BINDURA UNIVERSITY OF SCIENCE EDUCATION

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COMPUTER SCIENCE DEPARTMENT

AN ANALYSIS OF FACTORS MILITATING AGAINST THE EFFECTIVE TEACHING AND LEARNING OF COMPUTER SCIENCE IN SECONDARY SCHOOLS: A CASE STUDY OF HARTZELL HIGH SCHOOL AND ST AUGUSTINE’S HIGH SCHOOL IN MUTASA DISTRICT.

Submitted By

MUNGAZI AGRIPPA (B1129976)

Supervisor: MR MUROPA B. C.

A DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE BACHELOR OF SCIENCE EDUCATION HONOURS DEGREE IN COMPUTER SCIENCE

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TOPIC:  AN ANALYSIS OF FACTORS MILITATING AGAINST THE EFFECTIVE TEACHING AND LEARNING OF COMPUTER SCIENCE IN SECONDARY SCHOOLS: A CASE STUDY OF MUTASA SOUTH SECONDARY SCHOOLS: HARTZELL HIGH SCHOOL AND ST AUGUSTINE’S HIGH SCHOOL.

AUTHOR:  MUNGAZI AGRIPPA

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NAME OF AUTHOR: MUNGAZI AGRIPPA

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YEAR TO BE GRANTED: 2015

SIGNED: _____________________________

PERMANENT ADDRESS: HARTZELL HIGH SCHOOL
P. O. BOX 770
MUTARE

MOBILE NUMBER: +263773264470

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The undersigned certify that they have supervised, read and recommend to the Bindura University of Science Education for acceptance a research project entitled: An analysis of factors militating against the effective teaching and learning of computer science in secondary schools: A case study of Mutasa South secondary schools: Hartzell High School and St Augustine’s High School, submitted by Mungazi Agrippa, in partial fulfilment of the requirements for the Bachelor of Science Education Honours Computer Science programme.

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(Signature of Student)                Date

..............................................  ........../........../........./
(Signature of Supervisor)            Date

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(Signature of the Chairperson)       Date
DECLARATION

I, Mungazi Agrippa, declare this research project herein as my own work and has not been copied or lifted from any source without the acknowledgement of the source.

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………………/…………/…………/
DEDICATION

This research project is dedicated to my caring wife, Cleo, my lovely children Davies Tanyaradzwa, Praise Deborah and Davison Agrippa for all the time they missed me. They were my pillars of strength and comfort.

I also dedicate this project to my late parents Mr Isaac Tofambirepi and Mrs Janet Mungazi. God, you have a purpose to take my mother before I was old enough to remember her. May the said departed souls find consolation from my works ... 

Above all, God, our help in the ages past and our hope for the years to come!
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ABSTRACT

The aim of the research was to analyse the factors which militates against the effective teaching and learning of computer science at Hartzell High School and St Augustine High School, secondary schools in Mutasa South District. The researcher was motivated by the increasing number of students who are pursuing Computing, herein called computer science at advanced level.

The researcher used the qualitative approach to inquiry and the case study as the research design. In view of the study, the researcher used the qualitative approach to inquiry for he wanted to understand the factors militating against the effective teaching and learning of computer science at Hartzell High School and St Augustine’s High Schools and that he did not want to generalise his findings. The researcher used questionnaires, participant observation and document study to gather data from teachers and students.

Through the study, the researcher managed to identify the factors militating against the effective teaching and learning of computer science at the two schools. The factors included critical shortages of pedagogical resources such as acute shortages of textbooks, lack of adequate internet connectivity and inadequate functional computers and their consumables. Lack of suitably qualified teachers, enrolment of students with weak computer studies background and series of power cuts were other serious problems affecting the effective teaching and learning of computer science at the selected schools in Mutasa District.

In view of solving the prevailing challenges and/or problems, it was suggested that the schools must source donations from Old Students Associations and from non-governmental organisations. Schools were also encouraged to introduce computer levy in order to ease financial constraints. Furthermore, teacher training and/or retraining as well as in-service workshops or refresher courses were found to be the panacea to lack of suitably qualified computer science teachers. The use of small standby generators was encouraged for schools to counter the series of power cuts. It was also recommended that further study in this area with a quantitative approach or both qualitative and quantitative approach must be conducted to find out problems and solutions relating to factors that militates against the effective teaching and learning of computer science in secondary schools in Mutasa District, Manicaland and Zimbabwe at large.
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CHAPTER 1

1.0 INTRODUCTION

The factors militating against the effective teaching and learning of computer science in secondary schools in Mutasa south are those factors that make the subject not to be properly understood by the students at advanced level. They are those limitations that create ineffective understanding by advanced level students of computer science in secondary school in Mutasa south.

1.1 Background of the Study

Zimbabwe gained independence in 1980 and by then no notable developments have been made in Information Communication Technology (ICT) of which computer science is a branch. Before independence, bottleneck type of education was practised and the few schools where the majority of Zimbabweans received education were highly marginalised in general terms of scientific education or scientific advancement. When Zimbabwe attained independence, education was made free for all, sadly, computer science remained a preserve subject for the elite. Worse still the schools where the general populace of Zimbabwe was and still is being educated are under equipped as well as being under staffed with reference to ICT.
The Group A schools continued to be a preserve for the elite. Years after independence the majority of the schools, maybe up to 90% or more were not exposed to ICT where computer science belong. Donor agencies started to trickle in, the likes of World Links and partner the government to install computers in remote and disadvantaged communities in Zimbabwe. Computer science remained a sacred cow for Zimbabweans at any level up to university level. In the mid-1990s, many Zimbabweans trashed Mr Masiyiwa Strive when he approached the government to obtain a telecoms licence to establish Econet Wireless Zimbabwe. The majority of Zimbabweans failed to follow and contribute meaningfully to the debate due to lack of computer science orientation.

The government through His Excellency President Robert G Mugabe joined the donor agencies in the early to mid-2000s and donated computers and the associated accessories to schools around the country. The development of computer science or ICT in general took snail pace up to the time of the inclusive government established in 2009. The then minister of ICT, Honourable Chamisa steered the country’s ICT fortunes and this opened the flood gates for ICT developments. Donations increased with the major player being His Excellency President Robert Mugabe. Schools also started to purchase computer accessories (now affordable) on their own capacity to augment the efforts of the government. The then ministry of education, sports arts and culture crafted a policy which favoured the introduction of computer literacy and computer science in schools. Many schools introduced computer science and these include Hartzell High School (2014) and St Augustine’s High School (2012). The researcher would
want to identify and analyse factors militating the effective teaching and learning of computer science at the mentioned schools.

1.2 Statement of Problem

An investigation into the factors that militate against the effective teaching and learning of computer science at Hartzell High School and St Augustine’s High School.

Computer science is a technical subject which demands a skilful teacher to handle it, if the students should be expected to perform well in it. Following this assertion, it is known that the secondary schools in Mutasa South are faced with problems that hinder the effective teaching and learning of all the subjects especially-computer science.

1.3 Research Questions

The following questions are going to be asked to guide the study

i. What are the problems that militates against the effective teaching and learning of computer science at Hartzell and St Augustine’s High Schools in Mutasa South?

ii. What are the causes of the problems that militates against the effective teaching and learning of computer science at Hartzell and St Augustine’s High Schools in Mutasa South?
iii. What recommendations can be put forward for solving the problems that militates against the effective teaching and learning of computer science at Hartzell and St Augustine’s High Schools in Mutasa South?

1.4 The purpose of the Study

The overall purpose of this study is to identify and analyse factors militating against the effective teaching and learning of computer science in some secondary schools in Mutasa South.

