher enhancement UNESCO (2011). Lufungulo (2015) also did a study on the integration of ICTs in teaching and learning of social studies in Katete and Lusaka. It appears that very little study has been done on

the implementation of ICT in the primary education curriculum in Zambia. The Consequences and implications of poor implementation of ICT in primary schools among others are; poor learner achievement and no access to information.

1.3 General Objective:

To assess the implementation of ICTs in the primary education curriculum

1.4 Specific Objectives

1. To assess the levels of the teaching and learning of ICTs in selected primary schools of Chipata District.
2. To ascertain the availability of teaching and learning materials used for Information Communication Technology in selected primary schools.
3. To determine the challenges faced by teachers in the teaching of Information Communication Technology.
4. To explore interventions for improving the delivery and implementation of ICT in selected schools of Chipata district.

1.5 Research Questions

1. To what extent is the teaching and learning of Information Communication Technology in the primary schools of Chipata district?
2. What teaching and learning materials are available for Information Communication Technology?
3. What are the challenges faced by teachers in the teaching and learning of Information communication Technology in Primary Schools?
4. What interventions can be considered for improving the delivery and implementation of Information Communication Technology?

1.6 Significance of the Study

The study hoped to help in achieving the revised strategic national development plan (RSNDP) which has put ICT at the centre of education development. It may help teachers and pupils on how best they can utilize ICT in their teaching and learning. The study was believed to further help the Ministry of Education and curriculum designers on how best they can help teachers implement the ICT in primary schools. Furthermore, the study findings might be used as a litmus test to assess the challenges and opportunities for effective ICT implementation. The information generated has to close the gap on ICT use in primary school as and hence added more information to body of knowledge.

1.7 Study Limitation

Kombo and Tromp (2006) postulate that, limitation of study included challenges anticipated or faced by the researcher. Likewise, this study could not be conducted without constraints. Among the limitations faced during the time the research was conducted was in the area of data collection as some respondents were unwilling to take part or to be observed, as such it took more time to convince them to cooperate as a result the research was not finished as scheduled.

1.8 Delimitation of the study

The concept of delimitation of the study simply implies the context with regard to population, study focus and other demographic characteristics such as age, sex, population traits, population size, or other consideration (Dominik, 2013). The study was therefore limited to assessing the implementation of ICTs in the primary school education curriculum in selected primary schools of Chipata District which is not the same in rural districts.

1.9 Theoretical framework

This research was premised on two theories constructivism theory and force field theory.

Constructivism Theory

Constructivism is a theory that argues that humans generate knowledge and meaning from interactions between their experiences and their ideas. Taber (2011) contends that constructivism

as educational theory comprises of ideas about how human learning occurs, and the factors that tend to channel learning and ideas about how curriculum and instruction should be designed to best respond to educational purposes given what is understood about learning. Constructivism, suggests that learning is accomplished best using hands on approach which is encouraged in most learning today. Taber adds that the learner comes to knowledge by recognizing the meaning of what is found in the environment. Bada and Olusegun (2015) supports that, people construct their own knowledge of the world through experiencing things and reflecting on those experiences.

As a theory of learning its basis is as stated by Christie (2005) who emphasises problem solving and understanding, using of authentic tasks, experiences and content presented holistically not in separate smaller parts. Furthermore it shifts emphasis from teaching to learning, individualizes and contextualizes students learning experiences helps them to develop processes, skills and attitudes. It focuses on knowledge construction, not production. Constructivists, as Simon and Goes (2011) suggests that learning is more effective when a student is actively engaged in learning ICT rather than attempting to receive knowledge passively. Learning should not be passive but the pupils are supposed to be actively involved. Bhattacharjee (2015) adds that the theory hypothesizes that individuals will try to make sense of all information that they perceive and that each individual will therefore “construct” their own meaning from that information.

The study attempts to find out whether or not the learning of ICT is responding to the constructivist using the hands on approach and experimentation which helps pupils to make their own inferences, discoveries and conclusions. The pupils can only construct their own knowledge if given chance to go through the classroom experiences using the environment and following the instructions. That can only be successful if there are trained qualified teachers who are supposed to give guidance to the pupils and create an enabling environment to support the instructions given.

Force field theory

In, 1951 Kurt Lewin developed a theory called the Force-field. The theory suggested that all behavior was the result of equilibrium between two sets of opposing forces (what he calls ‘driving forces’ and ‘resisting forces’). Driving forces push one way to attempt to bring about

change; resisting forces push the other way in order to maintain the status quo. The diagram below illustrates an adaptive model of Lewin, 1951.

Generally speaking all, human beings seem to prefer to use driving forces to bring about change. They want to win by exerting pressure on those who oppose them, but as Lewin's model suggest, the more one side pushes, the more the other side resists, resulting in no change. Therefore the better way of overcoming this status-quo is by at least weakening or removal of factors that hinder the use of technology in teaching and learning.

Therefore the implementation of ICTs in the primary school can be attributed to behaviour and perception of teachers and pupils towards, availability of qualified teachers, supporting government, ICT infrastructure development teaching and learning materials for ICTs. On the other hand, the resistance can be external; teachers and pupils may be willing to embrace technology while external structures may be inhibitive. For example, lack of support from the government, the government may not promote supportive structure to implement the use of technology in the teaching and learning at primary level for successful implementation. Schools may not have TVs, Radios, computers, internet to ensure effective teaching and learning. Sometimes the curriculum itself may be difficult to adapt with technology. All these factors may be driving against the implementation of ICTs in primary schools.

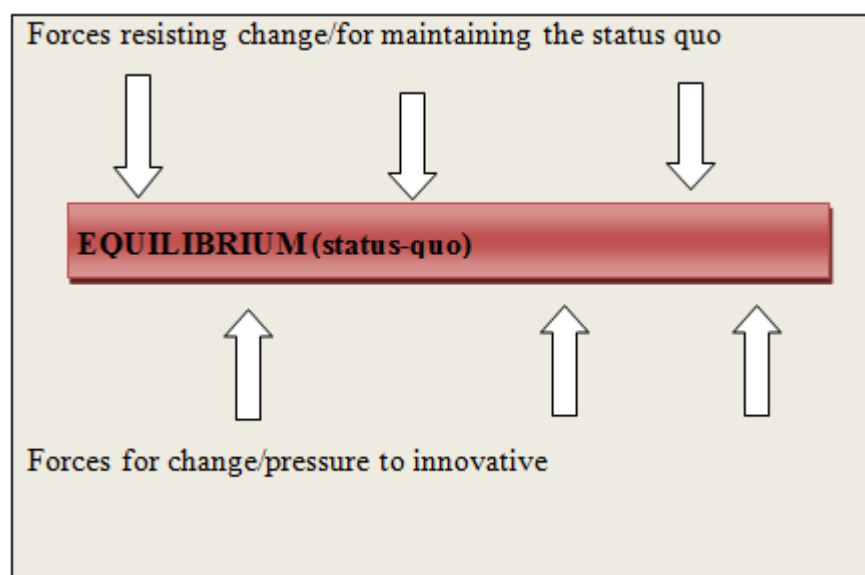


Figure 1:1 Extract model from Kurt Lewin (1951)

In order to overcome the state of equilibrium the theory advocated that the driving forces should be greater than the resisting forces so that a meaningful change could be attained. Therefore teachers should receive more training on how to integrate technology in the teaching and learning at primary level, there is also need for teaching and learning materials, suitable ICT infrastructure (computers, electricity, and ICT rooms among others). When teachers are positively influenced by technology they are more likely to value technology` and show appreciation for its contribution in the curriculum at primary level.

1.10 Conceptual framework

The conceptual framework of the implementation of ICT in primary schools critically looks at the factors that would make it possible for implementation to be successful. As the country has seen the need to introduce ICT in the curriculum the how and when must also be considered. The implementation must also show how ICT can transform education.

For implementation to be successful and effective a number of issues must be considered, such as the materials to be used. ICT is not a theoretical subject, it needs pupils to practice what they are being taught and from their own experience that is if they have access to the ICT materials at home or anywhere. The teacher must have the knowledge of what they are to teach the pupils, failure to which they will not give the pupils guidance that they require. ICT is not like any other subject that can be taught under a tree or anywhere else. It needs a special room because of the nature of the materials that are involved in the teaching and learning. In short, central to all is the government will and directives. Therefore, both governments and educators all around the world have recognised the exceptional promise of ICT to foster teaching and learning in primary schools. However, it is important to note that for ICT to enhance teaching and learning, it needs to be supported by education and school policies and effective professional development for teachers.

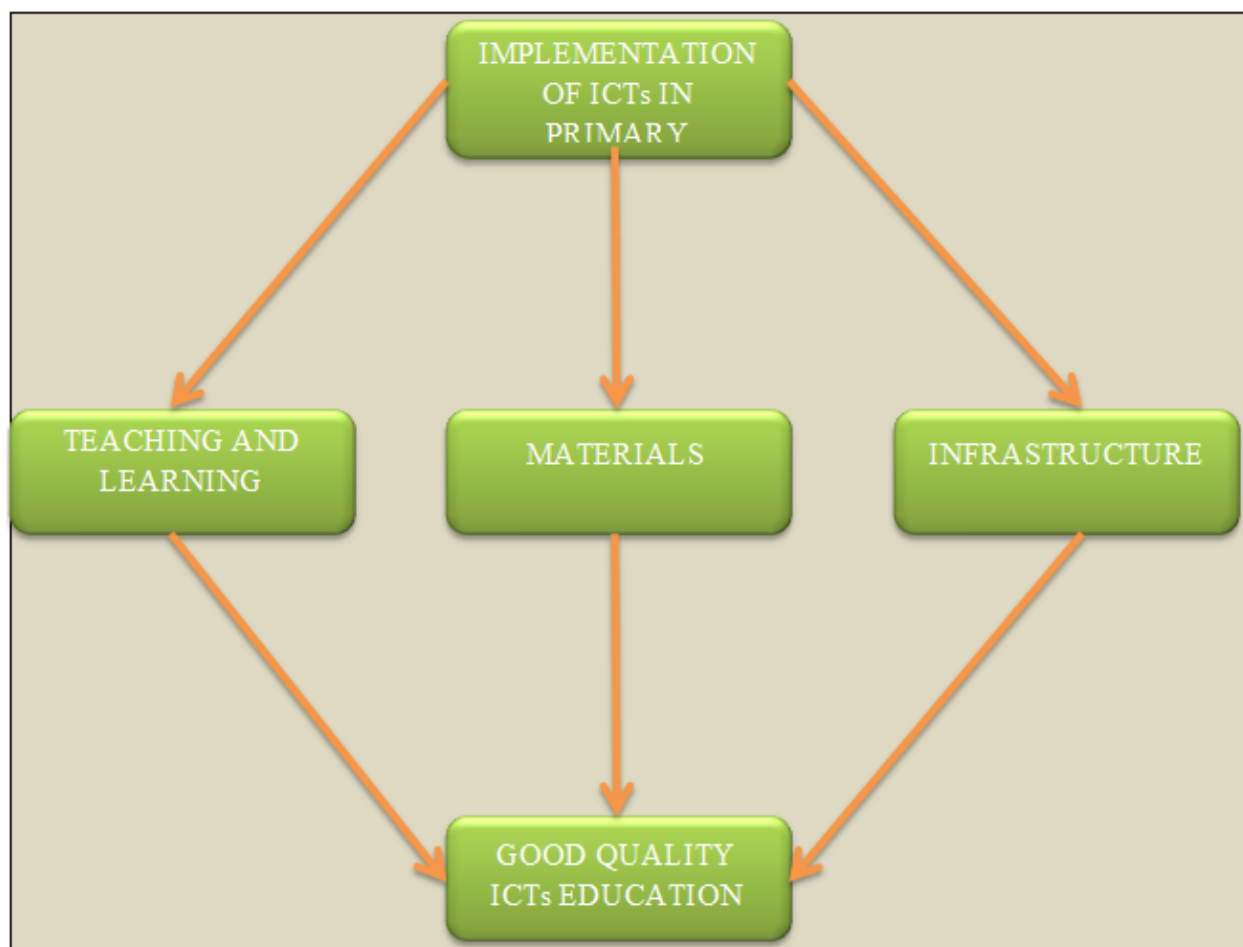


Figure 1:2 Conceptual framework for the implementation of ICTs in primary school curriculum.

As demonstrated in the figure above implementation can be successful once all the above has been fulfilled. If one is not, then it will not be effectively implemented.

1.11 Operational Definitions

Primary schools: Schools that run from grade 1-7 in the Zambian education system

ICTs: a generic term used to express the conversancy of communication and telecommunication information broadcasting and technology communication

Implementation: Execution of the ICTs in the primary schools (are primary school pupils using ICTs in schools?)

Infrastructure: Special buildings specifically where ICTs learning takes place.

Materials: ICT tools such as calculators, computers CDs, TVs, Internet, spreadsheets etc used in teaching and learning processes.

Teachers: professionally trained educators in ICTs at primary school levels.

1.12 Dissertation Overview

It is clear that the above chapter gave a background on the implementation of ICTs in the primary school curriculum in selected schools of Chipata District. Among the items underlying the chapter has been statement of the problem definition, purpose of the study, research objective and questions, significance of study, limitation and delimitations of the study, conceptual and theoretic frame works as well as philosophical foundation. Lastly, the chapter has presented definitions of operational terms used in this study.

