COST-BENEFIT ANALYSIS IN IMPLEMENTATION OF COMPUTER STUDIES AND IT'S IMPLICATIONS TO LEARNING IN GATANGA MURANGA COUNTY.

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JUNE 2013
DECLARATION

This research project is my original work and has not been presented for a degree in any other university.

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This project is dedicated to all members of my family for their great support

I love you all
ACKNOWLEDGEMENT

I thank God the Almighty for the strength to pursue my study this far. I acknowledge the guidance of my supervisors Dr. Mary A Otieno and Ms Githogori, whose counsel made this study a success. I also acknowledge the school principals, teachers and students for making available crucial information for the study.

My classmates, Wangui Rachael, Oyalo Evans, Obadha Richard, Goko and Kigaya Paul it was fun studying together

My typist, Jane, editors, Ithubi and Alice and all who gave their contributions toward the study, you all did commendable job towards completion of the whole project.

God bless you
ABSTRACT

We are living in the digital age and hardly any aspect of human endeavour can be effectively carried on without Information Technology as a means of Communication. With this in mind it would be important for the Educational policy makers to come up with strategies that will make our Educational system adapt to the use of ICT. This can only be achieved if learners are computer literate. ICTs are now at centre of education reform in line with the technological development of the 21st century. Although computer studies was introduced into our curriculum almost a decade ago the implementation of the subject have not been fully achieved. This may be due to various factors. The study was carried out in the schools that are offering computer studies, in Gatanga sub-county, to assess the implementation of computer studies, establish how the schools have been meeting the cost of implementing computer studies and the benefits the subject may impact on the learners The study is done through a cost-benefit analysis. It tries to figure out whether the benefits outweighs its initials cost. It also gives the reasons as to why the study is worth and try to look at the factors that hinder the uptake of computer studies in secondary schools and the measure that should be taken to overcome the constrains. The theory chosen in the study is the Human capital, which state that for any economy to develop, the government must invest in the education of its people. It is noted that ICT-supported education can promote the acquisition of knowledge and skills that will empower students for lifelong learning, hence the need to implement computer science globally, in African and kenyan institutions of learning. This can be done through funding and proper implementation of polices. Non-experimental descriptive survey was used since it is concerned with gathering facts. There are 38 secondary schools that made up the target population. A sample of 8 schools was used in the study. Stratified random was used to allow full participation of the schools. There were 76 HOD/computer studies teachers while the total number of students taking computer studies was 320. From the sampled schools 8 principals were considered. The number of HOD/teachers considered was 15 while students were 64. This sample represented 20% of the total population. Data was collected using questionnaires, interview and observation schedule. A pre-test was carried out in one school. This was to assist in determining the accuracy and clarity the suitability of the instruments. The data collected was organised, tabulated and analysed using the computer Spreadsheet. Descriptive statistics was used to present the results of the study and the general trends, this involved tabulating, graphing and describing data. This was followed by a discussion of the finding, drawing conclusions and giving recommendations based on the finding in the study. The study reviewed that most students taking computer studies could easily perform basics tasks on computer; inadequate infrastructure was the main issue leading to low enrolment. High cost of running the subject pushes the principals to charge extra fees to students taking computer studies. The researcher recommends that Government should intensify ICT funding in schools to help subsidize the high ICT costs and increase the number of computers in schools. The TSC should deploy more computers studies teachers in schools.
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<td>Association for Computing Machinery</td>
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<td>CFSK</td>
<td>Computer for Schools, Kenya</td>
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<td>CSTA</td>
<td>Computer Science Teachers Association</td>
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<td>ERS</td>
<td>Economic Recovery Strategy</td>
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<td>ICT</td>
<td>Information communication technology</td>
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<td>IDCE</td>
<td>International development of computer education</td>
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<td>IT</td>
<td>Information Technology</td>
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<td>KCG</td>
<td>Kyoto Computer Gakuin</td>
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<td>Kenya Education Sector Support Programme</td>
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<td>Ministry of Education</td>
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<td>Ministry of Education, Science and Technology</td>
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<tr>
<td>OECD</td>
<td>Organization of economic co-operation and development</td>
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<tr>
<td>PC</td>
<td>Programme counter</td>
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<tr>
<td>TIQET</td>
<td>Totally Integrated Quality Education and Training</td>
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<td>TIVET</td>
<td>Technical, Industrial, Vocational and Entrepreneurship Training</td>
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<td>UNESCO</td>
<td>United Nation Educational, Scientific and Cultural organization</td>
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CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

Information Communication Technology (ICT) has already played and will in all probability continue to play an important role in all spheres of society in the future. ICTs are already extensively used in banking, commerce, agriculture, government, and education. These are the economic sectors that will in future employ many school leavers. Mugenda, (2006) argue that without ICT skills and knowledge, many young adults may lose out. It is therefore vital to look at the role of ICT in education, and more specifically in schools.

Computer literacy is the main component to sustainable ICT integration in schools at all levels. This can only be achieved if computer studies as a subject is offered in our schools. According to the Koech Report (1999) on Totally Integrated Quality Education and Training (TIQET), an area of education curriculum that was found deficient was IT. This led to the commission (Koech) to identify communication technology, information technology and computer science as some of the emerging issues that needed attention. Therefore, the introduction of ICT in the education system was recommended as from January 2003. As a result of these recommendations the KIE through the TIVET department developed a syllabus for secondary schools for computer studies as a subject. It was placed among one of the elective subjects within applied science. It was published in September 2002.

The syllabus laid emphasis on how the computer can be used to carry out different tasks to facilitate teaching and learning. It introduces learners to simple maintenance
skills necessary for solving computer related problems. The course also imparts knowledge, skills, and attitudes to the learners necessary for fitting and adapting to the ever changing computer world and hence developing morally, mentally, socially and spiritually thus laying foundation for further education and training in the world of work.

To fully implement the new course, various resources and methodologies have been recommended for effective teaching. For instance KNEC is mandated to carry out evaluations and award grades for the course and this allows both students and teachers to cover the computer studies syllabus within the stipulated time. Despite the recommendation the implementation of computer studies in secondary schools have not been fully achieved. The main reason for poor uptake of computer studies revolves around the cost. Computer studies as a subject is taught through a combination of theory and practice and as such, practicals are an essential element of its teaching. Computer studies, home science and industrial courses are allocated an average of three theories and two practical 40-minute lessons each week, although students and teachers can, and may spend more than the allotted time. Beside time other teaching inputs for computer studies are classes, land, computer laboratory, computers and printers, printing stationary, diskettes and appropriate software for computer studies (K.I.E syllabus vol iv). All this looked together has an economic aspect on the cost.

The cost of teaching most vocational subjects except business studies is on average higher than that of teaching all other subjects including the sciences. These higher costs relate to construction and equipping of workshops and their running costs including consumables and equipment maintenance; the extra cost of training vocational education teachers many of whom are not maximally utilized; the cost of
books, many of which are imported; smaller class sizes; and the additional costs associated with examining practical subjects by the Kenya National Examinations Council (KNEC). The financing of vocational courses is shared between the government and parents. Government pays teachers’ salaries while parents meet the costs related to consumables (Oloo 2009). Parents also pay to have their children taught some vocational courses such as computer studies and home science. Apart from religious organizations, the rest of the private sector may not be involved in financing this curriculum. Kailikia (2005) state that factors that affect the implementation of computer studies are further associated with lack of qualified computer teachers, the cost of purchasing and maintaining relevant equipment, lack of electricity in most rural areas and limited opportunities for graduates with these skills in the rural areas of Kenya. The extra fees which they are required to pay for this course discourage some students who may also be interested in enrolling. Also, parents and school administrators are discouraged by the higher costs of teaching these courses.

Cost is one of the main factors that hinder the implementation of computer studies in most learning institutions. It should be noted that education is now universally recognised as form of investment in human capital that yield economic benefits and contributes to a country’s future wealth by increasing the productive capacity of its people. As we move from industrial to information society cost must be incurred (Capron, 2005). Thus expenditure on education can be partially justified in the terms of the potential contribution to education economic growth. All forms of investment involve a sacrifice of present consumption in order to secure future benefits in form of higher level of output or income (Bowman 1966). For the country to achieve the vision 2030 it must invest in technology.
1.2 Statement of the Problem

To live and work in an ICT dominated world, our learners today need to graduate with competence in information communication technology. ICTs promote access to information for private and professional decision-making which expand the range of choices and opportunities by facilitating greater access to economic, educational and development related information. No nation will be able to operate in the 21st century without a 21st electronic infrastructure. With this in mind it would be important to equip learners with skills that will make them easily fit into the world of work. This can be achieved if learners are computer literate.

Despite the fact that there is a clear policy from the MOE for computer studies to be part of examinable subjects research finding shows that few schools are offering computer studies as one of the examinable subjects while majority of schools have not implemented the ICT polices in schools. The study sought to investigate how the schools which are offering computer studies have developed computer work plans and how they raise and manage the budget allocations. The study also investigate the benefits the student's gains by taking computer studies as an examinable subject. The study will be done through a cost-benefit analysis in the implementation of computer studies in secondary schools in Gatanga (Murang’a county).

1.3 Purpose of the Study

The purpose of the study is to carry out an investigation of the cost-benefit analysis in the implementation of computer studies in secondary schools with a view of making suggestions on policy formulation and implementation for the education system. It would also sensitize school administration and board of governors on the cost-benefits of Computer Studies and having an ICT policy within their schools, and shade more
light on how the schools curriculum would be enriched through offering of computer studies.

1.4 Objectives of the Study

The objectives of the study are:

(i) Investigate whether the mean grade of the students taking computer studies at KCSE is worth the cost of offering the subjects.

(ii) Investigate how the schools have been meeting the cost of implementing computer studies.

(iii) Investigate the challenges faced by students in computer studies.