Specifically, the purposes of the study are:

i. To identify problems that militates against the effective teaching and learning of computer science at Hartzell and St Augustine’s High Schools in Mutasa South.

ii. To establish the causes of the problems that militates against the effective teaching and learning of computer science at Hartzell and St Augustine’s High Schools in Mutasa South.

iii. To propose solutions for the problems that militates against the effective teaching and learning of computer science at Hartzell and St Augustine’s High Schools in Mutasa South.
1.5 Significance of the Study

The findings of the study would help teachers improve the art of teaching computer science in both theory and practice.

The findings of the study will enable and/or help the computer science teachers to discover the areas that they need to improve on.

The findings of the study will equally lead to the discovering of students’ problems or weaknesses in the study of computer science.

The findings of the study will enable students to identify their own problems in the study of computer science.

1.6 Limitations of the study

The researcher faced financial constraints when he was carrying out this research project. The financial limitations caused the researcher to fail to effectively deal with the research in terms of document study at St Augustine’s High School. The researcher had limited time for the research. The researcher is a teacher, he had a full load of thirty-three periods per week. The researcher teaches advanced level computing and ordinary level computer studies at Hartzell High School. The researcher had to prepare adequately – researching and preparing notes, marking, giving remedial and extension work – for the following classes, Upper sixth form and Lower sixth form computing, and
form four and form two computer studies. The researcher was also under pressure with
the upper sixth students’ projects and form four Zimbabwe School Examinations Council
(ZIMSEC) coursework. This affected the researcher from effectively dealing with his
research work.

1.7 Scope of the Study

This study is delimited to ascertain the problems militating against the effective teaching
and learning of computer science at Hartzell High School and St Augustine’s High School
in Mutasa South.

1.8 Definition of terms

**Teaching**: - is an establishment of an environment for effective learning or imparting
knowledge to someone less skilled or knowledgeable in a particular domain of
knowledge.

**Learning**: - is the process of acquiring knowledge, attitudes and skills

**Effective teaching** refers to teaching which provides the learning supports, adjustments
and accommodations that students with additional needs require to enable learning and
participation

**Effective learning** refers learning strategies which involves the student in metacognitive
processes of planning, monitoring and reflecting whether the adopted strategies
enhances learning

**Militate**: - is hindering/preventing the effective teaching and learning processes
Computer Science: - a discipline that seeks to build a scientific foundation for computer design, computer programming, information processing algorithmic solutions problems, and the algorithmic process itself.

Zimbabwe School Examinations Council (ZIMSEC): - examination body in Zimbabwe

1.9 Summary

This chapter looked at the background of the research problem. The background highlighted the nature of computer science since 1980 to date in Zimbabwe. The research questions, the purpose of study and its significance were outlined in the chapter. The findings of the study would enable computer science teachers to discover the areas that they need to improve among other things. The researcher noted among other things that inadequate resources (time and money) limited or restricted the researcher’s capabilities when carrying out the research study. Finally, this chapter played a crucial role in the study of chapter two, were literature review was carried out.
CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction

This chapter review literature as they relates to teaching and learning of computer science at secondary school level in particular. Earlier researches by Bukaliya and Mubika (2012) in Chinhoyi, Mashonaland West province in Zimbabwe, another by Ali G, Haolader F. A. and Muhammad K. (2013) in Uganda and another research by Sripan and Suksawat (2010) at Rajamangala University of Technology in Thailand points to many factors that militates against the effective teaching of computer science. The researcher is motivated to carry out a research project on the analysis of factors that militates against the effective teaching and learning of computer science at Hartzell High School and St Augustine’s High School due to difference in time and place.

2.1 Concept of Computer Science

Shelly, Cashman and Vermaat (2008:3) says “[a] computer is an electronic device, operating under the control of instructions stored in its own memory, that can accept data, process the data according to specified rules, produce results, and store the results for future use. Hence, a computer can be defined as an electronic machine working under the control of stored programs, capable of receiving, storing, retrieving,
communicating and processing data to produce information. The researcher wanted to establish whether or not teachers and students are considering the computer’s design when delivering and learning programming lessons. The instructors and the learners must understand how the computer works, how it is organised and its capabilities for them to possess the correct interpretation of the computer. A computer forms the basic foundation for computer science and the knowledge that a computer is a programmable device or machine would motivate both teachers and learners to want to program the computer to solve their peculiar or particular problems. The understanding of the computer is in itself a giant leap forward as this arouse learners’ interest to solve problems and intrinsically motivates teachers and learners to psychologically prepare to tackle any challenges if present, which can hinder (militates against) progress in subject mastery.

Computer science as according to Brookshear (2013:16) is “a discipline that seeks to build a scientific foundation for such topics as computer design, computer programming, information processing algorithmic solutions problems, and the algorithmic process itself”. Brookshear (2013:16) continues to say computer science “provides the underpinnings for today’s computer applications as well as the foundations for tomorrow’s computing infrastructure”. Computer in education can be defined as the process of training and instructing children and young people on how to use and operate the computer to develop basic skills in computing and making contributions to the society. The computer science education curriculum content should
be packaged in such a way that it will cover all the necessary area that supposedly affect the teaching and learning of computer science so that students’ performance in the course of study would be enhanced. Teachers and learners alike must approach computer science with an open mind for them to engage in a meaningful interaction during the processes of teaching and learning of computer science. The researcher wanted to find out whether or not the sequencing of content (syllabus topics) and time allocated to the various topics is not militating against the effective teaching and learning of computer science at the selected schools in Mutasa District. The sequencing of content (topics) must be in the best interest of scaffolding nature of concept building. The teacher possess the subject compass and must help the learners by correctly sequencing the topics and allowing amble time for each topic to exhaust all aspects relating to the topic in order for learners to master the subject matter.

2.2 Concept of Teaching and Learning Computer Science

Bandura and Walters (1963) in Newman and Newman (2012:41) say “the concept of social learning evolved from the awareness that much learning takes place as a result of observation and imitation of other people’s behaviour. Newman and Newman (2012) weighed in and say that social learning theory assumes that a great deal of learning goes on through observation but that much of it is not observed in behaviour unless the reinforcement conditions are conducive. Social learning theories also brought about the idea of vicarious reinforcement – good behaviour is rewarded whilst bad behaviour is
punished. The researcher is aware that the teachers at Hartzell and St Augustine’s High Schools, where appropriate, teaches their classes through demonstrations and also employ vicarious reinforcements. Against this background, the researcher wanted to ascertain whether or not there are some factors which are militating against the effective teaching and learning of computer science at the said schools after the teachers demonstrated and also use vicarious reinforcements in form of comments on students’ work.

Rathus (2007:209), a behaviourist, argues that learning is a relatively permanent change in behaviour that arises from practice or experience. Behaviourist learning theories emphasize that learning takes place when certain environmental conditions occur, apparently independent of any conscious human involvement as in operant conditioning by Skinner B. F and in classical conditioning by Pavlov. Learning is therefore an interactive process involving the learner and the teacher within a specific learning environment. In the best knowledge of the researcher, interaction is taking place between the teachers and the students both at Hartzell High School and St Augustine’s High School. However, the researcher is motivated to carry out a research to find out whether or not there are some factors militating against effective teaching and learning at the said schools in Mutasa District.