This dissertation is divided into six chapters. Chapter one provided an overview of the background of the study, the problem statement, objectives of the study, research questions, and significance of the study, limitations and delimitations of the study. The chapter also sets out the theories and conceptual framework. Chapter two, provides a review of literature relevant to the study globally, African as well as Zambian contexts. Chapter three explains the research methodology this includes the research design, data sources, sample selection and size. It also outlines the various data collection tools. Chapter four presents the research findings and chapter five discusses the research findings, analysis and interpretations finally chapter six discusses the conclusions and recommendations.

To this effect the next chapter allowed the coming of the chapter two whose main aim was to highlight various literatures deemed relevant to the study so as to put it within the context of similar previous works.

CHAPTER TWO

REVIEW OF LITERATURE

2.0 Overview

The previous chapter presented a comprehensible introduction to the study by giving a historical background on ICTs in Zambia. Furthermore, it presented the statement of the problem, research questions and objectives, purpose and significance of the study, theoretical and conceptual frameworks, philosophical foundation, as well as definitions of operational terms.

This chapter sought to establish various related studies upon which this research shall be anchored. The rationale was that the reviewed literature would help in identifying the gaps in the knowledge that the research attempted to fill. The chapter further focused reviewing literature relating to the use, and availability of ICTs in the teaching and learning process in the primary school curriculum starting from the global, African and Zambian perspectives. It endeavored to identify the gaps in the studies reviewed which the study will sought to bridge up. In ending this chapter a summary shall follow while inviting Chapter three for the description of methodological approaches applied in this undertaking.

2.1 Global studies on ICT

From the global perspective, a study was conducted by Ramón, Manuel and Ignacio, (2010). The main aim of the study was to assess *ICT integration in Primary and Secondary Education in Andalusia, Spain*. The study reported that majority of the teaching staff regularly used computers in class (62.8%) as opposed to a third of the teaching staff who indicated that they do not regularly use them (37.2%). ICT use at primary schools showed continuous increase from 2000 to 2005, as it was seen that in 2000 it was 9.2%, in 2002, 12.7%, in 2003, 33.5%, in 2004, 61.5% and in 2005 76.9%. As we can see, starting from the large-scale incorporation of computers in these centers in 2003, after the initiatives taken by the Andalusian Provincial Government, there was a sharp growth in the regular use of computers in the classroom.

The study further found that integration of ICT in primary schools had increased collaborative work with parents and communication with parents and 69.7% thought that collaboration between the teaching staff of the schools has improved; 60% that other activities in the

institutions have improved; 50.7% argued that there has been an improvement in communication between teachers. In contrast, only 17.5% are of the opinion that communication with parents has improved, and 11.3% that there has been an improvement in collaborative work with parents. Another aspect, communication with the school management team, has improved according to 40.9%.

The study also found that the computers in institutions had led to an increase in the making of materials by the teaching staff adapted to these new media. When they were asked if they develop or design any type of material, only 14.8% said that they did. Of those that design some type of didactic material, 41.2% design web quests, 39.7% design web pages, and 33.8% design presentations. We have to bear in mind that these figures were based on only 14.8% of the teaching staff. So there are relatively few teachers who produce their own didactic materials.

The study is necessary as it has highlighted that integration of ICTs in primary schools is possible and this also depends on government will and commitment to achieve the desired end. The study has highlighted that, ICTs have potential to promote interaction and proper search for information by the pupils. Not only that, the study represented high use of ICTs among the pupils who participated in the study. Due to geographical and social economic differences in which the study was conducted it is therefore to assess the how ICTs have been integrated in primary schools in Chipata District. The study is likely to present results that are different due to underdevelopment in infrastructures as compared to Spanish society.

While ICTs are integrated in developing countries, as per study by Hyeonjick (2013) in Korea in which, there has been an increasing importance of mobile devices in education, it was still difficult to empirically investigate the necessary conditions for using mobile devices as an educational tool as well as its impact on educational achievement. Although the study results showed that respondents were interested to use Window-based large-screen devices for their educational purposes; some learners believed that the use of ICTs in school had little to help in their education. The study research results revealed that on one hand, there is a considerable confusion among teachers with regard to their role and on the other hand, there are several external and internal barriers to effective teaching.

One of the noted achievements in the Korean education system is that there is no overcrowding in classes as compared to developing countries such that 60% of the teachers who participated had at least 16 students in their classes, while in some classes the number of students exceeds 24. With regard to ICTs materials, 64% of the people questioned state that the school laboratory has ten or fewer computers in operation and 76% claim that they use the existing equipment without problems. The above seem to enable the usage of ICT in group and inter-group activities. Towards the latter seem to be orientated 68% of the participants, using in parallel the software proposed by the Ministry of Education –84%. However, in a following question, nine out of ten people questioned stated that they face problems in the implementation of an effective teaching procedure due to the space and the infrastructure of the laboratory with regard to the number of students per class; only 3% state that they can smoothly implement innovative teaching approaches. Given that 62% of the participants had not integrated laptops in their teaching, these contradictory replies, particularly with regard to the use of the infrastructure, are indicative of the ICT teachers' confusion regarding the orientation and the demands of the new framework as well as the obstacles they encounter during their teaching practice.

Meanwhile, only 63% felt that they generally succeed in having effective teaching sessions. With reference to the latter, 67% feel that the lack of assessment for the particular subject acts as an inhibiting factor in meeting its aims and 75% consider that the presence of a school book would help them and the students in the learning process.

The study also found that teachers tend to agree more with the critical acquisition of computational skills (Mean Rank = 47, 25, $\alpha=0,046$, Mann-Whitney U = 594,5), whereas ICT teachers without pedagogical competence feel less confident with reference to the dimensions of their role in the particular schools (Mean Rank = 47,80, $\alpha=0,020$, Mann-Whitney U = 561,5). Hence the study found a positive correlation between the degree to which ICT teachers agree with the sense of student assessment in ICT and of the feeling of achievement of an effective teaching session in a framework of increased rates of freedom ($\alpha<0,001$, $cc=0,431$).

The study is relevant as it has substantiated that although ICT teachers hold a positive attitude towards interdisciplinary approaches to ICT, they barely cooperate with teachers of other school subjects for the planning and implementation of their teaching sessions. And it was found that

not all ICTs were relevant during teaching practice, and some were scarcely used by other school subject teachers.

The reason for a positive attitude could be that teachers in the western countries were exposed to ICTs early and its part of their social life than teachers in developing countries like Zambia. Therefore the study focused on the perceptions of teachers' pupils and administrators on the use of ICTs to ensure implementation of ICTs in primary school curriculum.

One of the usefulness of ICTs in education was established by Young and Chung (2013) *Exploring online learning at primary schools: Students' perspectives on cyber home learning system through video conferencing* (chls-vc). The subjects consisted of 96 primary school students from 4th to 6th grade in South Korea. The study found that ICTs in primary schools could be used for conferencing. This approach to the use of ICTs helps and has the potential to interact effectively with each other and cut down on distances and resources. The learners also used a combination of voice and text chat over using voice or text chat, and the frequency of students' questions was higher in online than in offline classes. Finally, the students' perspectives on the effectiveness of CHLS-VC were positive in comprehension and increase in score. They thought that scores have increased in the respective academic subjects as well. Based on the results, it is concluded that CHLS-VC can fortify the learning process and foster student to teacher interaction.

Furthermore, Caliskan et al (2013) while investigating the effect of learning geometry topics of 7th grade in primary education with dynamic geometer's sketchpad geometry software to student's success and retention. The experimental research design with The Posttest-Only Control Group was used in this study. In the experimental group, dynamic geometer's sketchpad geometry software adapted to Computer assisted instruction; and in the control group, traditional teaching method was used. Quantitative research approaches were adopted in the study. Data was collected through 6th grade State Free Boarding Scholarship (SFBS) 2005 test, achievement test and worksheets. The study found that there was a significant difference between achievement test scores of experimental group learning geometry with GSP dynamic geometry software and control group learning through traditional method in favor of experimental group.

The study concluded that, computer-assisted training is effective for students having learning difficulties, from various ethnic groups and with disabilities. The colors, music, and dynamic

graphics used in laboratory activities give realism and selectivity to the subject helping learners to participate effectively in the school work.

The study has helped in confirming that ICTs has potential in promoting good performance among students. It should be known that if not properly integrated ICTs can affect learning and performance of learners.

In Alfassi's (2000) study of language classrooms, the teachers involved developed different assignment tasks that engaged their students in meaningful inquiries while using ICT information tools. The students applied research skills as they used the Internet and CD-ROMs as information tools to search for information and use critical judgment to determine if the information was accurate, relevant, and useful. The students also prepared electronic presentations in which texts were written, read and animated with accompanied music or sound effects. Through these electronic presentations, they improved literacy and communication skills because such presentations required them to interact with each other while using various forms of speech, symbols and logical analysis. The study found that after using ICT-enabled information tools, the students had significantly improved on their reading comprehension and writing. Therefore the study will focus on primary schools ICTs uses in Chipata District.

2.2 Barriers to effective ICT integration in primary schools in developing countries

ICT integration has always faced barriers, according to the study by Bingimlas (2009) that *aimed at assessing the barriers to the successful integration of ICT in teaching and learning environments in Australia* found that although the use of ICT in the classroom is very important for providing opportunities for students to learn to operate in an information age. The major barriers were lack of confidence, lack of competence, and lack of access to resources. Since confidence, competence and accessibility have been found to be the critical components of technology integration in schools, ICT resources including software and hardware, effective professional development, sufficient time, and technical support need to be provided to teachers. In Becta's survey of practitioners (2004), the issue of lack of confidence was the area that attracted most responses from those that took part. Some studies have investigated the reasons for teachers' lack of confidence with the use of ICT. For example, Beggs (2000) asserted that teachers' "fear of failure" caused a lack of confidence.

On the other hand, it was also found that limitations in teachers' ICT knowledge makes them feel anxious about using ICT in the classroom and thus not confident to use it in their teaching. Similarly, Becta (2004) concluded their study with the statement: "many teachers who do not consider themselves to be well skilled in using ICT feel anxious about using it in front of a class of children who perhaps know more than they do". In Becta's survey (2004), many of the teacher respondents who identified their lack of confidence as a barrier reported being particularly afraid of entering the classroom with limited knowledge in the area of ICT with their students knowing that this was the case.

It was argued that lack of confidence and experience with technology influence teachers' motivation to use ICT in the classroom. On the other hand, teachers who confidently use technologies in their classrooms understand the usefulness of ICT. Cox, Preston, and Cox (1999) found that teachers who have confidence in using ICT identify that technologies are helpful in their teaching and personal work and they need to extend their use further in the future.

Another barrier, which is directly related to teacher confidence, is teachers' competence in integrating ICT into pedagogical practice (Becta, 2004). In Australian research, Newhouse (2002) found that many teachers lacked the knowledge and skills to use computers and were not enthusiastic about the changes and integration of supplementary learning associated with bringing computers into their teaching practices. Current research has shown that the level of this barrier differs from country to country. In the developing countries, research reported that teachers' lack of technological competence is a main barrier to their acceptance and adoption of ICT (Al-Oteawi, 2002). In Syria, for example, teachers' lack of technological competence has been cited as the main barrier (Albirini, 2006). Likewise, in Saudi Arabia, a lack of ICT skills is a serious obstacle to the integration of technologies into science education (Al-Alwani, 2005; Almohaissin, 2006). Empirica (2006) produced a report on the use of ICT in European schools. The data used for the report came from the Head Teachers and Classroom Teachers Survey carried out in 27 European countries. The findings show that teachers who did not have adequate training in ICTs were less confident in teaching ICTs in Classes.

The study reports on barriers is very important since once we understand the barriers that are likely to affect effective implementation, it would be easy to skew all efforts and resources on reducing the barriers. Therefore studying the obstacles to the use of ICT in education may assist

educators to overcome these barriers and become successful technology adopters in the future. Therefore our study also will focus on establishing the barriers to the implementation of ICTs in primary schools of Zambia in Chipata District

2.3 African studies

ICTs in Africa present a different climate for enquiry studies such as one conducted by Kyakulumbye, and Katono, (2013) on *'The Management Practices of ICT Integration in the Curriculum of Primary Schools in Uganda* in which the study was cross sectional and quantitative in nature with teachers and head teachers as the study sample found that planning, coordination and organization significantly impacts ICT integration. A multiple regression analysis revealed that all the management practices had a casual effect on ICT integration. The study recommended that the state should formulate and implement policies in schools to regulate ICT implementation and prescribe strategies to influence teachers' attitude to ICT integration, and offer support to school management to enhance their management practices in order to manage the ICT integration process into the curriculum.

In another study by Sallimah and Kumar (2015) on *Examining the Effect of External Factors and Context-Dependent Beliefs of Teachers in the Use of ICT in Teaching: Using an Elaborated Theory of Planned Behavior*. In which a total of 1,040 teachers from 18 secondary schools in the four districts in Brunei Darussalam found that there is a positive relationship between teachers' intention to use ICT in teaching and subjective norms. The study also supported a positive relationship between teachers' intention to use ICT in teaching and perceived behavioral control. Additionally, a positive relationship between teachers' intention to use ICT in teaching and attitude toward use of ICT. The study concluded that, teachers must have positive attitudes and perceptions regarding the usefulness of using ICT in teaching and possess computer and ICT skills to effectively implement ICT in their teaching.

