MIDLANDS STATE UNIVERSITY

FACULTY OF EDUCATION

DEPARTMENT OF EDUCATIONAL TECHNOLOGY

COMPUTER AIDED TEACHING UNPACKED: EXPLORING INTO METHODS OF USING THE COMPUTER AS A TEACHING TOOL FOR ORDINARY LEVEL STUDENTS: A CASE STUDY OF SECONDARY SCHOOLS IN SHURUGWI URBAN CLUSTER.

BY

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A RESEARCH REPORT SUBMITTED TO THE DEPARTMENT FOR APPLIED EDUCATION IN PARTIAL FULFILLMENT OF THE REQUIREMENTS OF THE BACHELOR OF EDUCATION DEGREE IN COMPUTER SCIENCE.

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APPROVAL FORM

The undersigned certify that they have supervised/read and recommend for the acceptance, a research project entitled: Computer aided teaching unpacked: Exploring into methods of using the computer as a teaching tool for ordinary level students: A case study of secondary schools in Shurugwi urban cluster, Midlands province. This was submitted by **Terrance Madhovi** in partial fulfillment of the requirements for the **Bachelor of Education Degree in Computer Science** (Midlands State University).

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DECLARATION

I Madhovi Terrance declare that this project is my original work and affirm that it has not been submitted to any other university.

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DEDICATION

This report is dedicated to my lovely wife Sarah Mahachi, my mentor and Head of department for all the moral and financial support during the entire course of this research. My children Blessing, Blessed and Bliss thank you for understanding your father during this entire period. I love you all guys.

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Abstract

The purpose of this study is to unpack computer aided teaching. It focuses on an exploration into the methods of using a computer as a teaching tool for ordinary level students in Shurugwi District Urban Cluster located in the Midlands Province. A multiple case study approach was used to gather relevant data required for the study. Three School Heads, three computer science teachers and six pupils from form three and four purposively participated in the study. The research attempted to achieve triangulation in data gathering instruments through incorporating interviews as the main instrument complemented by document analysis and non-participant observation. The data collected was critically analysed to find out the extent of computer aided teaching application in the classroom to teach ordinary level students. Research findings revealed that teachers are not fully embracing computer aided teaching to a greater extent mainly due to lack of adequate computer resources for use to apply computer aided teaching and lack of support from the school administrations to financially support the department with enough resources. Pupils interviewed indicated that they enjoyed learning using the computer and research has suggested the computer to be a good teaching aid. The study recommends that the Ministry of Primary and Secondary Education officials (computer studies subject inspectors) in particular must organize seminars and workshops to help alert the School Heads and other stakeholders (teachers and parents) on the importance of this new dispensation of computer aided teaching and that it can be applied to all other subjects of the school curriculum.

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CHAPTER ONE

THE RESEARCH PROBLEM

1.0 INTRODUCTION

The research sought to explore into the methods of using the computer as a teaching tool, commonly referred to as Computer Aided Teaching (CAT) and highlight on the challenges and opportunities on the use of CAT to enhance teaching and learning of ordinary level students in Shurugwi District. In this chapter the researcher looked at the background of the study, statement of the problem, the research questions as well the significance of the study. The delimitations and limitations of the study are also defined in this chapter. The researcher had an interest in studying this after he had discovered that most of the teachers in Shurugwi District Urban cluster are not effectively using computers to aid their teaching.

1.1 BACKGROUND OF THE STUDY

The Millennium Development Goals that were set by the United Nations in the year 2000 highlighted on the importance of computer technology in the global development agenda. It is the eighth goal which drew attention to the need to ensure that the benefits of new technologies, especially in the field of computer technology are made accessible to all (World Summit on information Society, 2003).

The Zimbabwean government in its quest to achieve the millennium development goals developed a national Information and Communication Technologies (ICT) policy in the year 2005. According to Isaacs (2007), the ICT policy was informed both by a Harvard University-guided e-readiness survey, which highlighted that the country was not e-ready.

The ICT policy was also influenced by a host of other policies such as the Nziramasanga Education Commission Report of the year 1999, the national science and technology policy of 2002 and the vision 2020 policy. In particular, the Nziramasanga Commission recommended in support of the use and application of computers for teaching and learning in educational institutions. The National ICT policy that was adopted in 2005 makes significant references to the promotion of ICTs in education including their pedagogical use in educational institutions (Isaacs, 2007). The President's office also launched a campaign to provide most schools with computer related equipment. This resulted in most schools (including schools in the remote areas of the country) and universities benefitting and thus enabling them to utilize ICTs in the teaching and learning process.

In the world today, production of information and knowledge is growing fast and computers serve as a transmission industry in generation, dissemination and sharing of educational knowledge and information (Anderson, 2008). However education plays a key role in information and knowledge production hence there is a need to ensure that teachers and pupils are not left behind in the use of computer technology to achieve their objectives to teaching and learning respectively, and as a developing nation, Zimbabwe needs to be part of this wide dispensation which entails integrating new computer technological processes into the education system.

It is through this realization that schools around Shurugwi district in Zimbabwe need to make efforts to seize this opportunity to exploit the benefits of computer aided teaching for the purpose of learning and lesson delivery. These efforts should be informed by the understanding that computer technology in education is a significant key driver for pupil achievement through enhanced production of information and knowledge.

Victoria (2011:17) supported this saying, “the effective use of computer technology in education also has the potential to enhance achievement among the pupils through greater collaboration, improved communication and opening of wider opportunities to share information”. For a number of reasons that the researcher is going to find out, the use of computer aided teaching is not being embraced to its full extent in Shurugwi district schools. Teaching and learning in this area has largely remained rooted in the traditional models of lesson delivery. Suffice is to say that these traditional systems of teaching and learning have greatly been outpaced and outstripped by new and dynamic trends in the field of learning. The traditional concept of schooling inside the four walls of brick and mortar is fast being superseded by the spectacle of schooling without walls through the use of computer technology to achieve computer aided teaching.

Conventional learning set-ups of the classroom have been overtaken by digital environments and the face-to-face mode of tuition delivery is fast being replaced by online articulated learning and knowledge delivery methods. Education experts argue that bringing ICTs into the learning environment will create opportunities for broader education initiatives that will bring pupils into the information era (Kachembere, 2011). In the light of this view, teachers then need to integrate their current teaching methods to the technology of computers so as to move with time, the changing environments and to take up computer aided teaching as a new way of life.

In an effort to bring the potentially empowering benefits of computer technology to the pupils, the government of Zimbabwe embarked on a massive drive to turn around the education sector by donating state of the art computers to many schools around the country.

This was also supported with the effort to train computer science teachers who were badly needed in the schools with the recent massive five hundred teachers undergoing a bachelor of education degree in computer science with the Midlands State University under the government Unicef program of capacity building (Herald,14 October 2014). To that end, many teacher training institutions both primary and secondary were mandated to train computer science teachers or to offer computer appreciation courses to their student teachers among the programs they offered.

It should however be noted that, for the past years, Zimbabwe has been limping beneath the effects of an economic recession which has since gravely crippled the education sector and also made the country to lag behind in this cosmic digital revolution to exploit computer technology. Some of the major challenges that schools in Shurugwi district and Zimbabwe in general face are largely associated with the prohibitive costs to purchase adequate computers and maintenance of those computers currently in the schools.

1.2 STATEMENT OF THE PROBLEM

Despite the availability of computers in schools and the efforts by teacher's colleges to train computer literate teachers, computers are not being effectively used by teachers to enhance their lesson delivery skills. Most of the teachers in the schools are still mostly using the traditional models of teaching. These however can be enhanced by the incorporation of computer aided teaching. The purpose of this study was to unpack computer aided teaching, exploring into the methods of using the computer as a teaching tool for teaching ordinary level students in Shurugwi district schools.

It is my wish that the knowledge gained from this study will enhance the mode of lesson delivery in the school's curriculum through the use of computer technology.

1.3 RESEARCH QUESTIONS

1.3.1. What computer aided teaching methods can teachers use in teaching at Ordinary level?

1.3.2. What is the extent to which teachers are using computer aided teaching?

1.3.3 What are the possible remedies to ensure the effective use of computer aided teaching?

1.4 SIGNIFICANCE OF THE STUDY

Personally as a Bachelor of Education Computer Science student with the Midlands State University, this study was of paramount importance, as it brought out that the computer is not some monster that can only be used by technical wizards but that even the ordinary teacher can embrace its advanced programs to enhance lesson delivery and administration of the subject being taught in class which hitherto is referred in this research as computer aided teaching. Most teachers in school are still using the manual way of planning what to teach (Scheming) and the traditional way of using the chalk board to deliver lessons when they can use the white surface and erasable board maker pens instead of the dust-full chalks. Capel, Marilyn and Turner (2005:52) supported this when she said "The recent proliferation of data projectors and interactive whiteboards in classrooms has influenced the role ICT can play in supporting interactive whole class teaching".

The study is likely to benefit the following stake holders:

- Ministry of Education subjects inspectorate.
- Provincial education directors.
- District education officers.
- Heads of schools.
- Heads of Departments.
- Teachers.

This will provide them with new solutions on how to enhance performance in school through the use of computer aided teaching as a tool to teach Ordinary level students and perhaps the whole education fraternity at large. The district officials may know how to apply distributive justice in relation to distributing materials to learners and computers donated by the government through use of information given to them from the generalized findings of this study. Teachers then will exploit the new ways of lesson delivery as outlined in the computer aided teaching package.

1.5 ASSUMPTIONS OF THE STUDY

It was assumed that;

- The students included in the study have been exposed to the computer in their learning and in the society from the primary school level up to this point.
- Teachers and pupils are aware of what a computer is.
- Reliable information will be given by the respondents during interviews.

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1.6 DELIMITATIONS OF THE STUDY

This research was carried out in Shurugwi District in the Midlands Province. The schools in the district are divided into urban and rural clusters. The study will be carried out in the urban cluster and teachers of computer studies will participate together with students in Forms 3 and 4.

The schools used in the study are Parkinson High school, Chrome High school and Shurugwi No.2 High School. The study is going to be based on the use of computer aided teaching as a teaching tool used to deliver lessons in these schools and also the use of computer technology to help plan for lesson delivery. The researcher chose the group of form three and four students based on their maturity and their ability to learn fast.

The teachers are going to help the researcher find out the extent they are using computer aided teaching as a teaching tool, the use of computer technology as a tool for planning and delivering lessons has on the execution of their duties. Protection and respect of people's privacy was upheld. Informed consent would be sort from the individuals under study so that they are aware of the proceedings of the study.

1.7 LIMITATIONS

In carrying out this research, the researcher faced limitations in areas such as:

- Geographical location of the schools which is spacious.
- Financial resources.
- Time factor.

1.7.1 Spatial geographical location: The schools in the urban cluster are spaced which made it rather difficult for the researcher to travel to all the secondary schools at one go. It therefore took the researcher a good number of days to conduct the interviews for the study and collect data as it was not possible to travel to all the schools in one day.

1.7.2 Time: The College has a set period during which the project has to be completed yet the researcher is a full time student and had to cover work in other areas of study in the degree program. So the time to visit the schools was limited. However, the researcher had to make use of vacation time in order to carry out the research in-terms of data gathering.

1.7.3 Financial resources: there was need for the researcher to travel in order to carry out interviews and observations.

The researcher had to travel at different times to the different stations as it was not possible to conduct the research at the same time in all the stations.

1.8 DEFINITION OF TERMS

1.8.1 Computer- Haag, Cummings, Rea Jr (2004:8) defined the term computer as "a set of tools that help you perform information processing tasks". It is an electronic device that is capable of executing instructions, developed based on algorithms stored in its memory, to process data and produce required results faster than a human being can do.

1.8.2 Technology- Bates and Gary (2003:15) defined technology as "the physical, mechanical or electronic capabilities of a medium that determine its function and to some extent its shape and other features". Thus technology has to do with physical devices that can be used to enhance the way we do things in life and in this case computers, cameras, televisions, projectors, whiteboards etc.