Taylor and MacKenney (2008:3) say “learning includes not only acquiring the subject matter but also acquiring habits, attitudes, perceptions, preferences, interests, and
social skills of many types”. In addition Taylor and MacKenney (2008) writes that in the classroom, the activities and experiences that lead to change in performance involve ..., observing demonstrations, experimenting, interacting with pupils and guests and learning individually. Jarvis (2005:28) says Vygotsky conceived learning as taking place between a learner and a more advanced peer or an adult instructor. This clearly depicts that the idea of interaction is also echoed and emphasized by Vygotsky, a cognitive psychologist. Vygotsky conceived knowledge as existing initially on an intermental plane (i.e. between two people) and only then on an intramental plane (i.e. in the mind of the individual). Influenced by Vygotsky’s works, Jarvis (2005) says that the difference between what a child can understand on its own and what it can potentially understand through interaction with others is called zone of proximal development (ZPD). The researcher is well aware that the teachers at Hartzell High School and St Augustine’s High School do some demonstrations during the teaching and learning process. The researcher wants to establish whether or not there are some problems affecting the students and the teachers at Hartzell High School and St Augustine’s High School given that they occasionally use the demonstration method when delivering lessons and that there is teacher-pupil interaction as alluded to earlier.

According to Jarvis (2005:28), Piaget believed that the limiting factor in what a child could learn at any time was its stage of development while Vygotsky believed that the crucial factor was the availability of other ‘experts’ who could instruct the child. Vygotsky emphasized instruction from others in how to do things in order for the child
to achieve its potential. Piaget’s views have motivated the researcher to want to know whether or not the stage of development of the learners is not militating against effective learning. Equally important is that the researcher is aware that the teachers at Hartzell High School and St Augustine’s High School instructs their students on how to do given computer science tasks. So, the researcher is pushed to investigate whether or not students are not facing difficulties when completing assigned tasks.

Ormrod (1999) cited in Taylor and Mackenney (2008:245) concluded that learning is a change in performance through conditions of activity, practice and experience. The teachers and students at Hartzell High School and St Augustine’s High School engage in some activities which Ormrod (1999) argues that it would lead to learning by students. Against this background, the researcher has developed an unquenched thirsty to find out whether or not there are challenges being met by teachers and learners at Hartzell High School and St Augustine’s High School.

Lefrancois (2000) cited in Taylor and Mackenney (2008) writes that learning is “relatively permanent change in potential behaviour that result from experience, provided that changes are not the result of fatigue, maturation, drugs, disease or physical injury. In agreement, Kimble and Garmezy (1963) cited in Dececco and Grawford (1974:78) say learning is a relatively permanent change in a behavioural tendency and is the result of reinforced practice. The relatively permanent change in behaviour connotes a change in performance. One can easily observe performance but cannot observe learning. One
rather infers that learning has occurred when one can do something, which he/she could not do before. In computer science learning can be said to have taken place, for instance, when students are able to implement the concepts of inheritance and polymorphism in computer programming using Visual Basic. The students would be able to solve problems using computing techniques as required by the syllabus. There is no consensus about one definition for learning but there is consensus about the attributes of learning.

According to Piaget cited in Jarvis (2005:26), children need to construct their understanding of the world rather than passively accepting it from others. He went on to say that learning is an active process, and could not be achieved in the traditional classroom situation where information was delivered didactically. Jarvis (ibid) says the role of the teacher influenced by Piaget is thus to facilitate learning situations in which children can find things out for themselves and construct their own understanding. The researcher is well aware that the teachers at Hartzell High School and St Augustine’s High School use a variety of teaching methods including discovery method which enables learner to construct their own knowledge in computing. Inspired by the works of Piaget, the researcher wants to find out if or not the teachers and students at Hartzell High School and St Augustine’s High School are not confronted with challenges which affects effective teaching and learning of computer science. The researcher wants to find out whether or not the teachers are able to present computer science students at Hartzell High School and St Augustine’s High School with tasks specifically designed to
create disequilibrium and thus create the motivation in students to discover concepts for themselves. Jarvis (2005:26) says that a wide variety of tasks need to be given to students so that they can construct their knowledge of all necessary aspects of computer science. In the best knowledge of the researcher the students at Hartzell High School and St Augustine’s High School are presented with many tasks which they are required to find solutions in computer science. The researcher is motivated to know whether or not the learners are facing some challenges when they would be working towards discovering the necessary solution for the tasks at hand.

2.3 Implementation of Computer Science in Secondary Schools

According to Micro-computer in secondary school (common wealth of nation: 1996), information technology in schools is still a relatively new area of curriculum development. Computing, herein called computer science saw a chameleon pace implementation in Zimbabwe mainly due to lack of funding from the government and schools, hardware and human resources availability. Computer science is a practical subject and during lessons the teachers and students must use computers, for example, for creating databases and programming. However, the availability of electricity which is a key service in practical lessons for computer science is somewhat not consistent with the demands of the subject. The researcher is well aware that Hartzell High School and St Augustine’s High School are physically located in areas where electricity is sometimes available. The researcher however, is motivated to know to what extent does the loss of
power is militating against the effective teaching and learning of computer science
Hartzell High School and St Augustine’s High School.

The subject remains a sacred cow and a privilege for the elite and this can hinder
effective teaching and learning of the subject matter. Hartzell High School and St
Augustine’s High School recently introduced computer science at advanced level.
Hartzell High School introduced computer science at ordinary level and advanced level
in 2010 and 2014 respectively and St Augustine’s High School introduced the same in
2009 and 2013 respectively. The researcher is aware that the said schools’ introduction
of computer science is relatively new as compared to other subjects like Mathematics
and Shona. The researcher wants to know whether or not the late introduction of
computer science could be a factor militating against the effective teaching and learning
of computer science at Hartzell High School and St Augustine’s High School.

The government has developed curriculum to include computer science in schools since
time immemorial and has recently revised the computer science advanced level syllabus
to include project in visual basic 6.0 or visual basic .net. However, curriculum support by
the government, civic organisations and schools impedes the implementation of
computer science in Zimbabwean schools. The researcher has much interest to know
whether or not this change in syllabus does not bring with it challenges which militates
against the effective teaching and learning of computer science at Hartzell High School
and St Augustine’s High School.
2.4 Students Related Factors in Computer Science Program Secondary Schools

Lawton (2012:39) says that the physical condition of pupil’s home, income of the parents, age of parents leaving school, parents’ attitude to education and size of family added up to either foster or retard students’ performance in school. This assertion by Lawton is true and computer science students are equally affected by the factors he raised. Students coming from poor backgrounds are the hardest hit by these factors as they always possess low self-esteem or despise themselves. The physical condition of the student’s home can positively or negatively affects the psychological readiness of the student to learn. According to Phurutse (2005:15) there is “empirical evidence suggesting that socio-economic status (class) influences overall school performance. The researcher is aware that the students at Hartzell High School and St Augustine’s High School come from different socio-economic backgrounds. As such, the researcher intended to find out through this research whether or not the students are not affected or aided by their socio-economic background in computer science.

According to OECD paper, a disadvantaged “child’s environment (the family and the neighbourhood) negatively affect the child’s development of intellectual skills, school achievement, ... (Van Tuijl and Leseman, in press) even to the extent that poverty leads to irreversible effects on brain functioning (Hackman and Farrah, 2009). Guided by OECD paper, the researcher believed that the level of a child’s achievement in school depends on to a larger extent, on the prevailing socio-economic status and that home is an influential factor determining the academic achievement of pupils. According to Uche
facilities that have positive attitude on education encourage their children to have high aspiration. Parental occupation to a greater extent can influence the achievement of students. Duncan et al (1998) argues that the family’s socio-economic background is ... powerfully associated with children’s educational development. OECD weighed in saying children in higher socio-economic status families (SES) had significantly larger IQ than children from lower SES families because they were raised in richer, more stimulating environments. In the best knowledge of the researcher, the students comes from varying socio-economic backgrounds and the researcher wants to find out the extent on which it affects the educability of the learner.

