CONSTRAINTS IN THE USE OF ICT IN TEACHING –LEARNING PROCESSES IN SECONDARY SCHOOLS IN NYANDARUA SOUTHDISTRICT, NYANDARUA COUNTY, KENYA

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DECLARATION

I declare that this project is my original work and has not been presented for a degree in any other university.

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DEDICATION

To my family for their encouragement, concern and support which has made it possible for me to attain my goal.

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During the entire period of my study and writing of this research project many people were of great help and I wish to express my gratitude to them.

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LIST OF ABBREVIATIONS AND ACRONYMS

ASAL-Arid and Semi-arid Lands

CBIS-Computer Based Instruction Simulation

EFA- Education for All

GOK- Government of Kenya

ICT- Information Communication Technology

IRI-Interactive Radio Interaction

KENET-Kenya Education Network

KESSP-Kenya Education Sector Support Programme

KNEC-Kenya National Examination Council

MoE-Ministry of Education

MOEST- Ministry of Education Science and Technology

NCES-National Centre for Education Statistics

NEPAD- New Partnership for Africa' Development

NFE- Non Formal Education

SPSS- Statistical Package of Social Sciences

TAM- Technology Acceptance Model

TCIP-Transparency Communication Infrastructure Project

ABSTRACT

Information communication technology (ICT) is a major drive in most world economies. It has been used in almost all the sectors of the economy. In developed countries like United States and Canada it has been incorporated in the education sectors as a tool for administration, management and in curriculum for both teaching and learning processes in most developing countries like Kenya, hence the study was geared towards secondary schools in Nyandarua south District, Nyandarua county, seeking to establish constraints in the use of ICT in teaching and learning processes in the area. It also sought to find out the level of ICT infrastructure establishment enhancing learning and teaching, to find out the extent to which teachers and students are endowed with ICT skills for used in teaching and learning process. The findings of the study will contribute information to the policy makers that could help them to formulate their teacher training programmes involving ICTs for education. The study sampled schools using purposive sampling technique using the criteria of the type of schools (boarding, day, mixed, boys or girls). Descriptive survey design was also used since it is concerned with gathering of facts. From the sampled schools an equal number of students, teachers and the principal were selected. Data was collected using questionnaires, interviews and observations. A pre-setting of research tools was carried out in one of the institutions. Data collected was analyzed descriptively using chi square and pearsons' product moment correlation. Descriptive statistics was also used. The major findings showed that there were no adequate ICT facilities in most schools making it impossible to incorporate ICT in teaching and learning processes. Where ICT facilities were available there was no proper utilization of the facilities partly because of lack of staff. Most of the student seemed to engage in entertainment whenever they access computers rather than using them for academic benefits. Where facilities were available there was neither

educational programmes nor the internet. It was also found out that most teachers lacked basic computer training hence they need to address this problem. Based on this finding the study recommended that the government should assist schools to have electricity, train more staff in ICT and post them in schools, and also facilitate the provision of more computers in all the schools.

CHAPTER ONE:

INTRODUCTION

1.1Background information

Information technology has played a big role in accelerating the movement of learning opportunities to all parts of the world, to learners of all cultures and nationalities. Information technology is widely recognized as a vital resource in economic, social and political development. In the present world the skills of information technology are more than ever in great demand in all sectors including education, government, business and commerce (World Bank, 2004).

The importance of computers in life cannot be overemphasized as they deal with learning, employment, productivity and fun (Okumbe,2001). Colantonia (1992), points out that, computers are used in banks, offices, military installations, stores, factories, schools/colleges, government agencies and even other organizations. Computers have created a revolution in the production, processing and transfer of information, primarily because of their ability to handle colossal amount of data within a very short time. The main use of computers , regardless of the application area , is processing or manipulation of data fast and efficiently in order to obtain information that is complete, accurate, timely, economic and relevant. Computer users today are not computer professionals; rather, they are people who need information to do their jobs effectively. Electronic technology was in the past very mystified. It was extra-ordinary and belonged to only the experts and specialists. Yet in the recent past there has been transformation of learning through technology in all levels, removing inhibitions, obstacles and challenges that

were thought impossible (Zeleza and Kakoma, 2003). Computerization has set off new image identities and subjectivities in the learning environment (Benner, 2003). It is therefore not surprising that modern curriculum, instruction and education thinkers and practitioners all over the world have been swept off-balance by the new technological transformation taking place around the world. Learners are more informed about the possibilities that a computer can provide more than their instructors (Leask and Meadows, 2000).