Another study was conducted by James, and Al-hassan (2015) on *Promoting teaching and learning in Ghanaian Basic Schools through ICT*. The data was obtained through a cross-sectional survey involving a random sampling of 333 Primary and 295 Junior High Schools across four regions (Northern, Upper East, Upper West and Volta) in Ghana. Expert interviews on ICT policy implementation were also conducted with ten District and four Regional Directors

of Education. The findings show that there are relatively low computers at Primary Schools (4%) compared to the Junior High Schools (10%). In the Primary Schools, 69% of female teachers and 50% of male teachers use ICT tools to teach. The ability of teachers to use computer to teach and research is weak due to lack of access to internet, electricity/power problem, inadequate number of computers and technical know-how. The study recommends a strong and sustainable Public-Private-Partnership between the government, private sector and civil society organizations to map out plans and strategies in order to minimize the problems associated with the integration of ICT in the education system.

Similar to Acquah (2012) *Status of implementation of the ICT Curriculum in Ghanaian Basic Schools* focusing on the extent to which the ICT curriculum is effectively being implemented in basic schools. It was revealed that teachers had a positive perception about the teaching of ICT in primary schools. It was also found that 43 (51.2%) engaged in independent studies to acquire the relevant knowledge required for them to teach ICT. Only a total number of 35 (41.6%) had participated in seminars, conferences and workshops. ICT facilities were woefully inadequate for the teaching of the subject in basic schools; the majority of teachers appeared to be knowledgeable in the use of computers and other peripheral devices; and, most of the teachers preferred workshops as a means of acquiring more knowledge and skills in the teaching of ICT.

The study in Ghana was relevant as it had revealed that one of the challenges affecting ICT integration despite the efforts made was ICT equipment such as computers. However, among other factors affecting effective use of ICT integration was electricity, lack of trained teachers among others. These challenges are most likely to manifest in our study due to the fact that development in African countries are homogenous.

The implementation of ICTs in primary schools is not only affected by resource availability, Lawrence (2013) in a study on *Teacher factors influencing integration of information and communication technology in teaching and learning in public Secondary Schools in Samburu North Sub-County, Kenya*; in which the study sought to investigate an extent to which training of teachers, age of teachers, experience of teachers, gender of teachers and attitude of teachers influence ICT integration in teaching and learning. The findings of the study indicated that training of teachers influenced an extent to which teachers accessed and used technologies in

teaching and learning. The study had therefore found that training teachers on ICT integration could enhance competency and self-efficacy to utilize the new technologies. The study also found that young teachers aged less than 30 years were found to be more interested in technologies while teachers aged above 30 years were less enthusiastic to access and use technologies. The study thus concluded that teacher age determines the level of adoption and usage of ICT in the classroom. Additionally, length of teachers' work experience in teaching service did not considerably influence ICT integration in teaching and learning. The study recommended the MOEST to offer student-teachers with adequate practical teaching using instructional technologies. The study also found that teacher's gender, either male or female, influenced ICT use in teaching and learning. The study revealed that male teachers were able to access and use computers in teaching activities more than female teachers.

2.4 Zambian Context

Kivunja and Wood, (2012) Multigrade Pedagogy and Practice: Accelerating Millennium Development Goals for Sub-Saharan Africa based on global initiatives such as the Millennium Development Goal (MDG) process, the Education for All (EFA) movement and the UN Decade on Education for Sustainable Development (DESD) highlight the growing recognition of the vital role that education plays in improving health, social inclusion and driving economic development in a knowledge based society. Multigrade teaching is a common practice in many primary schools throughout the developing countries for achieving improved access to education for all primary school aged children. This paper reports the findings of a study which involved a situational analysis of the perceptions of stakeholders in Zambian multigrade contexts. The study found that the educational human and physical infrastructure in rural Zambia is in a poor state, which makes it highly unlikely that the MDGs projected for 2015 would be achieved. Capacity building involving the training of teachers and the effective use of information and communication technologies (ICTs) to motivate learners, facilitate innovative teaching and learning, and enhance multigrade education are suggested as possible engines to drive the realisation of MDGs, by 2015. It is argued that failure to provide effective multigrade teaching and access to the appropriate use of ICTs will commit millions of children in the developing countries to the vicious cycle of extreme poverty.

Zambia Daily Mail (2015, 29 March) argued that introduction of ICT subject in primary schools is a source of worry-ZNUT observed that the introduction of Information and Communication Technology (ICT) subject in primary schools is a source of worry for rural pupils who do not have access to computers. The Ministry of Education has made it compulsory for pupils in primary schools to learn ICT although the move is not supported by adequate facilities. Apart from a lack of computers and electricity, many teachers in rural schools are said to be so incompetent that they would need lessons before teaching their classes. ZNUT general secretary Newman Bubala told the Sunday Times in an interview that some pupils in rural areas would be forced to learn theory while those in urban areas would have an opportunity to learn both theory and do practicals. Ultimately, the division could be a big disadvantage to the pupils in rural schools. “We are all talking about ICT, but pupils are learning theory. By the time they will come to have their laptops, it will be something else,” Mr Bubala said. He said the Government should think of investing in rural schools so that each student could have a laptop.

The Government should seriously think of investing, and making sure that we flood the country with what we are saying, otherwise it will be difficult to implement the policy for rural schools, (Bubala 29th March 2015 Sunday Times)

Bubala added further that, ICT lessons would not be successful unless all rural schools were electrified; computers and text books were available. Meanwhile, Ministry of Education spokesperson Hillary Chipango said the ministry was aware of the problems that pupils in rural areas were facing in the implementation of the new policy. Mr Chipango said the ministry was working hand-in-hand with the Rural Electrification Authority (REA) to ensure that all the schools in rural areas were electrified. He said that pupils in areas where there was no electricity would be learning theory for some time until their schools were connected to the power grid.

Mr Chipango said the Ministry was aware that the subject was new and pupils would be writing exams in the subject for the first time. He said some teachers were also undergoing retraining so that they could be able to teach both practical and theory, while other teachers were yet to be employed.

Lufungulo (2015) studied the Primary School Teachers' attitude towards ICT integration in social studies, a Study of Lusaka and Katete Districts. The thrust of the study was to find out primary school teachers' attitudes towards the integration of ICTs in the teaching and learning of Social Studies. The study targeted schools piloting the e-learning programme with iSchool in Lusaka and Impact Network in Katete district of Zambia. The study was guided by the theory of Diffusion of Innovation which is one of the most referred to theories in studies related to ICT integration in education. Findings revealed that primary school teachers in Lusaka and Katete held positive views towards the integration of ICT in the teaching and learning of Social Studies. This was mainly attributed to the training they had undergone with iSchool and Impact Network on the usage of ICTs. Although the schools are located in different spatial dimensions, the urban and rural setup, the teachers' attitudes were positive.

Furthermore, teachers across the schools regarded ICT as advantageous over traditional methods of instruction and as suitable for the curriculum. Although the ICTs were available in the schools, they were not adequate to the extent that each pupil could have had one and use at the same time in the classroom. Thus the teachers called on the MESVTEE to subsidize the purchase of ICT tool and resources, as this would benefit both the pupils and teachers.

The study recommends that the MESVTEE should enact the ICT draft policy to guide schools and Stake holders on the Ministry's official position regarding the integration of ICTs in education. Further, the MESVTEE should closely monitor pilot projects in schools to ensure quality. For further research, the study recommends that scholars in the field of Social Studies should explore in detail benefits and challenges of incorporating ICTs in the subject area and also examine consequences of Ipads and Computer screens on the sight of teachers and pupils.

Another study that was done by Mtanga, et al (2012) in Lusaka concentrated on the Utilization of ICTs in education. It was established that utilization of ICTs in learning and administration is very low. The other findings were Teachers' perceptions of integrating ICTs in the teaching-learning process were a little disappointing in that only 48% of teachers felt the technology could bring benefits. Apparently 52% of staff was not aware of the ways in which ICTs can be applied in teaching and learning since they failed to indicate any benefits when asked. Again, this can be attributed to the low ICT competence levels among the teachers as already seen earlier in the

discussion that 57% of the teachers needed substantial help when using ICTs. Evidently they have not integrated the technology in their work and thus find it difficult to discuss the matter or express any view on something they have not done. Those teachers who valued the contribution of ICTs to education expressed views that everyone needs to access and should be able to use ICTs in their work for tasks such as preparation of tests and reports. Another reason they advocated for use of ICTs is that they can facilitate easy research and preparation of teaching materials.

2.5 Gap and own Comments

While there is vast literature on the role that ICTs play in primary education from the global perspective, not so much has been said about implementation of ICTs at the primary level in Zambia; the main reason that could be associated with the situation is that the implementation seemingly is still in its infancy. The situation has been promulgated by the fact that Zambia as a developing country has challenges in ICT infrastructure. Additionally, studies also show that the education system in Zambia has been greatly affected by the lack of qualified ICT teachers and relevant infrastructure to support ICTs. For example Nasilele (2015) in a study on the use of ICTs in the teaching and learning of mathematics at St Peter's, Monze and St Mary's secondary schools found that the schools lack ICT infrastructure. The most commonly used ICT by both teachers and pupils was a calculator. Although study environment differs, the study put by Nasilele helps in giving a clue of what is happening in the education sector regarding ICTs. Additionally, Lufungulo (2015) did a study and focused on the integration of ICTs in the teaching and learning of Social Studies (SS) in Katete and Lusaka without focusing on the implementation. Findings were that ICT was advantageous over traditional methods. Hence the study left a gap (on the implementation) despite having been conducted in Katete District.

Therefore, the fact that this area has not been explored through scientific enquiry, it is important to undertake this study in order to explore the current status and future prospects of ICTs in the primary education curriculum. It will also encourage teachers regarding the usefulness of using ICTs in teaching and possess computer and ICT skills to effectively implement ICT in their teaching. Most importantly, the study will seek to find better ways of integrating ICTs in the

primary education curriculum. The findings of this study will also add more information to the body of knowledge and identify gaps for future.

2.6 Chapter Summary

In conclusion, this chapter has discussed related literature on the topic and the problem under study using the following headings: Global related Literature, African Studies, Zambian Context and comments on the gap. What has come out clearly in the literature are; the main arguments, deductions, conclusions and recommendations by various scholars and researchers. The literature has also been linked to my study by way of highlighting similarities, differences, meanings, relationships and gaps that exist. The next chapter will discuss the methodology of the study.

CHAPTER THREE

METHODOLOGY

3.0 Overview

The previous chapter looked at various literatures from both developed and developing nations beginning with the Global, Africa and Zambian perspectives with a view of putting the present study within context of similar works hence justifying the need for it.

This chapter describes the research design, location description of study population, sample size sampling techniques, data collection instruments and data interpretation and analysis as well as ethical issues respectively. It explains various scientific methods which were used in achieving the research questions.

3.1 Research design

Various scholars have commented on research design, in the views of Bryman (2008), research design is a framework for collection and analysis of data which one employs in a study. This is usually designed according to epistemological and ontological assumptions a researcher might have adopted. Qualitative and quantitative are the two main research paradigms used in social research which Bryman (2008) refers to as positivism and interpretativism respectively.

Bryman observes that positivism has been an epistemological position that supports the utilization of natural sciences to the study of social reality and beyond whereas interpretativism is an epistemological position that requires the social scientists to understand the subject meaning of social act. Kombo and Tromp (2006) further simplified the meaning by arguing that research design could be seen as a plan on how a study will be carried out or a detailed outline of how a research will take place. Achola (1988) also defines it as, “the planning of any scientific research from the first to the last step. It is a specification of the most adequate operations to be performed in order to test specific hypothesis under given conditions”.

Therefore, the present study employed a single method approach and in a more precise way using a descriptive design. The study implored a single method design which applied qualitative data. The research appealed for the cross sectional paradigm in view to collecting and analyzing the data. This cross sectional design appealed for reasons of economy of time and cost though

the design did not allow for change overtime- that is, all data was collected at once, hence, difficult to demonstrate or offer casual interpretation overtime. The rationale for having chosen this design was to try and facilitate for the benefits of qualitative research design. It focused on open-ended questions in which responses from potential respondents were collected and for narration purposes, this had enabled the researcher to get in-depth information based on the respondents' experiences and opinions in their natural settings. Classroom observations were also undertaken to see how ICT teaching and learning was taking place.

3.2 Study location

According to Dominik (2006) there are various factors that can influence the researcher's choice of the study area, among them are the nature and incidence of the problem, research time frame, and data accessibility, clients' interest and instructions, resource availability, goals and objectives of the study. As such, this study was conducted in Chipata district in the Eastern part of Zambia. The researcher had chosen this location because it is one of the districts in Zambia affected by the move to integrate ICTs in primary curriculum. Additionally, it was a cost-effective measure as the researcher comes from the same area hence; the measure is aimed at lowering the cost of carrying out the study.

3.3 Description of the population

Kombo and Tromp (2009) refer to population as "... a group of individuals objects or items from which samples are taken for measurement." The population consisted of school administrators, teachers and pupils. The study targeted on pupils, teachers, primary school managers and an official from DEBS office. Therefore, the research study was conducted in five primary schools of Chipata District-St. Annes, St Betty, Nsanjika, Chipata and Lunxwankwa Primary Schools. The main targets were teachers, pupils, administrators and DEBS.