1.9.0 SUMMARY

The chapter looked at the background to the problem being researched which is that teachers of ordinary level students are not effectively using computer technology to enhance their teaching skills. The chapter also stated the research questions to be used to find out if the computer is being effectively used in schools. The importance of the study to the researcher, teachers, other stake holders and pupils were also looked at. The study is going to be carried out in Shurugwi District and the researcher sighted spatial geographical location, time and financial constraints as limitations likely to be faced. The chapter concluded by looking at the definition of terms that are going to be used many times in the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 INTRODUCTION

To put this research in context the researcher will review literature put forward by others regarding computer aided teaching (CAT) as a teaching tool to enhance teaching and learning of Ordinary level students. According to Creswell (2006), literature review accomplishes a number of purposes. It particularly shares with the reader findings from other studies that are closely related to the bigger, ongoing dialogue in the research, filling in gaps and extending knowledge from prior studies to enhance the knowledge bank of the readers. The center of attention will be on the unpacking of the computer aided teaching package, exploring into methods of using a computer as a teaching tool for ordinary level students in relation to the research questions of this investigation. Highlights will also be made to the definition of computer technology, teaching methods used by class teachers, use of the computer as a visual aid, benefits of using computer technology and perceptions of the parents, teachers and government on computers. The chapter will then conclude with a summary.

2.2 WHAT IS COMPUTER TECHNOLOGY?

The intention of this investigation was to find out how the use of computer aided teaching as a tool can enhance teaching and learning of various subjects offered at Ordinary level. Therefore, we must first establish what we mean when we use the term computer technology.

The term technology is defined by Bates and Gary (2003) as the physical, mechanical and electronic capability of a medium that will determine its purpose and to some extent its form and other unique features.

Figure. 2.1 Computer technology in use to aid teaching in the classroom.

Thus technology has to do with physical devices that can be used to enhance the way we do things in life and in this case computers, cameras, televisions, projectors, whiteboards and many other computer related gadgets. Merriam-Webster (2015) simplified the definition of technology as a manner of accomplishing of a given task especially when using technical means and methods as well as knowledge. Just as much, the projector as shown in figure 2.1 can be used to stage a Power point presentation of lesson aspects thus enhancing the way in which pupils gain knowledge in class thereby helping the teacher to explain the concept to the class. Haag etal (2004:8) defined the term computer as "a set of tools that help you perform information processing tasks". In general, it can be viewed as a device that helps in the processing of data which has the capability to store, process and use data as required by the operator. Bates and Gary (2003) then defined computer educational technology as the actual tools and equipment used to support teaching. These can include software, programs, networks as well as projectors, audio cassettes, television monitors, and so forth.

The skills needed to develop or use the tools and equipment effectively and the organization required to enable the tools and equipment to be developed and used appropriately all falls under computer technology. This then shows that computer technology is a broad area that encompasses the use and knowledge of how to use the technology to enhance the way we execute our duties in life. The classroom then becomes a good starting point for pupils to learn how to use these multifarious machines. If used in the right way technology can enhance the way a teacher executes duties in class. If students learn of word processing skills and how to navigate around computers as well as surf on the Internet early, they will be prepared well in life to utilize computers for more complex assignments at latter stages of their day to day living (Mann, 2015).

2.3 WHAT COMPUTER AIDED TEACHING METHODS CAN TEACHERS USE IN TEACHING AT O'LEVEL?

Computer aided teaching is a term often used interchangeably with computer assisted teaching meaning the use of a computer to aid the teaching of pupils certain specific aspects of the school curriculum. Computer-aided teaching (CAT) is an interactive instructional technique whereby the computer is used for presenting instructional materials and monitors the learning that takes place in the classroom. Nichols (n.d) views it as a new technique that is employed to educate the students via the use of computers. The computer in its real sense can be used in education to teach, explain difficult matter, test pupils and evaluate the progress made by pupils in their learning. The computer can also be used to communicate with the learner and have the leaner to learn on their own outside the classroom. The main aim of computer aided teaching is to communicate with the student in an environment that's not too intimidating to the pupil (Mann, 2015).

The teacher uses the computer to deliver knowledge to the pupil, and the pupil will not be learning about the workings of the computer but on the subject matter in question.

Beevers et al (1991) alluded that a basic understanding of the mouse and keyboard should be enough to allow the student to undergo computer aided teaching. This then make computer aided teaching to be easily applied to any subject in the curriculum. A teacher can use it to teach Shona, Mathematics, Integrated Science and even Agriculture or Fashion and Fabrics. Computer aided teaching can be divided into many branches or forms as the computer can be applied in many ways to teach the pupils. All these ways involve the use of the computer to help the student learn and below are some of the types of computer aided teaching methods which are computer assisted instruction, computer managed instruction and computer mediated communication.

2.3.1 COMPUTER ASSISTED INSTRUCTION

This is a self-learning technique, usually done while the computer is offline or online and it involves the interaction of the pupil with computer programmed instructional materials. In this mode the computer is being used as a tutor interacting with the learner and the learner getting instant feedback from the computer.

Cuban (2003) also views Computer-assisted instruction (CAI) as the interactive instructional technique where a computer is used for presenting instructional materials and monitor the resultant learning that eventually takes place. It uses a combination of graphics, video, text and sound in ensuring that the learning process occurs and the student has benefited. It is very useful for distant education learning where the instructions are sent over the computer and the student reply on the computer without having to go inside the classroom. In view of Cuban (2003)'s definition Computer Assisted Instruction then refers to the use of the computer as a tool to facilitate and improve instructions to carry out specific tasks for learning thus achieving instructional objectives**.**

Some of the types of computer assisted instruction are outlined below as given by Budin (1999). These include drill and practise, tutorials, games, simulation, problem solving and discovery methods.

2.3.1.1 TYPES OF COMPUTER ASSISTED INSTRUCTION

2.3.1.2 Drill-and-practice

Drill and practice is the technique which provides opportunities for students to repeatedly practice given tasks. The skills that have previously been presented can be redone over and over again until mastery of the skill has been achieved. Fullan (2001:160) is of the opinion that drill and practice "can be synonymous to the "flash card" system used with the stimulus-response model". These require further practice until mastery of the skill is achieved. The teacher can employ this in the classroom to have pupils practice on tasks that they need the students to dwell more on and these tasks can be repeated over and over again until the pupils have shown mastery of the concepts. The pupils can work on the computer on their own doing the tasks at hand. Drill and practice learning methods are as noted by Budin (1991), typically methods of supplementing to what the teacher would have taught in class. This is to say that a teacher can use this method in addition to those that the teacher already uses in class to teach the pupils. It is best applicable to concepts that the teacher requires pupils to memorize such as multiplication exercises in Mathematics and spelling exercises in English lessons. If the pupils show mastery of the concepts they are moved to the next level of difficulty of the concepts and if they fail the next level they are taken back to the previous level until they achieve the tasks at hand.

2.3.1.3 Tutorial

Tutorials are activities that include both the presentation of information and its expansion into different forms of work, including drill and practice, simulation and games.

These can also be used by the teacher to explain certain tasks in form of videos and texts that the pupil can use outside the classroom. iWebtool defines a computer tutorial as “an interactive software program created as a learning tool”.Tutorials have the advantage that a teacher can prepare a lecture in form of notes of a video and post it online so that the pupils can access it from home or in class when the teacher is away. They have the advantage that a pupil can play them or go over them time and again in a step by step manner until they are satisfied that they have mastered the lesson.

2.3.1.4 Games

Gaming software often creates contest usually between two or more players and the opponents can either be online or offline with the computer being able to play as the other opponent. The main goal is to achieve the highest score and either beat others or beat the computer. These mainly target the cognitive domain objectives as they sharpen the minds of the learner often providing a relaxing environment full off fun. The teacher in the classroom can take advantage of this by looking for games that are related to the subject area and have pupils go over them in a fun environment which in not tense and assumption is that they will master the concepts while at the same time playing. The games have an ability to offer a motivational environment to the learners (Beevers et al, 1991).

2.3.1.5 Simulation

In simulation, the software can provide an approximation and creation of reality that does not require the cost of real life or its risks. This often enables explanation of complex processes to be easy and pupils can understand them without having to crack their minds through imagination of the real processes. In the classroom the teacher can use the projector to present a power-point lecture that includes real life videos or pictures of certain aspects of the subject making the visualisation of the aspects easy.

The simulation software on a computer attempts to create an environment that allows the student to manipulate and alter different scenarios to a real life situation without really participating in it there by getting to experience the results of such conditions. This then enables the pupil to understand easily those concepts that maybe difficult to explain to them. A complex process such as driving an aeroplane or a car can be easily simulated using this software giving the learner chances of exploring the effects of changing different situation parameters like flying in a storm or flying in a clear environment.

2.3.1.6 Discovery

The discovery approach often provides a large database of information particular to a course or content or subject area and challenges the student to analyze, compare, infer and evaluate based on their explorations of the data. Pupils will generally discover the knowledge on their own through working through the instructions.

2.3.1.7 Problem Solving

This approach helps the pupils develop specific problem solving techniques and strategies that will yield solutions to the problems presented by the teacher. The pupils can make use of internet research to search for solutions to the problem presented to them thus this will help them learn through solving the problem on their own. For example word processing software can be used by the teacher to help pupils become good writers. This is achieved through expressing themselves to explain a story or a composition.

2.3.1.8 Advantages of computer assisted instruction

Buddin (1999) gave the advantages of computer assisted instruction as outlined below.

- Provides for a one to one interaction of the tutor and tutee.
- The computer is a great motivator to the learner.
- The pupil has freedom to try out with different options and methods.
- It provides for self pacing thus allows students to proceed at their own pace.

- Helps the teacher to devote more time to individual student.
- There is room for individual attention of the student.
- There is maximum privacy which helps the shy and slow learners to learn alone.
- The pupils will learn more content at a faster rate.
- Self directed learning as there is no one to lead the learner astray.

2.3.2 COMPUTER MANAGED INSTRUCTION

This is an instructional strategy where the computer can be used to provide the learning objectives, the learning resources, and also in the assessment of the learner's performance. It also aids the teacher in instructional management without essentially doing the teaching but just giving out instructions on which work the pupil can do. Chapman(2006) defined computer managed instruction as a system in which the computer is used for managing several aspects of instructions that include learning assessment through the administration of tests and exercises, designing and preparation of learning plans and the calculation, analysis as well as recording of student scores.

2.3.3 COMPUTER MEDIATED COMMUNICATION

This area basically describes those computer applications which facilitates communication say between the learner and the teacher. The categories that make up computer mediated communication include electronic mail commonly referred as e-mail, computer conferencing, the use of electronic boards and listservs to mention some of them. The classroom teacher can make use of these to follow up on pupil's assignments and send reminders of study areas as well as test reminders.

Fullan (2001) explained the advantage of computer mediated communication that the teacher can have a one on chat with the pupil outside the classroom and the pupil can have a chance to ask on gray areas for further explanations from the teacher.

2.4 WHAT IS THE EXTENT TO WHICH TEACHERS ARE USING COMPUTER AIDED TEACHING?

Teaching is an essential part of education and methods of teaching should be well selected so as to deliver the correct knowledge to the learner. Many scholars have tried to define teaching using various ways. John Dewey (1859-1952) in his attempt to explain teaching postulated that "one might as well say that he/she has sold when actually no one has bought, as to say he/she has taught when in fact no one has learned". From this thought it clearly shows that learning has to be evidenced. There has to be some evidence that learning has taken place. This means to say that teaching is a two way process whereby the teacher delivers content to the learner and the learner shows that learning has taken place. Geoff, (2009:40) supported this by saying "the student communicating directly with the teacher, and the teacher checking on the student's work are both examples of feedback for the teacher. Without this feedback the teacher cannot know whether or not understanding or learning has taken place".