(iv) Determine the benefit of computer studies in secondary schools in Gatanga sub-county.

(v) Suggest ways that can be used to increase enrolment in computer studies.

1.5 Research Questions

The study will attempt to answer the following questions:

(i) Is the mean grade of students taking computer studies at KCSE worth the cost of offering the subject?

(ii) In what ways are the schools getting the finances to manage computer studies?

(iii) What are some of the challenges faced by learners in computer studies?

(iv) What are the benefits of computer studies in secondary schools in Gatanga sub-county?

(v) What should be done so as to increase enrolment in computer studies?

1.6 Significance of the Study

Access to ICT in schools and training institutions can enhance teaching and learning processes (Ocholla 2001). This can only be achieved if learners are computer literate. The ministry of education science and technology (MOEST) are the main policy...
makers. The result of the study may assist them in planning, formulating, implementing and managing ICT in the education institutions. The school administration would use the finding in marking decisions on the type of ICT infrastructure to acquire as well as the technical support necessary for proper implementation of computer studies in their schools. The study may make the Teachers Service Commission (TSC) to demand for more funds so as to employ trained teachers to teach computer studies so as to increase computer literacy to most schools leavers.

1.7 Assumptions of the Study

This study will be based on the assumption that:

(i) There are major factors in terms of cost that are hindering the implementation of computer studies as a subject in secondary schools.

(ii) The selected respondents will co-operate and give accurate data.

(iii) Most teachers/learners are not aware of the importance of computer literacy in career choices.

1.8 Limitations of the Study

The following will be the limitations of the study

(i) Due to the geographical disparity, not all the schools will be considered for the study.

(ii) The study will confine itself to students and teachers in public secondary schools. This is because they constitute the highest number of students as compared to private schools.

(iii) The students and teachers to be included in the sample will be those in session in the respective schools at the time of the study. Those absent or who have completed examination will not be included even though they would have had an interesting input.
1.9 Delimitations of the study

The following will be the delimitations of the proposed study

(i) Although the study is concerned with the implementation of computer studies in Gatanga sub-county the information gathered can be generalized to all Kenyan secondary schools in rural areas where conditions are generally similar in nature.

1.10 Theoretical Framework

The theory used in this study is the human capital, which postulates that education and training are a form of investment in human beings. Like any other investment, it gives returns, which are reflected in earnings of the educated people. The human capital theory was first articulated by Adam Smith in 1776 when he compared educated workers to expensive machines. The theory gained prominence in 1960 when T.W Schultz first published the study ‘investment in human capital’, investment in education in the US economy.

Before Schultz, for most economists, capital was restricted to physical capital. Analysis of the traditional factors of production (land, labour and human capital) could not fully account for the rapid rate of economic growth. This is what Schultz, and others later, attributed to human capital achieved through formal education, on-the-job training, improved health, adult education and mobility of workers who were able to respond to changing job opportunities.

The underlying belief is that education creates assets in the form of knowledge and skills, which in turn increase the productivity of educated workers. As a result, those with more education receive higher lifetime earnings than those with less or no education. The theory rests on the assumption that workers are paid according to their productivity and the fact that educated workers earn more than the less educated or illiterate is assumed to reflect higher productivity. The theory compares investment in physical and human capital and concludes that improvements in productive capacity...
of educated personnel through general or specific education or training can be profitable as an investment in new machinery or any form of traditional physical capital.

Those who advance the human capital theory argue that investment in human capital will accelerate economic growth. It should be noted that human capital is more than investment in education; it also embodies health, nutrition, fertility and general welfare of people.

Since 1970s, many additional studies have shown that in developing countries, not only is education profitable but, in many cases, its rate of return exceeds the rate of return to physical capital. Between 1970 and 1977, the twelve countries with the fastest growth rate had well above average levels of literacy and life expectancy, literacy levels of national income and an increase in the literacy rate from 20-30% was found to cause national income (GDP) to increase by 6-8%. The relationship was stronger for African countries than for developing countries.

For any economy to develop, the government must invest in the education of its human capital. When making such an investment, we anticipate future financial and non-financial returns. Human capital theorists distinguish between investment and consumption. Investment refers to the acquisitions of assets, which yields benefits over a long time. Consumption refers to the purchase and utilization of final goods and services, which bring immediate but short-lived benefits. The distinction is important as education can sometimes be viewed as a consumption rather than investment (although at other times it may be regarded as both).

It is important to understand that there are earning foregone by the students when they attend schools or institutions of training. In theories developed by Becker (1964) and Schultz, (1971) and a host of others, it is assumed that rational people will attempt to invest in education up to a point where returns to them in terms of extra income are
equal to the costs of undertaking education, including the income foregone while education is being undertaken.

Decisions on investment in human capital generally relate to the amount of education to give children, incomes earners usually cannot afford to resume education on full-time basis or may be barred from doing so. People gain value in the job market by increasing their skills and abilities, or human capital. As a result, they can often get higher paying jobs.

With this in mind the government needs to put more resources in provision of ICT education in the educational system in the country. This will increase the rate of computer literacy among its people and therefore enhance easy communication as the world is being reduced to a global village. The government also need to put in place regulatory and supervisory oversight to safeguard access, equity and quality in the provision of ICT education and at the same time control capital market failures and information asymmetries in case of moral hazards like pornography through ICT like the internet (Tait, 2005).

For any economy to develop, the government must invest in education of its human capital. When making such an investment, we anticipate future financial and non-financial returns. Education planners and decision makers need to consider trends in the job market, which continue to change rapidly. Investing in technology is a major decision for schools, which worry that without a solid technological footing, their students won't be able to compete in the computer-driven workplace of the 21st century. There is no doubt that computers will play an ever-increasing role in our children's lives. The persons entering the job market today are expected to have basic computer skills (Ali, 2011 pg 397).
1.11 Conceptual Framework
Cost-benefit analysis in education planning was first published in 1970. The practice of education has undergone a great change since then yet the need to make sound decisions based on an analysis of costs and benefit remains. The tense debate surrounding the validity of this method has appeased as it now widely recognised that cost-benefit analysis and rates of return are not the only criteria to take into consideration when planning education and making policy decisions. However this criterion is important and is in very high demand among planners. All planning consists of choice between alternatives (woodhall 1973).

The issue of computer literacy is becoming a subject of concern worldwide particularly in developing countries. Hence there should be a clear policy on how resources should be directed towards the teaching of computer studies. The relationship between the costs and the benefits should be viewed as a form of social or private investment. When considering the costs that may be incurred towards computer studies it would be important to look at the following, societal, personnel, school policies and Government. All these may involve use of money, time, and opportunity cost.

On the benefit side of computer studies to the learners, it would increase computer literacy and hence easily fit into the world of work, grading by KNEC would also improve the KCSE result. The learners also may easily be able to join courses that are related to computers. This includes computer engineering, computer programming, IT, computer networking among others. When all these relationship are taken together they result to successful implementation of computer studies in schools.
Fig 1.1 Conceptual framework

**Societal costs**
- Direct costs
- Opportunity costs

**Personnel costs**
- Direct costs
- Opportunity costs

**Successful implementation of computer studies in secondary schools**

**Benefits**
- Increase computer literacy
- KCSE results
- Computer career choices

**School policies and costs**
- Hardware
- Software
- Maintainance

**Government**
- Direct funding
- Indirect funding
- ICT policies

Source: The researcher
1.12 Operational Definition of Terms

**Communication:** Refers to the process through which information is relayed, passed/transmitted from one point to another e.g. through the internet.

**Computer:** Any electronic, magnetic or any other high speed data processing device or system which performs logical arithmetic and memory functions by manipulation of Electronic, magnetic or optical impulses, and includes all input, output processing, Storage software and communication facilities which are connected or related as a system or network.

**Computer lab:** Building/room that houses computers in an institution.

**Computer “user”:** are people who purchase and use computer software.

**E-learning:** Process of getting information for learning purposes through the internet e.g. virtual class.

**E-waste:** Information name for electronic products nearing the end of their “useful life”

**Hardware:** The physical components of a computer system.

**Information revolution:** Refers to the enormous change in information processing in the past decade.

**Internet:** Is a loosely organized collection of network that connects users worldwide.

**Net-work:** A computer system that uses communication equipment to connect computers and their resources. Resources include printers and hard disk and software.

**On-job-training:** This is a situation where workers are given training at his/her work place by his/her immediate supervisor.

**Software:** Refers to the programmes that contain data e.g. Microsoft word, excels, access and power point.
CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter delves into literature that is related to this study. This is important so as to establish the evolution, development and the present status computer studies have on the impact of information and communication technology (ICT) on the society not just in Kenya but globally in general.

2.2 Computer Science – Policy in Developed Countries

Despite its name, a significant amount of computer science does not involve the study of computers themselves. Because of this, several alternative names have been proposed. Certain department of major universities prefer the term computing science, to emphasize precisely that difference. Danish scientist (Peter Naur 2006) suggested the datalogy, to reflect the fact that the scientific discipline revolve around data and data treatment, while not necessarily involving computers. Computer science is considered by some to have a much closer relationship with mathematics than many scientific disciplines; with some observers saying computing is a mathematical science. Some university teach computer science as a theoretical study of computing and algorithmic reasoning. Other colleges and universities, as well as secondary schools and vocational programs that teach computer science, emphasize the practical of advanced programming rather than the theory of algorithms and computation in their computer science curricula. Such curricula tend to focus on those skills that are important to workers entering the software industry (Computer science journal, 2006).
Renowned computer scientist Edsger Dijkstra (2005) once stated, "computer science is no more about computers than astronomy is about telescopes". The design and deployment of computers and computer systems is generally considered the province of disciplines other than computer science. For example, the study computer hardware is usually considered part of computer engineering, while the study of commercial computer systems and their deployment is often called information technology or information systems. However, there has been much cross-fertilization of ideas between the various computer related disciplines. Computer science research has also often crossed into other disciplines, such as philosophy, cognitive science, linguistics, mathematics, physics, statistics and economics.