Amutabi (2004) says that, since the 1980s integration of ICT in education has been compulsory in the developed nations, this is not so in developing world nations like Kenya, where ICT featured in 2005 as one of the priority areas identified. The first draft ICT strategy was completed in August 2005. In the same year USAID facilitated a team of consultants to evaluate the various possible options which the ministry would consider in integrating ICT in the sector (National Strategy for Education and Training, June, 2006). With the development and approval of Ministry's policy through the sessional paper No. 1 of 2005 and the approval of the National ICT policy in 2006, the strategy gives a snapshot of what is required for ICTs not only to have an impact in reducing the digital divide but also as a tool for curriculum delivery and learning.

In the year 2005, it was estimated that there were 1.7 million children and youth of school going age in Kenya who are unable to access conventional education due to special circumstances or various socio-economic reasons. While these children can be found throughout the country, two areas in particular contain a larger percentage of these 1.7 million children; Arid and Semi-arid lands (ASALs) and urban slums (G.O.K., 2006a). The adaption of ICTs such as Interactive Radio Interaction (IRI) for educating children, especially girls, in ASALs and urban slums is an option that Kenya can employ for both formal schooling and Non-Formal Education (NFE)

centres. The phillipines Deprtment Of Educatuion has formulated policies for ICT use. This has also been done in Indonesia, Malasia, Uzbekistan and Vietnam. In Asia and the pacific, including emerging countries, teachers in primary, secondary and tertiary levels are being trained in the use of ICT in education with varying degree of scope. Most of the training programs carry general objectives aimed at developing awareness, knowledge and skills in either the use of computers in teaching and learning (IPS, 2003). In Canada school principals and teachers use computers for educational purposes such as activities directed towards lesson preparation, execution and evaluation.

1.2 Problem statement

The central problem of this study is that despite the critical role of ICT in sectors like banking, construction transport and communication, it has not been fully adopted in the teaching and learning processes in most developing countries like Kenya. While there is a wide range of innovations in ICT to support effective and quality of delivery of educational services, there is considerable technology lag in the Kenyan educational institutions. Most of the institutions still use nearly obsolete systems and consequently are unable to exploit educational potential of the emerging technologies (GOK, 2006a). Use of ICT in education at all levels is limited by poor ICT infrastructure, weak policy and regulatory framework, limited number of teachers who are ICT proficient, low telecommunication services penetration and poor quality services (Abdulrazak,2005). Access to ICT facilities is presently one of the major challenges in Kenya and other African countries. The Government of Kenya, Ministry of Education Draft Information (2006) notes that the ratio of 1 computer to 15 students is the norm in most of the developed countries. The ratio in Africa stands at 1 computer to 150 students. In Kenya, the ratio for universities and colleges is 1 computer to 45 students, at secondary schools level, the ratio is 1

computer to 120 students and primary schools remain much more limited to 1 computer to 150 students (G.O.K, 2006b). These figures may have changed owing to the various initiatives made by MoE and its development partners to computerize educational institutions. This study was thus expected to generate information on the impact of the ICT in teaching and learning. With changes in modern technologies learners need to be equipped with updated knowledge that will make them adapt to the changing world. Such knowledge leads to better communication and increased earnings as a result of e-Commerce and self employment in the ICT sector. The study was also expected to generate knowledge on ICT Impacts on education quality, access and completion rates. It will bring to the fore the preparedness of teachers on the use of ICT right from teacher education institutions.

1.3 Purpose of the study

The purpose of this study was to investigate the constraints in the use of ICT in teaching – learning processes in secondary schools in Nyandarua South District and proposing the remedies which can be taken to improve use of ICT in the area.

1.4 Objectives of the study

1. To find out the level to which secondary schools in Nyandarua South District have installed ICT infrastructure for use in enhancing teaching and learning.
2. To investigate the extent teachers and students are endowed with skills on ICT use in enhancing teaching and learning in secondary schools in Nyandarua South District.
3. To find out the challenges affecting the use of ICTs in enhancing teaching and learning

4. To establish the factors which enhance the use of ICTs in enhancing teaching and learning in secondary schools in Nyandarua South District

1.5 Research Questions

The study was guided by the following questions:

1. What is the impact of ICT in teaching and learning?

2. Is there any impact on quality, access and completion rates?

3. What are the constraints in the use of ICT in teaching and learning process?

4. Do schools have ICT infrastructure for use in enhancing teaching and learning?

5. In what ways can secondary schools strengthen ICT infrastructure for use in teaching and learning?

1.6 Significance of the study

The findings from this study will provide education policy makers and managers/administrators with information to help formulate their teacher training programmes involving ICTs for education. It may also help Ministry of Education Science and Technology (MOEST) in formulating institutional capacity building framework to empower ICTs for education. The study has also made possible recommendation towards increasing the use of ICT in enhancing teaching and learning processes.

1.7 Limitation\Delimitation of the study

1. In this study, not all secondary schools in Nyandarua South district were covered.
2. The ICT sector is highly dynamic and could change within a short span of time making the findings obsolete. However the delimitation is that the information gathered can be

generalized in particular to all the schools in Nyandarua south since they are similar in nature and to all Kenyan secondary schools in general.