However, there are various teaching methods that can be implored to teaching some of which take the learners to be passive participants and some of which involve the learners for example, through drill and practice, critical thinking is promoted and through computer simulation, independent mastery of skills, concept development and the skill of inquiry is enhanced. The word processor is another software that be used to improve pupils' writing skills and on the same note Spreadsheets can promote mathematical skills while playing computer games can assist students learn how to process facts and make logistical inferences while solving a problem that is interesting to them (Grabe and Stoller, 2003). Aggarwal, (2004) went on to list some of the common teaching methods that can be used by the teacher in the classroom as:

- Assignment Method
- Discussion Method
- Lecture Method
- Observation Method
- Play-way Method
- Questioning
- Problem Method
- Project Method
- Story Telling Method
- Supervised Study Method
- Text Book Method

The computer and its related technologies can however be used in administering all of the above teaching methods listed if only the teacher would embrace the use of technology in lesson delivery. The teachers in schools can make life easy for them and the pupils through the use of computer technology to deliver their lessons in class and the whole objective of ensuring that learning has taken place will not be a problem.

This is supported by Tyack and Cuban (2000) when they argued that computer and related technologies can be powerful teaching and learning tools when in the hands of teachers who know how to integrate them appropriately into their day to day interaction with their students.

2.5 THE BENEFITS OF LEARNING USING COMPUTER TECHNOLOGY

Computers are an extraordinary presentation device for teachers and are also a potent tool for learners. They grant access to the Internet, which hosts a large number of academic researches and offers educational support to the concepts pupils will be learning in class.

These can include historical records, social organizations, scientific discoveries providing an affluence of information for studying our historical cultures and social activities. Learning using computer technology has more advantages than disadvantages, bringing more benefits for using them.

Tyack and Cuban (2000) noted that students and teachers are now able to communicate with tutors and other learners anywhere in any part of the world easily and instantly. This phenomenon opens up opportunities for collaboration that did not previously exist. Teachers can encourage pupils to sign up for email updates and text message alerts so as to receive homework, assignments and reminders for tests or projects. Pupils will respond well to these types of communications and thus, will respond better to the assignments themselves.

Computer technology in the classroom has evolved beyond the traditional drill and practice programs of learning to problem solving approaches that allow pupils to learn at their own pace and doing motivational research on the internet. Today's technology can provide teachers and other school related departments like sports with greater opportunities to bring information such as current game records, modern training manuals to their students. This allows teachers to prepare pupils for the future, both in their personal and resultant professional lives (Friedman, 2013).

There is a vast of resources and communities that are online which are available to help students develop and improve skills such as mathematical or scientific understanding. They can change the whole field of teaching into an interesting arena replacing most of the boring teaching methods traditionally used to teach.

The verbal channel of communication is the most used in teaching but for many purposes visual information is more effective (Geoff, 2009). Pupils learn better through visualization of the concepts they are being taught and they enjoy it. The computer can help create real visual simulations of concepts being taught to the pupils better than any other visual aid. It can encompass both audio and visual aids at one go. Complex processes like the germination of a bean seed (figure 2.2) can be simulated in reality with the computer, and a student can be able to visualize the correct sequence of stages encountered in germination.

Fig 2.2 Simulation of seed germination computer graphics

Some researchers have put forward that 87% of information that get in our brains goes through the eyes and 9% goes through the ears while 4% is acquired through the senses (Geoff, 2009). This clearly shows that the use of computer technology really can enhance teaching of complex processes in the field of science and even in all other subjects as it stimulates the much needed visual senses allowing more information to stick onto the student's memory.

The new technologies that are being developed will enable teachers to have more tools available to them for use when carrying out computer aided teaching. Electronic books and tablets may remove the need for physical textbooks as shown in figure 2.3, costing schools or parents more money.

The devices may seem to cost more initially when the device is acquired, but will cost less through the years when only licenses can be purchased for each class instead of a new device.

Fig. 2.3 (Students using tablets in the classroom. Source: Voranai Vanijaka and Lamphai Intathep, "Tablet Tryout at Rachawinit School," bangkokpost.com, Mar. 12, 2012) (Procon.org)

Computer technology has quite a number of benefits especially in the moulding of the student as well as giving the student an upper hand in their studies. Mann (n.d) concurred with this when he highlighted some of the benefits that, some technologies utilized by students in the past were voice recorders and iPods. Today, most cell-phones come equipped with voice recording capabilities and many phones can download and playback podcasts, which makes lectures available for review at a later date. Although most instructors frown upon the use of cell-phones in the classroom, there are some benefits to them being used responsibly (Mann, n.d).

Incorporating computer technology in the classroom and daily lesson planning can be a great challenge for a number of teachers, as they must select the most proficient means of delivering lessons and the assignments that reinforce it. This is done while staying on target with imposed standards of the curriculum. However, despite computers being extremely beneficial to the educational process there are some negative aspects that present themselves.

Pupils might have access to greater distractions during their research and or study time, in the forms of games and social networking websites such as ‘face book’ and ‘whatsapp’. There is also the risk of students interacting with potentially dangerous, anonymous individuals which might ultimately influence the behaviour of the student. Therefore, it becomes vitally important for teachers and school authorities to monitor computer use to ensure they are being used safely and for the right purposes.

In conclusion the computer can function in the classroom as:-

- A teacher, thus providing computer aided instruction in form of tutorials, drill and practice as well as testing the student’s level of competence.
- A dynamic textbook library containing thousands of knowledge resources.
- A database of videos, sound and knowledge bank.
- An administrator academically ensuring record keeping of student marks, school assets and school accounting records.
- A communication device to send and receive email messages.

Thus use of a computer has a lot of benefits to the school, teachers and pupils.

2.6 THE COMPUTER AS A VISUAL AID.

Many teachers love using visual aids to aid their teaching as to make the explaining of complex concepts easier. Teaching aids do pose a lot of advantages and their frequent use has since made life easy for most teachers though making and preparing them is still a challenge to many (Farrant,1991).

The computer has since statistically been proven to be an important visual aid hence the need to look at some of the advantages of using visual aids as put forward by Geoff, (2009). These are given below as follows:-

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Fig.2.4 (Teacher using a white board as a visual aid)

2.6.1 They gain attention of the pupil.

A teacher cannot teach without the attention of the pupils no matter how well a lesson has been prepared. A new image on the screen is difficult to ignore than a new sentence in a speech but the images must be carefully selected so as to capture the interest of the learner from other competing visuals like the view out of the window.

2.6.2 They add variety to the teaching methods and styles the teacher uses to teach.

As has been mentioned above there are a number of teaching methods a teacher can use to deliver lessons to the learners. All these teaching methods can be used with the limited or maximum use of the computer thus variety is added to the lesson delivery in the classroom. One only need to properly plan for the lesson and using any teaching method the computer can come into play from typing of notes to the actual presentation of knowledge to the learner as well as a resource.

2.6.3 They aid conceptualization of complex concepts being introduced to the pupils.

As an example, pupils can understand more easily the complex processes that go on in the Haber process.

Thus it is easy to master the things that take place during the production of ammonium if a simulation of the chemical reaction is done visually than just teaching using the complex chemical equations involved in the process. A video can also be used to enhance conceptualization of some complex processes which can be difficult to explain.

2.6.4 They aid memory. As alluded to earlier by Geoff (2009) much of the content that sticks to the brain memory cells is acquired through the eyes hence using visual aids improves memory holding capacity as pupils will recall more work seen with the eyes.

2.6.6 They show you care. A carefully planned lesson using a good power point presentation would show that you really care about the knowledge acquisition in your pupils as they tend to enjoy the lessons more thereby appreciating that you care for their learning.

2.7 WHY IS IT IMPORTANT TO USE COMPUTER TECHNOLOGY AS A TOOL IN PLANNING AND ADMINISTRATION OF TEACHING CONTENT?

Teachers have an especially important role to play in computer technological advancements, as incorporating computer aided teaching in the classroom can be both a knowledge tool for pupils and a teaching tool for the teacher. Pupils seem to be adapting to the rapid advancements in technology better than many adults, and they actually have embraced it better. For this reason, incorporating computer aided teaching in lesson delivery is a great way to increase a child's interest in learning. Capel et al, (2005:51) wrote that, "The most obvious and hence the most common use of ICT to support teaching is in the production of paper-based resources such as worksheets, template documents, handouts, information leaflets and pupil booklets". Thus computer technology can aid the teacher in the planning of what to teach instead of using the pen to write, the teacher can type the scheme of work on the computer and print the hard copy of the

scheme book. This is easy to edit say if classes being taught are changed during the middle of the term. It's less laborious to edit on the computer than having to start writing the scheme book all over again.

Times have changed and our teachers need to move with time and technological advancements. Fullan (1991, p. 3) in support of the need for change said, "Everything must change at one time or another or else a static society will evolve". The 21st century has largely been dominated by a techno-centric educational paradigm shift for most developed countries in the world (Feldman, 1993) thus shifting society towards a technological boom. This is particularly true in the case of the use of computers, with emphasis on learning using educational technology in order to meet the perceived needs of contemporary life and the use of computer technology to be able to function in this new society.

The teacher can also embrace the computer technology to record pupil's progress marks using Microsoft excel software rather than having to spend time adding the marks using the calculator. The computer can compute all the averages and make life easier for the teacher leaving more time to researching on what to teach in the next lesson. Increasingly, teaching resources are being provided online through websites which the teacher can use in the planning of what to teach the pupils.

2.8 LEVEL OF QUALIFICATION OF TEACHERS IN COMPUTER USE

Recent years have seen both an increase in the use of technology to support teaching and learning and considerable developments in the use of Management Information Systems within organizations such as schools (Dawson and Loane, 2006).

So in this light there is need for all teachers in the system to have some computer knowledge and skills in developing lesson models using the computer to help them deliver their lessons. The recent exploit by all institutions of higher learning in Zimbabwe to have everyone studying at these institutions undergo the module of ICT is a welcome remark towards achieving the goal of embracing computer technology.

Teacher education students have a significant role to play in the sustained application of ICT in schools as they have the basic knowledge of using the computer from college where they are exposed to effective use of ICT in their training (Steketee, 2006). Osborne and Hennessy (2003) supported this by postulating that integrating ICT as a learning resource during regular classes, lecturers of teacher training colleges will be exposing student teachers to innovative ways of learning. Teacher training programs are now effectively training their prospective teachers in using different ICT materials for lessons and also so that they will be able to direct and have learners effectively benefit from such materials. According to Musarurwa (2011), the integration of ICTs in the Zimbabwe teacher education curriculum was achieved through the College Information Technology Enhancement Programme (CITEP). This has since helped in teachers becoming more exposed to the use of computers in carrying out their work. Thus most teachers are now qualified to use computers especially those newly trained.

2.9 THE ZIMBABWE GOVERNMENT PERCEPTION ON COMPUTERS

There is a need to look at the various perceptions of the different stakeholders in the Education sector regarding the use of computer technology so as to link the computer aided teaching use to different views. The provision of Information Communication Technology resources to the education sector in Zimbabwe has been growing at a very slow pace since 2002 due to economic hardships facing the country.

The Zimbabwean government developed a national ICT policy in 2005 in the hope of raising awareness in the field of information technology. According to Isaacs (2007), the policy was clued-up both by a Harvard University-guided e-readiness survey which suggested the country was not e-ready, and by a host of preceding general and sector policies that included the Nziramasanga Education Commission Report of 1999, the national science and technology policy of 2002 and the vision 2020 document. The Nziramasanga Commission recommended on the use of computers for teaching and learning in educational institutions as a way to embrace the use of technology in these institutions.

Fig. 2.5 *(President Mugabe, Information Communication Technology Minister Nelson Chamisa (left) and Chogugudza Primary School headmistress Mrs. Mercy Mashore use some of the new computers donated to the school yesterday(ZimEye,29 March 2012)*

The National ICT policy that was adopted in 2005 makes significant references to the promotion of ICTs in education including their academic use in educational institutions (Isaacs, 2007).

The Zimbabwe schools computerization program that was originally established in 2001 by IT Schools Africa's partnership organization for African schools, has distributed over 7000 computers to more than four hundred schools. It has since been adopted by the president of Zimbabwe and has spread to every province in the country with almost all secondary schools receiving at least ten computers from the government (Zim-eye 2012). The presidential program (see figure 2.5) along with other stakeholders such as the school development associations has ensured that most schools have computers in their schools including those schools in Shurugwi district. The office of the President also launched a campaign to provide most schools with computer related equipment that included printers, e-learning kits and educational software packages.