2.5 Computer teachers and their role in computer science

Computer science teachers have special functions during the teaching and learning processes. Ben-Peretz (1990) argues that teachers need special qualifications and expertise for carrying out curriculum functions. In separate dimension, InfoWorld (1998) says it is hard to find people (teachers) who are truly qualified, who have practical experience ... in the field. Teachers are key personnel in education and can make students achieve what the curriculum design was designed to achieve yet to secure the right qualified teachers has been a problem. The researcher wants to establish whether or not the teachers at Hartzell High School and St Augustine’s High School are implementing the curriculum as per the director’s circular number 36 of 2006, ZIMSEC advanced level syllabus and school departmental policies among other official
documents stipulating basic requirements for computer science at advanced level. The researcher is also motivated to know whether the time stipulated by the same circular and syllabus is adhered to and lastly wants to find out whether the teachers are suitably qualified to teach advanced level computer science at Hartzell High School and St Augustine’s High School. Having gained some insights to prevailing conditions at the said schools, the researcher would want to establish whether or not the gathered facts are not militating against the effective teaching and learning of computer science.

The teachers for computer science requires technical support as they cannot attend both tasks of teaching and servicing computers simultaneously. Krysa (1998) cited in Bukaliya and Mubika (2012) identified technical support is another important enabling factor. He states that hardware and software problems occur frequently and that solving these problems is time consuming. Solving many of the problems is beyond the current level of the teacher’s computer knowledge (Krysa, 1998). Madden, 1989; Lau and Sim, 2008 cited in Bukaliya and Mubika 2012:60 state that, “it is therefore incumbent upon the head of school and other responsible authorities to appoint a technical person to look at issues of hardware and software while the teacher focuses on the instructional processes”. Therefore, the researcher wants to find out whether the teachers at Hartzell High School and St Augustine’s High School are able to attend to technical faults on hardware and software.

The researcher is also aware of the fact that Hartzell High School only allows a bona fide computer technician to attend to hardware and software faults. In the best interest of
the researcher, he wants to establish whether or not St Augustine’s High School teachers are allowed to fix computer faults. In the interest of this research, the researcher wants to find out the extent to which technical support or lack of it militates against the effective teaching and learning of computer science at Hartzell High School and St Augustine’s High School. Jones (2004) cited in Ali, Haolader and Muhammad (2013) reported that the breakdown of a computer causes interruptions and if there is lack of technical assistance, then the regular repairs of the computer will not be carried out which resulting in teachers not using computers in teaching. Yilmaz (2011) cited in Ali, Haolader and Muhammad (2013) says it is also crucial to provide the schools with technical support with regard to repair and maintenance for the continued use of ICT in schools.

2.6 Computer Literacy in Zimbabwe

Competency in computer science is achieved by a person who have a high degree of computer literacy. Businessdictionary.com defines computer literacy as “the level of familiarity with the basic hardware and software (and now internet) concepts that allows one to use personal computers for data entry, word processing, spreadsheets, and electronic communications”. Shelly, Cashman and Vermaat (2008) say, “Computer literacy involves having a knowledge and understanding of computers and their uses”. Zimbabwe’s majority population resides in the country side or rural areas where electricity is a rare commodity. The government’s rural electrification programme is
slow in implementation and many schools which received computer accessories from His Excellency President R. G. Mugabe are lying idle due to lack of power. Many of the schools in the rural areas have average to little availability of amenities which can attract suitably qualified computer science teachers to these schools. Computer science has failed to take off in many schools in the rural areas due to shortage of teachers. Hartzell High School and St Augustine’s High School are boarding schools and their catchment areas include rural areas which are hardest hit by lack of power and teachers. The researcher is aware that some of the students enrolled for computer science are not computer literate. The researcher is interested on whether or not computer literacy or lack of it militates against effective learning of computer science by students at Hartzell High School and St Augustine’s High School.

2.7 Class attendance

Class attendance is mandatory in teaching and learning processes and all students are expected to attend all lessons. Popovic and Green (2012:102) say “several research studies summarised by Van Schalkwyk et al. (2010), have shown link between attendance and performance …” Further, Popovic and Green (2012:102) say Van Schalkwyk et al recommended passing on this information to students to encourage class attendance. This is also supported by Gunn (1993 in McCarthy 2009) who found a significant relationship between attendance and performance. McCarthy et al. (2009:171) also shared the same view when they say, “in general, most studies have
found a ... relationship between lecture attendance and performance. The link between attendance and performance was also noted by scholars such as (Cohn and Johnson, 2006; Devadoss and Foltz, 1996; Marburger, 2001; ...), including in psychology classes (Federici and Schuerger, 1976; ..., Van Blerkom, 1992, 1996), all cited in McCarthy et al. (2009). The researcher is aware that students at the two schools attend lessons. The researcher is motivated to know whether or not there is also linkage on class attendance and effective learning of computer science by students at the selected two schools, if any do not attend classes consistently.

2.8 Attentiveness of students during lessons

Keeves and Watanabe (2003:749) argue that, “Regardless of any connection ..., many studies of classroom processes related to achievement support the view that a key aspect of educational success is attentiveness, or active learning time, time on task or some equivalent term (e.g., Creemers, 1994)”. The researcher is fully aware that students attend lessons, but he is more interested on whether or not the students would be attentive during lesson times.
2.9 Conclusion

The researcher reviewed related literature and established that earlier researches and some theories points to quite a number of factors which militates against the effective teaching and learning of computer science. The researcher is motivated to find out whether or not the said factors are also militating against the effective teaching and learning of computer science at Hartzell High School and St Augustine’s High School.
CHAPTER 3

RESEARCH METHODOLOGY

3.0 Introduction

This chapter focuses on the research design, data collection procedures, population, and the sample concerning the research: an analysis of factors militating against the effective teaching and learning of computer science in secondary schools: a case study of Hartzell High School and St Augustine’s High School. The researcher used a qualitative paradigm to inquiry, with a case study as the research design. In this thesis, the researcher used questionnaire, and observations as the main research tools and document study as a complimentary research tool. These instruments were the most appropriate for collecting data from the respondents in view of the research design.

3.1 Research design

Kerlinger and Penhhazur (1973 cited in Oyedele 2010) define research design as the plan, structure and strategy on investigation conceived, as to obtain answers to research questions and to control variances. In this research, the researcher used qualitative approach to inquiry. White (2005: 81) writes: “Qualitative research is more concerned with understanding social phenomena from the perspectives of the participants.” The researcher was interested in establishing factors militating against the effective teaching and learning of computer science at Hartzell High School and St Augustine’s High School from the participants’ point of view. In agreement with White (2005), Bogdan and Biklen
(1992) say qualitative research emphasises ... people’s understanding of phenomenon. Qualitative research is also called interpretative research, naturalistic research, phenomenological research and descriptive research or idiographic research, which literally means uniquely descriptive research involving small groups (Johnson and Christensen, 2007). In reference to Johnson and Christensen (2007) views on qualitative research, the researcher studied a small group of participants.

The researcher chose the qualitative approach to inquiry on the basis of its advantages and the scope of the research. Qualitative research design enabled the researcher to have an indepth assessment of the factors militating against the effective teaching and learning of computer science at Hartzell and St Augustine’s High Schools in Mutasa District, Manicaland in Zimbabwe. Boxill, Chambers and Wint (1997) argues that qualitative research paradigm allows for investigation of highly sensitive issues and this aided the researcher to collect confidential data about teacher qualifications and students’ performance from record books. Boxill, Chambers and Wint (1997) also argued that qualitative research relies primarily on subjective assessments in data collection phase. The researcher used document inspection at Hartzell and St Augustine’s High Schools for him to mitigate the issue of subjectivity. In view of the study, the researcher used the qualitative approach to inquiry for he wanted to understand the factors militating against the effective teaching and learning of computer science at Hartzell and St Augustine’s High Schools and that he did not want to generalise his findings.
While the researcher used the qualitative approach to inquiry, he used the case study as the research design. Klenke (2008:381) says “case study is a transparadigmatic and transdisciplinary heuristic that involves the careful delineation of the phenomena for which the evidence is being collected. For Borg, Gall, and Gall (1993:203): “Case studies focus on contemporary phenomena by studying a single instance of the phenomenon ... the researcher observe events as they occur and ... phenomena are studied in their total context”. Factors militating against effective teaching and learning of computer science at Hartzell High School and St Augustine’s High School are contemporary phenomena. The researcher therefore used case study basing on Macleod (2008) who says case study “provides rich qualitative data, provides insight for further study and that it permits the investigation of otherwise impractical (or unethical) situations”.