3. The respondents may tend to give responses that would tend to cover up their weakness in using ICTs for the purpose of safeguarding their self interests.

1.8 Basic assumptions of the study

1 Teachers in selected schools would be willing to participate in the study and that they will voluntarily give the correct information

2 It is assumed that the administrators of the selected secondary schools would allow data collection to take place in their institutions.

1.9 Theoretical framework

The study was guided by Diffusion Innovation Model adapted by Rogers. Diffusion is the process by which an innovation is communicated through certain channel over time among the members of social systems (Rogers, 1995). The theory notes the part played by attitude of people when it comes to adapting to new technology. Rogers' theory advocates that innovations diffusion is a process that takes time to occur and that it takes place in five stages. The five stages are:

Knowledge

According to Roger's model the knowledge about the new technology is very important. In this study the knowledge of the students and teachers about ICT is important. The knowledge is found through the teachers and students being introduced to resources like computers, internet,

relevant computer software, availing a conducive computer lab, having a technician in the school and the teachers being qualified in computer use.

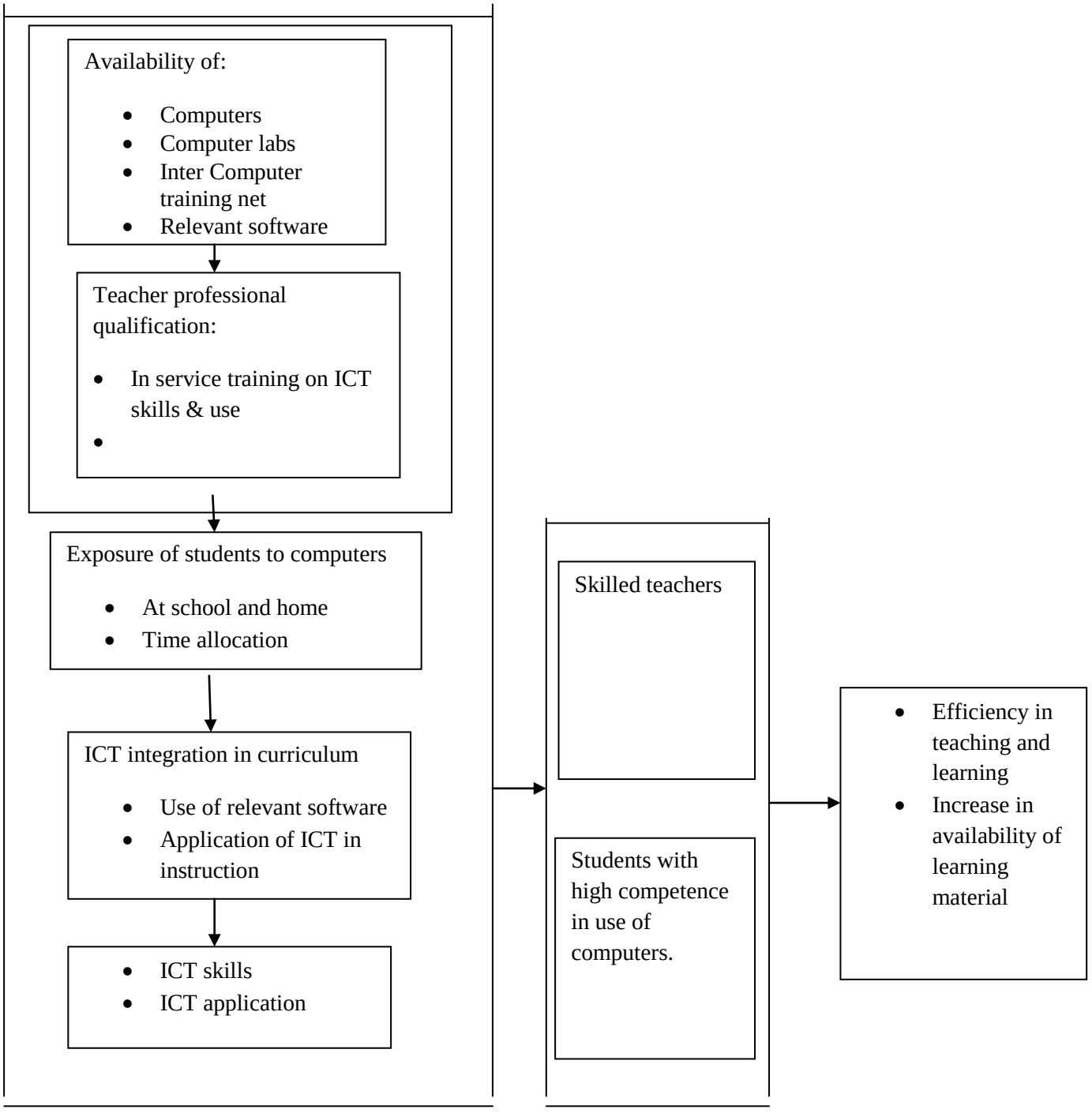
Persuasion and decision

Persuasion is important as it gives rise to the willingness to attend to the innovation. The teachers and student will now be able to attend selectively to various aspects of the context within the innovation. Both the teachers and the students will require an active participation rather that listening or attending. More complete, responding would be indicated by students willing to engage in various activities involving ICT. In this study, this involved teachers being able to use computer in the teaching process. The students should be involved in the use of computer programmes, internet and participation in computer practice. The constraints that affect these activities will be investigated.

Implementing and confirming

At the implementing level, teachers and students judge an activity as to its worthiness and tend to do so consistently enough so that the pattern is recognized to others. After becoming convinced of the validity of the activity, the student expresses commitment to the activity. At the confirmation stage ideas are internalized and become increasingly interrelated and prioritized. The students and teachers become organized into a value system. The valued ideas are arranged to foster their consistency.

CONCEPTUAL FRAMEWORK



Source: Researcher 2011

From the framework above, it can be seen that the ICT incorporation into secondary school system has several components. First the infrastructure is very important and these include the availability of computers, computer labs and the computers having the relevant software installed. The teachers are required to be well equipped with ICT skill and this can be achieved through training. The level of exposure to ICT facilities plays a vital role and this depends on whether the teachers and the learners have access to a computer in their homes and also how much time is allocated to computer use. This will then result in utilization of relevant software and application of ICT in instruction. This then implies increased level of ICT skills and application. When all this take place in a school it brings about a school with teachers that have skills in ICT and students with high level of competence in use of computers. The overall result is efficiency in teaching and learning in addition to having an increase in learning materials.