This resulted in most schools (including schools in the remote areas of the country) and universities benefitting and thus enable them to utilize ICTs in the teaching and learning process, although an audit still needs to be carried out to ascertain how far the equipment has been put to good use. The government of Zimbabwe has a perception biased towards the use of computer technology in education and the honors is on the classroom teacher to implement computer aided teaching to the pupils being taught.

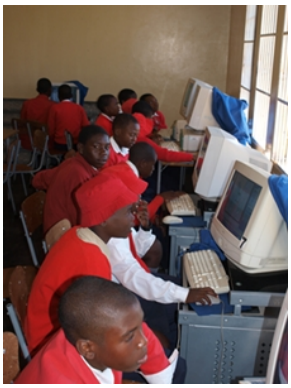

Fig. 2.6 (Shurugwi No.2 High School pupils during a computer lesson)

2.10 SUMMARY

The above reviewed literature puts my research in context. This research is concerned with the unpacking of computer aided teaching and exploring into the methods of using it as a teaching tool to enhance learning of Ordinary level students. In this chapter the researcher reviewed what other scholars said pertaining to the definition of computer technology as well as listing some of the basic various teaching methods. It also outlined the benefits of learning using computers as well as listing some of the advantages of using the computer visual aids in teaching. The researcher went on to review literature on the availability of computers in school to the benefits of using them and the perceptions of the government regarding computers.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 INTRODUCTION

In this chapter, the researcher outlined the research paradigm and the methodology used in the study. The chapter looks into the research design, the population, the sample, sampling techniques used, the research instruments, ethical considerations, data collection procedure as well as data presentation and analysis plan. It then concludes with a summary of the chapter.

3.2 THE RESEARCH PARADIGM

A research paradigm can be defined in general as a way we think about and research the world. It is a particular kind of mindset we have about a certain phenomenon. The knowledge that we gain and how we use it basically forms the approaches to this phenomenon. Thomas Kuhn (1970) cited in Gary Thomas (2009:73) defined paradigm "to mean a fixed set of assumptions about the way inquiry should be conducted". This research sought to explore into the methods of using the computer as a teaching tool commonly referred to as Computer Aided Teaching (CAT) and highlight on the challenges and opportunities on the use of CAT to enhance teaching and learning of ordinary level students in Shurugwi District. This being a case of three schools, it focused on a few individuals who are using the computer to teach in class hence the researcher opted for the interpretivism paradigm.

3.3 RESEARCH DESIGN

Johnson and Christensen (2012) defined a research design as the segment in the research project which presents the strategy used to investigate and provide the answer to the research questions. Murimba and Moyo (2000) concurred with this notion when they said that the term research design means an explanation of the layout and theoretical constitution to be followed to carry out the research. This however shows that a research design is a plan of action to take when answering research questions highlighted and the methods to use in collecting the evidence to answer the research questions as well as how to select subjects taking part in the investigation. So for a research to take place there has to be a plan, the subjects and the research questions and for you to be able to get the answers you follow a plan to solicit the answers from the subjects. Creswell (2009:3) echoed the same sentiments that "research designs are plans and the procedures for research that span the decisions from broad assumptions to detailed methods of data collection and analysis".

The research questions to this study are:-

- What computer aided teaching methods can teachers use in teaching at Ordinary level?

-What is the extent to which teachers using computer aided teaching?

-What are the possible remedies to ensure the effective use of computer aided teaching?

These all call for straightforwardly descriptive answers and this prompted the researcher to use the case study qualitative design approach as the research design because it takes the interpretivism paradigm approach to give answers to these questions. Fraenkel and Wallen (2003) views qualitative research as involving the collection of information from a group of people in order to describe characteristics of the population such as opinions, attitudes, beliefs and values.

Rudestam and Newton (2007:49) explained the term case studies to "usually refers to studies that focus on a single individual, organization, event, program or process…..". Reardon (2006:135) in agreement to this also defined a case study as "…a method of study in which a particular organization or situation is used to explore an occurrence, for instance and to examine it as a possible indicator or typifier of potentially similar occurrences in other organizations or situations".

A case study approach seeks to bring out inner feelings and inner meanings to situations which are unique to an individual. Thomas (2009:75) highlighted that "we have to immerse ourselves in the research contexts in which we are interested, for example talking to people in depth, attending to every nuance of their behavior, every clue to the meanings that they are investing in something". The key concept in this case is in the understanding of the true meaning of events uniquely to that individual.

This paradigm was used so that the researcher could gather original data about what teachers are doing or not doing regarding the use of computer technology in carrying out computer aided teaching as well as the teaching methods they are using, through interaction with teachers and pupils in their natural settings. This type of research design was also preferred because the investigation focuses on three schools in Shurugwi district urban cluster which are currently most likely to be using computer aided teaching.

This research being qualitative in nature heavily relied on interviews, use of observations and document analysis to collect data. In order to understand the determinants of computer aided teaching and the technology use for teaching and learning, the feelings, opinions, attitudes and perceptions of the participants in the study, were taken into account.

Heads of schools, Teachers and Pupils as human beings have feelings, emotions, and perceptions and the case study qualitative research model is best suitable to probe such inner feelings from an individual without too much bias. Through the use of interviews, the study was thus able to gather in-depth data on the level of computer aided teaching use in teaching, impediments to effective implementation of computer technology use in schools, and the extent to which teachers and heads appreciates the need to use the technology in their schools especially in the area of lesson delivery. The data collected from the samples was then used to draw conclusions about the objectives and the research questions to the research problem. The data obtained through interviews was analyzed manually from listening to the recordings and a review of the notes gathered from the interview sessions. Observations and document analysis was also used to orgument what came out of the interviews.

3.4 TARGET POPULATION

According to Bryman (2012) population means, the whole group of objects or subjects of a particular type and study. In the same view, Reardon (2006) defines population as the entire group of individuals that a study is intended to investigate. This however means that a population is the target group from which the researcher is going to select subjects or respondents to collect information from which the researcher will then use in answering the research questions. So for the purpose of this research, the population refer to learners who are in Shurugwi District Urban Cluster that is those in their Ordinary Level studies, school Heads from the different schools in the area and teachers from these schools. The researcher is a teacher in Shurugwi District Urban Cluster, so this facilitated research work to be easier since the researcher was working with people whom he knew very well and it saved time since the secondary schools are closely located and money was also saved in terms of reduced transport costs.

3.5 SAMPLE

A sample is defined by Bryman (2012) as the part of the population that is used in caring out the research. The sample is a representative of the total population of the subjects used in the study. It is a division of the population referred as the sample in this research.

Borg and Gall, (1990) highlighted that in simple terms, a sample is said to be a true representative of the population if it is within 10-20% of the population. The sample for this research was, however, not taken from the population of the whole district since the research design being a case of three schools focused on the urban cluster. It was taken from three urban schools and involved the Heads of selected schools, teachers for computer studies and students in their Ordinary level. The sample comprised of three teachers thus one from each school. Six students were used, that is two from each school and three Heads of all the schools.

3.6 SAMPLING TECHNIQUES

Purposive sampling was used to select the schools in the urban cluster, the school Heads and the teachers to take part in the study. Chiromo (2009) posits that purposive sampling involves choosing the samples to be used on the basis of the researcher`s knowledge of the population and the purpose of the study. Kumar (1999:162) views judgmental or purposive sampling as "….the judgment of the researcher as to who can provide the best information to achieve the objectives of the study".

The schools that participated in the research were therefore those likely to have computers and most likely using them to carry out computer aided teaching and thus were purposively selected for the research. This type of sampling technique can be very useful if one wants to construct historical reality data or to basically describe a concept or phenomenon which is not very common and is little known (Kumar, 1999).

Computer aided teaching is fairly new hence not very commonly used across the curriculum thus purposive sampling was ideal as the subjects chosen are involved in computers. The researcher finally came up with the figures showing the number of pupils, teachers, school heads from the population used in the study in Shurugwi Urban Cluster

3.7 RESEARCH INSTRUMENTS

According to Leedy (1997), a research instrument is said to be something that is used to gather data for a research investigation. In this research, interview guides document analysis and observations were used to gather data as research instruments.

3.7.1 OBSERVATIONS

Marshall and Rossman (1995:79) defined the term observation as "the systematic description of events, behaviors, and artifacts in the social setting chosen for study". Observation is postulated as one important methods used to collect comprehensive data especially when carrying out qualitative research. Observational techniques as viewed by Kelly (2006) are an important feature for numerous action research studies as well as case studies. The researcher chose this technique for this research since it is a case of three schools and it is appropriate for qualitative research designs.

Schmuck (1995) cited by Kawulich (2005) gave the usefulness of an observation to the researcher as that it provides the ways for checking the feelings that are nonverbal.

It determines those who interact with the respondents and how they communicate as well as checking on how much time is spend doing which activities. According to Annum (2015), observations have the advantage of bringing out first hand information on both oral and visual evident data at the same time. There are two main variations to this research instrument that is participant observer and non participant observer.

3.7.1.1 Participant observer

Schensul, Schensul, and LeCompte (1999:91) define participant observation as "the practice of learning through exposure to or taking part in the day-to-day activities of subjects involved in the research". DeWALT & DeWALT, (2002) cited by Kawulich (2005) put forward that participant observation becomes the practice that enables researchers to learn on the activities of the subjects under study in the natural setting by observing and participating in those activities from which is being investigated upon. It also has the advantage of providing the context for expansion of interview guides and sampling guidelines. In this type of observation the participants are not aware of the research proceedings as the identity of the researcher is concealed to the subjects under study.

3.7.1.2 Non participant observer

In this type of observation the researcher is not going to live as one of the participants in the study but rather watches the participants, with their knowledge of who he/she is and not taking an active part in the situation being looked at. Kumar (1999:106) asserts that this “is when the researcher does not get involved in the activities of the group but remains a passive observer, watching and listening to its activities and drawing conclusions from this”. This is the type of observation that was used by this researcher to collect data.

3.7.2 INTERVIEW GUIDE

The interview is defined by Johnson and Christensen (2012:198) as “a data collection method in which an interviewer (the researcher or someone working for the researcher) asks questions of an interviewee (the research participant)”.

They further suggested that interviews can be carried out face-to-face for which they are called in-person interviews or they can be carried out over the telephone for which they are called telephone interviews. In the light of this view, for an interview to take place there must be two or more people that is the interviewer and the interviewee. The advantage of the interview is that of being impersonal. It creates one on one interaction between the interviewer and the interviewee. This is so because both parties have a chance to talk to each other freely without any barriers and mostly should be in a favorable environment. Johnson and Christensen (2012: 198) further explains the strength of interviews as that a researcher "can freely use probes" to get more information from the respondent.

For one to carry out an interview there has to be a purpose and intention and for this research it was carried out to probe reasons for not using computer aided teaching in the classroom. This is supported by Dyer (1995:56) who wrote that "an interview is not an ordinary everyday conversation… it has a specific purpose, it is of question based". The purpose of these interviews with the Heads of schools was to clarify on the research questions so as to gather more in-depth data on the research.

As an instrument similar to the questionnaire it gathers almost the same information but is a bit unique in that it allows for face to face interaction thus probing and following on the paralinguistic kinetic cues from the interviewee. Denscombe (2003:163) also supports this saying "… the interview gives the researcher face to face information" and for this study the researcher used structured questions to interview the school heads, with the hope of getting information which may not be obtained using the questionnaires. Also given the tight schedule of most Heads of school they do not have the time to sit down and fill out a questionnaire and this also is an advantage of the interview.

The other advantage was that the researcher informed the participants of the exact interview dates which made it easy for the respondents to adequately prepare for the interview unlike a questionnaire which is just impromptu. Interviews gave the researcher a flexibility that allowed him to pursue leads that appeared fruitful and encouraged elaboration of points that were misunderstood by respondents and this also added strength to the use of the interview. This also further led to the closing of gaps in the collected data through further probing and enabled direct verbal interaction between interviewer and the respondent. The interview guide first asked the Heads to give their statistics regarding the number of computers in their schools and elaborate further on those that are available to the teachers and students so as to take away the blame from the teachers if the use was not because of unavailability. It had questions that were meant to elicit answers relating to the importance of teaching and planning using the computer to the recommendations of how best the solution can be achieved.