While computer science professions, increasingly drive the US economy, computer science education is absent in most American K-12 curricula. A report entitled "Running on empty", the failure to teach K-12 computer science in the digital age, was released in October 2010 by Association for Computing Machinery (ACM) and Computer Science Teachers Association (CSTA), and revealed that only 14 states adopted significant education standards' for high school computer science. The report also found that only 9 states count high school computer science courses as a core academic subject in their graduation requirements.

In tandem with "Running on empty", a new, non-partisan advocacy coalition-computing in the core (C in C)—was founded to influence federal and states policy, such as the computer science education Acts, which calls for grants to states to develop plans for improving computer science education and supporting computer science teacher.
2.3 Global Digital Divide and its impact on educational opportunity

The advent of computers, the internet and other Information and Communication Technologies (ICT) has brought significant changes to individuals and communities across the globe. However, these technologies are not equally or universally accessible to all individuals and communities and disparities in ICT access exist. In particular gaps currently exist between those people considered to have access to ICT services and those who do not. These gaps are commonly referred to as the digital divide.

Widening levels of education seem to magnify the digital divide; it is not just the cost of computers that results in the digital divide, but also other range of factors like income, education level, age, location, disability, opinion, gender and culture (Beamish 2007). The concept of the digital divide was originally popularized with regard to disparity in internet access between rural urban areas of the United State of America. Guillen and Suarez, 2005, pg 681 state that ‘Internet has developed unevenly throughout the world’. Over the past few decades there has been a steady increase in individual’s reliance and use of computers in communities around the world, yet this has not been evenly distributed across individuals or communities (Rombel 2006). To address these inequalities in ICT, many initiatives have been applied to improve access to associated technologies and the necessary computer literacy (Devins et al. 2007). While the issues associated with the digital divide may differ across individuals, communities and countries there are some common elements. Most authors agree information technologies, such as computers and the Internet are an integral aspect of society and the internet is a necessary information and communication tool for a knowledge-based economy (Tiene 2004). Globally the digital divide is identified in terms of the difference in access to the internet between
developed and developing countries (Rombel 2006, Tiene 2004). In many countries, the issue of where a person is located is one of the main hurdles to acquiring technology based skills. In their Australian study of barriers affecting technology uptake, Lloyd and Hellwig (2002) found an individual’s educational level was the most significant barrier to ICT access rather than income. However, most studies cite education and income as the most important factors influencing access probably because they are often interrelated (Tait, 2006). Carr (2007) considers education as a key factor in determining access, with findings that show that university graduates are two and a half times more likely to have home internet access than others. The skills that are acquired through education and learning are also mentioned as an important factor influencing ICT uptake Warschauer (2008). Hargittai (2002) comments on the relationship between a person’s access to technologies and their ability to use it, is generally derived from some form of extended education. In the case of education, one of the problems in trying to reduce the effect of a digital divide is that ICT is an expensive item in a school’s budget (Tiene 2002). To overcome this problem most Government in the world have started program aimed at the provision of funding government school with free or affordable access to the Internet and to their information and communication technology (ICT) facilities. This is based on the belief that schools would be best able to provide computer literacy to a large number of students. The cost of ICT devices, traffic, applications, technician and educator training, software, maintainace and infrastructures require ongoing financial means.

The infrastructure by which individuals, households, businesses, and communities connect to the Internet address the physical mediums that people use to connect to the Internet such as desktop computers, laptops, cell phones, iPods or other MP3 players, Xboxes or PlayStations, electronic books readers. Internet connectivity can be utilized
at a variety of locations such as homes, offices, schools, libraries, public spaces, Internet cafes, etc. There are also varying levels of connectivity in rural, suburban, and urban areas (Tait, 2006). Providing access to ICT, it is possible to strengthen and vitalize existing communities, leading to the advancement of citizen involvement in public affairs and by connecting community members it is possible to create virtual communities and more effective and efficient systems of government (Beamish, 2007).

2.4 ICT in African Countries

Despite its short history as a formal academic discipline, computer science has made a number of fundamental contributions to science and society. This includes the start of the digital revolution which includes the current information age and the internet (Cornu 2006). While ICT continues to advance in western and Asian countries, African countries still experience a lag in its implementation, and that continues to widen the digital and knowledge divides. In a recent study by Rathore, et al (2010), observed that access to ICT facilities is a major challenge facing most African countries, with a ratio of one computer to 150 students against the ratio of 1:15 students in the developed countries. Whereas results indicate that ICT has penetrated many sectors including banking, transportation, communications, and medical services, the introduction of courses like computer studies in secondary schools is still at the infancy stage. Implementation of computer education in most African countries is faced by a number of challenges. Butcher (2003) state some of these challenges include: Lack of qualified teachers to teach ICT in schools, the demand for ICT learning has been tremendous and the number of teachers who are trained to teach ICT cannot meet the demand. There are more students willing to be taught computing skills than there are teachers to transfer the skills.
Lack of computers, computers are still very expensive and despite spirited efforts by the government agencies, NGO, corporate organizations and individuals to donate computers to as many schools as possible, there still remains a big percentage of the schools unable to purchase computers for use by their pupils. Lack of electricity, many schools are still not yet connected to electricity, consequently those schools that fall under such areas are left handicapped and may not be able to offer computer studies. Cost of computers are still high, majority of schools cannot afford to buy a computers. Broken down computers; while a good number of schools have benefited from donated used computers, they have not been adequately equipped with the same on maintenance and repair, hence its very common to see a schools computer lab full of broken down computers, some repairable and some not. This has actually been a major problem (It is seen as a dumping ground); e-waste management. Burglary, the fact that computers are still very expensive in Africa, makes them a target for thieves who usually have ready markets to another party at a much less figure. This has made many schools to incur extra expenses trying to burglar proof the computer rooms. This extra expense makes some schools shy away from purchasing computers for their students. Fear by the administration, there is still a strong perception especially by the older generation that computers require highly skilled personnel to operate them, while this may not be the case, some school administrators also fear that their students will be exposed to adult sites and other undesired sites, through the use of the internet. Some also fear the infection of viruses to their computers leading to data loss, while this may be true to some extent, proper education on the safe use of computers and help can alleviate some of these fears.

Although ICT in education is seen as significant in many aspects in a computer-rich world, there is still a huge gap regarding implementation of computers studies in
schools between rich and poorer countries. This is what is known as the ‘digital divide. Digital divide is a growing disparity between those individuals and communities that have and those that do not have easy access to new information technology. The digital divide is more evident in the implementation rate of computers in schools (Beamish 2007). While many developed countries have had a 90 – 100% computer implementation success rate, developing countries have had less success with the implementation of computers science in its schools.

Developing African countries can achieve higher computer literacy by putting in place appropriate educational policies, human development policies and programmes by mobilizing the necessary financial resources for implementation of computer studies. Country with the right policies and plans set within the required enabling and facilitating environment can transform their economies and societies as part of meeting the challenges of globalization and the emerging information age (Dzidonu, 2002).

Some African countries have already put measure to have schools adapt to the use of ICT. Riding on the hugely successful adoption of mobile phone technology, a pilot study on using Kindle (an e-reader) to access electronic books in primary and secondary schools in Ghana in 2010, by a non-profit organisation was started (World reader 2011). In this pilot, Amazon.com, in an effort to aid the study, had donated 20 Kindles and associated accessories, which included covers and power adapters. Since internet connectivity was a problem, organisers pre-loaded textbooks and various reading materials to ensure that students could properly use the Kindles. The Kindles is often touted as a solution to textbooks in schools. Primarily, some advocates feel it would be as well placed in university, helping to relieve the mass of textbooks used (Wambugu, Sunday Nation August 14, 2011). This program can only be successful if
the intended consumers are taking computer studies as one of the compulsory subject and the schools have the right students/computer ratio.

The following table shows computer penetration ratios at schools in selected African countries.

<table>
<thead>
<tr>
<th>Countries</th>
<th>number of schools</th>
<th>schools with computer</th>
<th>% of schools with Computers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egypt</td>
<td>32,000</td>
<td>10,000</td>
<td>31.25</td>
</tr>
<tr>
<td>Ghana</td>
<td>35,000</td>
<td>500</td>
<td>1.43</td>
</tr>
<tr>
<td>Mozambique</td>
<td>7,000</td>
<td>20</td>
<td>0.29</td>
</tr>
<tr>
<td>Namibia</td>
<td>1,519</td>
<td>60</td>
<td>3.94</td>
</tr>
<tr>
<td>South Africa</td>
<td>28,798</td>
<td>5,000</td>
<td>17.36</td>
</tr>
</tbody>
</table>


From table 1.3 above, Egypt has the highest number of schools with computers standing at 10,000 while Mozambique has the lowest at 20 schools only. Although the situation may appear bleak senior leaders across the continent have recognized this problem and are committed to tacking it. According to the sub-Saharan African Education for All Framework for Action (2001), Education ministers, representatives of civil society and international development agencies, have recognised the necessity of Education systems to provide all African people with opportunity to acquire the skills and knowledge essential for access and use of information communication technology. This can only be achieved through offering computer studies in schools (Butcher 2003).

In 2000, the Hasegawa family of the Kyoto Computer Gakuin (KCG) established the International Development of Computer Education (IDCE) program, a special
program to expand computer education. The IDCE program has donated computers and provided computer instruction to countries in Africa. IDCE, which has also been registered as a non-profit corporation in Cambridge, Massachusetts, is headed by Yu Hasegawa, a graduate of the Massachusetts Institute of Technology (MIT) and Harvard University. All these are meant to improve the implementation of computer science in schools in Africa.