1.10 OPERATIONAL DEFINITION OF TERMS

Computer: Is a machine that automatically accepts, stores and processes data to produce information

computer software: Is the collection of computer programs and related data that provides the instructions telling what to do.

Computer hardware: These are the physical components of a computer.

Information Technology: Is the science of managing and processing information using computers.

Teacher: Is a person who instills knowledge, attitudes and skills.

Information and communication technology: An umbrella term reffering to a wide range of Software technology component such as computer, telecommunication, internet, video and digital cameras that can be used by teachers to support their work.

CHAPTER TWO:

LITERATURE REVIEW

2.1 Global context on ICT use in education

Today, most countries include ICT integration, either in the national policies or in the laws pertaining to the education sector. In Australia, for example, the commonwealth Government has set goals for schools in relation to ICT development. The Government wants students to leave schools as confident, creative and productive users of new technologies on society. Schools are expected to integrate ICT into their operations. The phillipines Department of Education has also formulated policies for ICT use. The same trend is seen in Indonesia, Malaysia, Uzbekistan, Vietnam and others where the national government set goals for ICTs in education. In Asia and the Pacific, including emerging countries, teachers in primary, secondary and tertiary levels are being trained in the use of ICTs in education with varying degree of scope. Most of the training programmes carry general objectives aimed at developing awareness, knowledge and skills in either the use of computers or the integration of computers into teaching and learning (IPS, 2003). In a study done in Canada in 2004 almost all principals reported that their schools used desktop computers or laptops for educational purposes such as activities directed towards lesson preparation, execution or evaluation during the 2003/04 school year. Less than 1% of the elementary and secondary schools in Canada were without computers

2.2 Africa and ICT

In Africa, pre-service teacher training institutions in even the poorest African countries are slowly being equipped with computers, and increasingly, teachers are being exposed to this

technology, through various school networking initiatives as well as the presence of telecenters, multipurpose community centers and internet cafes. Among the most ambitious African initiatives is the NEPAD e-school programme. The programme is on a multi-collaborative partnership strategy between the NEPAD, major ICT companies and ministries/departments of education in different participating African countries. Due to high costs and shrinking educational resources in Africa and the increasing demand for secondary education in the regions, technology intervention is seen to be one of the most feasible choices for education transformation. Without disregarding the basic needs of secondary education in Africa, such as building more classrooms, there is growing evidence that ICTs maybe the only feasible and economically sound means of expanding access to and improving the quality of secondary education in Africa (Isaacs, 2002). The NEPAD e-school initiative is designed to accomplish this goal through public-private partnership approach. As with so many other educational –ICT initiatives in Africa , its focus remains primarily on the importance of giving pupils and teachers ICT skills, rather than on using ICT to enhance their wider learning experience. A review of experience with ICTs in education project by IEC (2001) finds that in Africa, projects tend to follow a pattern of high levels of take-up.