Case study was also chosen due to its suitability for small-scale research done by single persons as did the researcher. Case study is a good method of collecting data about the respondents and hence, the researcher used it. The method was relatively cheaper and manageable to the researcher and dealt mainly with the pupils who were at his disposal all day long at Hartzell High School. Case study had limited generalisation of findings but the researcher used it as Bogopane (2013:223) writes: case study ... is an indepth analysis of a single or multiple cases over a period of time. Stakes (1995) in Bogopane (2013:223) buttressed the researcher’s selection of case study arguing that “the sole criterion for selecting ... a case study should be the opportunity to learn ...” The
researcher wanted an in-depth analysis of the phenomena under study and to learn when he selected the case study as the research design.

3.2 Population

Ahmad (2008:393) defines population as all cases in a group, from which samples may be drawn for study. According to Bogopane (2013:226), a population is a collection of objects, events, or individuals having some common characteristics the researcher is interested in studying. The population of the study comprised of sixty participants. Thus two teachers and twenty-four students from Hartzell High School and two teachers and thirty-two students from St Augustine’s High School. All the teachers teaches computer science and all the students are doing computer science at advanced level either at Hartzell High School or St Augustine’s High School in 2015. The pupils’ average age was 17-18 years.

3.3 Sampling

Gay (1987 in Yount, 2006) says sampling is the process of selecting a group of subjects for a study in such a way that the individuals represent the larger group from which they were selected. Subong (et al) (2006:191) also say that sampling is “the process of selecting a number of individuals (a sample) from a population, preferably in such a way that the individuals selected represent the larger group from which they were selected”. Sample is part of the population under study. Thus, it is often selected from a larger
group. Sampling means selecting part of a population so as to study it. If the results are to be varied, then, a sample should be a representative. That means that a sample must have the same characteristics as the population from which it is selected.

In view of the above, this research had a sample of 20 respondents/participants. Thus two teachers and eight students from Hartzell High School and two teachers and eight students from St Augustine’s High School. The researcher used the purposive sampling method. Subong (et al) (2005:24) say purposive sampling is where “the researcher simply picks out the subjects that are representatives of the population depending on the purpose of study”. Maykut and Morehouse (1994) give the advantage; thus, “purposive sampling increases the likelihood that variability common in any social phenomenon will be represented in the data ...” The researcher included all the four teachers in the sample for the researcher is well aware that the teachers possess the data he required. The researcher identified three groups of students, students who wrote ZIMSEC Computer Studies at ordinary level, students who wrote HEXCO Computer Operations and Packages and those who did not undergo any computer based examinations. The researcher targeted those groups and purposively selected sixteen students who were rich sources of the required data.

3.4 Data collection procedures

The researcher collected data through questionnaires, observation and use of primary documents (sources). The researcher used three research tools to allow for data
triangulation. Ahmad (2008:520) says “triangulation is the use of multiple methods, data collection strategies, and/or data sources in order to get a more complete picture and to cross check information”.

The researcher is a teacher at Hartzell High School since 2008 and is no stranger to the respondents at Hartzell High School and so he used observation to collect data from them. In the interest of time and triangulation of data gathered, the researcher used questionnaire and document study mainly for the respondents at St Augustine’s High School. Questionnaires required less time than interviews and equally the same document study did not take much time to complete.

3.5 Questionnaires

McLean (2006) defines a questionnaire as “a set of carefully designed questions given in exactly the same form to a group of people in order to collect data about some topic(s) in which the researcher is interested”. The researcher designed two questionnaires, which were used as data collection tools from pupils and from the teachers. The questionnaires were distributed by the researcher to the concerned pupils and teachers at Hartzell High School and St Augustine’s High School. The questionnaires designed had a mixture of open ended questions and closed ended questions. The researcher used closed ended questions as introductory questions and the answers for the questions were predefined and could be selected using a mark. The closed ended questions were also included on the questionnaires to guide the respondents especially students on the
expected responses. The questionnaires also carried open-ended questions with spaces provided for the respondents to write their responses. The spaces provided for answering open-ended questions allowed the respondents to cover any issues they felt had been left out by the researcher. The responses on the questionnaires were assessed and evaluated. The researcher asked for time for all the respondents to fill in the questionnaires and hence arrested the issue of questionnaires not being returned.

3.6 Observation

According to Maykut and Morehouse (1994) in Bogopane (2013:223): “participant observation is ... a data collection method that seeks to understand the lives of people in their own terms by spending extended amounts of time with the people in a natural setting they inhabit”. The researcher is a teacher at Hartzell High School since 2008 and is no stranger to the respondents at Hartzell High School. The time factor enabled the respondents to behave naturally and hence, the researcher observed the students in their natural learning setting. The researcher observed the students’ time to complete assigned tasks at Hartzell High School and the accuracy of students’ answers. In a nutshell, the researcher observed the following:

- participation of students
- nature of answers given by students
- attentiveness of students during lessons;
- class attendance by students
• time for completing tasks

The researcher observed pupils’ participation, that is, the pupil’s involvement with class activities, raising hand to respond to questions and response to tasks given during lessons regardless of answers being wrong or correct. The researcher observed the students’ attentiveness during lessons, class attendance by students, time taken by students to complete class activities and the nature of the answers given by the students to class activities.

3.7 Document study

Document analysis is a social research method and an important research tool in its own right. Advised by Bogopane (2013:224), the researcher was mindful and extremely cautious of the documents he used and their authenticity as scientific documents. The advisory and supportive role of the supervisor ... was sought and was not compromised, Bogopane (2013:224). The researcher studied the following primary documents:

• students’ tests exercise books,

• teachers’ record of marks,

3.8 Data presentation and analysis plan

The collected data were qualitatively analysed. The findings were presented extensively in prose and descriptively according to the emerging themes.
3.9 Conclusion

In chapter 3, the researcher looked at research design, data collection procedures, data presentation and the data analysis plan. The chapter focused on the way the research was contacted. In the next chapter, chapter 4, the researcher presented the collected data, analysed and interpreted it.
CHAPTER 4

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter is concerned with presentation, analysis and interpretation of the data obtained through questionnaires, observation, and document study from teachers and students from Hartzell High School and St Augustine’s High School in Mutasa District, in Manicaland. The researcher collected data using systematic observations, document study and sixteen questionnaires from students and three questionnaires from the teachers. The analysis and interpretation are followed by an endeavour to link the results to the theoretical notions and other research findings. Therefore, the data was presented descriptively in prose. In regards to the study findings, this chapter present the challenges hindering the effective teaching and learning of computer science as well as the causes of the said problems.

4.1 Challenges hindering the effective teaching and learning of computer science

According to the study there are several problems which hinders the effective teaching and learning of computer science at Hartzell High School and St Augustine’s High School. The researcher is going to present and interpret the challenges which are militating
against the effective teaching and learning of computer science from the teachers’ and from the students’ perspectives.