In Africa, there is insufficient evidence to suggest a direct link between ICTs and development. Ngwenyama, (2006) argue that recent studies have found a positive correlation between investment in ICTs and economic growth in developed countries, but evidence for developing countries is not as extensive. However, the potential for ICTs to transform the productive capacities of developing nations has been noted (Zhu, 2004). It must be stated that meaningful productive capacities are aligned with a nation’s development goals. To the extent that ICTs are used in many businesses in Africa, especially in the urban areas, this does not suggest that ICTs have brought development to these areas. It can also be argued that the correlation between investment in ICTs and economic growth does not help in understanding whether ICTs cause economic growth or vice versa.

ICT and development are linked both in terms of information and communication technologies as an engine of development (Fleming 2002), and by the “multicausal duality of technological effect” (Ng’ambi and Brown 2004) on development. Ng’ambi and Brown explain that the relationship between ICTs and the effects it causes is always a two-way process. This means that poor nations cannot afford to invest in ICTs, yet without such investment they are likely to continue being poor. In any case, investment in ICTs alone would not make a nation rich. Hawkins (2002) contends that
although development is driven by information, technology, and knowledge, without corresponding investment in infrastructure and human capital, such development would not be realized. The paradox though is that the level of ICT use in any country is closely related to the country’s income (Hesselmark 2003). The implication of this is that there is a need for Africa to conceptualize the role of ICTs in realizing the continent’s unique development goals. The needs in most African countries are too compounded to disaggregate. Ngwenyama (2006) warn that disaggregating issues of education and healthcare infrastructure from ICT infrastructure development is unwise.

Oyendemi (2003) observes that policy makers and national governments in Africa are faced with the challenge of developing appropriate policies that enhance the universal diffusion of, and access, to ICT services while adopting a holistic approach taking cognizance of the social, cultural and political needs of the community. The need for a holistic approach is echoed by Barnard and Vonk (2003) who postulate that Africa ought to develop a strong collective vision, a plan for ICT implementation and establish an information society on the continent. Hawkins (2002) reports that many ministries of education view computers as a stand-alone subject requiring a curriculum focusing on basic computer literacy skills. While computer literacy represents a start, the integration of computers and the Internet into the broader curriculum is where real learning gains will need to be made.

2.5 ICT Policy in Education System in Kenya

The power of ICT to improve the quality of teaching and learning and to rationalize the administration and management of schools is recognised across the globe. It is in view of this that the MOE in conjunction with Belgium Government and Directorate
of E-Government launched the national ICT-innovation centre at the Kenya science campus. This centre will enhance teaching and learning in Kenya schools (Republic of Kenya 2005).

The MOEST policy is to integrate ICT education and training systems so as to prepare learners and staffs of today for the future economy, so as to realise the goals as per vision 2030.

Computer studies is an elective subject which is offered as an examinable subject by KNEC and it is grouped among applied subjects which includes home science, art/design, agriculture, woodwork, metal works, among others.

To make use of ICT in educational sector in Kenya, computer literacy is of great use. A report by computer literacy initiative of Kenya (2003) says that about 60,000 computers are needed for all the 20,000 educational institutions at all levels in Kenya.

In 2006, a pilot programme dubbed e-slates was started in Kenya. It provided pupils with hand held computers in which they used to access digitised textbooks. Successful implementation of this project would have meant that pupils would be reading e-books downloaded on their computers and possibly submit their homework to their teachers electronically. Five years later the project had not picked as expected.

In 2010 a similar project was started in some schools in Kilogoris but the impact of the project is yet to be realised (Worldreader 2011). According to KIE computer studies syllabus for secondary schools (2002), schools intending to offer computer studies are expected to have minimum requirements such as computer laboratories/classroom, computer desks that accommodate monitor at eye level, at least one computer per every four students (1:4) in form one and form two and one computer for every two students (1:2) for forms three and four, at least one printer for
every four computers, printing stationery, appropriate storage devices e.g. diskettes, storage facilities for diskettes and other consumables e.g. diskbanks, appropriate software for the curriculum, relevant reference materials and computers to be used for the course to be preferably be IBM's or IBM-compatible due to their low maintenance costs and availability of spare parts.

For the country to fully embrace the use of ICTs, schools must play the key role in equipping the nation with the necessary skills to cross the digital divide and create dynamic sustainable economic growth. A computer literate workforce is the only foundation upon which the role of Kenya as an emerging economy in Africa can be built (Report by the computer literate initiative in Kenya 2003).

A report by the economic recovery strategy (ERS) on wealth and employment (2003-2007) indicates that there is a low penetration of ICT in rural and marginal areas due to:-

(i) High cost of equipment
(ii) Poor telephone communication
(iii) Lack of power
(iv) Lack of awareness
(v) Poor focus, priority and co-ordination

Kakinda (2003) tended to agree with the above ERS report when he identified some of the challenges facing computer studies implementation in the classroom as:-

(i) Lack of reliable electricity
(ii) Lack of technical skills
(iii) Fear of technology among teachers
(iv) Lack of a national policy on use of computers in schools
The demand by KNEC for the registration of candidates for national exams in both primary and secondary to be made online has put a lot of pressure on teachers to acquire basic knowledge in computers. This is because it has become expensive in registering students in cyber cafés, in terms of money and time.

2.6 Computer for Schools in Kenya

Kenya's private and public sectors have teamed with thriving non-profit organisations to provide secondary schools with refurbished computers and ICT training. CFSK collects refurbishes and redistributes used computers to Kenyan schools. A Kenyan adaptation of a Canadian government program, computers for schools Canada (CFS), the computers used by CFSK are not imported from abroad but are donated by the local business community.

Working closely with Kenya's private sector and the MOEST, CFSK aims at giving more students access to computer technology and to cultivate the skills that young people need to succeed in the knowledge based society. CFSK is also helping teachers, school principals, volunteers and other stakeholders acquire computer training. The CFSK is beginning to introduce wireless internet access into Kenyan schools (http://www.cfsk.org).

In the last nine years of existence, CFSK has sourced over 48,000 personal computers that have been deployed in over 2,500 Public Secondary and Primary Schools, Technical Training Institutes, Teacher Training Colleges, Medical Training Centres and several Universities. The CFSK also call out a comprehensive preventive and curative maintenance programme for these computers to ensure they are fully operational all the time. In a number of these institutions, it has placed electricity generators, Internet access and the WorldSpace Direct Media Service.
In this period of time, CFSK has trained over 10,770 heads of schools and Education officers, teachers and tutors, and members of Schools’ Boards of Governors and Parents/Teachers Associations. It has also successfully developed digital multimedia teaching/learning resources specifically intended for our national Secondary School curriculum – providing both teachers and students with an invaluable modern tool that makes learning fun and stimulating. It has also developed software tools for school management. The main challenges faced by CFSK include inadequate funds, high demand for computers and high level of computer illiteracy.

2.7 ICT in Education Investment Programme

The 2005 Sessional Paper emphasizes that Information and Communication Technology skills play a key role in promoting economic development of a country. The Government appreciates and recognizes that, an ICT literate workforce is the foundation on which Kenya can acquire the status of a knowledge economy. The Government therefore makes education the avenue for equipping the nation with ICT skills in order to create a vibrant and sustainable economic growth. In the e-Government strategy and National ICT policy, considerable attention is given to education, particularly schools as agents with the greatest potential to address digital divide, expansion of learning opportunities and e-Government. The proposed investment programme is intended to put in place the policy and strategy for ICT in education, building of necessary capacity, development of required ICT infrastructure, and institutional management systems.

The initiatives towards ICT in education have been carried-out largely by individual institutions with occasional support from the private sector. The Ministry’s policy on ICT is to integrate ICT education and training into education and training systems in
order to prepare the learners, and staff of today for the Kenyan economy of tomorrow and therefore enhances the nation's ICT skills. This can easily be achieved if learners are computer literate, hence the need to introduce computer studies as one of the core subject in our education system.

The cost of implementing computer studies curriculum in schools may not be put at a fixed cost. This is because there are various factors that are put into consideration in the implementation of any curriculum. This may be associated to inflation which may lead to: changing cost of hardware/software, change in cost of instructional materials, the cost of running the subject, the number of students taking the subject and payment of the personnel among others. Hence for effectiveness implementation of computer studies in schools, various sources of funding have to be identified.

The Government supports ICT in education with the view to providing guidelines, standards and controls to support implementation of ICT in educational institutions. In this respect, the components of the investment programme are; ministerial ICT capacity development, ICT advisory services to education institutions, digital content development and delivery, ICT teacher development, research and development on ICT in education and capacity Building.

Table 2.2 shows the summary of the total cost over 5 years for ICT in education investment programme, which is about Ksh.394.3 million excluding capacity building. It is envisaged that the capacity building on ICT will cost Ksh.288 million.
Table 2.2 summary of the total cost for ICT in education

<table>
<thead>
<tr>
<th>Description</th>
<th>Total Amount</th>
<th>2005/06</th>
<th>2006/07</th>
<th>2007/08</th>
<th>2008/09</th>
<th>2009/10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ministerial ICT</td>
<td>192.55</td>
<td>49.84</td>
<td>34.84</td>
<td>63.94</td>
<td>25.59</td>
<td>18.34</td>
</tr>
<tr>
<td>capacity development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICT advisory services to Education</td>
<td>56.25</td>
<td>6.3</td>
<td>13.3</td>
<td>19.55</td>
<td>18.3</td>
<td>5.8</td>
</tr>
<tr>
<td>institutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital content development and delivery</td>
<td>35.3</td>
<td>7.26</td>
<td>8.26</td>
<td>7.26</td>
<td>6.76</td>
<td>5.76</td>
</tr>
<tr>
<td>ICT teachers and Development</td>
<td>87.75</td>
<td>17.55</td>
<td>17.55</td>
<td>17.55</td>
<td>17.55</td>
<td>17.55</td>
</tr>
<tr>
<td>Research and development on ICT in education</td>
<td>22.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>394.35</td>
<td>85.45</td>
<td>78.45</td>
<td>112.8</td>
<td>72.7</td>
<td>51.95</td>
</tr>
</tbody>
</table>

Source: Kenya education plan 2005-2010

The investment put above is geared to making that ICT is fully achieved in our educational institutions. Thus the implementation of computer studies in secondary schools should also be looked into as a vehicle to increase computer literacy. Integration of ICT in schools can only be achieved if learners are computer literate, hence more resource should put toward offering of the subject.