However like any other research instrument, the interview has its own weaknesses. Johnson and Christensen (2012:200) noted these weaknesses when they said that, "sequencing and wording questions can result in substantially different responses, respondents must fit their experiences and feelings into the researcher's categories and the interview may distort what respondents really mean or experience and this limits their response choices". So this means that some participants may give false information for the sake of remaining in good books with the interviewer. Before the interview process, the researcher formulated an interview guide in order to remain on track.

There are unrecorded gestures to responses that may be exhibited by the respondent that may really show meaning and support to what they would be saying and if these are not carefully read they may distort the response and as a result may force the researcher to

have a wrong conclusion. For this research the researcher used two types of interviews that is structured and unstructured interviews to conduct the research.

3.7.2.1 Structured Interviews

Kumar(1999:109) defined a structured interview saying that "in s structured interview the investigator asks pre-determined set of questions, using the same wording and order of questions as specified in the interview schedule". This type of interview if very formal because the questions that are asked to each interviewee are all from the list of prepared questions and no deviation from the prepared set and the responses are the recorded using a standard schedule. Annum (2015) views it as a closed interview situation in which the interviewer has to follow a prescribed pattern with strict adherence to the order in which the questions are appearing on the schedule and formal principles have to be upheld at all times. The researcher used this type to interview the Heads of schools.

3.7.2.2 Unstructured Interviews

This type of interview uses less formal principles than the structured one although there has to be a set of questions; the interviewer is free to modify the question sequence, modify the wording in the questions and even explains the questions further to the respondent. Annum (2015) highlighted that the atmosphere has to be as casual as ever to provide for the freedom of interaction. The researcher applied this on teachers and students during data collection.

3.7.3 DOCUMENT ANALYSIS

This is another form of data gathering in which certain documents are analyzed and interpreted to add voice and logic around a research topic.

The content found in the documents is coded in the same way or using the same themes used to analyze interview transcripts (Administration methods, 2010). In any organization we have primarily three types of documents and these are listed below:

3.7.3.1 Public Records: These make up the official records of ongoing organizational activities such as syllabus, record books of students, plan books (schemes of work), mission statements, policy circulars, school rules, inventory records.

3.7.3.2 Personal Documents: This category involves first-person accounts that detail the actions of an individual at an organization such as emails, blogs, whatsaap conversations, face-book posts, incident reports.

3.7.3.3 Physical Evidence: This category comprises of physical objects that the researcher encounters within the course of the study often called artifacts and may include flyers, training materials, posters, meeting agendas and handbooks.

(Administration methods, 2010)

3.8 ETHICAL CONSIDERATIONS

Hammersley and Traianou (2012:16) defined ethics as "A set of principles that embody or exemplify what is good or right, or allow us to identify what is bad or wrong". The subjects that are taking part in a research need to be aware of what will be taking place in a research investigation. Protection and respect of people's privacy was upheld, informed consent was sort from the individuals under study and they were aware of the proceedings of the study.

In this research, the researcher promoted ethics by:

- seeking permission to carry out the study from the Ministry of Primary and Secondary Education as well as the schools involved.(Copy attached)

- ensuring that he was ethically responsible for the protection of the rights and welfare of the respondents while the study was being carried out. To ensure this, the researcher made sure that the respondents or participants knew how he could be contacted and who he was.
- remaining honest and keeping the information collected private and confidential throughout the study.
- ensuring that confidentiality of the information gathered in the research was maintained as no confidential data was recorded or published, but in cases where confidentiality could not be guaranteed due to the demands of study, the participants were informed well in advance.
- writing a consent letter (copy attached) was given to all respondents to sign as acknowledgement that they had agreed to take part in the research.
- making sure that participants were not deceived in any way. The nature of the study and how the information was going to be collected and used was explained to them through the consent letter and verbally.
- making sure that participating in the research was extremely voluntary. Under no circumstances were respondents forced to take part in the research outside their will.

3.9 DATA COLLECTION PROCEDURE

A procedure is a sequence of steps to be taken in carrying out a process. The data collection procedure is defined by Chisi (2005:51) as "steps taken in administering instruments and collection of data from subjects under study". Murimba and Moyo (2005:57) went on to elaborate on this saying that, "… such steps include, making appointments with research subjects, distribution, administering and retrieval of instruments".

The researcher's steps began with a letter of introduction from the Department of Applied Education at the Midlands State University that was taken by the researcher to the Ministry of Primary and Secondary Education in Harare to seek for permission to carry out the research. The permission was granted and the letter from Harare was then taken to the Midlands Provincial Education office in Gweru where another letter permitting the carrying out of the study was granted. The Shurugwi District Education Office and the Heads of the responsible schools then endorsed the letters and the process of collection of data began.

Due to the knowledge of the Heads of schools by the researcher, purposive sampling was done to the Heads of schools and the schools used in the research. The teachers of computer studies were also purposively selected by virtue of them using computers to carry out their duties. Heads of schools were interviewed by the researcher in their offices offered by the different schools at agreed times because appointments had been made in advance. They lasted between fifteen and twenty minutes each. The responses to the interviews were written down by the researcher while he was recording them on his mobile phone at the same time. Observation were also carried out to find out the extent on which the teachers are applying computer aided teaching and also to really determine the type of computer aided methods they are using.

3.10 DATA ANALYSIS PLAN

As a way of analyzing data collected the researcher used mostly descriptive statistics method as it generalizes the findings of the research. Descriptive statistics present data in a convenient way in summary form which makes interpretation easy.

On data analysis, Johnson and Christensen (2012: 200) stated that, “it begins after some initial data have been collected, and it involves examining the data and naming and categorizing discrete elements in data. In other words it involves labeling important words and phrases in the transcribed data”. The data collected was presented in form of tables, graphs and pie charts. The data is presented first using themes that are related to the research questions and latter analysed and discussed using the same themes. Tichapondwa (2013:221) supported this when he said that “presentation and communicating research results and findings is quite important.” The results of this study have been presented so that they show particular settings of the research, contexts of the research questions, samples used and nature of the participants. These have been laid out in line with the research questions, starting with the most significant and ending with the least significant in order to help focus the readers.

3.11 SUMMARY

Focus on this chapter was on the research design which was a multiple case study that used both observations and interview guides as research instruments. It looked at the population that was used from the three urban schools from which a sample of three Heads of schools, three teachers and six students was taken. The researcher also looked at the considerations that made his study ethical, valid and reliable. The data collection procedure that included the teacher observations and interviewing Heads, teachers and pupils was also looked at in the chapter. The chapter then ended with a data presentation and analysis plan which was mainly descriptive.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.0 INTRODUCTION

In this chapter the researcher gave explanations on the data collected from the sample of the research project. The data was presented in form of tables, pie charts and graphs as well as note interpretations. The tables, graphs and pie charts helped the researcher to interpret the data as well as analyze it. This data was collected through the use of the research instruments interviews, observations and document analysis which were made by the researcher. After the data was presented it was also discussed and analyzed by the researcher in relation to the research questions presented in chapter one. The data presentation and analysis is organized in themes that are synonymous to the research questions. The chapter then concludes with a summary of the proceedings.

4 .1 DEMOGRAPHIC DETAILS OF PARTICIPANTS

Question 2 and 3 of the interview guide was meant to give a picture of the characteristics of the participants. The table 4.1 shows the gender distributions of the subjects from the various schools. Figure 4.1 shows the level of qualification of the research subjects and Figure 4.2 outlines the level of experience in number of years for the teachers and the school heads combined. The pupil participants in the study were six pupils in total from all the schools. The sample group of pupils was of mixed sex because they were selected using the non probability sampling technique. The purposive sampling approach was employed to select the pupils and the distribution is shown in table 4.1. The school Heads were selected by virtue of being the Head of school using purposive sampling technique and the results of the sample distribution is also shown in table 4.1.The sample of teachers' shows a bias towards the male sex but this being a case purposive sampling was used to select participants.

Table 4.1 Sample distribution. (KEY- : M=male and F= female)

NAME OF SCHOOL	SCHOOL HEADS		TEACHERS		PUPILS			
	M	F	M	F	Form 3		Form 4	
					M	F	M	F
Chrome High	1	0	0	1	1	0	0	1
Parkinson High	1	0	1	0	0	1	1	0
Shurugwi No. 2	1	0	1	0	0	1	1	0
Total	3	0	2	1	1	2	2	1

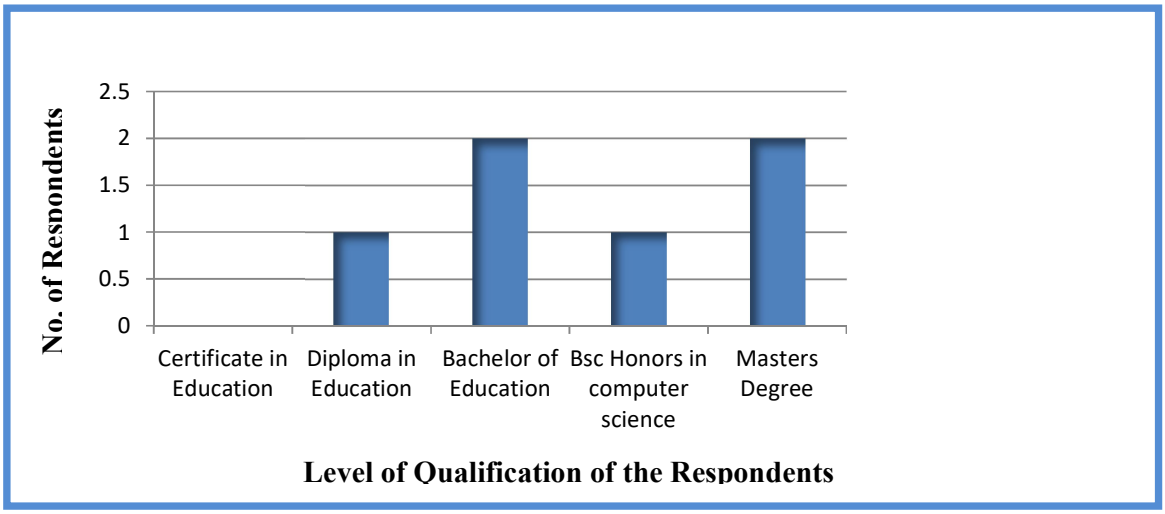

Figure 4.1 Qualifications level

From Figure 4.1 it shows that 0% of the sample had a qualification of a certificate in education, 17% poses a diploma in education, 33% of the teachers in these schools have bachelor of education degrees, 17% have a Bachelor of Science Honors degree in computer science and 33% have a Masters' degree in Educational Management. The results resemble a high level of education among the teachers with the majority having higher qualifications of the Bed degree and a Masters degree.

Question three from the teacher and Head interview schedule asked for the work experience of the participants in the sample and the findings show that 17% have 0-5 years experience of working in schools, 33% have 6-10 years experience, 33% have 11-15years experience and 17% have 15+ years experience and the data is represented in the bar graph figure 4.2.