4.2 Under qualification of the computer science teachers

This study enabled the researcher to establish that the teachers at the selected schools in Mutasa District who offer computer science at advanced level are not suitably qualified to teach at that level. The teachers are partially qualified and Ben-Peretz (1990) argues that teachers need special qualifications and expertise for carrying out curriculum functions. The researcher concluded that lack of full qualifications by the teachers is one factor militating against the effective teaching and learning of computer science both at Hartzell High School and St Augustine’s High School. From the data gathered from the teachers, the researcher found that one teacher had three years, one teacher had two years, the researcher had one year teaching experience in computer science at advanced level and the last teacher had no teaching experience at advanced level computer science. However, the researcher failed to establish linkage between the teachers’ teaching experience at advanced level and factors militating against the effective teaching and learning of computer science. Rather, in agreement with Ben-Peretz (1990), the researcher concluded that the teachers’ under-qualification was militating against the effective teaching and learning of computer science at the said schools.
4.3 The shortage of computers, the associated accessories and consumables

From the study the researcher found that the majority of the participants cited the shortage of computers as hindering the effective teaching and learning of computer science. The researcher established that most of the participants – teachers and students – cited the unavailability of adequate computers as hindering the effective teaching and learning of computer science. One student said, “sharing of computers with the teachers” was a challenge militating against the effective learning of computer science (questionnaire for students). The researcher agreed with the student as teachers use the same computer labs with the students (personal experience). In agreement to the notion of inadequate computers, one teacher said the unavailability of reliable computers hinders the effective teaching and learning of computer science. The lack of adequate reliable computers culminated in the teachers and students sharing the same computers. The sharing of computers by the teachers and the students points to the shortage of computers and this deprives the students ample time to interact with the computer so that they can practice and perfect their psychomotor skills.

The researcher noted that the majority of the observed students were not fast enough to complete tasks within stipulated time. These students were slow to complete tasks as compared to the smaller number of the observed students which was efficient when executing tasks (observation). When students were given written, practical or oral exercises, the researcher observed that on average, only a few students were efficient in terms of time complexity. The majority of the students were found to be having
restricted code’, knowledge gaps, poor psychomotor skills and these lengthens the time complexity to complete tasks (personal experience).

The researcher, a computer science teacher, had also discovered that the lack of printers and computer consumables like toner and bond paper was another factor militating against the effective teaching and learning of computer science. The students need to learn how to print different documents from different applications and were being deprived of the opportunity by shortages in computer hardware and consumables. In a nutshell, the researcher had established that the shortages of computers and computer consumables was (or is) militating against the effectiveness of the teaching and learning processes in computer science.

4.4 Unavailability of adequate Internet access

From the study, the researcher found that the majority of the students (87.5%) cited lack of access to the internet as a factor militating against the effective learning of computer science. One student from Hartzell High School said, “access to the internet is very difficult since there is only one computer which has access to the internet” (students questionnaire). In agreement on the lack of internet connectivity issue, one teacher from St Augustine’s High School also mentioned lack of adequate internet connectivity as hindering the effective teaching and learning of computer science. The researcher is a bona fide computer science teacher at Hartzell High School and from his
own experience, he had established that the students and teachers scrambled for internet access in the school’s computer laboratory.

The study findings also showed that the majority of the student who participated had poor to average marks (records of marks). The poor performance of the students can be linked to lack of adequate learning resources like the internet resources. The researcher agreed with Elizabeth (2014) who says those – teachers and students – with internet access can take advantage of learning resources that in the past, may have been available to “an elite few” Asia-Pacific E-Learning Alliance (2002:18). In line with the above, one student from Hartzell High School had these words to say, “the internet facilities being provided are not adequate for us students to learn computer science effectively”. The same student went on to say, “it is hard for more than five people to research … using one computer which is connected to the internet”. All the three teachers agreed on the lack of adequate internet access and that the lack of adequate internet facilities was hindering the effective teaching and learning of computer science. In support of the students and the teachers, John and Wheeler (2008:106) say “the internet is now the centrally most important learning technology”. In addition John and Wheeler (2008:106) write that “through the internet, children have the opportunity to access digital learning resources anywhere and at any time”. In agreement with the notion of lacking Internet facilities at the two schools, the researcher can reveal that internet connectivity is in dire situation and this was noted to be militating against the effective teaching and learning of computer science. The findings of this study showed
that both the teachers and the students had no ample time to access internet resources which would aid the processes of teaching and learning of computer science at Hartzell High School and St Augustine’s High School.

Internet abuse is another factor mentioned by the students at St Augustine’s High School and Hartzell High School which was found to be hindering effective learning of computer science at those schools. Data gathered from the study revealed that the majority of the students spent more time on social sites whenever they connect to the internet. Data gathered showed that the majority of the students who participated in this study wasted time socialising on the internet at the expense of researching and this militates against the effective teaching and learning of computer science at the said schools.

4.5 Critical shortage of textbooks

The researcher gathered from the study that shortages of textbooks were militating against the effective teaching and learning of computer science at the mentioned schools in Mutasa District. Data collected by the researcher shows that all the sixteen students stated that textbook shortages was one chief factor militating against the effective learning of computer science. The students agreed with all the teachers who participated in the study who also mentioned the shortages of textbooks as a factor militating against the effective teaching and learning of computer science. According to
the study, teachers and students agreed with Watkins (2000) who says, “shortages of pedagogical equipment are particularly damaging, because teaching tools, such as textbooks ... are significant determinants of achievement ...” Not surprisingly, children who have textbooks and other reading materials perform far better than those who do not.

In light of the above, one student has this to say, “Lack of textbooks” hinders the effective learning of computer science, (questionnaire for students). In agreement with all the participants, one teacher said textbook shortage hinders the effective teaching and learning of computer science (questionnaire for teachers). The researcher established that the majority of the students who participated lacked Information Technology (IT) terminology when they answer questions (observation and document study – tests exercise books). The students had no textbooks to read and/or study and thus, students cannot reinforce what they have been taught since their schools lacked the necessary textbooks. In support of this view, The World Bank (2012:132) had also established this in South Sudan, thus it says, “there is a shortage of textbooks, ... in South Sudan’s schools and these shortages limit opportunities for reinforcing what is taught”. This study led the researcher to establish that the majority of the students had low tests scores for the work given to them, (document study – teachers’ records of marks). The low test scores can be linked to non-availability of teaching and learning resources such as textbooks. From the researcher’s experience, textbooks are the sources of materials where the teacher extract the content outlined in the syllabus. The
shortages of textbooks deprives the teachers and the learners of teaching and learning resources. Thus, the researcher concluded that textbook shortages and total unavailability of textbooks are critical factors militating against the effective teaching and learning of computer science at Hartzell High School and St Augustine’s High School.

The researcher’s experience points to the fact that without adequate textbooks teaching and learning of computer science is made difficult as teachers and students scrambled for the inadequate textbooks. Non-availability of textbooks is another aspect linked to inadequate textbooks which equally prevents effective teaching and learning computer science at Hartzell High School and St Augustine’s High School. The researcher noted that it becomes increasingly difficult to assign homework to students knowing fully well that there are no resources for them to use. The researcher had also established that abnormal student-textbook ratio increased the rate of wear and tear and the schools are fast approaching a state of non-availability of textbooks which is a sad eventuality if no action is taken. Research in India found that children in schools where a full set of basic instructional material was available scored two to three times higher in tests than children in schools where such materials were not available (Watkins, 2000). The researcher established beyond doubt that the shortages of textbooks was (or is still) militating against the effective teaching and learning of computer science.
4.6 Series of power cuts

The researcher noted from the study that power cuts were impeding the effective teaching and learning of computer science at the schools under study. Three students, a teacher and the researcher all agreed on the issue of power outages as militating against the effective teaching and learning of computer science. In agreement to negative effects of power cuts, Bessant (2006:170) says, “… if there is a power cut when you are using your computer, the documents and information that you have not saved to disk will be lost”. One student from Hartzell High School said “power cuts are a disturbance especially when doing practical lessons”. In line with the idea of disturbances effected by power cuts, Evening (2009) points to damage and/or loss of data from a sudden power cut. The researcher recognised that power cuts were militating against the effectiveness of the teaching and learning processes in computer science at Hartzell High School and St Augustine’s High School, (questionnaires). The researcher teaches at Hartzell High School were power cuts were frequently experienced. Hartzell High School and St Augustine’s High School are on the same power line grid and suffer from power outages which were rampant across the country during the course of carrying out this thesis. The two schools are located in the rural areas of which the rural areas are the most affected areas in terms of power black outs. From the researcher’s experience, teachers use computers when presenting their lessons, students use computers to research on the internet and to perform practical tasks. Through this study, the researcher had also found that teachers and students also share electronic resources such notes and tutorials which are only accessible in the presence of power (personal
experience). Lack of power, thus, militated against the effective teaching and learning of computer science at Hartzell High School and St Augustine’s High School.