2.3 ICT in Education

Studies point to the fact that use of ICTs results in improvement in academic performance. Two studies in the USA written by the National Center for Educational Statistics in 2001 found a positive relationship between availability of computers in schools and test scores. In a study done in USA the level of computer use in math classes and scores on math tests were compared and a positive relationship was established between use of computers and learning in both 4th and 8th grades (Wenglinsky, 1998). Similar positive relationships have been found in OECD countries

between computer use and test scores for mathematics, science and reading. However using ICTs is not cheap solution for education, but can be a means of facilitating the creation of new types of learning environment, by supporting distance based models of teacher training, and by opening up a wealth of new educational resources and thus playing a significant role in education. In her 2005 ICT in education Options Paper, Kenya recognizes the many ways in which information and communication technologies (ICTs) can be leveraged to support and improve the delivery of quality education for Kenyans. These options are as per the educational priorities outlined in Sessional Paper No. 1 of 2005 (G.O.K, 2005b) and Kenya Educational Sector Support Programme (KESSP) document (G.O.K., 2005c) and which include Quality Training and Learning through ICTs.

Waema, (2002) argues that, most curricula are oriented towards teaching the technical aspects of the technology and ignore the social and organizational aspects of ICT. Graduates lack organizational and managerial skills and are therefore inadequately prepared to deal with the complexity of analysis, design and implementation of ICT in educational organization. Waema further argues that most programmes for training ICT professionals are copied from economically developed countries with little modification to reflect the realities of industrial and development goals in individual countries. These training programmes need to be adapted to the local environment to reflect among other things, the application environment, and availability of resources and capabilities of existing training institutions. Waema says that, most curricula are rarely modified. In some situations, they are still geared towards producing people with specific skills that do not match the demand of the industry or reflect changes in technology. Early ICT initiatives in schools were essentially technology driven, aiming at developing students computer literacy.

2.4 Integration of ICT in teaching

ICT started to be regarded gradually not only as a skill worthy to acquire, but also as a valuable tool for development of other skills. In the present world ICT has become an important component of a school curriculum, a support tool for providing teachers and students with enhanced teaching opportunities in the whole range of school subjects. The content of the national curriculum statements of countries like UK, the USA and Australia provide clear evidence for this shift from the teaching of ICT alone to the infusion of ICT as a significant tool in the school curricula (McDonald & Davis, 1995). In response to the modern advancement in technology, the revised curriculum in Kenya incorporated ICT as a teaching tool (Kenya Institute of Education, 2002). A survey done by the Kenya National examination Council revealed that, students' academic performance and interest in secondary school biology has been generally poor. This has been attributed to the current methods of instruction for instance, the expository approach of instruction in which the teacher spends most of the time giving verbal explanations in the form of talk and chalk while students listen and write notes from chalk board. Obviously, such inadequate and limited teaching methods tend to negatively affect the learners view of scientific concepts and associated methods (Kiboss & Ogunniyi, 2003). The study assessed the effects of computer based instruction simulation (CBIS) program developed for the teaching of biology, on improving students understanding and perception of the cell theory. The findings in this study reaffirmed that the use of computer based instructional programs tend to improve achievement scores of students as compared to the use of traditional or regular methods on instruction (Ndirangu,2006).

Shunguyia (1995) conducted a case study of instruction technology in the curriculum of the education program of Kenyatta University. It was found out that the instructional media are

meager and limited such that most student teachers end up finishing their training program without a single opportunity for involvement in necessary practical professional experiences. The study further found out that communication technology department had constraints and shortages of various types (in relation to media), including equipment, technicians, practice rooms and ever present debilitating influence of the large student numbers (Shunguyia, 1995). However, current study will be carried out in Secondary schools but not in a university.

Lack of ICT facilities has been noted to be one of the major challenges impeding the use of ICT as a teaching tool in Africa. This was revealed in a study done by Ministry of Higher Education Science and Technology which revealed the computer ratios in different institutions. The computer ratio at university was one computer to 45 students. This study aimed to establish the current computer ratios in addition to other factors that influence their use in teaching.

Research on the use of different educational settings over the years, invariably identify as a barrier to success, the inability of teachers and other staff on how they can use ICTs to help them work better. Various competencies, hence, must be developed through the education system for ICT integration to be successful (Tusubira and Mulira, 2004) The history of educational computing reveals that teachers have long been seen by educational technologists to exhibit a range of obstructive behaviours from incompetence to resisting change. Some causes of resistance are identified by the 1997 Stevenson Report which detailed the state of education computing in the UK. The report recommended that, teachers should be given access to effective training for ICT, which they should have up-to-date computers for themselves and their classes, and that network should be set up allowing teachers to exchange professional information.