3.4 Sample size

The sample size of the study refers to the number of items to be selected from the universe to constitute a sample. Hence the size of sample should neither be excessively large, nor too small. However, it should be optimum meaning that it should fulfill the requirements of efficiency, representativeness, reliability and flexibility. Therefore, while deciding the size of sample, the

researcher must determine the desired precision as also an acceptable confidence level for the estimate (Kothari, 2004). Sample size determination involves various techniques that can be employed. These include using a census for small populations, imitating a sample size of similar studies, using published tables and applying formulas to calculate sample size, (Israel, 1992). The study samples were categorized in four groups; Teachers, administrators, pupils and DEBS.

Table. 3.1: Categories of the respondents in the sample

Category	Total Number
Teachers	20 (4 x5 schools)
Pupils	20 (4x5 schools)
Administrators	5 (1x5 schools)
DEBS	1
Total	46 Participants

For teachers the sample was 20 consisting of 4 teachers from each school in which a total of 20 was randomly selected using a lottery method of simple random sampling so that each element is given an equal and a non-zero chance of inclusion in the study. 5 administrators and 20 pupils were also purposively selected from the 5 schools, Msambila and Nalaila(2013) states that the process involves nothing but purposely hand picking individuals from the population based on the authority's or the researcher's judgment. Therefore, 4 from each school participated in the study. It was also prudent to ensure that 1 key informant from the DEBS be interviewed for triangulation satisfaction purposes. The sample size 46 was used because the central limit theorem states that a sample size equal or more than 30 was good enough and able to provide a normal distribution of the characteristics of the population under investigation (*Blalock, 1972*). Therefore the participants in this study totaled 46.

3.5 Demographic presentation of data

The main variables of interest were; gender, residential area, personal computer/laptop ownership, total number of pupils in class, and length of service respectively. Therefore, figure

3.1 below is a distribution of respondents by their gender. Out of the 20 teachers interviewed 7 were male and 13 were female.

From the findings it can be argued that the majority of respondents were female as indicated by Figure 3.1 below.

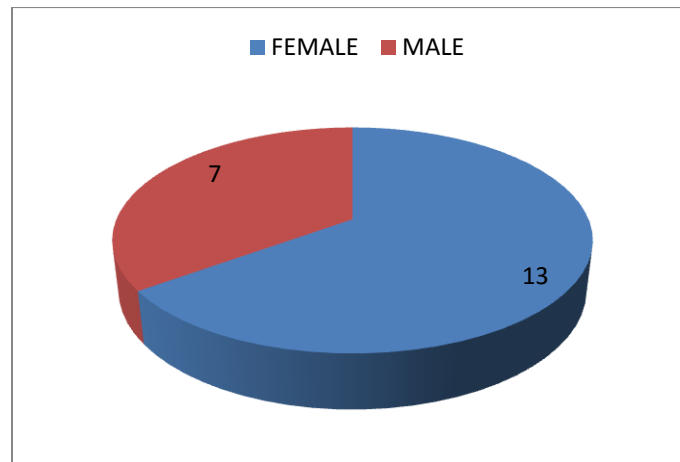


Figure 3.1: Distribution of respondents by gender

Furthermore, distribution of respondents by their residential area indicated that, of the 20 respondents, 4 resided in a high density residential area, 5 indicated having come from the low density residential areas and 11 of the respondents confirmed to have come from medium density residential areas. From the above it is axiomatic that the majority of the respondents come from the medium density residential area and where most of the primary schools are overcrowded with pupils.

On the number of years that the respondents had worked, below is the figure 3.2 showing the results.

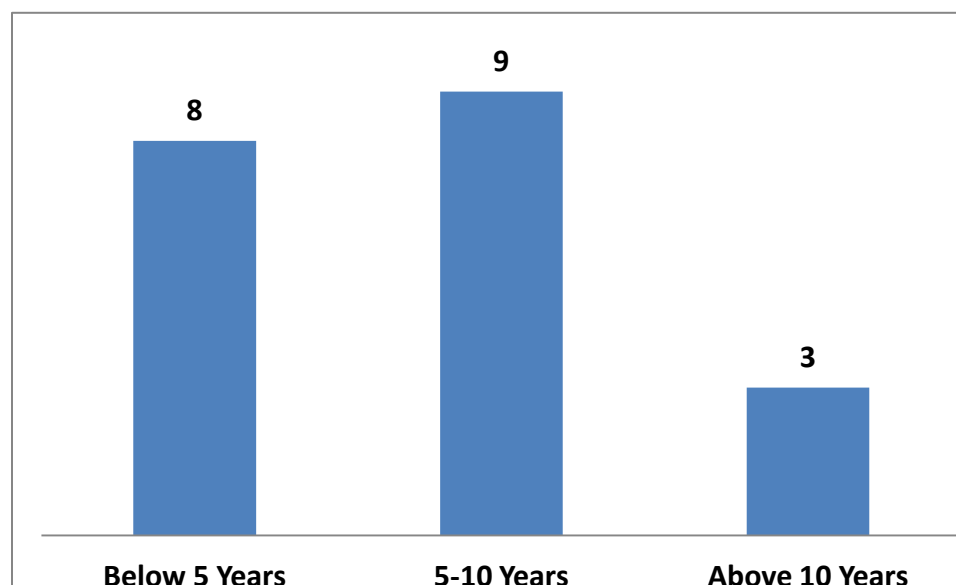


Figure 3.2: Distributions by length of service

The results indicate that the longest serving teachers were 3 in number accounting for 3. However, it was found that 8 respondents being 8 had worked for less than 5 years which was significantly lower than the number of teachers who had worked between 5 years up to 10 years which in this case were 14 accounting for 9.

The implication of the demographic characteristics of the respondents is that, the longest serving teachers are also likely to have little skills in ICTs because of lack of emphasis on ICTs by the training institutions which might affect the use of ICTs among teachers.

3.6 Sampling procedure

In this study, both probability and non-probability sampling methods were used. Purposive sampling was used to select primary school managers and Ministry of education official. This was in agreement with Achola and Bless (1988) who stated that “purposive sampling method is based on the judgment of the researcher regarding the characteristics of a representative sample”. Simple random sampling was used to select primary teachers so as to accord every element (teachers) in the population equal chances of being included in the sample. A teacher was picked from each stream grade one to seven randomly. The names were put in a box and four names were picked by the researcher while blind folded. As Kombo and Tromp (2006), observed that

simple random sampling permits the researcher to provide equal opportunity for selection of each element in the population to constitute the sample.

3.7 Data collection

In this report primary and secondary data was collected. The study used interview guides, observations and data collection sheets to obtain data.

3.7.1 Interviews

An interview guide was used to collect primary data from key informants. In fact, interview guides are a way of communicating through exchanging ideas or information because it contains specific lists of questions which may allow follow up questions. Among the three types of interview guide, the structures interview guide had been adopted for the purpose of collecting additional information from pupils, DEBS and teachers. Two separate interview guide were designed for this purpose. These tools of data collection had helped in collection of in-depth and comprehensive data from the study units. Hence, likely to reduced biases, increased accuracy and relevancy of target group.

3.7.2 Observations

The lessons that were observed were given by teachers who had been interviewed. This was to help the researcher understand some of the comments that teachers made in the interview, such as, teaching in abstract. Kothari (2004) justifies that, the information obtained under this method relates to what is currently happening; it is not complicated by either the past behaviour or future intentions or attitudes.”

3.7.3 Secondary sources

Secondary data was collected from sources of information such as journals, the internet, and other data sources which are already collected, analyzed and presented and information by various scholars and researchers in textbooks, newspapers and other publications. In a case study, the researcher may collect extensive data on the individuals, programs or events on which the investigation is focused through these methods. In many instances, the researcher will spend

an extended period of time on the site and interact regularly with respondents and informants in order to collect the most relevant and useful information for the research.

3.8 Ethical considerations

Ethics has become a cornerstone for conducting effective and meaningful research. As such, the ethical behaviour of individual researchers was under unprecedented scrutiny (Best and Kahn, 2006). There were, therefore, various ethical codes of conduct that regulated the researchers' behaviour. These codes discuss many issues that potentially might arise in research, as well as other issues associated with professional practice (Arnold et al, 2004). For example, the Gundlach and Wilkie (2009) statement of ethics¹ touches on research-related issues and specifically stated that research members must "do no harm."

It is in line with the aforementioned that while conducting this research, the study strived to "do no harm" to participants. This was achieved by following the ethical guidelines proposed by Kimmel (2007). The researcher sought permission from the district education board secretary and had an introductory letter from the University of Zambia. The researcher explained to the participants what the study was all about. She informed the participants approximately how long the interview will take. Participants were assured that there were no physical risks to them if they took part in the study. And if they did not want to take part in the study they were free to do so. At the same time if they did not want to answer any question they were free to do so. They were also informed that they were not getting any form of personal benefits by participating in the study. The participants were also informed that the information that was collected was to be used for academic purposes and was confidential.

Acknowledgements: The works that did not belong to the author of the paper have been acknowledged using Harvard Referencing System in an appropriate format. That is, texts belonging to other authors that have been used in any part of the study have been fully referenced with Harvard Referencing System.

Contents of the interview guide: In an effort to uphold the dignity of our respondents, the researcher ensured that the interview guide did not contain any degrading, discriminating or any other unacceptable language that could be offensive to any members of the sample group. In

addition to this, the interview guide had been designed to only collect information directly related to the research questions at hand.

Honesty and objectivity: the research had strived for honesty at each and every stage of this study i.e. report data, results, methods and procedures, and publication status in an honest manner by avoiding fabrication, falsifying, or misrepresentation of data.

3.9 Validity and Reliability

Validity refers to truthfulness. The validity of an instrument is a determination of how well the instruments reflect the abstract concept being examined (Saunders et al. 2011). Reliability refers to how consistent a measuring device is (Nueman, 2000). A measurement is said to be reliable or consistent if the measurement can produce similar results if used again in similar circumstances

In an attempt to explore the implementation of ICTs in primary education the research followed a systematic approach firstly, the researcher carried out a pilot study at one of the public schools to test the quality of the interview guide in terms of clarity of questions. This was followed by editing interview guide and data collection sheets so as to perfect them. The last stage involved purely data collection and in the fourth phase, data analysis and interpretation was done.

In order to enhance reliability of the findings, data collected was verified by using triangulation and respondent validation. Triangulation was done by comparing different kinds of data from different instruments to see whether they collaborate for example, from the District Education Board Secretary and the teachers. Respondent validation was done by verifying the results with respondents and by relating the findings with the evidence from the available literature. In order to ensure that the findings were valid, the researcher cross- checked the respondents' responses with those of other respondents that were obtained by different instruments.

3.10 Data analysis

Data analysis refers to examining what has been collected in a survey or experiment and making deductions and inferences (kombo and Tromp, 2006). This will involve selecting, categorizing, comparing, synthesizing and interpreting the information collected. The data obtained from interviews was transcribed and then manually analyzed using thematic and content analysis. The themes were the topics or objectives that came up in the discussions. Major concepts or themes

were identified. Major issues were classified according to objectives. Key quotations or insights were highlighted and was shown by presenting reality in verbatim (quotation of parts of the speech or the whole speech). This part of the data that speaks for itself and allowed the reader to make his or her own conclusion, in contrast content analysis interpreting results, the frequency with which an idea appears was regarded as important.

3.11 Summary

This chapter outlined the type of research adopted in this study; qualitative description statistical approach was used to conduct the study. The chapter discusses the methods used in data collection and result analysis. Primary data collection was done through interviews, focus group discussions and observations while secondary data was obtained through a review of publicized articles such as journals, internet and other written materials. Probability and none probability sampling was used in selecting respondents.

CHAPTER FOUR

PRESENTATION OF FINDINGS

4.0 Overview

This chapter seeks to provide the findings of this research. Tables, graphs, and descriptive statistics were used during data interpretation. The structure of this chapter has been premised on the research questions as highlighted below:

1. To what extent is the teaching and learning of Information Communication Technology in selected primary schools in Chipata district?
2. What teaching and learning materials are available for Information Communication Technology?
3. What are the challenges faced by teachers in the teaching and learning of information communication technology in primary schools?
4. What interventions can be considered for improving the delivery and implementation of Information Communication Technology?

Looking at the study participants, it is worth mentioning that the researcher had interviewed 20 teachers, 5 head teachers, 1 DEBS representative and had 5 focus group discussions, one from each school. The focus group discussions had 4 pupils in each group. The information gathered from the interviews, focus group discussions and observations were useful in achieving the research objectives.

4.1 ICTs Usage by teachers and pupils.

The aim of this question was to understand whether ICTs were being used in the teaching and learning in primary schools. By establishing this, the researcher would better understand whether or not ICTs have been implemented in the primary school curriculum. Therefore, in order to answer the research question on the use of ICTs in the teaching and learning processes the researcher used interviews, focus group discussion and lesson observation to gather relevant information. From the Focus group discussion held with four teachers from each school, it was generally found that ICTs materials were not available in primary schools which in turn affected effective implementation.