N=6

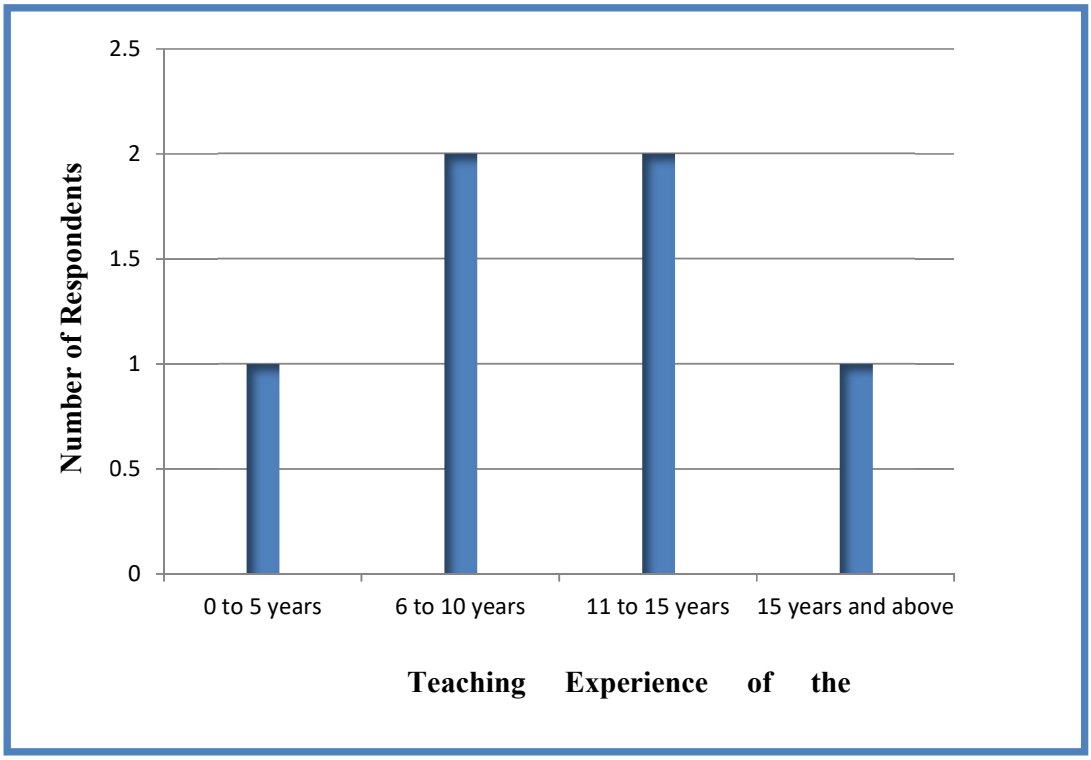

Figure 4.2 level of experience of respondents

Figure 4.2 shows a resemblance of experienced participants in the three stations with the majority having six years and above. By the nature of the schools in the urban cluster they show that they have experienced and highly qualified teachers taking on the subject computer studies and Heading the schools.

4.1.1 RESOURCE AVAILABILITY IN THE SCHOOL

Question four of the Head's interview asked how many computers the school had and question five asked how many are available to the teachers and pupils.

Question four of the teachers interview guide asked how many computers are available in the computer lab. The results for the statistics of computers are shown in the table 4.2. This was also confirmed by observing the computers being used by both the administration and the students. The researcher noted physically that some machines were just stacked in store rooms and not being used confirming that they are not working due to various faults. A document analysis of the inventory showed the total number of machines in the schools including laptops.

Description	**Chrome High**	**Parkinson High**	**Shurugwi No2**
Total number of computers in school	24	15	20
Computers available to Admin	5	3	4
Computers not working	10	4	8
Computers available for use in lab	9	8	8

Table 4.2 Computer inventory

Question six of the teacher interview guide asked the teacher that "Do you have other resources such as printers, projectors, white boards, tablets (give numbers where necessary)?" The answers given have been shown using a table.

	Chrome High	Parkinson High	Shurugwi No2
Projector	0	0	0
White Board	1	0	1
Printer	4	3	4
Electronic Tablets	0	0	0
Computer Speakers	10	10	10
Laptop computers	2	1	1

Table 4.3 Resource inventory

An observation of the resources available in each school for use to carry out computer aided teaching also confirmed the presence of the listed resources within the stations and the researcher had the privilege of testing some of the computers to see their efficiency and they were working. A document analysis of the school inventories confirmed that the school owned the listed equipment and none of the machines was reported missing from those originally brought into the school.

4.2 WHAT COMPUTER AIDED TEACHING METHODS CAN TEACHERS USE IN TEACHING AT ORDINARY LEVEL?

Question nine of the teacher interview schedule focused on the computer aided teaching methods the teachers preferred to use during teaching in class and Figure 4.3 displays the results of question eight answers in a clustered cone graph.

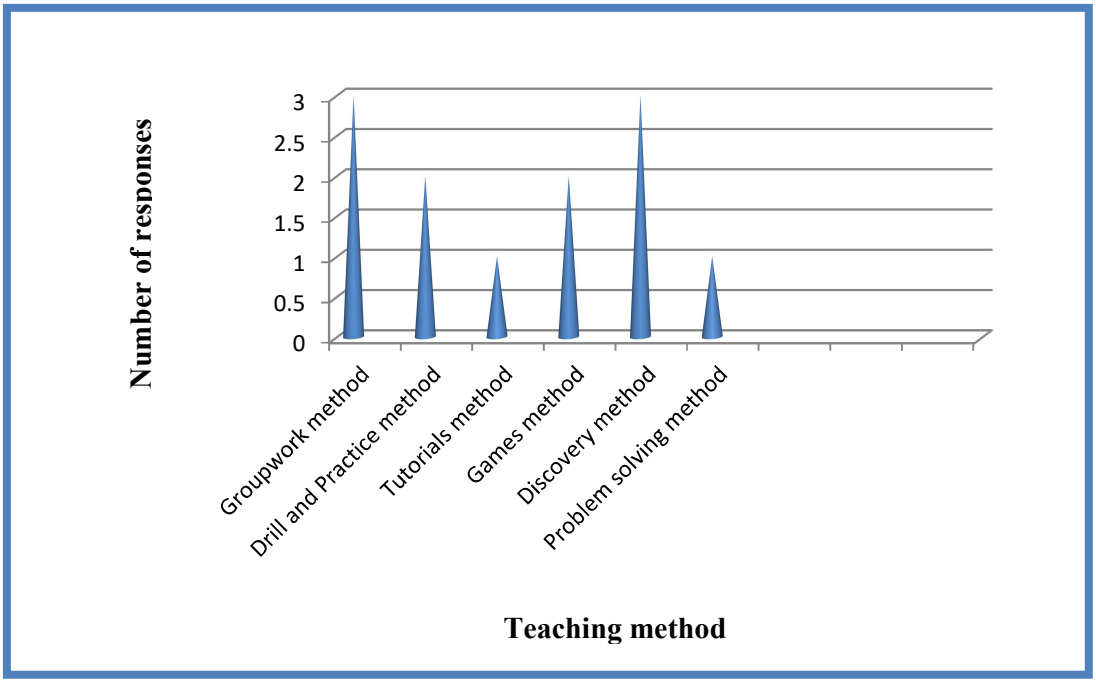

Figure 4.3 Teaching methods use

Question eleven of the teacher interview questions was asking for suggestions to other computer aided teaching methods and the teachers suggested tele-collaborative learning methods which involved communication through the internet in which the teacher would just post work online and pupils would respond without having to come to the classroom. Simulation was also suggested by one of the teachers as being one method that would enhance explanation of concepts easy.

The teaching method a teacher uses can directly be influenced by the teaching aid that one chooses to use during the lesson and hence the need to ask for the respondents to list some of the common teaching aids they favor most during lesson delivery. Question seven and eight of the teacher's interview schedule asked about the use of teaching aids and the types of aids used in lesson delivery respectively. 100% of the teachers said that they used the teaching aids as shown in figure 4.4.

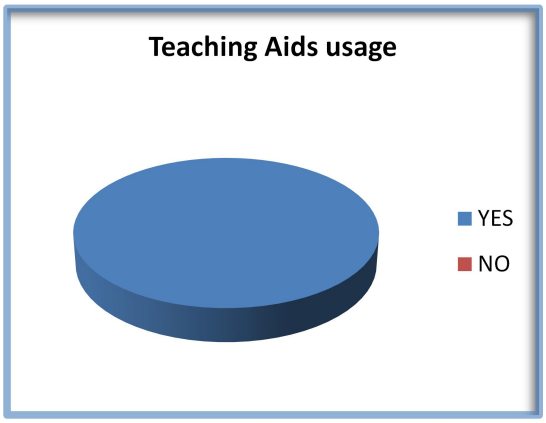

Figure 4.4 Teaching Aids Use

The computer being a powerful teaching aid, all the teachers used the computer proving the notion that all used teaching aids of some sort and this was noted from the lesson observations carried out by the researcher in which all the teachers used the computer as a teaching aid. A document analysis of the schemes of work of the teachers also revealed the computer as listed under the teaching aids needed for most of the practical lessons.

The example of the teaching aids listed by the teachers are shown in table 4.4

Teaching Aid	Number of teachers listing it
Text Books	3
Computer	3
White board	2
Work cards	2
Pictures	1
Charts	3
Chalkboard	1

Table 4.4: List of the teaching aids used by the teachers

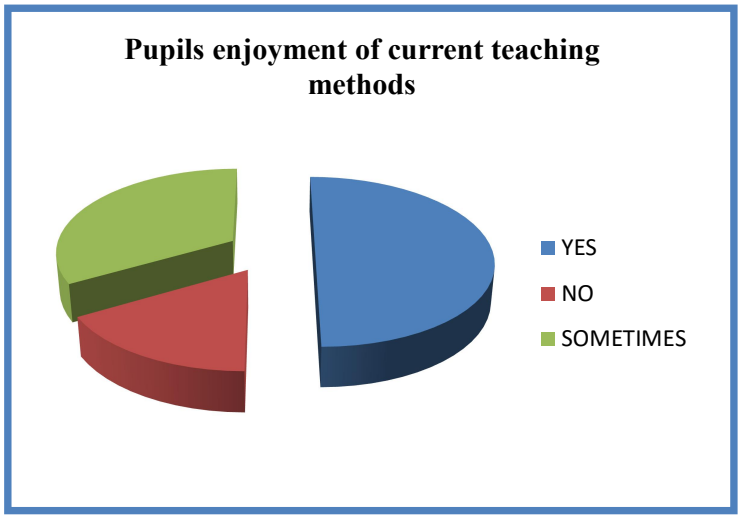

Figure 4.5 Pupils enjoyment of current teaching methods

Question eight of the student interview guide asked the pupils that "Do you enjoy learning using the current methods teachers are using to teach you?", and the pupils' responses are shown using a pie chart in figure 4.5.

Three said **YES** while one said **NO** and two said **SOMETIMES** showing mixed feelings about the current methods teachers are using to teach the pupils. A closer observation of the pupils during lessons showed activity and signs of enjoyment of the lessons being conducted by the teacher and this however confirmed that pupils indeed enjoyed the lessons. The teachers also noted in their scheme of work lesson evaluations that pupils enjoyed the lessons being taught to them. Thus an analysis of the record of mark documents also showed good grades in the work of pupils sample proving the point that a motivated pupil performs better in class.

4.3 WHAT IS THE EXTENT TO WHICH TEACHERS ARE USING COMPUTER AIDED TEACHING IN LESSON DELIVERY?

Question seven of the Head interview schedule asked the Head to give an insight on the extent to which the teachers are using computer aided teaching and all the Heads indicated that they think computer aided teaching is being applied to a greater extent since the teachers involved are all qualified for the positions.

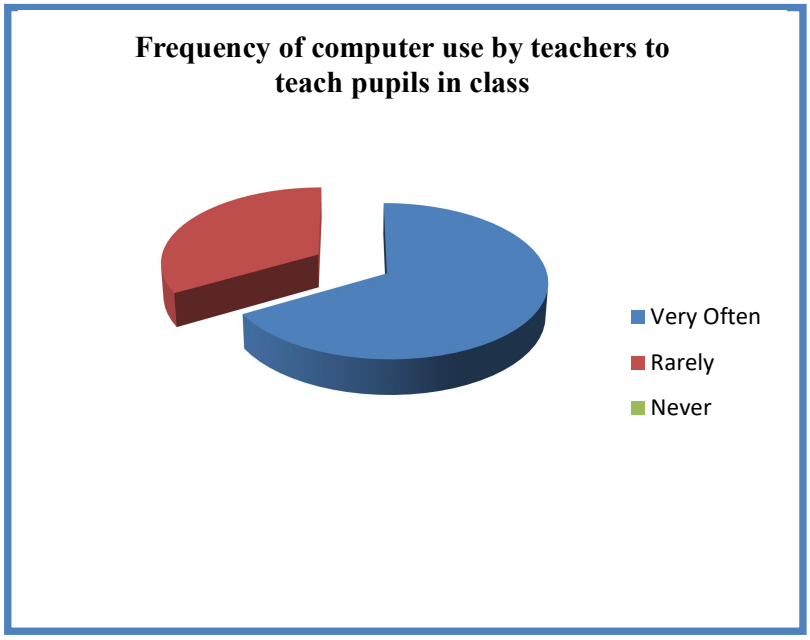

Figure 4.6 Frequency of computer use by teachers to teach pupils in class

Question four from the student's interview schedule asked how often the teachers used computer technology to teach the students and figure 4.6 shows the finding. 67% of the pupils said that very often do teachers use the technology and 33% said that teachers rarely used computers to teach them while 0% highlighted that never did the teachers at any given time use computer technology during teaching. The researcher also noted in one of the observations that during theory lessons the computer teachers did not use the computer much and tended to use it more during practical lessons. Pupils would be given tasks to do in groups since the machines are not adequate. A document analysis of the scheme of work also showed little use of the computer during theory lessons and maximum use of the computer during practical lessons.