Ownership of computers by teachers is also a factor that may influence the use of ICT in teaching. Leask and Meadows (2000) asserts that, people who have full access to computers

become confident in their use. The personal possession of a computer may well be the single most important factor enabling a teacher to integrate ICT into their professional practice. A study done by Dowes (2000) in the UK showed that, given equipment and crucially the chance to take it home and learn about it in their own time, teachers and students made rapid gains in skills. They also acquired commitment and enthusiasm. The instruments used were questionnaires and interview schedules for teachers. The study data supported the view that those teachers who had their own computers were more likely to know how to use them with the students. This study therefore investigated the ownership of computers by teachers and established if those teachers who own computers have high knowledge on various computer applications. The researcher also has a strong belief that when teachers have their own computers they might acquire the essential skills for using the computer without necessarily having a formal training.

2.5 ICTs in learning

Recent trends towards the constructivist approach and teacher learner interaction suggest that the learning process can be enhanced through the use of technology, which adapts to the presentation of user needs, preferences and requests. Due to the interactive nature of the internet, it is well suited for a creative learning approach (World Bank, 2004).The ability to share knowledge and experiences with an emerging global community is one of the biggest benefits of internet to education. This enables the students to actively seek out their counterparts in other countries in order to come up with joint research projects on a variety of topics (World Bank, 2004). Furthermore, online resources offer teachers access to a vast and diverse collection of educational materials enabling them to design curriculum that best suits the needs of their learners. The development of scientific research networks on a worldwide basis, usually over the internet, is also helping to empower indigenous research and development programmes in

developing countries. Virtual research groups composed of interconnected specialists in different parts of the world allow data bases to be shared , conferences to be organized, papers to be circulated and discussed, and collaborative research and report to be undertaken (Mugenda, 2006). ICTs can be used as a tool in provision of immediate and up to date resources using one or more media to a large number of educators and learners in an easy and cheap way. Changes made to resources are immediately available to educators and students without incurring major distribution costs. New technologies can also help in improving the quality of administrative activities and processes including human resource management, student registration and monitoring of students enrolment and achievement (Mugenda, 2006). Historically, secondary education is more accessible to urban areas than to rural communities in Africa (World Bank, 2004). Additionally, there are some significant gender disparities in the distribution of secondary education in Africa. Socio-cultural, religious, and economic factors have contributed to this disparity that has placed young women at a serious disadvantage (James, 2003).ICTs can and are used to extend educational provisions through enhanced distance education opportunities. The World Education Forum (2000) listed "harness new ICTs" as one important strategy to help achieve the education for All goals. The aim of this study was to establish if the level of establishment of ICT in the schools is at a level which can enable meaningful learning to take place. The attitude of the students and teachers in use of ICT was also investigated as it affects their use in learning.

2.6 Factors affecting the integration of ICT in teaching and learning

The expansion of basic services and the development of sustainable infrastructure are key challenges of the e-school project in Africa. Basic infrastructures are critical for successful

implementation of the e-learning (World Bank, 2006). Technical and basic infrastructures, coupled with sustaining schemas, make up structures that can empower or constrain the application of ICT in secondary education in Africa. Infrastructure requirements are costly and involve various stakeholders, particularly the governments of African states. There are a number of challenges concerning access to and use of ICT in Kenya, including high levels of poverty, limited rural electrification, and frequent power disruptions. African countries need to commit themselves to innovative rural electrification projects to benefit both rural schools and communities This can be more innovative with the application of a solar energy system for electric power in communities that are far removed from urban centers (Gunga and Ricketts, 2006).Cost is also an important factor that guides the adoption and growth of ICT in a country. A small number of schools have direct access to high-speed connectivity through an Internet service provider, generally there is limited penetration of the national physical telecommunication infrastructure into rural and low-income areas. Consequently, there is limited access to dedicated phone lines and high-speed connectivity for e-mail and the Internet. Most developing countries are constrained by resource scarcity. Even where the importance of ICTs is recognized, allocation for the development of ICTs is often inadequate. Mugenda (2006) points out that one of the greatest challenges in ICT use in education is balancing educational goals with economic realities. The study aimed to establish to what extent lack of infrastructure is affecting ICT use in the study area bearing in mind that not all areas in the country may be having the same infrastructural problems. Management of ICTs in schools is another factor that needs to be put into consideration. This involves two levels: strategies level which includes reviewing and putting in place the most appropriate ways of exploiting existing ICTs , and sourcing and using new ICTs that are needed in the organization; and the operational level which

involves providing high quality, reliable ICT services to the organization: and the operational level which involves providing high quality, reliable ICT services to the organization through capacity building (training), development (delivery of ICT projects), implementation, application and monitoring the usage and effectiveness of systems. Administrative support is hence critical for the success of the two levels. In this connection the researcher would like to know if the available computers are fully utilized by ensuring that the computers are available for use by the students. Also the researcher will establish if the students are given equal chances to use the computer and if the "utilization" of computers by the students is of academic benefit. The researcher was also interested to know if the availability of computers to students could be in any way be a hindrance to the students participating in other important activities like games because of being preoccupied with using computers.