2.8 Summary of Literature Review

The literature reviewed shows clearly that the use of ICT is an integral part of any country’s social-economic transformation. Therefore, it would be important for most countries to invest more and increase the level of computer literacy among the citizens. Any country that invests in ICT pays a high divided (Kailikia 2005). It is noted that to close the widening digital divide gap between developed and developing
countries, more resources needs to be put in development of ICT in the education sector.

Again it is noted that the government appreciates and recognize that ICT literate workforce is the foundation on which Kenya can acquire the status of knowledge economic, hence a lot of resources has been channelled for ICT in education programme. Failure to train learners at appropriate time with new skills will lead to the countries lagging behind globally. Technological innovation, often fuelled by government led research and development (R&D), have been the driving force for industrial growth around the world. A cost-effective way thus needs to be put in place to make computer studies as a core subject in all secondary schools.
CHAPTER THREE

METHODOLOGY

3.1 Introduction
This chapter discusses the procedures and strategies that were used in the study. It is organised under the following sections: research design, research site, population, sampling techniques, research instruments, and data collection procedures and analysis.

3.2 Research Design
The research design used in the study was descriptive survey. The researcher collected information from respondents on factors that affect the implementation of computer studies in secondary schools in Kenya generally and in particular Gatanga sub-county with view of carrying out a cost benefit analysis in the implementation of computer studies. Descriptive survey is a method of collecting information by interviewing or administering questionnaires to a sample of individuals (Orodho, 2003). It can also be used when collecting information about people’s attitudes, opinions, habits or any of the varieties of education or social issues (Orodho and Kombo 2002). A descriptive survey study (Robson, 1993) provides a relatively simple and straightforward approach to the study of values, attitudes, beliefs and motive.

3.3 Location of the Study
The study was carried out in secondary schools in Gatanga sub-county in Murang’a County (Kenya). The area was chosen because of the diversity of schools where some are in urban areas and well equipped while others are in the interior parts and poorly equipped.
3.4 Target Population

The target population were the school principals; HOD/computer studies teachers and students in public secondary schools within Gatanga sub-county, Murang’a County. The county has a total of 208 secondary schools, where 38 schools are in Gatanga. The schools are in various categories i.e. boys boarding, girls' boarding, mixed day, and mixed boarding schools.

3.5 Sampling Techniques

Sampling is the procedure a researcher uses to gather people, places or things to study. A sample is a finite part of a statistical population whose properties are whole (Webster, 1985). Slavin (1984) observed that due to limitation in time, fund and energy, a study could be carried out from a carefully selected sample to represent the entire population.

3.6 Sample Size

A sample size of 8 schools representing 21.05% of the total secondary schools was used in the study. A total of 15 HOD/computer studies teachers were considered for the study. This represented 19.73% of the total HOD/computer studies teachers in the sampled schools. The students who were taking computer studies were randomly picked to be the respondents in each sample. A total of 64 students were thus considered for the study. This sample represented 20% of the total population. Gay (1992) postulated that a sample size of at least 20% of the population is a good representation.
Table 2.3 shows the composition of the sample size.

Table: 3.1 Samples and Population

<table>
<thead>
<tr>
<th></th>
<th>Population</th>
<th>Sample Size</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principals</td>
<td>38</td>
<td>8</td>
<td>21.05%</td>
</tr>
<tr>
<td>HOD/Computer studies teachers</td>
<td>76</td>
<td>15</td>
<td>19.73%</td>
</tr>
<tr>
<td>Students</td>
<td>320</td>
<td>64</td>
<td>20.0%</td>
</tr>
</tbody>
</table>

Source: Researcher 2012

3.7 Research Instruments

The researcher employed four instruments to collect data for the study. This was to ensure the data collected was accurate since corroboration was to be carried out later. They included questionnaires, interview schedules, observation schedules and documentation analysis.

3.7.1 Questionnaires

According to Kombo and Tromp (2006), to ensure the effectiveness of the questionnaires, a pre-test was carried out. The questionnaires consisted of two parts, where part one consisted of items to gather demographic data of the respondents while part two contained questions seeking to establish the extent of computer studies curriculum implementation in the schools. Each questionnaire included open and closed-ended Questions.

a) Questionnaire for the principal

b) Questionnaire for HOD/Computer studies teacher

c) Questionnaire for students
3.7.2 Interview Schedules for the Principal

Bell (1993) argues that interviews put flesh onto the bone of questionnaire responses. On the same note, Peril (1995) is even more apt saying that interviews can provide reliable, valid and theoretically satisfactory results than a Questionnaire especially in societies where interaction is highly personalised. The school principals targeted for questionnaire were the same ones for the interviews.

3.7.3 Observation Schedules

Mugenda and Mugenda (1999) postulates that a researcher utilizes an observation checklist to record what he/she observes during data collection. This is supported by Gosh (1992) who says that much is learnt by observing what people actually do and how they do it. And that observation is almost combined with casual or informal interview. The observation was conducted at the Computer laboratory, to determine the ratio of computers to the students, sources of power, level of operation, safety features and type of computers.

3.7.4 Documentation Analysis

The study made extensive use of the literature review method. This involved examining the MOE, ICTs policy documents such as the sessional paper No .1 of (2005) on Education, training and research. The KIE computer studies syllabus vol. Four (September 2002) which indicates the topics to be covered and the objectives of the subject to the learners.
3.8 Pilot Study

A pilot study was conducted to enhance validity of the questionnaires. The research instruments were piloted in a few schools. This enabled the researcher to modify and make the necessary amendments on the instruments.

3.8.1 Validity

The validity of a test is a measure on how well a test measures what it is supposed to measure (Kombo and Tromp, 2006). Before the actual research, a pre-test was carried out in a few schools. The pre-test was to assist in determining the accuracy and clarify the suitability of the instruments. Validity was established through close consultation and expert judgment of the supervisors; they verified the validity of the research instruments used in the study.

3.8.2 Reliability

Reliability enhances the dependability, accuracy and adequacy of the instruments through Piloting. Mugenda and Mugenda, (1999) observes that the reliability is a measure of degree to which a research instruments yield consistent results or data, after a repeated trials. Borg and Gall (1989) define reliability as the level of internal consistency on stability over time of the measuring research instruments. To ensure reliability of the study, the test- pretest was applied. Respondents conducted during the pre-test were deliberately excluded during the final administration of the instrument. This helped control extraneous influences on the research finding due to prior knowledge of the information required by the instruments.

Reliability correlation co-efficient (r) was calculated using the spearman rank order.
Rho(r) = \frac{1 - 6 \sum d^2}{n (n^2 - 1)} \quad \text{where: } r = \text{spearman’s co-efficient}
\quad d = \text{difference between ranks of pairs of the two variables}
\quad n = \text{the number of pairs of observation}

A correlation(r) of 0.85 was obtained which was higher than 0.75 as recommended by researcher (Orodho 2009). This was considered high enough to judge the instruments as reliable.

3.9 Data Collection Procedure

It worth noting that before conducting the research, a research permit was obtained from the MOE through Kenyatta University. Principals of the participating schools were contacted, after which the Schools were visited for data collection. This was done both at pilot and at the main study. All respondents were assured of confidentiality.

3.10 Data Analysis and Presentation

The data collected was organised, tabulated and analysed into ratio, frequencies tables, percentage and bar charts. This process of data analysis required the use of computer Spreadsheet, which the researcher developed with the assistance of a professional computer specialist. The analysed data provided answers to research questions that the study sought.
CHAPTER FOUR
DATA ANALYSIS, PRESENTATION AND DISCUSSION

4.1 Introduction

This chapter report on the major finding of the study as they relate to each of the five research objectives. Responses on the questions are summarized in tables, graphs and pie-chart. The rest of the data is presented in a narrative form where the most responses are mentioned.

4.2 Demographics and other General Information.

In this section the general demographics and other general information of the study about the participants have been given. The information given includes the gender of the students and the teachers, the age group of teachers, and the level of education of teachers.

4.2.1 Gender of respondents

Figure 4.1 gives the gender distribution of the respondents who participated.

**Figure 4.1 Gender of respondents**

From figure 4.1, it can be observed that 55% of the respondents were female and 45% were male students while majority of the teacher respondents were female as they
consisted of 67% of the respondents as compared to 33% of the respondents who were male.

4.2.2 Type of School

Table 4.1 Type of schools in the sample

Table 4.1 Types of school.

<table>
<thead>
<tr>
<th>School</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls' boarding</td>
<td>3</td>
<td>37.5</td>
</tr>
<tr>
<td>Boys boarding</td>
<td>2</td>
<td>25.0</td>
</tr>
<tr>
<td>Mixed boarding</td>
<td>1</td>
<td>12.5</td>
</tr>
<tr>
<td>Mixed day</td>
<td>2</td>
<td>25.0</td>
</tr>
<tr>
<td>Total</td>
<td>8</td>
<td>100</td>
</tr>
</tbody>
</table>

From table 4.1 it can be observed that majority of the students respondents belonged to girls' boarding schools which had 37.5%. Boys boarding and mixed day had 25.0% each while mixed boarding was 12.5%.