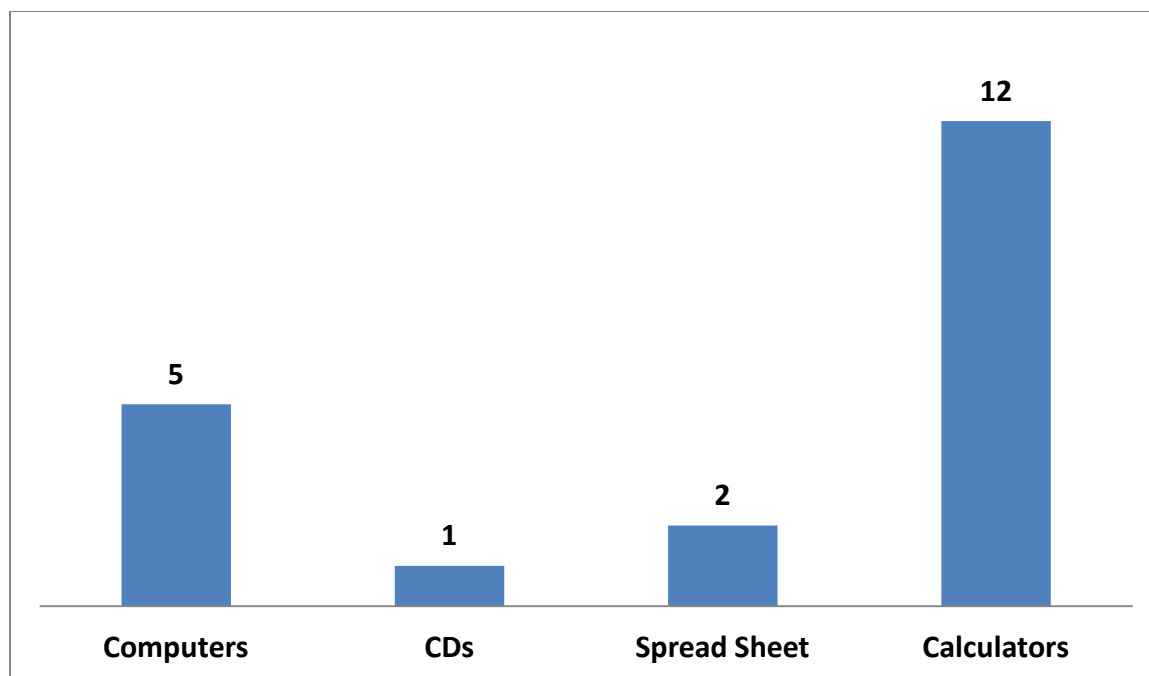


Figure 4.1: Distribution of technology type use

In support of ICT not being taught in schools, a multiple response question followed and the teachers were asked to identify the type of Information Communication technology they use in teaching process, it was established that the most used technology type was a calculator at 12 followed by computers at 5, CDs by 1 and spread sheets at 2 of the respondents. Therefore teachers to a larger extent use calculators as the most used technology in primary schools as per figure 4.1 above.

When the teachers were asked to give a comment on the use of ICTs at their respective schools, three quarters of the teachers were quick to indicate that ICT use in school was not much. This was supported by figure 4.1 to cement this view, one of the teachers from Primary School A said:

...the use of ICTs in primary school especially where I teach is very low. Mostly as a teacher I use the conventional rather for lack of better terms the traditional way of teaching in which I prepare and do most of the talking in class, this is practiced in all the subjects including ICTs which is quite a disadvantage to the pupils because..eeh they do not have a feel of what they learn and cannot connect between theory and practice” (interview with primary teacher, February 2016)

From the above discussion, the study findings show that the use of ICTs in primary schools is low. The study findings further painted that ICT use has been affected by lack of infrastructure and materials, and 3 of the 4 discussant from one of the schools indicated that it is difficult to integrate ICTs into the primary school curriculum because of lack of human and equipment capacity in schools.

The researcher therefore deliberately asked the discussants to indicate whether they used ICTs in their classes. It was clear from the discussions that teachers did not use ICTs to a larger extent. However, one of the teachers from Primary School C said:

...as an individual, it has been difficult to use ICTs because, of lack of support structure, however, I have been teaching ICTs although is just theory so I can just say that my pupils learn ICTs in abstract, although does not completely benefit the pupils but helps them to have an idea of ICTs and this can be the basis for further development of their knowledge in future (interview with primary school teacher march 2016).

This was also supported by one of the administrators who said that:

... I am quite sure that the government is implementing ICTs in primary school curriculum which is the right path for our pupils today. The implementation is rather on paper and practically cannot be ascertained (Interview by one head teacher, March 2016).

The findings also confirmed that the use of ICTs in primary schools is equally low. Therefore, when the respondents were asked to rate the statement, I use and feel comfortable teaching ICTs, in primary schools, it was found that, 17 were in disagreement to the statement as opposed to one of the respondent who was in agreement with the same statement. However, two of the respondents were in the neutral arena. Therefore the majority of the respondents indicated that teachers in primary school did not teach because they felt not comfortable teaching ICTs. Therefore, majority of the respondents argued that ICTs in primary schools were being taught at a very low rate in schools.

The researcher went further to understand the extent of agreement or disagreement with the use of ICTs in the teaching process based on the ICTs resources. The findings indicate that the use of ICTs in the teaching and learning process is still low in primary schools. The low use of ICTs would be as a result of unsuccessful implementation of ICTs in primary schools. Despite the low

use of ICT in primary schools, respondents still confirmed that ICTs are important in primary schools.

One of the teachers had this to say:

...ICT will enable rural pupils an opportunity to have basic knowledge in computers and other ICT related devices. This will help their ability to search and retrieve information from the internet and most of the school going pupils reach Grade 12 without knowing that the World Wide Web has more than enough data for their academic development. Thereforethe move to integrate ICTs in the primary school curriculum will improve the ICT skills of school going children early (Interview with primary teacher, March 2016).

Administrators were not left out on a look at the use of ICT in primary schools during teaching and learning processes, the administrators were in agreement that teachers and pupils alike did not use ICTs so much. However, teachers seemed to have a better opportunity as they had smart phones which could access internet. The administrators also confirmed that, pupils had been learning in abstract without practical exposure to actual ICTs such as internet, Computers among others. One of the administrators highlighted that, pupils are still ignorant about ICTs in primary schools especially the fact that they were in rural areas.

Despite the low usage of ICTs in classrooms, teachers at times teach in abstract as shown below in figure 4.2.

Therefore, in response to the way the integration of ICTs in the teaching and learning processes, the DEBS representative argued that the implementation was not yet effective but improving day by day. He further added that the teaching of ICTs was more theoretical than practical in some schools. Despite, the low use of ICTs in primary schools, DEBS was of the view that ICTs were very helpful to pupils.



Figure 4.2: Grade two ICT lesson

When the ownership of a computer at home was cross-tabulated with feeling comfortable teaching ICT at primary level, it was revealed that there was no relationship between having a computer at home and being comfortable teaching ICTs at primary school level. Both the teachers who had and those who did not have personal computers at home felt uncomfortable teaching ICTs at primary school. Therefore, ownership of personal computers did not have an impact on teachers' confidence in teaching ICTs in class.

4.3 Available teaching and Learning ICTs materials

The researcher went further to look at the availability of teaching and learning material in primary schools, this was necessary in order to assess whether the ICT has been effectively implemented in primary schools. The teachers were asked to rate the extent of ICT resource availability in their respective schools. From the Focus group discussion held with the twenty teachers, it was generally found that ICTs materials were not available in primary schools which in turn affected effective implementation. One teacher had this to say *“as at now the school has got nothing completely in terms of materials for teaching ICT.”* In line with the issue of materials the results through interviews with an officer from DEBS agreed to this fact that materials for

Information and Communication Technology are very few not only in the district but also country as a whole; he said from his knowledge the available materials mainly are some few books and very few computers in selected schools. He also estimated the ratio of teaching and learning materials was: 50:1000 (*materials/pupils*)

Apart from visible challenges of material the DEBS was quick to also mention that there are no infrastructures put in place for teaching of ICTs.

The respondents further disagreed in a follow-up interview question arguing that “*since I came to this school I have used an ICT material supplied by the ministry of education*” Further, most of the respondents also said “*since the implementation of ICT in the curriculum pupils have not had an opportunity to access and use ICT materials in their learning process*”.

While respondents indicated low availability of ICTs, it was found that respondents collectively agreed that more needs to be done in order to make ICT a reality in primary schools.

As evidenced by the responses from the teachers interviewed, one would not wonder why respondents felt that ICT has not been successfully implemented in primary school curriculum. The trend of results therefore, shows that majority of the teachers were of the view that ICT implementation was not successful as most of the pupils did not have access and use of ICT materials in their learning processes. It can be argued that teachers, understand that the ICTs in primary school is necessary but its implementation leaves much to be desired.

Management support cannot be overemphasized in influencing policies and decisions. Therefore it was necessary to fulfill the requirement for triangulation, getting the views of administrators on the implementation of ICTs in the primary school curriculum. Therefore 5 administrators gave responses based on the interview schedule. The administrators were asked to state their perceptions over the implementation and use of ICTs in primary schools. All the 5 administrators showed a strong affirmation that the ICT implementation was on course. However, its use was still questionable in most schools due to being ICT resources were poor.

One of the head teachers at primary school C had this to say:

I am quite aware that the government is implementing ICTs in the primary school curriculum which is a right path for our pupils today. The implementation is rather on paper and practicality cannot be ascertained as at now. Most of the teachers for example at this school do not have relevant skills and infrastructure to implement the ICTs.in short it's just on paper not so much has been done as you can see for yourself (Interview with primary head teacher, February 2016).

The study went further to gather information from pupils through focus group discussions based on semi-structured interview schedules. Therefore 4 pupils were involved from each school. The focus group discussion wanted to determine the availability of both material and ICTs resources for effective implementation from each school.

When pupils were asked if they had computers at home, it was established that none of the pupils had at home. It was followed by a question to find out if they had ever used a computer in school. It was established that three groups had seen one in school and two groups had never seen some in school. It was established that, though some schools had some computers, they had no access but the grades eights and nines. To ascertain the number of computers schools have, reference can be made to appendix j and h.

The researcher had observed some lessons which established that some teachers were teaching without any teaching and learning materials which proved to be difficult because the lessons were meant to be practical lessons. Commenting on the use of ICTs in teaching and learning process in primary schools one of the discussant from Primary School A said:

Teaching ICTs in abstract has been a challenge for me as a teacher and the learners at large. It is difficult to make connections between the theory and practice. Eeeeh I am sure if you asked a pupil what a keyboard looks like they won't be able to describe it. All required materials should be made available when conducting lessons for ICT e.g electricity, solar computers etc. ICTs can be difficult for learners especially when it is based on theory only without practice (Interview with Primary school teacher March 2016).

The observer also observed that schools that had received some computers have failed to maintain them as figure 4.3 indicates below.



Figure 4.3: CPUs and monitors that need to be fixed.

4.4 Challenges affecting ICT implementation in primary schools

The researcher wanted to find out challenges or factors that affect ICT implementation. The respondents were asked questions on the challenges that they were facing in the teaching of ICTs.

It was established that 17 out of 20 respondents felt that shortages of labour force is due to the failure of training institutions to produce ICT technicians and professionals needed for the labour market. This was also affirmed by the 5 administrators that were interviewed. In addition 14 out of 20 also felt that ICTs had not been successfully implemented in primary schools. It was found that primary schools have no teaching and learning materials, furthermore other challenges highlighted include; Poor technical and physical infrastructure of instructional technology and shortages of labour force due to the failure of training institutions to produce ICT technicians and professionals needed for the labour market. The respondents were not sure whether the skills they had were enough to handle ICTs in primary schools. However, teachers had mixed feeling on whether the time was enough to prepare ICTs for class

The respondents were further asked to indicate challenges that affect both teachers and pupils with regard to the implementation of ICT in the curriculum at primary school level as shown by figure 4.4 below comparing the views of teachers and pupils on the ICT challenges.

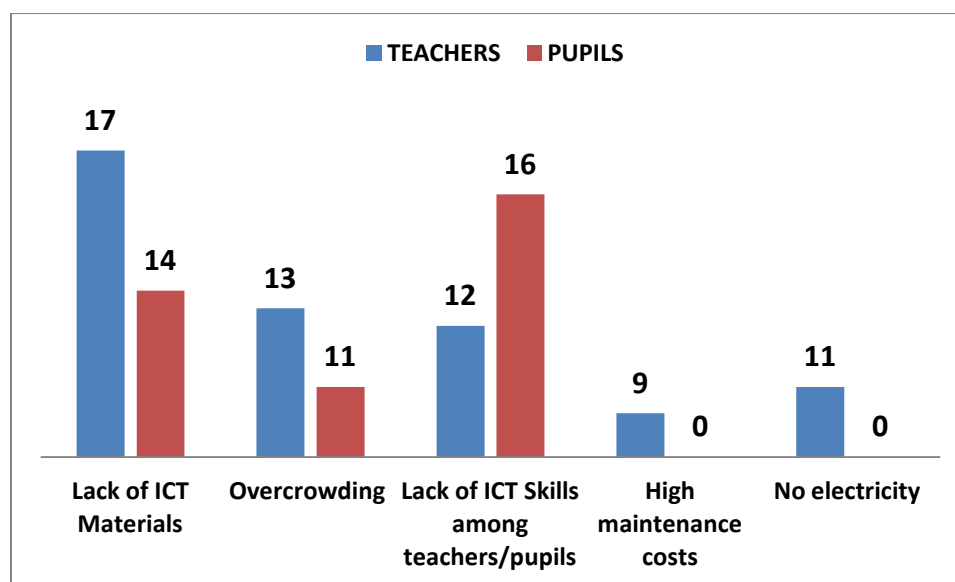


Figure 4.4: Challenges in the teaching and learning of ICTs.