Question five from the teacher interview questions asked if the schools had internet access and they all confirmed that all schools have internet access. An observation report also confirms that the schools are all connected to the internet through the Tel-one service provider. Documented receipts of internet services payment proved that the wi-fi subscriptions were for the unlimited plan which ensured maximum network availability throughout the month.

Question ten on the schedule of the teacher interview asked for the frequently used computer aided teaching method and the teachers all indicated that they favored the group work and the discovery method.

Question three on the student interview schedule asked if the pupils had access to the computers in the computer lab outside lesson time and the pupils interviewed all highlighted that they had access to the computers.

Question five of the student interview schedule asked how often the student researched on the internet and the results are shown in figure 4.7.

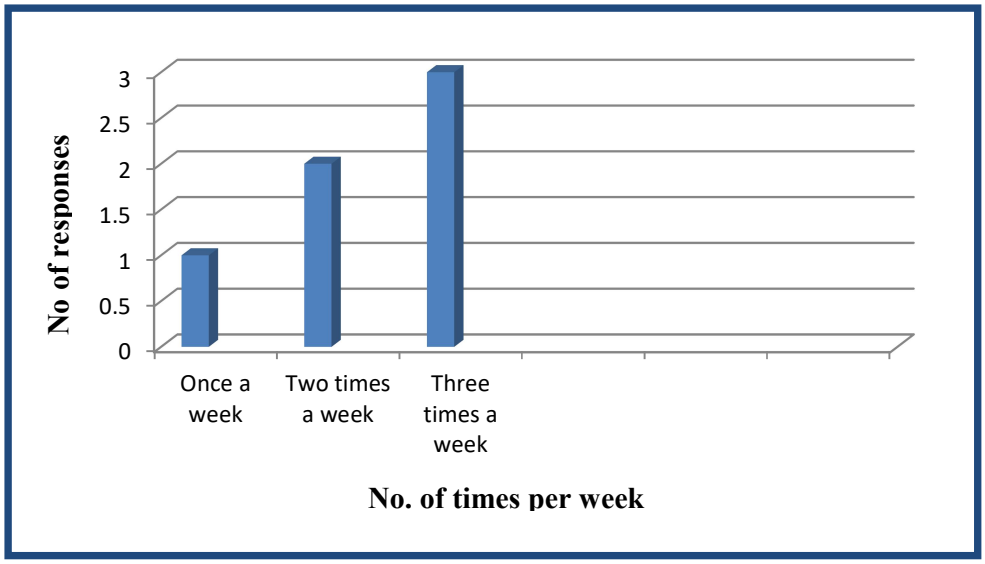

Figure 4.7 frequency of student internet use

Question six of the student interview schedule asked how many students work on one machine at a given time. The results are shown in table 4.5.

The observation also confirmed that the pupils did share machines during practical lessons and the machines are not adequate.

SCHOOL	RATIO
Chrome High	1:3
Parkinson High	1:5
Shurugwi No2 High	1:4

Table 4.5 computer ratio to the number of students

Question seven of the student interview schedule asked if the student had an email address and if they used it for communication. All pupils confirmed that they had email address and they did however indicate that the teacher did not use it for communication with them. An analysis of the schemes of work showed a lesson on opening an email address from all the three school but it was not being used for education related materials.

4.4 WHAT ARE THE CHALLENGES TO IMPLEMENTING COMPUTER AIDED TEACHING?

Question eight of the Head's interview schedule and question eleven of the teacher's interview schedule asked the Heads and teachers to give some of the challenges that they meet in implementing computer aided teaching in their lessons. They gave the following as the challenges they are encountering in implementing computer aided teaching effectively as listed in table 4.6. Question twelve of the teacher interview schedule asked also of the challenges being faced by the teachers in implementing computer aided teaching and the views given are also tabulated in table 4.6. Some of the challenges were also noted during the observation of some of the lessons where pupils had to crowd around on machine in order to learn since the ratio of machine to the number of pupils is high.

Table 4.6 computer usage challenges

Computer Challenge
Inadequate computer knowledge
Inadequate computer resources for use
No funds to service the machines not working
Lack of technical support (technicians)
Lack of administration support
Negative attitude towards computers from the students
Outdated software and hardware
Electricity power shading
Unavailability of projectors and accessories
High computer to pupils ratios
Poor network from the service provider

4.5 WHAT ARE THE POSSIBLE REMEDIES TO ENSURE THE EFFECTIVE USE OF COMPUTER AIDED TEACHING?

Question nine of the Head's interview schedule and Question twelve of the teacher interview schedule asked the Head and the teacher to give solutions to the challenges that they listed in question eight and eleven respectively and they gave various responses which covered a lot of very genuine problems. The solutions given to the above problems listed in table 4.6 varied from parent involvement in the purchase of the resources through the School Development Association to the provision of staff developments for the administration and the teachers in general so that they will also appreciate the provision of computer aided teaching. They have been summarized in table 4.7.

The teachers and the school heads all gave different views but they all have been summarized and presented in the table.

Table 4.7 showing computer challenges and their solutions

Computer Challenges	Solution suggested for the challenge
Inadequate computer knowledge	Staff development seminars on computer use.
Inadequate computer resources for use	-Schools should buy more resources. -Equal time allocation for use across the whole school.
No funds to service the machines not working	-Fund raising activities to finance the department. -Budget should provide for the servicing of the machines.
Lack of technical support (technicians)	-Recruiting technical expects. -Government should deploy more staff to support the initiative.
Lack of administration support	- Staff develop the Heads so as to appreciate subject.
Negative attitude towards computers	- Provide incentives to motivate teachers to use the technology.
Outdated software and hardware	- Keep the machines up to date. -Use online auto software updates.
Electricity power shading	- Schools to buy generators and other provisional power options (solar systems).
Unavailability of projectors and accessories	- Schools to purchase the equipments. -Cluster can buy one to rotate the schools.

Table 4.7

4.6 DATA ANALYSIS AND DISCUSSION

From the findings above the researcher made observations in relation to the study and these have been outlined in this section. The process of data analysis is based on the reflection of the findings of the research and drawing conclusions from the available results. Creswell (2009: 183) echoed that "The process of data analysis involves making sense out of text and image data. It involves preparing the data for analysis, conducting different analysis, moving deeper and deeper into understanding the data, representing the data, and making an interpretation of the larger meaning of the data". The data collected was analysed and reflected so as to extract the required answers to the research questions in this investigation. The results are going to be discussed and analysed as they have been presented in the data presentation section. The researcher used the same themes used above to present the data and they are going to be used here to analyze the data.

4.6.1 DEMOGRAPHIC DETAILS OF PARTICIPANTS

Table 4.1 shows the distribution of the sample and the Heads of schools all had male respondents due to the fact that all the Heads from the schools are male. The researcher used purposive sampling technique to select this sample. The distribution of the sample for teachers shows a bias towards the male sex with only one female teacher among the three teachers on computer studies. The sample distribution for the pupils shows a normal distribution with an equal number of both sexes. The level of qualification of the sample of teachers and Heads of schools is shown in figure 4.1. The breakdown of the qualifications has been detailed in table 4.8 to show the exact qualifications of the subjects.

SCHOOL	School Head Qualification	Teacher Qualification
Chrome High	Masters in Administration	Bachelor of Education in computer science
Parkinson High	Masters in Administration	Diploma in Education Computer science
Shurugwi No2 High	Bachelor of Education in Woodwork	Bsc. Honors in Computer Science

Table 4.8 Respondents qualifications

The teachers in the sample have all the necessary required qualifications as outlined in table 4.8 showing that they all are very much qualified for the job. Osborne and Hennessy (2003) highlighted that teacher training colleges and universities have integrated ICT in the learning of their modules thus exposing the teachers to the benefits of using computers. Since the teacher teachers all except one came from the teacher training colleges they have adequate knowledge on the application of computer aided teaching techniques. The other teacher is currently doing a post grade diploma in education with Masvingo state university thus application of computer aided teaching should not be a problem since the teachers have adequate knowledge about it.

Question three of the interview schedule asked of the teaching experience of the teachers and school Heads and figure 4.2 show the results. The teachers in the urban cluster are very experienced in doing their work as generally the majority is above five years experience and they now know how to do their work in class. This even shows that the responses they are going to give are based on experience of their work.

4.6.2 RESOURCE AVAILABILITY IN SCHOOLS

The number of computers available in the schools and the computer accessories are all shown in table 4.2 and 4.3 respectively. The number of computers in the labs is very low compared to the number of students available in the schools and this can be an inhibiting factor to the implementation of computer aided teaching. The number of computers that are not working is also too high as if these can be fixed it can reduce the computer-pupil ration which is too high. The other accessories needed such as printers are okay since only one printer can service the whole lab if properly networked. The schools do not have a projector to use for theory lessons that may require power point presentations. The tablets which are also now common for e-books are absent in all these school and the teachers rely on the textbooks and also on the internet. If there are power cuts there will be no research and the books may be outdated hence they will not have current information.

4.6.3 WHAT COMPUTER AIDED TEACHING METHODS DO TEACHERS USE WHEN TEACHING AT ORDINARY LEVEL?

Question nine of the teacher interview schedule asked the teachers to give the teaching methods they use and figure 4.3 shows the responses. From the responses given it can be noted that group work and discovery method are the common computer aided teaching methods given by the teachers. Drill and practice and the games method emerged as the second best teaching methods that they are using while the tutorials and the problem solving approach were the least of the used methods. Budin (1991) notes that the discovery approach often provides a large database of information particular to a course or content or subject area and challenges the student to analyze, compare, infer and evaluate based on their explorations of the data.

Pupils will generally discover the knowledge on their own through working through the instructions. This is probably why it is among the top methods.

Question eleven of the teacher interview schedule required the teachers to suggest other computer aided teaching methods that the teachers could employ other than those that they suggested. Simulation and tele-collaborative teaching where suggested. . Fullan (2001) explained the advantage of computer mediated communication that the teacher can have a one on chat with the pupil outside the classroom and the pupil can have a chance to ask on gray areas for further explanations from the teacher. Thus tele-collaborative learning has its advantages.

Question seven of the teachers' interview schedule asked if teachers used teaching aids during teaching in class and from figure 4.4 it can be seen that 100% of the respondents used the teaching aids during teaching showing the power of the teaching aid. This comparing with the level of experience of the teachers in these schools which is also high, it shows the power of the teaching aid as these teachers have seen their importance and the results they produce. Farrant (1991) supported the use of teaching aids by highlighting that they enhance the explanation of concepts so pupils will not have a problem understanding what they are being taught by the teacher. Geoff (2009) also concurred with Farrant (1991) when he singled out the computer as a statistically proven and important visual aid. Geoff (2009) went on to give numerous advantages of using the computer as a visual aid to aid the explanation of concepts as outlined in chapter two.

This then shows that computer aided teaching can improve the level of understanding the pupils can achieve if the teacher is able to integrate the computer as a teaching aid to be used in other subjects across the curriculum.

Question eight of the teacher interview schedule asked the respondents to list any three teaching aids they used in class and the most popular was the white board with the others being listed in table 4.4.

The computer was among the teaching aids mentioned and this can also be applied to other subjects in form of power point presentations and computer aided methods. Computer technology in form of the white board and projector and projector screen are some of the hardware that can be incorporated into teaching to support computer aided teaching using power point presentations.