4.2.3 Age of Respondents

The distribution of the age of teachers is as shown in table 4.2

Table 4.2 Age Distribution

<table>
<thead>
<tr>
<th>Age (Year)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 25</td>
<td>1</td>
<td>12.5</td>
</tr>
<tr>
<td>26-35</td>
<td>5</td>
<td>62.5</td>
</tr>
<tr>
<td>36-45</td>
<td>2</td>
<td>25.0</td>
</tr>
<tr>
<td>Above 46</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

As shown in table 4.2, most of respondents were in the age category of between 26-35 years at 62.5% Below 25 years was at 12.5% while above 36 years was at 25.0%.
The purpose of this data was to ensure that the information gathered was a representation of all the teacher population across all the age groups.

4.2.4 Education Level of the teachers

This was to capture the level of the education of the target group. Figure 4.2 show the distribution of the respondents.

Figure 4.2 Educational levels of the teachers

From figure 4.2 those with master in Education was at 25%, degree had the highest with 63% while Diploma was at 12%. It should be noted teachers play a very big role in impacting knowledge to learners.

4.3 Mean Score of Students who have Taken Computers Studies in KCSE

The researcher sought to find the performance of the students in computer studies at KCSE. This was in order to calculate the mean grade. It should be noted quality measured by test score is directly related to individual earnings, productivity and economic growth. Thus the economic benefits of effective schooling as measured by student achievement are much greater than the benefits of ineffective schooling.
Table 4.3 show the result for computer studies in KCSE that was realized from the schools that were sampled.

Table 4.3  KCSE Result for computer studies.

<table>
<thead>
<tr>
<th>Grade</th>
<th>A</th>
<th>A'</th>
<th>B'</th>
<th>B'</th>
<th>B'</th>
<th>C'</th>
<th>C'</th>
<th>D'</th>
<th>D'</th>
<th>E</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>10</td>
<td>12</td>
<td>17</td>
<td>19</td>
<td>16</td>
<td>19</td>
<td>14</td>
<td>11</td>
<td>11</td>
<td>20</td>
<td>160</td>
</tr>
<tr>
<td>Girls</td>
<td>4</td>
<td>6</td>
<td>13</td>
<td>20</td>
<td>14</td>
<td>18</td>
<td>17</td>
<td>17</td>
<td>29</td>
<td>11</td>
<td>167</td>
</tr>
</tbody>
</table>

From the study it is noted that 327 students had taken computer studies in KCSE in the previous year with boys at 160 and girls at 167. The mean score for boys was found to be 6.961 and girls' 6.141, hence boys had performed better than girls with a mean grade of C+ to girls at C. The mean score for both boys and girls was 6.551 with a mean grade of C+. Therefore cost-benefit analysis in this case try to account for the quality of computer studies as measured by achievement test score and not just quantity as measured by years of schooling. With the mean score of C+ for both boys and girls, the cost of implementing computer studies should be an investment worth taking.

4.3.1 Instructional Material for Computer Studies

From the literature review, it is noted that implementation of computer science education is faced by a number of challenges this includes inadequate instructional materials which have a negative effect for effective implementation of the curriculum.

When the students and teachers were asked about the adequacy of instructional materials for computer studies in their schools, the result was as shown in figure 4.3.
From figure 4.3 it can be seen that almost all the students at 87% and teachers at 81% who participated in the study indicated that the number of instructional materials for computer studies was not adequate for proper delivery of the syllabus.

4.3.2 Computer Studies Syllabus for secondary schools

Computer studies syllabus emphasis on how the computer can be used to carry out different tasks to facilitate teaching and learning. It introduces learners to simple maintenance skills necessary for solving computer related problems. The course should impart knowledge, skills and attitudes to the learners necessary for fitting and adapting to the ever changing computer world. The syllabus is supposed to guide the teacher on how to deliver the curriculum. It is also the instrument used by KNCE to set exams.

The researcher had sought to know from the curriculum implementer how extensive the computer studies syllabus is in its coverage. The figure 4.4 show the result realized.
From figure 4.4 it can be seen that 38% of the respondents felt that the syllabus was very extensive while 50% felt it was extensive. 12% were of the opinion that the syllabus was shallow.

4.3.3 Factors that Influence the Performance in Computer Studies in secondary schools

There are various factors that hinder effective implementation of computer studies curriculum. Poor delivery of the curriculum will affect the performance. The researcher had sought to seek for the factors that influence the performance in computer studies. The table, below present's percentages of how they responded to the statements presented in the questionnaire. SA-strongly agreed, A-agreed, U-uncertain, D-disagreed and SD-strongly disagreed.
Table 4.4 Factor that affect performance of computer studies

<table>
<thead>
<tr>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualified teachers</td>
<td>45.5%</td>
<td>43.2%</td>
<td>0.0%</td>
<td>5.3%</td>
<td>6.0%</td>
</tr>
<tr>
<td>High cost of running the subject</td>
<td>43.4%</td>
<td>44.6%</td>
<td>2.9%</td>
<td>5.8%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Equip computer lab</td>
<td>39.1%</td>
<td>37.3%</td>
<td>6.2%</td>
<td>11.8%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Poor access of technical help</td>
<td>26.8%</td>
<td>29.2%</td>
<td>16.7%</td>
<td>13.2%</td>
<td>14.1%</td>
</tr>
<tr>
<td>Internet connection</td>
<td>43.8%</td>
<td>44.2%</td>
<td>3.0%</td>
<td>3.1%</td>
<td>5.9%</td>
</tr>
<tr>
<td>Fear of students toward the subject</td>
<td>32.3%</td>
<td>30.7%</td>
<td>12.0%</td>
<td>14.4%</td>
<td>10.6%</td>
</tr>
</tbody>
</table>

From table 4.4, lack of qualified teachers to teach computer studies influence the performance of the subject, 45.5% strongly agreed, 43.2% agreed, 0.0% was uncertain while 5.3% disagreed and 6.0% strongly disagreed. That high cost of running the subject was 43.4% strongly agreed, 44.6% agreed, 2.9% were uncertain while 5.8% disagreed and 3.3% strongly agreed. On lack of equipped computer lab, 39.1% strongly agreed, 37.3% agreed, 6.2% were uncertain while 11.8% disagreed and 5.6% strongly disagreed. When asked about poor access of technical help when computer breakdown, 26.8% strongly agreed, 29.2% agreed, 16.7% were uncertain while 13.2% disagreed and 14.1% strongly agreed. On internet connection 43.8% strongly agreed, 44.2% agreed, 3.0% were uncertain while 3.1% disagreed and 5.9% strongly disagreed. And fear of the students toward the subject was at 32.3% strongly agreed, 30.7% agreed, 12.0% were uncertain while 14.4% were disagreed and 10.6% strongly disagreed.

4.4 Students Skills on Computer Basic Functions

The literature review revealed that effective integration of ICT in the education system is not possible without knowledge, skills and experience to perform basic tasks on a computer (Rathore 2010). Hargittai (2002) comments on the relationship
between a person's access to technologies and their ability to use it. The students were asked if they could perform basic tasks on a computer in order to find out the extent to which they are endowed with skills on computer use. This involved basic use like log on/log off, create/edit a document and open a file. The results of the outcome are as shown in figure 4.5 below.

Figure 4.5 Computer Basic Functions

Figure 4.5 indicate that 95% were able to log on/log off a computer while 5% were unable, 76% would create/edit a document while 24% would not and 74% would open a file while 26% would not. From the outcome it is important to note that most students had accrued basic knowledge on how to perform some basic functions on a computer. This implies that if learners are introduced to computer courses at an early age they would adapt quickly to advances in technology. Beamish (2007) state that computer skills learned in middle schools and high school will benefit students during higher education courses and their careers. Students as young as 12 learn how to create Power Point presentation, video projects and photo slideshows. By learning how to use computers, students even in low-income areas have access to the world at large (World Bank 2004).
4.5 Internet Facilities

The researcher had sought to find whether the school has made an effort to have internet connection in the computer laboratory.

The result on investigation about the internet facilities are as shown in figure 4.6

**Figure 4.6 Internet facilities**

From figure 4.6 it can be seen that 92.4% of the respondents were of the opinion that, their computer laboratory were not connected to the internet while 7.6% were connected. The schools with internet were mainly through the prepaid modems. This means that the access to the internet is not only erratic but also very expensive because the prepaid modems are provided by the mobile phone service providers who are exorbitant in charge. In the literature review Guillen and Suarez (2005) state that internet has developed unevenly throughout the world. Cornu (2006) notes that developed countries have 80% of the world internet users with developing countries having only 20%.

4.6 Cost of Managing Computer Studies

Managing computer studies in schools involves use of cost in term of providing instructional materials, repairs of computers and payment of the personnel. The study was concerned with how the schools were coping with the challenges of managing the subject. From the study it was noted that the parents of the students taking computer
studies were paying extra money, so as to facilitate the offering of the subject. Hence from the study it was noted that a vote head have been specifically started to run the computer studies. The government was only concerned with payment of personnel, provision of reading material and policy guidelines. Donations from CDF in some schools have been used in building and equipping computer laboratory. Other source of fund was from well wishers while CFKS was also cited as a source of support in some schools.

Figure 4.7 below shows the various source of funding of computer studies in schools.

**Figure 4.7 Funding of Computer Studies**

![Graph showing funding sources](image)

Figure 4.7 shows that parents are the main financial contributor with 60% followed by CDF at 15%, GOK/ministry and CFKS at 10% each and 5% others. The financing of vocational courses is shared between the government and the parents. Government pays teachers’ salaries while parents meet the cost related to consumables (Oloo 2009). Kailikia (2005) notes that parents also pay to have their children taught some
vocational courses such as computer studies and home science. This is confirmed from the finding where the main financial contributors were the parents.