The figure 4.4 above identified five main challenges from the respondents' arguments, therefore both teachers and pupils accepted Lack of ICTs materials was one of the challenges that affected ICT implementation in the curriculum. Furthermore, teachers and pupils alike were quick to mention that overcrowding in classes was a challenge in primary schools affecting integration of ICTs in the curriculum however, the numbers of teachers was on the higher side as compared to the pupils. Both teachers and pupils indicated that they lacked skills in ICTs. However, only teachers were able to indicate that electricity and the cost of maintenance were also part of the problems in affecting implementation of ICTs in primary school curriculum.

Some teachers (15 out of the 20) added that teaching in familiar language in lower grades is also confusing pupils because of using two languages in one lesson as shown in figure 4.5. (Teaching in familiar language is the use of a local language in a particular area as a medium of instruction). Furthermore some parts of the computers are given different names in different

schools. For instance a mouse is called a mausi by some teachers, while others call it “*kambeba*”.

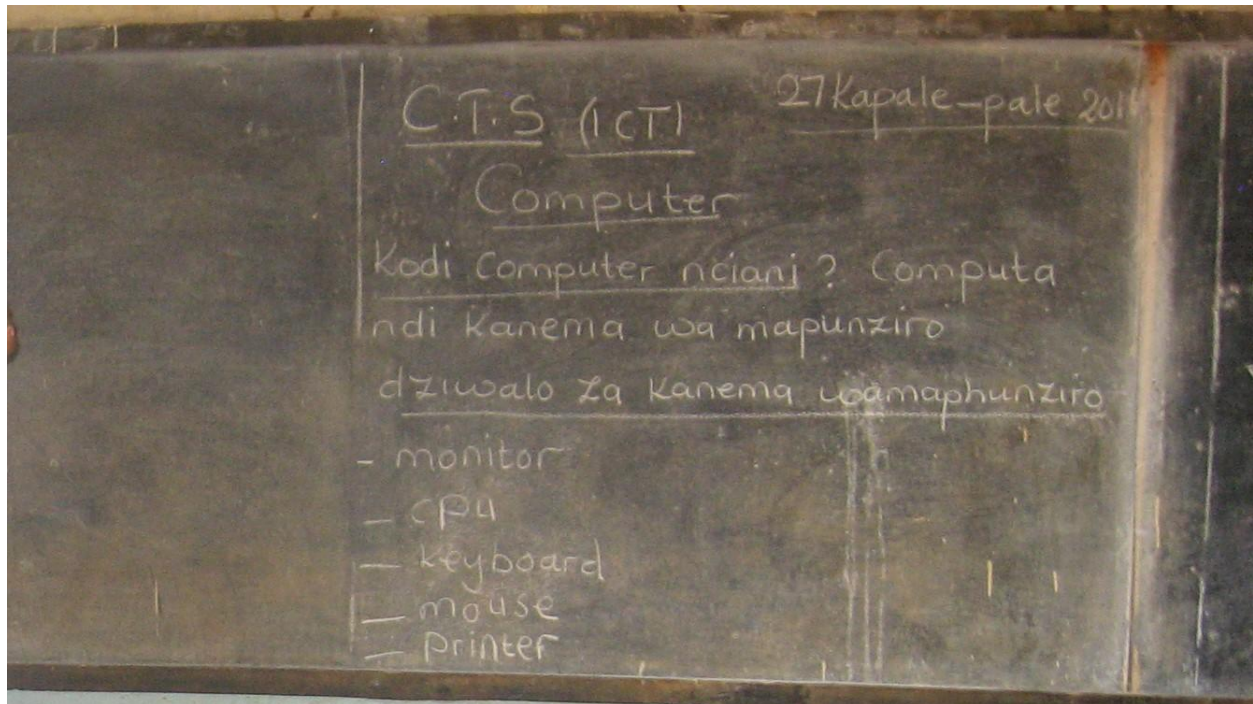


Figure 4.5: Notes in ICT (Grade 2 class)

It was therefore expedient to find out the challenges that the administrators faced in the implementation of ICTs in primary schools. Among the challenges mentioned the most common was lack of ICT supporting infrastructure-electricity, computers, printer, internet, ICT teaching and learning materials TVs, Radios among others. Some of the administrators were aware of the fact that some of their schools did not have qualified teachers in ICTs.

One of the administrators said:

...It's been a challenge for our teachers to implement the ICTs in the primary school curriculum with necessary support equipment. The government was in a hurry to implement the program because it's like taking place in a vacuum. The teachers and pupils do not have materials for reference and the school infrastructure is dilapidated. ICTs require modern tools and knowledge which some teachers do not have unless they have some kind of training for effective use in their teaching process. In short it's like a blind person leading the blind in this scenario. (Interview by one head teacher, March 2016)

The administrators were also required to comment on the infrastructure. Therefore, it was self-evident that the primary school infrastructure did not support the implementation of ICTs in primary schools. The administrators alluded to the fact that some schools did not have electricity which makes the integration of ICTs in the curriculum a mockery to the teaching profession. The schools did not have well equipped computer labs, the numbers of pupils were too many to be attended to by very few computers which were available in some schools. One of the administrators argued that some teachers do not even have a time table for ICT practical due to lack of ICT supporting infrastructures.

With regard to the problems of implementing ICTs in the primary school curriculum, the District Education Board Secretary representative in Chipata (DEBS) was not ignorant of the constraints. Therefore, in response to the way the integration of ICTs in the teaching and learning processes, the DEBS argued that the implementation was not yet effective but improving day by day. He further added that the teaching of ICTs was more theoretical than practical in some schools. Despite, the low use of ICTs in primary schools, DEBS was of the view that ICTs were very helpful to pupils.

He also highlighted that among the challenges affecting the members of staff in the district, were, lack of qualified staff in ICTs; Lack of equipment; lack of reference materials. Due to these challenges he felt that teachers are not comfortable teaching ICTs in primary Schools, additionally, many of the teachers were not qualified ICT professionals.

4.5 Proposed Interventions for improving the delivery of ICTs

When the respondents were asked to suggest what they would do to help in solving the challenges they faced, the following suggestions were made;

The teachers and administrators suggested that the government should increase funding to the ministry of general education towards ICTs programme. They should have invested in the buying of materials before they could kick start the program. Then train ICT professionals who would help in the maintenance of the materials. The DEBS was also for the same suggestion he said that as part of solution in order to improve delivery of ICTs in schools, firstly there is need to train and recruit qualified teachers secondly, intensify on the purchase of ICT equipment. He also

proposed for standardization of computer laboratory for example the networked ones which ZICTA is donating to schools in some parts of the country.

The DEBS should make it mandatory that all schools should buy at least a minimum of one ICT material like computer every term. The syllabus must be availed to the teachers first before anything starts and connect all the schools to the national grid or facilitate solar power. The pupils should be levied a minimum fee for the purchase of ICT materials. The government should train more standards officers so that they monitor if the programme is on course.

The implementation should be done in phases like they did in the new breakthrough to literacy (NBTL) which came out to be a success. This was also supported by the representative from DEBS who said, considering the constraints in the Zambian education system, the District Education Board Secretary argued that it was not appropriate to integrate ICTs at once-without proper consultation and preparation in schools. It was therefore suggested that the government should have implemented ICTs in an incremental approach or step-by-step which would lead to gradual expansion without disrupting the existing order.

DEBS also shared some future plans concerning ICTs. He stated that capacity development through continuous professional development of staff in ICTs. Teachers should be trained continuously especially those that were trained before technology was introduced in colleges. Schools should be encouraged to budget for ICT equipment and come up fund raising ventures and DEBS will come up with mechanisms to monitor the progress and implementation.

4.6 Summary of the findings

The aim of this chapter was to present the study findings based on the set questions of this study report. Therefore the main themes of the information revolved around providing demographic information; availability of ICT teaching and learning materials, perceptions of teachers towards the use of ICTs in class; challenges and possible solutions.

The study found that, majority of the respondents was female accounting for 17. Majority also resided in medium density area. Most of the respondents had no personal computers. In terms of length of service, it can be argued that majority were still youthful and had served 5 years up-to 10 years.

With regard to the availability of ICT teaching and learning materials in primary schools, it has been found that ICT materials in primary schools are not available. Therefore, majority of the respondents argued that more should be done in order to make ICTs a reality in primary schools.

The DEBS also confirmed that availability of materials was not certain in primary school. In schools calculators were the most available and used ICTs in primary schools by pupils and teacher. However, respondents who felt that more needs to be done in order for ICTs to become a reality in primary schools was more significant than those who felt that ICTs have been successfully implemented in primary schools. Therefore, ICTs in primary schools has not been successfully implemented because a lot is still at stake.

Looking in to the perceptions of respondents, it can be argued that respondents had positive perceptions towards the use of ICTs. However, due to lack of know-how, majority of them were still uncomfortable teaching ICTs at primary school level.

The study therefore found that there was no significant difference between ownership of computer and feeling comfortable to teach ICTs at primary school level. Therefore, both those who owned and those who did not own personal laptops/computers felt uncomfortable teaching ICTs at primary school level alike.

The study also established some recommendations on how to improve the implementation. Some teachers recommended that the implementation should be done in phases; a minimum fee should be introduced towards buying and maintenance of ICTs equipment.

CHAPTER FIVE

DISCUSSIONS OF FINDINGS

5.0 Overview

As observed, the previous chapter focused on data analysis and interpretation. Therefore, this chapter focused on adding meaning to the presented data by analysis in the context of social economic and political aspects. On that account, the discussion shall seek to determine the gaps, similarities between our study findings and studies reviewed in chapter two of this report. To this effect, the discussion shall be focused on the following aspect: ICTs use by teachers and pupils, ICT material availability in primary schools. Furthermore, it was also necessary to look at the constraints faced by teachers as they integrate ICTs in primary school curriculum. Prior to this, it will be important to understand the demographic characteristics of the respondents. The chapter shall end by giving a summary of main issues of this chapter in readiness for chapter six.

5.1 Low Usage of ICTs by Teachers and Pupils

Effective implementation of ICT integration in primary school can only be determined by the extent to which both teachers and pupils use ICTs in schools during the teaching and learning processes. To this effect the study has established that ICTs in primary school were not largely used by both teachers and pupils. A look at the study findings, it is clear that most, 17 of teachers *felt uncomfortable teaching ICTs, in primary schools*, this is likely to affect the quality of education in primary schools. Furthermore, it was clear that most teachers do not use ICTs in primary school considering the types of ICTs teachers confirmed using in their teaching process, 12 out of 20 use calculators such that, it was the most used type of education technology. However, to lesser extent teachers also acknowledged the use of computers that was 5 out of 20 of the respondents, CDs 1 out of the 20 respondents, spread sheets 2 out of 20 of the respondents as indicated by Figure 4.2 in chapter four. Though there is a bit of use of ICTs in the teaching, the methodology that is being used is wrong.

It is therefore, clear as presented in chapter four, that teachers use more of calculators, computers and internet. To this effect, it can be safely stated that calculators and computers were the mostly used ICTs in primary schools at the time of study. The high use of calculators in primary schools is because calculators are parts of technology that most of the parents can afford to buy for their

children. Calculators as educational technology are easy to maintain and found in every store. Based on the findings respondents indicated a weak acceptance of internet as being used. The low use of internet by the teachers was due to the fact that the implementation of ICTs had not reached the level of using internet. Internet services in Zambia are very expensive and require more resources to buy, install and maintain for effective use. It can be that the teachers who indicated using internet, access it from their smart phones or internet cafes. However, from the study, the primary schools under study indicated not providing any internet services to teachers and pupils. The provision of internet services could not be achieved over a short period of time in primary schools, since the introduction of free primary education, primary schools have suffered low financial base and which makes the educational levels to depend on government grants for survival.

While calculators and computers were actively used, teachers were quick in registering their disagreement to the use of projectors, spreadsheets, radios, whiteboards, and typing of work for their pupils as shown in chapter four. From the pupils' point of view, the situation was similar, it was found that all the interviewed pupils did not have a computer at home, which clearly showed that their hope to learn computers was at school, and majority of the pupils indicated that they had not used a computer since they came to join the school. Given this scenario one would wonder how pupils were supposed to benefit from ICTs in schools if they come from poor homes that do not have computers to a school that equally does not have computers. When critically analyzed, the low use of ICTs by pupils result from lack of ICT materials as will be discussed later since some schools had no computers despite the increase in the number of pupils in classes such that one pupil indicated that they were 93 in her class.. Administrators attributed low ICTs use in primary schools left to lack of ICT supporting infrastructure-electricity, computers, printer, internet, ICT teaching and learning materials TVs, Radios among others. This is opposed to study finding by Ramón, Manuel & Ignacio, (2010) in *Andalusia* where majority of the teaching staff regularly used computers in class (62.8%), the use of ICTs was also indicated being on the increase since ICTs were integrated in primary school curriculum.