4.7 Students with weak computer studies background

Through this study the researcher had established that the enrolment of students without computer studies at ordinary level (O’level) to study advanced level computer science is a factor which militates against the effective teaching and learning of computer science. Two teachers shared the same view and stated that students without computer studies at O’level were posing challenges during the teaching and learning processes of computer science (teachers’ questionnaire). The researcher agrees with the teachers and had also noted that much time is lost on ‘backtracking’ concepts or bridging concepts to ordinary level at the expense of concentrating on advanced level concepts (personal experience). The researcher also established that inattentiveness by the students hinders the effective teaching and learning of computer science (observation). Inattentiveness by students with ordinary level computer studies was noted by the researcher when explaining ordinary level concepts to students without ordinary level computer studies. Lack of proper attention was also noted on students without ordinary level computer studies when explaining advanced level concepts based on previous knowledge (assumed knowledge). Through personal experience, the researcher found that the need to balance content to cater for the two groups hinders the effective teaching and learning of computer science. Students without ordinary level
computer studies background were also largely found to have challenges of IT terminology when responding to questions or expressing themselves, (tests exercise books and observation). The performance of such students were noted to be far below that of their counterparts who studied computer studies at ordinary level.

4.8 Causes of the challenges preventing the effective teaching and learning of computer science

From the study, the researcher had established that financial constraints were the major cause of almost all the problems militating against the effective teaching and learning of computer science. All the four teachers inclusive of the researcher and the majority of the students cited the lack of adequate financing of the computer science departments as the root cause of much of the problems hindering the effective teaching and learning of computer science. The researcher concluded that the administrators at Hartzell High School and St Augustine’s High School were not sincere about providing adequate teaching and learning resources for computer science. Two students agreed saying the attitude of the administrators was questionable towards computer science, (students’ questionnaire). The researcher had established that the attitude of administrators and their prioritisation schemes forms the bed rock of most of the problems militating against the effective teaching and learning of computer science, (personal experience and questionnaires). The lack of adequate textbooks and total unavailability of some relevant textbooks at Hartzell High School and St Augustine’s High School are attributed to the lack of will power or the level of support pledged by the administrators at these
schools. One student from Hartzell High School categorically stated that lack of attention to the computer lab, lack of cooperation and refusing suggestions given by students by the administrators was negatively affecting the teaching and learning processes in computer science.

The researcher had established that power cuts were primarily caused by load shading and lightening at Hartzell High School and St Augustine’s High School. The majority of the participants simply mentioned power cuts. The researcher is a resident teacher at Hartzell High School which is on the same power line with St Augustine’s High School since 2008 and had observed that load shading and lightening are the major causes of power outages around the area. However, four students mentioned that the causes of power cuts was the inability by the schools to procure generators which must service the computer laboratory during the absence of power from Zimbabwe Electricity Supply Authority (ZESA). The researcher agrees with the students and a teacher from St Augustine’s High School on the issue of the unavailability of a small generator which can service the computer labs as causing power cuts which then militates against the effective teaching and learning of computer science.

In view of teaching and learning processes, two students mentioned teachers’ and students’ behaviour which is rife as negatively affecting the effective teaching and learning of computer science. The students mentioned that there is rampant internet abuse by teachers and students alike. One student said that students abused the
internet by accessing social sites and such behaviour negatively impacts on the effective
teaching and learning of computer science. The other student wrote, “I think the school
administration and some staff members who use the internet for their personal issues
instead of allowing us (students) to do our researches”. In support of these students’
views, the researcher had established that some teachers spent considerable time on
the internet, accessing such sites as www.beforward.jp and social sites such as
Facebook, Twoo, LinkedIn and newspaper sites. The researcher also observed the same
on students who access social sites especially Facebook at the expense of researching. In
the realm of teaching and learning processes, the said teachers’ behaviour deprives the
students amble time to do their researches. The administration had no policy with
regard to internet access especially at Hartzell High School. The researcher noted that
the teachers and non-computer science students at Hartzell High School would be in the
computer lab accessing the internet on the single computer with access to the internet
when computer science lessons are in progress (personal experience). These
unwarranted visitors also contributed negatively on the teaching and learning of
computer science. The researcher established that the students are not free to
participate in lessons in the presence of intruders, the presence of intruders is a
causative factors which militates against the effective teaching and learning of computer
science.

From the study the researcher found that lack of consistent class attendance and
inattentiveness in class was causing challenges in the effective teaching and learning of
computer science. The performance of two students who were noted to have been inattentive in class and one student with inconsistent class attendance was poor, (record of marks).

4.9 Suggested solutions for the challenges preventing the effective teaching of computer science

This section of the study is about the recommendations and suggestion put forward by the participants who participated in this study. The researcher would also put his suggestions and/or solutions to the problems identified to be militating against the effective teaching and learning of computer science.

From the study the researcher discovered that the majority of the participants who participated in the study mentioned the buying of more textbooks to alleviate the problems of textbook shortages. Almost all the students who participated in the study mentioned that new supplies of textbooks were a must to solve the problems of textbook shortages. The researcher agrees with the majority of the students who mentioned that the availing of additional textbooks is the panacea to the problems of textbook shortages. In line with the above, one student had these words to say, “the schools should buy more textbooks to solve the shortage of books problems”. In agreement to this student’s view, two teachers proposed that the school must avail additional textbooks either from donations or from the schools’ finance. One teacher mentioned that the solution to textbook shortages is to approach the Non-
Governmental Organisations (NGOs) and Old Students Associations to purchase and donate computer science textbooks to the schools. The researcher is in support of this suggested solution as this can improve the availability of textbooks in the schools. In view of the above, two teachers suggested that the schools must charge special levy to all students studying computer science to cater for the procurement of textbooks, computers and computer accessories. The researcher agrees with the idea of encouraging the schools to charge computer levy to all students enrolled on these schools as the majority of them (students) also conduct internet researches in the computer labs.