4.7 Enrolment in Computer Studies

The researcher had sought to seek for the factors that lead to low implementation of computer studies in secondary schools. Table 4.5 shows the responses that were realized.

Table 4.5 Enrolment in Computer Studies

<table>
<thead>
<tr>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of computers</td>
<td>49.1%</td>
<td>27.8%</td>
<td>6.5%</td>
<td>8.3%</td>
<td>8.3%</td>
</tr>
<tr>
<td>Inadequate teachers</td>
<td>11%</td>
<td>22%</td>
<td>5.8%</td>
<td>30%</td>
<td>31.2%</td>
</tr>
<tr>
<td>Subject difficult</td>
<td>2.5%</td>
<td>7.5%</td>
<td>5.0%</td>
<td>20%</td>
<td>65.0%</td>
</tr>
<tr>
<td>Learning other subject</td>
<td>30.0%</td>
<td>47.5%</td>
<td>10%</td>
<td>7.5%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Additional cost</td>
<td>52.5%</td>
<td>27.5%</td>
<td>7.5%</td>
<td>7.5%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Access to the internet</td>
<td>56.2%</td>
<td>26.8%</td>
<td>6.5%</td>
<td>4.4%</td>
<td>6.1%</td>
</tr>
<tr>
<td>Use of ICTs</td>
<td>44.5%</td>
<td>34.2%</td>
<td>3.4%</td>
<td>7.4%</td>
<td>10.5%</td>
</tr>
</tbody>
</table>

Few numbers of computers hinder students from registering for computer subject 49.1% strongly agreed, 27.8% agreed, 6.5% were uncertain, while 8.3% disagreed, and 8.3% strongly agreed. When asked whether inadequate number of teachers to teach the subject 11% strongly agreed, 22% agreed, 5.8% were uncertain while 30% disagreed and 31.2% strongly agreed. On the subject being difficult 2.5% strongly agreed 7.5% agreed, 5.0% were uncertain while 20.0% disagreed and 65.0% strongly disagreed. Learning other subject 30.0% strongly agreed, 47.5% agreed, 10% were uncertain while 7.5% disagreed and 5% strongly. On additional cost, 52.5% strongly agreed 27.5% agreed 7.5% were uncertain while 7.5% disagreed and 5.0% strongly disagreed. Access to internet was at 56.2% strongly agreed 26.8% agreed, 6.5%
were uncertain while 4.4% disagreed and 6.1% strongly disagreed. On ICTs, 44.5% strongly agreed, 34.2% agreed, 3.4% were uncertain while 7.4% disagreed and 10.5% strongly disagreed. It should be noted with proper management of resources and implementation of educational policies enrolment in computer studies would greatly improve.

4.8. Benefits of Computer Studies at the secondary level

As established in the literature review policy makers and national Government in Africa are faced with the challenge of developing appropriate policies that enhance the universal diffusion of and access to internet, a plan for ICT implementation in schools and proper foundation for further studies. While computer literacy represents a start, the integration of computer science syllabus into the broader curriculum is where real learning gains will need to be made. When asked the benefits they would have after studying computer studies, the responses are as shown in the table 4.6 below.

Table 4.6 Benefit of computer studies

<table>
<thead>
<tr>
<th>STATEMENT</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy access to internet</td>
<td>44.7%</td>
<td>36.5%</td>
<td>4.0%</td>
<td>8.5%</td>
<td>6.3%</td>
</tr>
<tr>
<td>Foundation for further studies</td>
<td>48.1%</td>
<td>41.6%</td>
<td>3.0%</td>
<td>3.8%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Easy integrations of ICTs in schools</td>
<td>47.0%</td>
<td>42.7%</td>
<td>4.2%</td>
<td>2.3%</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

From the respondents, most felt that computer studies would greatly benefit the students in the following areas. Essay access to internet, 44.7% strongly agreed 36.5% agreed, 4.0% were uncertain while 8.5% disagreed and 6.3% strongly disagreed. While on foundation for further studies were at 48.1% strongly agreed 41.6% agreed, 3.0% were uncertain while 3.8% disagreed and 3.5% strongly disagreed. For easy integration of ICTs in schools was at 47.0% strongly agreed 42.7% agreed, 4.2% were
uncertain while 2.3% disagreed and 3.8% strongly disagreed. It should be noted that the benefits of computer studies is not only limited to the above once.

4.8.1 Exposure to Computer Software/Hardware

Time is a crucial resource for proper delivery of the curriculum. Computer studies is a practical subject hence the need to exposure learners to hands on activities in the computer lab.

The researcher had sought to known how well the students are exposed to computers in form of practical in the computer laboratory in a week. Figure 4.8 show the responses realized.

**Figure 4.8 Exposures to computer software/hardware**

![Exposures to computer software/hardware](image)

From figure 4.8, it clearly indicates that the students have minimum contact with computer. From the responses 52.38% said they have practical once in a week, while 42.86% attend twice in a week and 4.76% said they attend practical thrice. Beamish (2007) state that there is a strong perception especially by the schools administration that computers require highly skilled personnel to operate them and also the fear that when students use computer they will be exposed to adult sites and other undesired sites through the use of the internet. This may be one of the courses of few practical lessons as the computer lab is out of bound to students when there is no teacher.
4.9 Challenges Faced By Students in Computer Studies

Computer literacy has the potential to improve the use of ICT in class in both secondary schools and in tertiary level. But from the observation schedule and responses from the respondents the research finding realized that there are various challenges that are faced by the students as they study computer studies. This includes:

Limited number of computer leading to a high number of students sharing a single computer and therefore less individual attention. In the literature review the recommended ratio of the number of computer to students is (1:2) in form three and form four. Dzidonu (2002) state that limited access to computers is barrier to effective use in class.

In case of power shortage during practical lessons most schools offering computer studies did not have a back-up like generator on standby. Kakinda (2003) indentify one of the challenges facing computer studies implementation in the classroom as lack of reliable electricity. This make the students lose on syllabus coverage and loss of data.

Limited internet connectivity: most schools sampled did not have internet facilities and hence students could not access educational information from the internet. In the literature review Guillen and Suarez (2005) state that internet has developed unevenly throughout the world. This may have a great impact on the students as the computers may be used for connectivity with other computer users. It is also a social media where students can share with other people through social sites like facebook, Ali (2011) indicates that most social sites are available at no cost.
Limited time for the subject: There was a feeling that the time allocated for computer studies was not enough as the syllabus was extensive. Hence coverage of the syllabus was a challenge in some schools. Butcher (2003) state that skills and knowledge are essential for access and use of ICT.

Teaching methodology was also cited as an issue in some schools sampled. Some students felt the approach used by their teacher was not learner centred. The teaching methods used make greatly have an impact on the performance of the students. James (2008) suggest that in order to make use of ICT we must first build up the literacy/language skills, computer literacy and technical competence. In almost all the schools sampled the computer lab accessed by the students in the presence of the teacher. At other time the lab was out of bound to students.

Poorly maintained computers: Most computers used by the students are not regularly updated. Issues of virus in the computers were mentioned. The virus would destroy students work/project, folder, and often make the computer hang and crush. Kakinda (2003) identified one of the challenge facing computer studies implementation in the classroom as lack of technical skills.

Extra cost: An extra fee to parents of students taking computer was also a challenge the students raised. This also affects the enrolment since some parents cannot afford to pay the extra fees. In the literature review a report by the computer literate initiative in Kenya (2003) indicates that there is low penetration of ICT in rural and marginal areas due to high cost of equipments.

A number of respondents felt the number of instructional material for computer studies was not enough for proper deliver of the curriculum. As revealed by the
principals interviewed there were few teachers deployed to teach computer studies and some schools have employed teachers who are paid by the B O G
CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATION

5.1 Introduction

This chapter presents the summary of the study findings, discussions, conclusion and recommendation of the research. The chapter also contains suggestions of the related studies that may be carried out in the future.

5.2 Summary of the study findings

From the findings there was strong indication that the implementations of computer studies in secondary schools can results to a number of benefits to students at an early age. The performance of the students in KSCE revealed that most of them had passed well in the subject with 77.98% of the students having D+ and above and 22.02% scoring less than D+.

The study also revealed that the students taking computer studies could easily perform basic tasks on a computer. These skills would impact an appreciation among learners in adaptation to new technology from an early age. Students who are introduced to computer courses at an early age adapt quickly to advances in technology.

It was also noted that several factors affect the implementation of computer studies in schools. These includes: the high cost of running the subject, and lack of clear policy from the Ministry of Education. The ratio of computer to students is not as per the Ministry recommendation. High cost of running the subject pushes the principals to charge extra fees to the students taking computer studies which lead to low enrolment in the subject.
Inadequate infrastructure was also noted to be a hindrance in the implementation of computer studies in secondary schools. This includes: inadequate number of computers in the schools, inadequate power supply (in case of power interruption there is no back-up in almost all schools sampled). Limited internet connectivity and inadequate technical help/maintenance in case of computer breakdown was an issue in most schools.

From the study it was noted that most of the students that took computer studies were able to perform basic computer functions which can be of great help when they join tertiary institutions.

5.3 Conclusion

The ICTs have great advantage in improving all sphere of life including education. The researcher therefore concludes that there are a lot to benefits from the implementation of computer studies in secondary schools. This includes; it would target a large number of students from different social-economic background. It would drastically cut on cost that is used to train learners in computer literacy in middle level colleges both in monetary cost and time. It would also have great impact in integration of ICTs in tertiary level and could greatly help in bridging the gap that result to digital divide.