In my opinion, the major reason attributing to ICTs use between our study and the study in Australia is that the education system in Zambia is still developing and development of ICTs facilities is still low in all the sectors of the economy. Not only that some teachers in developing

countries are innovative and design material of those that design some type of didactic material. However, in countries such as Zambia which are resource poor, ICT use depends on western technology. By the time it reaches Zambia, other new educational technologies would have been developed.

Some of the administrators were aware of the fact that some of their schools did not have qualified teachers in ICTs. They said that the government was in a hurry to implement the program because it's like teaching in a vacuum.

The study shows that overcrowding and lack of ICT human and material resources has affected implementation of ICT integration in primary schools, in contrast, countries like Korean experience no overcrowding in classes as compared to developing countries such that 60% of the teachers who participated had at least 16 students in their classes, while in some classes the number of students exceeds 24 (Hyeongjik L et al 2013).

Despite the low use of ICTs in primary school, majority of teachers (88%) perceived that *ICT should be encouraged among pupils in primary school*, the respondent in support emphasised said that ICT will enable rural pupils an opportunity to have basic knowledge in computers and other ICT related devices. This will help their ability to search and retrieve information from the internet and most of the school going pupils reach Grade 12 without knowing that the World Wide Web has more than enough data for their academic development. Therefore ...the move to integrate ICTs in the primary school curriculum will improve the ICT skills of school going children early similar to the study by Young and Chung (2013) when he indicated that ICTs in primary schools could be used for conferencing, the use of ICTs helps, it has potential to help teachers and pupils to interact effectively with each other and cut down on distances and resources. The learners also used a combination of voice and text chat over online chat and the frequency of students' questions was higher in online than in offline classes.

Therefore, in relation to the force field theory, teachers and pupils face a number of challenges in implementing ICTs in the teaching and learning processes. Therefore, there is need to identify the factors affecting effective implementation of ICTs in primary school curriculum. The next part will focus on the availability of ICT materials in primary schools. The implication of the situation is that the quality of education will be compromised. The performance will also be

affected because the examiners may not take into account the level of ICTs use while developing examinations for the Grade 7 classes. This will mainly disadvantage the rural child more than an urban child.

To assess the levels of teaching and learning of ICTs in selected primary schools. It has thus been found that ICTs are sparingly used in primary schools by both teachers and pupils

5.2 Limited Availability of ICT Material

Although the move to integrate ICTs in Primary Schools was necessary as indicated by majority 12 out of 20 of respondents, were for the idea. The availability of ICTs material is central to success integration of ICTs. However, the use and type of material in the study indicate clearly that ICT material availability is still a challenge to overcome. The study indicate that Since the implementation of ICT in the curriculum, availability of ICT materials create opportunities to access and use ICTs materials in the learning process supplied by the Ministry of General Education has not been achieved hence majority of the respondents indicated that more need to be done in order to successfully implement ICTs in primary school and that hence the failure to successfully implement ICTs as indicated in chapter four of this report. The study established that, calculators were the most available and used among the teachers and pupils. However, more teachers indicated availability of computers however, to a lesser extent as highlighted in figure Figure 4.1 of chapter four. The schools did not have spreadsheets, projectors, whiteboards and radios for educational purposes. Due to lack of computers the teachers were quick to mention that they did not type any work for their pupils. Therefore the study has found that the ICT educational infrastructure and material were poor, in support the study by Kivunja and Wood, (2012) Multigrade Pedagogy and Practice: Accelerating Millennium Development Goals for Sub-Saharan Africa, found that the education and infrastructure in developing countries Zambia inclusive were very poor, it was further explained that lack of access to the appropriate use of ICTs has potential to commit millions of children in the developing countries to the vicious cycle of extreme poverty. The study has found that the implementation of ICTs in the primary school curriculum has not been successful; ZNUT general secretary Bubala told the Sunday Times in an interview that some pupils in rural areas would be forced to learn theory while those in urban areas would have an opportunity to learn both theory and do practical. Ultimately, this would be

a big disadvantage to the pupils in rural schools. “We are all talking about ICT, but pupils are learning theory. By the time they will come to have their laptops, it will be something else.” Looking at another literature concerning what the study has established James and Al-hassan (2015) on *Promoting teaching and learning in Ghanaian Basic Schools through ICT* found that there were relatively low computers at Primary Schools (4%) compared to the Junior High Schools (10%). In the Primary Schools, 69% of female teachers and 50% of male teachers do not use ICT tools to teach.

From the study findings, it was clear that ICT integration in the Zambia primary education system has not been accompanied by relevant infrastructure and equipment. Some schools in rural areas do not have electricity, computer and ICTs study materials despite the having large numbers of pupils in classes. However, there seem to be a difference between studies in Africa and western world. In the studies from the developed countries ICTs have been successfully integrated into primary school level while in Africa it is still a challenge as confirmed by studies in Ghana by Acquah (2012), the study revealed that ICT facilities were woefully inadequate for teaching the subject in basic schools. This could be attributed to the differences in ICT use and material acquisition between developing and developed countries. In Zambia, one of the factors that could have contributed to the status core is that the implementation was done in a hurry without proper consultative process. It can also be argued that African countries have poor performing economies to meet with high technological development such as computers, projectors etc. ICTs also come with maintenance cost that most of the primary schools cannot handle due to low financial base. The low financial base could be attributed to the introduction of free education from grade 1-7 which have been the sources of financial resource for the supplement of government grants. Even if the government provides computers, if they are not maintained, they will get back to zero, as it was evidenced in some schools where the ministry of education had provided some computers. The computers needed to be worked on but the school did not have resources to have them maintained they ended up being white elephants as shown in figure 4.5 in chapter 4.

To ascertain the availability of ICT teaching and learning materials in selected primary schools. It was established that there is very little or no teaching and learning materials in some primary schools.

5.3 Challenges in the implementation

According to Kurt Lewin's force field theory, there are two types' of forces that work against change. The driving and restraining forces, the driving force wants to change the status-quo while the restraining forces want to maintain the status-quo. Therefore, if the driving forces are overcome by restraining forces, there will be no change. Therefore, change can only be achieved by ensuring that the restraining forces are eliminated or reduced in order to effectively implement the desired change. Therefore, the study found that the implementation of ICTs in the primary level curriculum has been affected by a number of restraining forces.

The study in seeking to identify the challenges to the implementation of ICTs in the primary level curriculum established that, lack of ICT skills among primary school teachers, lack of teaching and learning materials, poor technical and physical infrastructures were among the challenges to the implementation of ICTs in primary school curriculum. The respondents also posited that shortage of labour force has been orchestrated by the failure of training institutions in Zambia to produce ICT technicians and professionals needed for the labour market.

From the pupils' point of view, it was indicated that the overcrowding had been one of the problems affecting the use of ICTs in primary schools and the study found that the largest class size had over 80 pupils. Looking at the barriers of ICT integration Bingimlas (2009) did a similar study to this study and found that lack of confidence among teachers, lack of competence, and lack of access to resources. Since confidence, competence and accessibility have been found to be the critical components of technology integration in schools, ICT resources including software and hardware, effective professional development, sufficient time, and technical support need to be provided to teachers. Becta (2004) in support of the findings adds that lack of confidence among the teachers greatly affect implementation of ICTs in primary schools.

The rationale is that in schools teachers are the change agents and if they lack confidence to make the desired change take place then, they may decide to affect the whole process negatively. According to the constructivist theory, human beings do not just act without reasoning; every action taken is planned towards achieving a particular goal and objective. Therefore, it can be argued that if the teacher lacks necessary skills as the study has established the status-quo will be maintained as any change is seen as fighting against them, for example, Beggs (2000) asserted

that teachers' "fear of failure" caused by lack of confidence makes them feel anxious about using ICT in the classroom and thus not confident to use it in their teaching. Similarly, Becta (2004) concluded their study with the statement: "many teachers who do not consider themselves to be well skilled in using ICT, feel anxious about using it in front of a class of children who perhaps know more than they do.

The study further established not only did teachers lack confidence but most of the schools were found that they had no trained personnel in ICTs. The situation had been promulgated by the fact that the schools did not have ICT rooms, internet, ICT syllabus and pupils and teachers text books to effectively use ICTs in teaching and learning processes as also found by James, and Al-hassan (2015) that there are relatively low computers at Primary Schools (4%) compared to the Junior High Schools (10%) and the ability of teachers to use computer to teach and research is weak due to lack of access to internet, electricity/power problem, inadequate number of computers and technical know-how. The study recommends a strong and sustainable Public-Private-Partnership between the government, private sector and civil society organizations to map out plans and strategies in order to minimize the problems associated with the integration of ICT in the education system in consonance, Acquah (2012) woefully found poor integration of ICTs in Ghanaian primary schools, such that, teachers had to be engaged in independent studies to acquire the relevant knowledge required for them to teach ICT due to positive perception about the teaching of ICT in primary schools. This simply shows how instrumental teachers are in the implementation of ICTs.

As the force field theory and constructivist theory, teachers can help in eliminating the perceived barriers through engaging in behaviors that will help them acquire ICT skills. The scenario is similar to past and the present study, for example Kivunja and Wood, (2012) found that educational, human and physical infrastructure in rural Zambia is in a poor state, which makes it highly unlikely that the MDGs projected for 2015 will be achieved. Lufungulo (2015) also echoed that although Primary School Teachers were available, ICT resources such as computers and study materials were not adequate to the extent that each pupil could have had one computer and use at the same time in the classroom.

These challenges, from the researchers' point of view presents a situation where studies in developed countries show a successful integration of ICTs in primary schools, however, studies in most parts of Africa and Zambia alike presents that ICT integration still has some teething problems. One of the factors attributing to the scenario is that developed countries have made computers and ICT equipment as part of their life. There is much technological development as compared to developing countries where having a personal computer is still a privilege of well to do in society. Some pupils in developing countries have their first experience of using computers in high school or college. It is unfortunate that not everyone that is seen with a computer is computer literate but it is at times just prestige. In Zambia one of the factors at play in affecting the integration of ICTs according to MOE (2010) is the worsening poverty levels negated Zambia's economic growth during the fifth National Development Plan, a factor that has greatly challenged opportunities of attaining both the education for all goals and the millennium Development goals. From the onset of ICT implementation in primary schools in 2014, the country has had free falling of kwacha against major world currencies which has made the government to reduce support on primary schools.

To determine the challenges faced by teachers in the teaching of ICTs. The infrastructure in terms of in terms of computer laboratories and classroom space are significantly limited n capacity to meet the ever rising demand. Huge investments are required to change the status quo. The language policy in lower grades was also another challenge. ICT is supposed to be taught in the language of play but topics like, "parts of the computer" is in English. Translation and teaching of those parts into the language of play is a challenge.

5.4 Interventions for improving the delivery of ICTs

Teachers that were interviewed had suggestions on how the delivery of ICTs in schools could be improved.

Teachers suggested that there is need for schools to be expanded, by building more classrooms since most of the classes are overcrowded. They needed more rooms to decongest the classrooms as pupils were overcrowded. Looking at the nature of ICTs, it needed pupils to have enough space and the materials like computers need to be in one place. One teacher had this to say;

It is so time consuming at times when one wants to access a computer. The school has no computer room. The six computers are kept in the store room which is at the heads office. You get them at the time of use. You cannot get in advance. Just for you to get and bring to class it takes about 10 to 15 minutes. That is time already lost. The Life of the computers is also reduced because of the movements (Interview with primary teacher, March 2016).

The implementation should be done in phases like they did in New Break Through to Literacy.(NBTL) Training of teachers must first be done and materials must be in schools before teaching and learning can start. As Acquah (2012) supports that when considering a technology deployment, it is helpful to think of the process in terms of the plans, phases and participants encompassing all of the elements needed to make the deployment successful. The current situation is that some schools have materials and have started teaching and learning while others have not.

Government should train teachers in ICT and provide teaching and reference materials in primary schools such as syllabus. This can help in the implementation as observed by Ertmer, (2005).That teachers need access to multiple types of training where technology and pedagogical needs are addressed. This is because teachers' ability to use ICTs affects their willingness to integrate them into the classroom. If teachers do not have the knowledge and skills to use ICTs they will not integrate them

The government should introduce a minimum fee at primary level for purchase and maintenance of ICTs facilities. Though it is free primary education a minimum fee can make a big difference to the current status of ICT. If they can allow schools to levy parents to buy school buses they can do the same for the materials. Teaching in familiar language in ICTs must be well planned. The language policy must be embraced locally developed with cultural, linguistic and curricular relevance (Commonwealth of Learning, 2004) Teachers in provinces should sit and come up with a well translated document of all the lessons so that as a province, they stick to one language.

To explore the interventions for improving the delivery and implementation of ICTs in primary education curriculum, in selected schools of Chipata district. The results have shown that the implementation should have been done in phases and also that the government should introduce

a minimum fee at primary level for the purchase and maintenance of ICT materials and facilities. Training of teachers in ICT was also highlighted.

5.5 Summary

The underpinning factor of this chapter was to discuss the finding of the study in relation to reviewed literature in chapter two. The study firstly, focused on the use of ICTs in the teaching and learning processes in primary schools, the study also discussed the availability of ICTs and the challenges affecting the integration of ICTs in primary schools. Therefore, the following chapter focused on the major conclusion of the study and present recommendations as future action for effective implementation of ICT integration in primary school curriculum.