Through this study the researcher established that the majority of the participants (teachers and students) called upon the schools to connect more computers to the internet to solve the problems of inadequate internet facilities. One student from Hartzell High School recommended that all the computers in the school must be connected to the internet when she wrote these words, “let all the computers access the internet”. The researcher agreed with the student and also suggested that all teachers’ offices in the school must have at least a computer installed which connects to the internet to reduce pressure in the computer lab. In line with this recommendation, the majority of the participants (who participated) in this study suggested that separate computer labs for teachers and students must be built to allow students amble time to conduct researches on the internet. One teacher agreed with the majority of the students and weighed in saying ‘constructing of real computer labs with all the facilities
needed by computer science subject’ would solve the current problems being experienced by students studying computer science. A small number of the students who participated in the study added that unlimited access to the internet would solve the problem of textbook shortages as the students would download textbooks from the internet. The researcher agreed with these students as enough/amble access to the internet would enable the students and teachers alike to read and download electronic books from such sites as www.books.google.com and many other learning resources accessed online. In line with unlimited internet access, a small number of students who participated in this study suggested that only fruitful use of the internet would benefit the school. A few students agreed with this idea and recommended the blocking of social sites to restrict students and allow them to concentrate on educational sites. The researcher also harbor the same views and further recommends that the schools should connect all computers to the internet and then monitor students when online, block sites such as Facebook and enforce parental controls on sites which host adult content (pornography). Further supporting the same idea, one student from St Augustine’s High School stated that to avoid abuse, the internet access can be restricted to certain approved sites only. Almost each participant had something to say on internet connectivity and one teacher recommended connecting all machines on the internet through parents’ initiatives as a move which solves problems to do with inadequate internet connectivity.
The researcher had noted that a few participants who participated in the study recommended the purchasing of generators to solve the problems associated with power cuts. One teacher from St Augustine’s High School recommended that the schools must buy small generators which would service the computer labs during power outings. In support of this suggested solution, one student from Hartzell High School weighed in and also suggested that the school must buy a generator for supplementary power supply during power cuts. The researcher totally agreed with the suggested solution of purchasing generators and also suggested that the generators must always have fuel to avoid power cuts even when the schools procured the generators.

Many students who participated in the study suggested that students studying computer science should bring to school their own laptops. The researcher established that the students argued that the laptops would ease pressure on the inadequate schools’ computers. The students also suggested that they would use the computers to practice and improve their psychomotor skills. The majority of the students who participated in the study suggested that the school should deploy wireless fidelity (Wi-Fi) so that the students would access the internet using the laptops they brought and also reduce pressure on the computers in the computer labs.
4.9.0 Conclusion

The researcher had established that there are many challenges militating against the effective teaching and learning of computer science at Hartzell High School and St Augustine’s High School. Some of the challenges identified include shortage of textbooks, shortage of functioning computers, series of power cuts, poor enrolment criteria and unsuitably qualified teaching staff. The researcher also established that there are many factors which caused problems in the teaching and learning processes. The major cause identified was lack of finances to finance operations within the computer science department.

The researcher noted that the majority of the participants proposed solutions to the challenges hindering the effectiveness of the teaching and learning processes of computer science. The suggested solutions to the problems include the purchase of adequate textbooks, adequate computers and computer accessories. A small number of the participants proposed a noble solution of buying standby generators to service the computer laboratories.
CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.0 Introduction

This chapter consists of three main sections which conclude the entire project. These are summary, conclusion and the recommendations. In this chapter, the researcher gave information on the research problem, methodology used, major findings and their applications in effective teaching and learning of computer science at advanced level at Hartzell High School and St Augustine’s High School.

5.1 Summary

The study focuses on the analysis of factors militating against the effective teaching and learning of computer science at advanced level in secondary schools: A case study of Hartzell High School and St Augustine’s High School in Mutasa District. The research design used was the case study and instruments used were questionnaires, observation and document study. The population had sixty participants, thus, four teachers and fifty-six students. The sample which was purposively selected had twenty participants, four teachers and sixteen students.

The researcher collected data from three teachers using a questionnaire which largely carried open-ended questions. Data from the students was collected using three
Instruments to allow for data triangulation. Instruments used were questionnaire, systematic or participant observation and document study.

The researcher faced financial challenges, pressure of work and pressing family commitments during the period he was conducting the research work. These challenges prohibited the researcher from effectively dealing with his research work.

5.2 Conclusions

The researcher managed to establish the problems or the factors which were (or are) militating against the effective teaching and learning of computer science at Hartzell High School and St Augustine’s High School. The researcher discovered that critical textbook shortages, inadequate or too limited internet access, lack of suitably qualified teachers, series of power cuts, critical shortage of computers and computer consumables, enrolment for advanced level computer science of students with weak computer studies background were the major factors which were found to be hindering the effectiveness of the teaching and learning processes in computer science at the selected secondary schools in Mutasa District.

Lack of finance or inadequate funding of the computer science departments at the two schools negatively affected the provision of teaching and learning resources at Hartzell High School and St Augustine’s High School.
5.3 Recommendations

From the conclusions which were drawn from the findings of the study, the researcher recommends the following:

- Computer science teachers are encouraged to upgrade/improve themselves
- The school heads and government should encourage (computer science) teachers through District Education Officers to further their studies in a stipulated time frame, say, in five years a teacher must have attained a suitable qualification to teach advanced level computer science
- The schools should purchase small generators which would service the computer laboratories when there is a power cut
- The schools, funds permitting, should construct separate computer laboratories and furnish them with internet connected computers for use by teachers and students
- The schools may charge computer levy to ease financial constraints which limits the schools to avail the most wanted pedagogical resources
- The schools may approach well established previous students and Non-Governmental organisations for donations of critical textbooks and computer hardware
- School authorities may allow computer science students to bring their own laptops to reduce pressure on the schools’ desktop computers. The computer science teachers should check contents of students’ laptops to trap unwanted content like pornographic materials
- The school should improve internet connectivity and also restrict access to social sites and pornographic material
References


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31. Subong P. E. et al. (2006), Statistics for Research, Rex Bookstore Inc: Philippine

Websites
3. www.businessdictionary.com/definition/computer-literacy.html date accessed 12-04-15
APPENDIX 1

Questionnaire Guide for Teachers

The researcher, Mungazi Agrippa, is a student with Bindura University of Science Education and is carrying out a research study on the analysis of factors militating against the effective teaching and learning of computer science at Hartzell and St Augustine High Schools in Mutasa District, Manicaland, Zimbabwe.

- The data gathered will be used solely for the purpose of this study.
- Your responses are highly confidential and would be treated with confidentiality
- Please do not write your name on this questionnaire
- Where options are given, please tick (☑) the appropriate response and write your opinion where spaces are provided.

1. What is your sex? Male ☐ Female ☐
2. Which school do you teach? Hartzell High School ☐ St Augustine High School ☐
3. What is the nature of your qualification with regards to teaching advanced level computer science?
   Fully Qualified: ☐
   Partially Qualified (Currently reading towards the qualification): ☐
   Not Qualified: ☐
4. For how long have you been teaching computer science at advanced level?
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5. In your opinion, what challenges are you facing, if any, which hinders the effectiveness of the teaching and learning processes of computer science at your school?
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6. What solutions do you propose to the challenges you mentioned above, if any?

7. What do you think is (are) the causes of these challenges militating against the effective teaching and learning of computer science at your school?
APPENDIX 2

Questionnaire Guide for Students

The researcher, Mungazi Agrippa, is a student with Bindura University of Science Education and is carrying out a research study on the analysis of factors militating against the effective teaching and learning of computer science at Hartzell and St Augustine High Schools in Mutasa District, Manicaland, Zimbabwe.

- The data gathered will be used solely for the purpose of this study.
- Your responses are highly confidential and would be treated with confidentiality.
- Please do not write your name on this questionnaire.
- Where options are given, please tick (☑) the appropriate response and write your opinion where spaces are provided.

1. What is your sex? Male ☐ Female ☐

2. Which school do you attend?
   - Hartzell High School ☐
   - St Augustine High School ☐

3. What is your attitude towards computer science?

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4. In your opinion, what challenges are you facing, if any, which hinders or prevents you from effectively learning computer science at your school?

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5. What solutions do you propose to the challenges you mentioned above, if any?

6. What do you think is (are) the causes of these challenges hindering the effective learning of computer science at your school?
## APPENDIX 3

Observation Guide

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<th>Excellent</th>
<th>Very Good</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Poor</th>
<th>Very Poor</th>
<th>Reason</th>
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<td>2 Nature of answers given</td>
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<td>3 Pupil attendance in class</td>
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<td>5 Time for completing tasks</td>
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