2.7 ICT Policy

ICT policy can be defined as the rules and regulations set by the organization in regards to ICT. Policy determines the type of internal and external information resources that can accessed, the kinds of programs they may install on their own computers as well as their authority for reserving network resources. Policy is also related to network quality of service (QoS), because it can define priorities by user, workgroup or application with regard to reserving network bandwidth. Hawkins (2004), in Ten Lessons for ICT and Education in the Developing World, notes that while many ministries of education around the world have made the commitment to computerize schools; few have developed coherent strategies to fully integrate the use of computers as pedagogical tools in the classroom. While all countries in Africa acknowledge the strategic role of ICTs in development, only a couple has established a comprehensive policy for the integration of ICT in education. Where such policies exist, they tend to remain vague and

make little reference to implementation. According to Kandiri, 2006 the ICT policy process for a long time lacked political leadership, which has been reflected in the absence of a national ICT strategy and ineffective coordination between different government departments and agencies with ICT responsibilities. This for a long while also included the absence of ICT policy process open to participation by all stakeholders and based on public discussion and debate. The first national ICT policy was released in late 2003, just prior to World Summit on the Information Society (WSIS) in Geneva. The copy was however not officially available and was more of a document just to give Kenya a face during the world summit. It is right to note that the WSIS involved the national ICT development process. After several years of effort, Kenya promulgated a National ICT Policy in January 2006 that aims to "improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services."The national policy has several sections, including information technology, broadcasting, telecommunications, and postal services. However, it is the section on information technology that sets out the objectives and strategies pertaining to ICT and education. Secondary schools are expected to develop an ICT strategy that incorporates the overall goals of the education sector and how they will be met using ICTs in the context of the prevailing socio-economic environments. The school policies guide the integration of ICT in teaching and learning by articulating the expected teacher and student characteristics and experiences, and how they will be used to enhance the use of ICTs in enhancing teaching and learning. This further enhances the creative, interactive and supportive teaching and learning environment.

2.8 Summary of Literature Review

From the review of literature, it can be noted that many factors affect the integration of ICT in Secondary school education and other institutions of learning. Such factors may include teacher and student preparation to integrate and use ICT in education, teacher professional training towards ICT and student training on computer literacy skills, level of integration of ICT in secondary school curriculum, access to ICT and availability of ICT resources. The previous studies which have been done on use of ICT have each a unique difference as compared to the present study. One of the factors that differentiate them is the time and place of the study. As pointed out earlier ICT is changing very fast and repeating a similar study in the same area after a period of time like 3 years might present totally different results. The study by Oloo (2009) was a general survey on learning institutions in the country which did not give the unique difference in level of use and integration ICT in Secondary schools depending on the level of development and nearness to urban areas. The survey done by the Kenya National Examination council investigated the perceptions using only CBIS program in Secondary School Biology. The current study, on the other hand, will investigate the general ICT integration and use in Public Secondary schools within Nyandarua South District.

CHAPTER THREE:

METHODOLOGY

3.1 Introduction

This chapter covers research design, location of the study, target population, sample and sampling procedures, data collection procedures and data analysis.

3.2 Research Design

A research design is the arrangement of conditions for collection and analysis of data in away that aims at minimizing expenditure of efforts, time and money Kombo and Tromp (2006). Orodho (2005) notes that the research design employed depends on what the researcher is trying to investigate. In this study, descriptive survey was used. This method was preferred because information was readily obtainable from subjects in their natural environment, concerning their attitudes or beliefs on certain issues of the study.

3.3 Locale

The study area was Nyandarua South District which is in Nyandarua County. This is one of the 8 districts in Nyandarua county. There are a total of 28 secondary schools in the District. The District was chosen for the study due to its proximity to the capital city, Nairobi where there is high use of ICT. Due to this fact some of the teachers may be travelling to the city often and therefore having the influence of the city including the use of ICT. Some of the students in the

boarding schools may have been enrolled in the schools from Nairobi and therefore may well have been exposed to the use of computers.

3.4 Target Population

The target population of the study consisted of 21 school principals, 160 teachers and 800 form three students in all public secondary schools in Nyandarua South District. Teachers were targeted in this study because they are the major agents of ICT implementation in teaching and learning process. Students are targeted because they are expected to use ICT during the process of acquiring knowledge and skills. On the other hand the principals were targeted because they are the administrators who supervise, coordinate and ensure that facilities are provided.