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.0 Overview

Conclusions based on the findings have shown the background of the study that highlighted that ICTs is important for economic development. But planning is important and the plans must be implemented accordingly. Chapter two presented the literature review available on the implementation of ICTs. Studies on implementation have been explored mostly in developed countries, Africa and Zambia. The literature has revealed that ICTs has potential to promote good performance among students and if not properly integrated can affect learning and performance of learners. Chapter three discussed the methodologies that were used in collecting data from respondents and how it was analysed. Chapter four presented the findings of the research study and chapter five discussed the research findings.

The main aim of this chapter is to establish the major conclusion of the study based on the research objectives. Thereafter, the chapter shall present recommendation as future action for effective integration of ICTs in primary school curriculum.

6.1 Use of ICTs

The use of ICTs among teachers and pupils in primary schools is low. The study has substantiated that the most used ICT resource by both teachers and pupils were calculators which are not so useful to the primary sector. However, a considerable number of teachers indicated using computers and internet. Due to this situation, pupils end up learning ICTs in abstract which robs them of an opportunity to have hands-on experience.

The low use of ICTs did not imply negative attitude towards ICTs among teachers and pupils because teachers and pupils alike were more than willing to have ICTs integrated in the primary schools curriculum. The education of Zambia aims at producing a child who answers to the demands of the labour market. According to the competence outcome based syllabi, they aim at producing a learner who will be able to among other things can use science and technology

effectively. Currently the education sector is struggling to accord pupils and teachers to have hands on experience. .

6.2 Availability of ICTs materials

There is poor availability of ICTs materials in primary schools. The schools, completely did not have overhead projectors, television sets, spreadsheets, CDs, DVD, WWW, White boards computer rooms. However, selectively, some schools had internet which was mainly accessed by teachers through the smart phones, few sets of computers among which were not functioning, lack of ICT teaching and learning text books and syllabus. There is also poor infrastructure, many schools are old with old school buildings, extensive retrofitting is needed to ensure proper electrical wiring, heating/cooling and ventilation and safety and security would be needed.

Some schools do not have Technology syllabi; one wonders how one can teach without syllabus and text books for pupils. Though some teachers accessed internet through their mobile phones, they mainly use it for social purposes like face book not to aid teaching purposes. Some schools do not have electricity which simply means all efforts towards ICT integration in such primary school crippled.

As ICT endeavors to change the standard of education and system of learning for pupils in Zambia the ministry of education should continue to work towards ensuring that all schools have sufficient materials for better enhancement of teaching of ICTs.

6.3 Problems of ICT integration in primary schools

The study concludes that, lack of trained teachers in ICTs, poor infrastructure, lack of ICT equipment such as computers, internet, poor supply of electricity and overcrowding have affected the integration of ICTs in primary school curriculum. Furthermore, due to poor ICT skills among teachers their confidence to teach ICTs is low which is likely to affect the quality of education provided in ICTs to learners.

All in all, it can be safely argued that, the study finding were similar to most studies done in developed countries. However, opposed to developed countries where ICTs have been effectively and successfully been integrated. Therefore, it can be argued that the effort by

government to integrate ICTs in primary schools needs a lot of efforts and support to achieve its intended purpose. At the moment, the extent to which ICTs has been integrated is poor and the pupils are forced to learn ICTs in abstract. Based on the force field theory upon which this research is anchored, it can be argued that, more support from government regarding finances, trained teachers and ICTs equipment will help change the status quo-of equilibrium.

6.4 Recommendation

Based on the major research findings, the following interventions were proposed to ensure effective implementation of ICTs in primary education curriculum schools. The respondents recommended that:

- i. Government should provide primary school teachers with skills in ICT through their tool of recruitment exercise. This will reduce on the cost to retrain teachers and also improve quality of education in ICT. But those that are already deployed should be trained through short courses in order to raise their confidence towards teaching ICTs. This will in turn motivate them further and eventually impact a positive influence on ICT use among learners.
- ii. Government should create ICT worth environment by making available both teaching and learning material as well as improving on ICT support infrastructure. Without ICT worth environment, all efforts will negatively affect the quality of education at the primary level. The nature of materials like computers need to be in an environment that is air conditioned for prolonged life. This can only be done if primary schools have a financial muscle that is strong enough to sustain what will be put in place or in partnership with some none governmental organisations.
- iii. The government should provide soft and interest free loans to teachers for the purchase of personal laptops which they can use practice, for ICT lessons and prepare for lessons at home. Some may decide to use some of the money to buy teaching materials and undertake short ICT training courses.
- iv. The DEBS should have encouraged first of all training of its personnel then monitor ICT integration in primary schools to new development and any deviation from the original plan for quick interventions. This is very important because the DEBS may not understand the real challenges in primary schools information breakdown between the

teachers, school managers DEBS and the Government at large. For effective implementation to take root, programme should have been done in phases like they have been doing with other programmes like NBTL.

6.5 Recommendation for future study

A comprehensive study to sample all the provinces is required in order to get what is happening on the implementation of ICTs in the primary education curriculum. A comparative study can also be done on the use of ICT in teaching and learning in rural and urban primary schools

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APPENDICES

APPENDIX A: RESEARCH BUDGET

Description	Unit	Unit Price	Total
Stationery	- Paper	K 60	K 180
	- Pens	K 30	K 30
Typing/photocopying	- Research instruments	K 100	K 400
	- Project report	K 500	K 2500
	- Binding	K 200	K 800
	- Poster	K 350	K 350
Tools	- Recorder	K 650	K 650
	- Memory stick	K 100	K 100
	- Camera	K 1500	K1500
Transport	- 1 Researcher	K 1000	K 3000
Food	- 1 Researcher	K 500	K 2000
Contingency	- Assorted	K 1000	K 1000
Total			K 12,510

APPENDIX B: WORK PLAN

Date	Activity	Duration
July, 2015	Refining of the proposal	2 weeks
August, 2015	Break	2 weeks
August-September, 2015	Finalising proposal writing	2 weeks
October, 2015	Piloting the research instruments	2 weeks
October, 2015 – December, 2015	Data collection and Analysis	10 weeks
January, 2015	Report writing	4 weeks
February, 2016	Submission of first draft report	4 weeks
March, 2016	Submission of second draft report	4 weeks
April, 2016	Presentation during seminar week	1 week

APPENDIX C: QUESTIONNAIRES

THE UNIVERSITY OF ZAMBIA

SCHOOL OF EDUCATION

DAPARTMENT OF PRIMARY EDUCATION

RESEARCH TOPIC: The implementation of ICT in the primary education curriculum in selected schools in Chipata District, Eastern Province, Zambia.

Dear respondent,

You have been selected purposively to participate in this research through the completion of this questionnaire. Therefore you are requested to assist by answering the questions on the above topic. While you help, be assured that the information provided will be kept with maximum confidentiality. To this effect you requested not write your name or leave any mark that could lead to your identification.

Instruction

1. Do not write your name
2. Tick were applicable
3. Be honest

APPENDIX D: BACKGROUND INFORMATION (TEACHERS)
SECTION A

1. What is your gender?

- 1. Female ☐
- 2. Male ☐

2. Which residential area do you belong to?

- 1. High density area ☐
- 2. Middle Density area ☐
- 3. Low Density area ☐

3. Do you have a computer or laptop at home?

- 1. Yes ☐
- 2. No ☐

4. How many pupils do you have in class.....

5. How long have you been teaching?

- 1. Less than 5 years ☐
- 2. 5 years up-to 10 years ☐
- 3. 10 years and above ☐

THANK YOU FOR YOUR PARTICIPATION

APPENDIX E: INTERVIEW SCHEDULE FOR TEACHERS
SECTION B

1. How do you perceive the teaching and learning of ICT in your school?
2. How do you find the teaching of ICT?
3. Is it necessary to integrate ICT in the primary curriculum?
4. What materials are available in the teaching and learning of ICT?
 - a) Since I came to this school I have used ICT material supplied by ministry of education.
5. Do you have the infrastructure for the teaching of ICT?
6. What challenges are you facing in the teaching and learning of ICT?
7. Are you comfortable teaching ICT? Reasons.
8. What do you think can be done to improve the delivery of ICTs?
9. Do you think it is necessary to train teachers to teach ICT?
10. What is your opinion on the best way ICT can be implemented?
11. Are there any other issues that you would like to raise in connection to implementation of ICT in primary schools?

THANK YOU FOR YOUR PARTICIPATION.

APPENDIX F: INTERVIEW SCHEDULE FOR PUPILS

1. Date of interview
2. Do you have a computer/laptop at home?
 1. Yes ☐
 2. No ☐
3. From the time you come to this school have you used a computer for the school
 1. Yes ☐
 2. No ☐
4. Have at one time learnt about computers?
 1. Yes
 2. No
5. How many are you in class.....
6. How helpful do you think ICTs/technology is helpful to you?

THANK YOU FOR YOUR PARTICIPATION.

APPENDIX G: INTERVIEW GUIDE FOR ADMINISTRATORS

1. How do you perceive the teaching and learning of information communication technology?
2. How do you find the teaching of ICT?
3. How helpful is ICT to pupils?
4. What materials are available in the teaching and learning of information communication technology?
5. Do you have the infrastructure for the teaching and learning of ICT?
6. What challenges are you facing in the teaching and learning of ICT?
7. Do you think teachers/you are comfortable in teaching ICT? Reasons.
8. What do you think should be done to improve the delivery of ICT in at your school?
9. Do you think it is necessary to train teachers in ICT?
10. What measures are you planning to put in place to change the current scenario?
11. What advice can you give the government on the way ICT should be implemented?
12. Are there any other issues that you would like to raise in connection with implementation of ICTs in primary schools?

THANK YOU FOR YOUR PARTICIPATION

APPENDIX H: PERMISSION LETTER A



THE UNIVERSITY OF ZAMBIA SCHOOL OF EDUCATION

Telephone: 291381
Telegram: UNZA, LUSAKA
Telex: UNZALU ZA 44370

PO Box 32379
Lusaka, Zambia
Fax: +260-1-292702

Date: 02.11.2015

TO WHOM IT MAY CONCERN

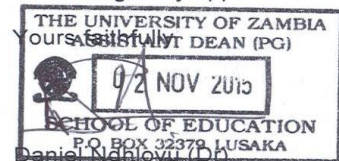
Dear Sir/Madam

RE: FIELD WORK FOR MASTERS / PhD STUDENTS

The bearer of this letter Mr./Ms. BANDA ISABEL Computer number 511104081 is a duly registered student at the University of Zambia, School of Education.

He/She is taking a Masters/PhD programme in Education. The programme has a fieldwork component which he/she has to complete.

We shall greatly appreciate if the necessary assistance is rendered to him/her/



ASSISTANT DEAN POSTGRADUATE STUDIES- SCHOOL OF EDUCATION

cc. Director, DRGS
Dean, Education

APPENDIX I: PERMISSION LETTER B

All correspondence should be addressed to
The District Education Board Secretary
Tel 06-222463, 06-221152
Fax 06-222463
E-mail:debschipata@gmail.com

In reply please quote
No:.....



REPUBLIC OF ZAMBIA
MINISTRY OF EDUCATION, SCIENCE, VOCATIONAL TRAINING AND EARLY EDUCATION
District Education Board Secretary
P.O. Box 510241
CHIPATA

17th November, 2015

Computer No 514704081

The Headteacher

.....
CHIPATA

FIELD WORK FOR MASTERS STUDENTS

I write to introduce to you Ms Banda Isabel a registered student at the University of Zambia, School of Education.

Ms Banda has come to your School for a research on Computer Implementation on ICT.


F M Nkholoma
Ag/District Education Standards officer
For/DISTRICT EDUCATION BOARD SECRETARY
CHIPATA DISTRICT

/nss*

APPENDIX J: DATA COLLECTION SHEET

Nsanjika, Lunkhwankwa, Chipata& St-Annes Primary School

Material	Nsanjika Primary			Lunkhwakwa Primary			Chipata Primary			St-Annes Primary		
	Qty	Adm	T/L	Adm	T/L	Qty	Qty	T/L	Adm	Qty	Adm	T/L
Cell phones	No					No	No			No		
TV	1	✓				No	1			1		
Radio	1	✓		✓	✓	1	3			0		
Printers	1	✓				1	1			0		
Laptops	Non					0	0			0		
Computers	10	✓		✓	✓	13	20	✓		5		
Trained personnel	65	✓	✓			31	31			19		
ICT Room	1		✓		✓	1	0	✓	✓	1		
Electricity	Yes					Yes	2 Blocks			1 Block		
Number of pupils	789					2098	1884			1193		
ICT syllabus	1		✓			0	1	✓		0		
ICT books	G. 5 30		✓			1	G5 30			0		
ICT trained personnel	No					2	1			0		
Internet	No					No	No			0		

APPENDIX K: DATA COLLECTION SHEET

St Betty Primary School

Material	St Betty Primary School		
	Qty	Adm	T/L
Cell phones	No		
TV	0	✓	
Radio	1	✓	
Printers	0	✓	
Laptops	0		
Computers	7	✓	✓
Trained personnel	12	✓	✓
ICT Room	No		
Electricity	yes		
Number of pupils	1095		
ICT syllabus	No		
ICT books	No		
ICT trained personnel	No		
Internet	No		