Computer aided teaching has also the advantage of making use of a single computer which can store thousands of textbooks both offline and online and the teacher and pupils will not have to carry books to the classroom for reference. They can make use of them both offline and online since the textbook is the second most popular teaching aid and the computer can be a perfect replacement.

4.6.4 WHAT IS THE EXTENT TO WHICH TEACHERS ARE USING COMPUTER AIDED TEACHING IN LESSON DELIVERY?

The Head of schools in their responses indicated that they think computer aided teaching is being applied to a greater extent since they claim the teachers are all qualified for the job. Tyack and Cuban (2000) supports them when they argue that computer and related technologies can be powerful teaching and learning tools when in the hands of teachers who know how to integrate them appropriately into their day to day interaction with their students. From the observations conducted on the lesson delivery the results show that the teachers are using computer aided teaching to a lesser extent as the pupils are not fully utilizing the benefits of learning using computers. The reasons most probably are because of shortage of adequate resources to use.

Observations also revealed that computer use during lessons was mainly limited to practical lessons and during the theory lessons there was limited if no use of the computer at all.

The reasons could also be attributed to few resources to use in terms of projectors and adequate computers. The teachers also favored group work most since the numbers of the students are too high for individual work on the computer. Thus pupils are always crowded on the machine and the only way to have everyone involved is through group work. The advantages of group work as out lined by Caruso & Woolley (2008) is that pupils develop and practice techniques in problem solving, decision making, critical thinking, communication, teamwork and negotiation.

The fact that pupils have access to the computers outside lesson time for research shows that the teachers have taught the pupils the basic they require to navigate the computer. Beevers et al (1991) alluded that a basic understanding of the mouse and keyboard should be enough to allow the student to undergo computer aided teaching. The students confirmed that they have access to the computers mostly three times a week showing that if computers are availed more to the pupils they will do much from it. Teaching other subjects will really not be a problem and pupils will be better equipped for the future. Friedman (2013) noted that many teachers are finding out that once they incorporate computer aided teaching in the classroom, it provides benefits to their students by engaging them in ways that they are familiar with and enjoy to work with, which ultimately makes their job easier.

4.6.6 WHAT ARE THE CHALLENGES TO IMPLEMENTING COMPUTER AIDED TEACHING?

Table 4.6 listed some of the challenges given by the teachers as hindering their use of computer aided teaching. All the respondents pointed out the fact that the resources to use are not adequate hence they eventually resort to the manual way of doing things, though there are maximum results in using computer technology.

One Head of school interviewed mentioned a fact that "*Inadequate computer knowledge of some of us Heads affect greatly the use of computer aided teaching since we are not aware of the benefits it brings hence we don't support it to the full*". This really can be a problem if the school Head who is supposed to provide financial support to the computer department is not knowledgeable enough will not provide the necessary resources to the department. Funds to service machines not working will not be available as the Heads don't really see the need to make the department top priority and this also was revealed as another challenge. This also will culminate to lack of support to the department and eventually affect its effective performance.

Negative attitudes towards computers especially from the female students somehow affect the effective use of computer aided teaching. Studies have revealed that men view the computer as a toy and women only use it as a tool to achieve the task at hand hence they don't value the use of the computer much. This was revealed by a journal number 17 of 2008 from Interactive Educational Multimedia which cited Eck, Hale, Ruff and Tjelmelant, (2002). If the attitude of the learner is negative then effective application of computer aided teaching will be affected greatly as it entails the maximum use of the computer by both the students and the teacher.

The other challenge that was mentioned is the issue of outdated software and hardware. This really can be a problem to the teacher as use of computers that are old is not fun at all as they keep breaking down and they are slow to respond to instructions. Augustin (2014) posits that the continued use of outdated software can have diverse risks and penalty depending on the type of software and its intended use. Thus a teacher cannot effectively apply computer aided teaching with outdated machines and software as technology is ever changing.

4.6.7 WHAT ARE THE POSSIBLE REMEDIES TO ENSURE THE EFFECTIVE USE OF COMPUTER AIDED TEACHING?

Table 4.7 gives some of the solutions to the challenges highlighted by the teachers. The solutions if implemented well will go a long way in ensuring that the use of computer aided teaching improves in the district. The Heads, teachers and the students are the ones that suggested the solutions and if implemented will go a long way to ensure the application of computer aided teaching. Since the solutions suggested are coming from the respondents there is likely to be less resistance in implementing them since the subjects will be intrinsically motivated to achieve the recommendations.

4.7.0 SUMMARY

The chapter started with a brief introduction and went on to present the findings of the research inform of graphs, pie charts and tables. The presented data was further analysed and discussed. The challenges to inadequate computer usage by teachers were highlighted together with some solutions and recommendations to the challenges as given by the teachers.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.0 INTRODUCTION

This chapter focuses on the summary of the research study on computer aided teaching unpacked: Exploring into the methods of using the computer as a teaching tool for Ordinary level students, a case study of three schools in Shurugwi urban. It also looks into the conclusions made from the study and concludes by making recommendations and suggestions to improve the teaching methods used by teachers in schools.

5.1 SUMMARY

The aim of the research was to explore into the methods of using the computer as a teaching tool for Ordinary level students at three schools in Shurugwi district. It sought to unpack the phenomenon computer aided teaching and how it can be adopted in the schools to aid teaching of various subjects in the school's curriculum. Through the unpacking of computer aided teaching, the researcher aimed to find out what computer aided teaching methods can teachers use in teaching at Ordinary level? In the same view the research aimed at finding out to what extent are teachers using computer aided teaching? , and what are the possible remedies to ensure the effective use of computer aided teaching? A sample of three Heads of schools and a sample of six students was extracted from the whole population of Heads and students in the Shurugwi District urban cluster to participate in the study. Three teachers of computer studies were purposively used in the research.

The multiple case study design was used in this research with observations, document analysis and interview guides being used as the research instruments. The data collected were presented in the form of a pie charts, tables, bar graphs and clustered cone graphs for easy interpretation. Data from the interviews was critically analyzed and discussed to find out the extent to which teachers apply computer aided teaching and ways they can embrace to apply it in schools. Observations and document analysis also helped gather data for the research.

Time and financial constraints emerged as the main limitations to this research process. The time constraint was overcame through the use of interviews as the primary research instrument and this helped to alleviate the constraint as the instrument enabled the collection of large amounts of data within a short space of time. As for the financial constraints, they were offset by the researcher doing all the typing himself and then just having the work printed for a small fee. The schools chosen were geographically spaced near each other and this did cut greatly on the cost of transport.

The research findings revealed a number of disquieting factors, chief among them being that computer aided teaching is barely being applied in the schools. The reasons that teachers gave ranged from the fact resources are inadequate leading to high pupil computer ratio and lack of administration support to provide adequate funding to the department. The issue of outdated software and hardware topped among the list of challenges affecting computer usage.

5.2 CONCLUSIONS

The study found out that computer aided teaching is not being embraced to its full in the teaching of students in schools since the computers department which is supposed to spearhead the implementation is not doing it fully.

A lot of work still needs to be done in educating the teacher to be able to explore on the methods of computer aided teaching. It can also be concluded that there are a lot of benefits of using computer aided teaching to both the pupil and the teacher to a greater extent. The teachers can benefit from this technology in lesson delivery as well as using the computer to accomplish a number of tasks ranging from setting class tests, report writing, recording of pupils performance to lesson preparation through internet research. The pupils on the other hand can benefit through drill and practice methods, internet research, accessing of e-resources, communication and simulations to mention just a few of the benefits.

5.3 RECOMMENDATIONS

5.3.1 ACADEMIC AND PROFFESIONAL RECOMMENDATIONS

In this research it was found out that there is very little computer aided teaching being applied in the schools that participated in the research so the following recommendations were made.

1) Schools should buy more resources to supplement on the few available within the schools so as to have everyone afford a chance to be able to use the computer.
2) Staff development seminars on computer use is a must for the whole district as doing it at district level first then at cluster level and finally at school level will enable the enforcement to have weighting.

3) Equal time allocation for use of the few resources across the whole school will enable everyone to have an equal chance of using the resource at least once a week so as to benefit from the computer.

4) Fund raising activities to finance the computer department will go a long way in acquiring things such as tablets for pupils, projectors for teachers as well as more computers and printers. School budget should provide for the servicing of the machines and constant update of latest software versions.

5) Recruiting technical experts by both the schools and the government will help solve the problem of machines that constantly breakdown and would require service every now and then as some of the breakdowns are due to use without inadequate knowledge. Government should deploy more staff to support the initiative to computer aided teaching inform of computer studies teachers and technicians.

6) Staff developing the Heads of school so that they appreciate the computer aided technology as some attitudes of the school Heads may hinder the success of computer aided teaching in their school. Their lack of knowledge in the area can be a great hindrance to the success of computer aided teaching.

5.3.2 RECOMMENDATIONS FOR FURTHER STUDY

The researcher makes the following recommendations to improve the study:

- Further study on computer aided teaching on other specific subjects outside computer studies.
- The use of questionnaire as a data collection research instrument to validate the data collected more accurately.

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APPENDICES

Appendix one

Interview schedule for the school Head

My name is Madhovi Terrance and I am a final year BED Computer Science student with the Midlands State University. I am carrying out a study on Computer Aided Teaching Unpacked: Exploring into the methods of using a computer as a teaching tool for ordinary level students: a case study of secondary schools in Shurugwi District. You are kindly requested to please prepare for an interview answering to the following questions.

I would like to thank you in advance for your co-operation.

1. Formal greetings.
2. What is your highest professional qualification?

……

3. How long have you been in the ministry?

……..

4. How many computers do you have in the school?

…….

5. Of the computers that you have how many are available for use by the teachers and pupils?

……

……

……

6. Are there plans in place to increase the number of computers in the school?

……

……

……

7. To what extent are teachers using computer technology in lesson delivery?

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……

8. What challenges are affecting effective use of computers in teaching?

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……

……

9. What solutions do you suggest to be done to solve these challenges?

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Appendix two

Interview schedule for the teacher

My name is Madhovi Terrance and I am a final year BED Computer Science student with the Midlands State University. I am carrying out a study on Computer Aided Teaching Unpacked: Exploring into the methods of using a computer as a teaching tool for ordinary level students: a case study of secondary schools in Shurugwi District. You are kindly requested to please prepare for an interview answering to the following questions.

I would like to thank you in advance for your co-operation.

1. Friendly greetings
2. What is your highest professional qualification? ……..
3. For how long have you been teaching computers? ……..
4. How many computers do you have available for your computer lab? ……..
5. Are they all connected to the internet and who is the internet service provider?

……

……

6. Do you have other resources such as printers, projectors ,white boards, tablets (give numbers where necessary)

……

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……..

7. Do you use teaching aids when teaching? ……
8. Can you give three examples of some of the teaching aids that you use in your lessons?

……

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……

9. Which computer aided teaching methods do you use in your teaching?

……

……

……..

10. Which one do you frequently use and why?

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……

……

……

11. What other computer aided teaching methods do you suggest that can be used in teaching?……

    …….

    ……

12. What challenges are you facing in implementing computer aided teaching?

……

……

……

13. Which solutions do you suggest to the mentioned challenges?

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…….

Appendix three

Interview schedule for students

My name is Madhovi Terrance and I am a final year BED Computer Science student with the Midlands State University. I am carrying out a study on Computer Aided Teaching Unpacked: Exploring into the methods of using a computer as a teaching tool for ordinary level students: a case study of secondary schools in Shurugwi District. You are kindly requested to please prepare for an interview answering to the following questions.

I would like to thank you in advance for your co-operation.

1. Friendly greetings
2. Which class are you in? ……
3. Do you have access to computers in your school? …….
4. How often do teachers use computers to teach you? …….
5. How often do you research on the internet?.....
6. How many students work on one machine at a time?.....
7. Do you have an email address and do you use it to communicate with your teacher? ……..
8. Do you enjoy learning using the current methods teachers are using to teach you?

   ……

   ……

   ……..

Appendix 4

Observation schedules

1. Computers in the school
2. Accessories available for use by the pupils and teachers
3. Teachers teaching the pupils
4. Pupils working on the computer

Appendix 5

Document analysis

1. Schemes of work
2. Record of marks
3. Inventory record
4. Pupils' books