Therefore factors that hinder the implementation of computer studies should be looked into. This includes; cost of running the subjects which should be subsides. This may result in the improvement of the infrastructure toward proper syllabus coverage in computer studies.
5.4 Recommendations

Based on the findings of the study, the researcher recommends that:

1. The ministry of Education, science and technology should invest heavily in providing adequate number of computers in schools and also enhance internet connection in the schools to ensure easy access to teaching learning materials in the web.

2. The TSC should deploy more teachers to the schools to train the students on the use of computers and hence increase in the enrolment in computer studies.

3. The schools administration should familiarize themselves with the national ICTs policies and especially in education in order for them to develop school ICT policy that would enable them integrate use of ICTs in teaching and learning in class.

4. Government should make available avenues in which the schools can acquire computers at reduced cost. This can be done through tax waiver on computers meant for learning in secondary schools.

5. All the students should be given some basic training on the use of computers before choosing to take computer studies as a specialized course.

5.5 Suggestions for Further Research

1. This study was carried out in one county only; a similar study could be carried out in other sub-county.

2. A study could be carried out on the factors that hinder the uptake of computer studies in primary schools.

3. A comparative study can be carried out on the impact of using ICTs in secondary school performance.
REFERENCES


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Peter, N: (2006). *Common myths and preconceptions about Cambridge computer science* Computer science Department, University of Cambridge


Dear sir/madam

RE: COST-BENEFIT ANALYSIS IN IMPLEMENTATION OF COMPUTER STUDIES AND IT'S IMPLICATIONS TO LEARNING IN GATANGA, MURANGA COUNTY.

I am a postgraduate student wishing to carry out research on the above mentioned subject. The questionnaires, interview schedules and observation schedules attached are meant to gather information for this study from you. The study will be reported only in terms of the entire population. Therefore do not write your name or anything that may identify you as an individual in this questionnaire. You are kindly requested to respond to all the items in the questionnaire.

Your positive response will be highly appreciated.

Thank you in advance.

Yours faithfully

Githinji J P
APPENDIX 2
Student Questionnaire

Please indicate the correct option as correctly as possible by putting a tick (✓) or by giving a brief explanation. Use the space provided.

PART A
NB: Do not write your name anywhere on this paper.

1. Indicate your gender
   (a) Male  
   (b) Female  

2. Do you know how to log on and log off a computer
   (a) Yes  
   (b) No  

3. Can you open a file on computer
   (a) Yes  
   (b) No  

4. Are you able to create/edit a document on a computer
   (a) Yes  
   (b) No  

5. Are there enough instructional materials for computer studies
   (a) Enough  
   (b) Not Enough  

6. How many times do you go for practical in the computer lab in a week?
   a) Once  
   b) Twice  
   c) Thrice  

7. State two challenges that you encounter as you study computer studies
   ................................................................................................................................................
   ................................................................................................................................................

8. State TWO areas where computers are widely used within the school
   ................................................................................................................................................
   ................................................................................................................................................
PARTB: Factor that influence enrolment in computer studies.

Use a tick (✓) to show how whether you strongly agree (SA), agree (A), undecided (U), disagree (D) or strongly disagree (SD) to the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of computers hinder students from taking computer studies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learning computer lesson would improve my performance in other subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer studies is a difficult subject</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer knowledge would help me access soft copies of revision materials</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Additional charges levied to students taking Computer studies make the subject appear expensive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 3

Questionnaire for the Teachers

Please indicate the correct option as correctly as possible by putting a tick (✓) or by giving a brief explanation. Use the space provided.

NB: Do not write your name anywhere on this paper.

PART A

1. Indicate your gender. a) Male □ b) Female □

2. Indicate your age in years
   - Below 25 □ 26-35 □ 36-45 □ Above 46 □

3. What’s your designation in the department?
   a) HOD □ b) Computer studies teacher □
   c) Teacher □

4. What’s your highest academic/professional qualification?
   a) Certificate □ b) Diploma □
   c) Degree □ d) Med □

5. Is the ratio of computer to students as per MOE recommendation?
   a) Yes □ b) No □

6. Is the computer lab connected to the internet?
   a) Yes □ b) No □

7. How extensive is the computer studies syllabus in it coverage?
   a) Very extensive □ b) Extensive □
   c) Shallow □ d) Very shallow □

8. How many students are taking computer studies as an elective subject in Form 3 and 4?

9. What is the total number of students who have taken computer studies at KCSE since the school started offering the subject?

10. What has been the performance of the students in computer studies within this period?

<table>
<thead>
<tr>
<th>A</th>
<th>A'</th>
<th>B'</th>
<th>B</th>
<th>C'</th>
<th>C</th>
<th>C'</th>
<th>D'</th>
<th>D</th>
<th>D'</th>
<th>E</th>
</tr>
</thead>
</table>

62
**PART B. Factor that influence enrolment in computer studies.**

Use a tick (√) to show whether you strongly agree (SA), agree (A), undecided (U), disagree (D) or strongly disagree (SD) to the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of computers hinder student from enrolling in the subject</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inadequate number of teachers to teach computer studies hinders the uptake of the subject.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The computer are not accessible for learning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The students fear to learn computer because they think it is difficult</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Computer studies would assist the students in learning other subjects better</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Computer studies would assist the students access learning materials in the internet</td>
<td></td>
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</tr>
<tr>
<td>Computer studies will make the students more competitive in the job market</td>
<td></td>
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</tr>
<tr>
<td>Computer studies will give students foundation for further studies in the colleges</td>
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<td></td>
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</tr>
</tbody>
</table>
APPENDIX 4

Questionnaire for School Principals

Please indicate the correct option as correctly as possible by putting a tick (√) or by giving a brief explanation. Use the space provided.

PART A

NB: Do not write your name anywhere on this paper

1. Indicate your gender  a) Male  b) Female

2. What’s your highest academic/professional qualification?
   a) BED (arts)  b) BED (Sci)  c) MED

3. How many computer studies teachers are there in the school?
   a) TSC  b) BOG

4. Is the computer lab/room in the school connected to the internet?
   Yes  No

5. What is the approximate cost in managing computer studies as a subject in the school?

6. Who is the financial contributor to the vote head that is used to run computer studies?

7. How has the government helped the school to implement the computer studies curriculum in the school?
### PART B. Factors That Influence performance in Computer Studies

Use a tick (✓) to show whether you strongly agree (SA), agree (A), undecided (U), disagree (D) or strongly disagree (SD) to the following statements.

<table>
<thead>
<tr>
<th>Statement</th>
<th>SA</th>
<th>A</th>
<th>U</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of qualified teachers to teach computer studies</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>High cost of paying teachers employed by the BOG</td>
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</tr>
<tr>
<td>High cost of running of computer studies as a subject</td>
<td></td>
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</tr>
<tr>
<td>Inadequate number of computers in the school for efficient learning</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>High cost of computer maintenance</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Poor access of technical help when computer breakdown</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inadequate internet connection in the school</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of an equipped computer Lab in the school</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear of the subject by the students who feel that computer studies is a difficult subject</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer studies would assist the students to access the internet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer studies would increase the students' access to educational materials</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer studies is a foundation for further studies</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Computer studies will make teaching and learning easy through the use of ICTs</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 5
INTERVIEW SCHEDULE FOR THE PRINCIPAL

1. Is there an ICT department in the school?
   - Yes [ ]
   - No [ ]

2. How does the school fund the computer studies in the school?

3. Is there an internet facility in the schools?
   - Yes [ ]
   - No [ ]

4. Is the ratio of computers to students as per the ministry?
   - Yes [ ]
   - No [ ]

5. Are the students allowed to select the subject they would wish to take on their own?
   - Yes [ ]
   - No [ ]

6. In case of power blackout, does the school have alternative source of power
   - Yes [ ]
   - No [ ]
APPENDIX 6
OBSERVATION CHECKLIST

<table>
<thead>
<tr>
<th>Unit of observation</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer laboratory</td>
<td></td>
</tr>
<tr>
<td>Alternative source of power</td>
<td></td>
</tr>
<tr>
<td>Number of computer</td>
<td></td>
</tr>
<tr>
<td>Type of computers</td>
<td></td>
</tr>
<tr>
<td>Internet facilities</td>
<td></td>
</tr>
<tr>
<td>Safety features</td>
<td></td>
</tr>
</tbody>
</table>
## APPENDIX 7

### Work Schedule (Time Line)

<table>
<thead>
<tr>
<th>ACTIVITY/DATES</th>
<th>MAY 2011</th>
<th>JANUARY 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROPOSAL WRITING</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FIELD WORK</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DATA ANALYSIS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PROJECT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WRITING/SUBMISSION</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## APPENDIX 8
### Budget

<table>
<thead>
<tr>
<th>ITEM</th>
<th>Approximate amount (Ksh)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Proposal writing</strong></td>
<td></td>
</tr>
<tr>
<td>• Internet surfing</td>
<td>3000</td>
</tr>
<tr>
<td>• Typing and printing</td>
<td>2000</td>
</tr>
<tr>
<td>• Downloading and printing internet materials</td>
<td>2500</td>
</tr>
<tr>
<td><strong>Piloting</strong></td>
<td></td>
</tr>
<tr>
<td>• Photocopying of research instruments</td>
<td>500</td>
</tr>
<tr>
<td>• Subsistence and travelling</td>
<td>2500</td>
</tr>
<tr>
<td><strong>Data collection</strong></td>
<td></td>
</tr>
<tr>
<td>• Development of research instruments</td>
<td>30,000</td>
</tr>
<tr>
<td>• Subsistence and travelling</td>
<td></td>
</tr>
<tr>
<td><strong>Data Analysis and presentation</strong></td>
<td></td>
</tr>
<tr>
<td>• Computer services</td>
<td></td>
</tr>
<tr>
<td>• Project typing</td>
<td>25,000</td>
</tr>
<tr>
<td>• Project photocopying and binding</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>65,500</td>
</tr>
</tbody>
</table>