3.5 Sampling Techniques

The sampling units for the study consisted of all public secondary schools in Nyandarua South District. The study targeted students, teachers and principals in the secondary schools. In this study stratified random sampling was used. The secondary schools were classified into boarding girls' school, boarding boys' school, boarding mixed schools and day schools. A sample of eight schools , two from each category was purposively selected. The schools which participated in the study had their students sat for KCSE examination for at least two times and there had to be some form of use of computers in the schools. Five teachers from each school participated in the study. Stratified sampling was used in the selection of the teachers where two were from language department, while the mathematics, science and humanities department produced one teacher. Students in their third year of study were targeted as they had been in the institution long enough to have adequate information on the subject of study. While those in their fourth year of

study were expected to have more information on the subject the reality of them being busy studying for their final exam may have hindered them from participating in the study with

enthusiasm. According to Ary and Razariah (1972), and Gay (1992), a sample of 10% of the population is considered minimum while 20% of the total population is required in a survey study. One hundred and sixty students were randomly selected to participate in the study. This number is appropriate as it represents10%- 20% of the students in their third year of study assuming the number of students in each form range from 100 to 150 students.

Table 3.1: Sample and population

	Population	Sample
Principals	24	8
Teachers	160	52
Students	800	160

Source: Researcher 2011

3.6 Research Instruments

These are the tools that were used to collect data from the sampled respondents. The tools which were involved are, questionnaires, interview schedule and observation check list.

3.6.1 Questionnaire

A questionnaire was administered to teachers and students who were participating in the study. The questionnaires contained both open ended and closed ended questions. The closed ended

questions provided an easy way of coding, while the open ended ones enabled the researcher to gather wide and free opinions from the participants. The closed ended questions were used to collect quantitative data while the open ended were used to collect qualitative data.

3.6.2 Interview Schedule

The researcher also administered interview schedules to the principals of institutions which participated in the study.

3.6.3 Observation Checklist

The researcher observed the institutions' environment for relevant information. This was because it could expose any hidden information that is not easily brought out by the questionnaire. A check list was used when making the observation.

3.7 Pre-testing

The research instruments were pre-tested in one of the Schools within the study area but the school was not included in the main study. During the pretesting the principal was interviewed while five teachers and 20 students filled questionnaires.

3.8 Validity

Content validity was used to assess whether the content of the questionnaire measured what it was supposed to be measure. The instruments were presented to experts in the area of study. The experts in the area of study helped in improving the instruments. The experts' feed back, in form of recommendations to the researcher, were incorporated in the final instruments.

3.9 Reliability

This can be defined as a measure of the degree to which a research instrument yields consistent results on data after repeated trials. To ensure reliability, the researcher used a test-retest method to estimate the degree to which the same results could be obtained with a repeated measure of

accuracy. This was to determine the reliability of the instruments. The questionnaire was administered to five teachers and twenty students. These were not included in the main study. The answered questionnaire were scored manually and after two weeks the same were administered to the same group of subjects. The responses were scored manually and a comparison between the answers obtained in the first and second test was made. It was noted that scores obtained by each respondent was quite close indicating high reliability.

3.10 The data collection procedures

The researcher obtained authority to conduct the study from the Ministry of Education head-quarters and the Graduate School, of Kenyatta University. Before collection of the data, the researcher contacted the participating institutions and scheduled appointments for visits. The research entailed the administering of the questionnaire to the student participants, who filled the same in the presence of the researcher. This ensured that the exercise took the shortest time possible. This also helped the research participants to fill the questionnaires appropriately since the researcher was around to make any clarification if at all they were needed. Ample time was given to the respondents to respond to the questionnaire and interview schedule. Observations were made by the researcher both during pre-testing and during the actual research exercise. Field notes about what the researcher heard, saw experienced and thought in the course of collecting data in the study were also taken.

3.11 Data analysis procedure

After clean up and reviewing of the collected data, the close and open ended questions were coded manually and entered into a code book. From the code book, the data was keyed into a computer using the statistical package of social sciences and analysed.

CHAPTER FOUR:

FINDINGS AND DISCUSSION

4.1 Introduction

This chapter reports on the major findings of the study as they relate to each of the five research objectives. Responses on the questions were summarized in tables, graphs and pie charts. The rest of the data is presented in a narrative form where the most outstanding responses are mentioned. The rate of return is an indication of the usefulness of a questionnaire. The rate of return is affected by several factors considering method of distribution, kind of information requested and the status of the respondents. In this study the rate of return of the questionnaire was relatively high as they were distributed personally to the respondents. Students filled theirs in the presence of the researcher. This minimized bias as respondents were not allowed to communicate during the exercise. However, the rate of return on teachers' questionnaire was affected by the fact that they responded over a period of time which could have introduced some elements of bias.

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 include the gender of the students and teachers, the school type, the age group of teachers, area of specialization of teacher, and level of education of teacher.

4.2.1 Student gender and type of school

Figure 4.1 gives the gender distribution of the students who participated while table 4.1 gives the type of school of the respondents.

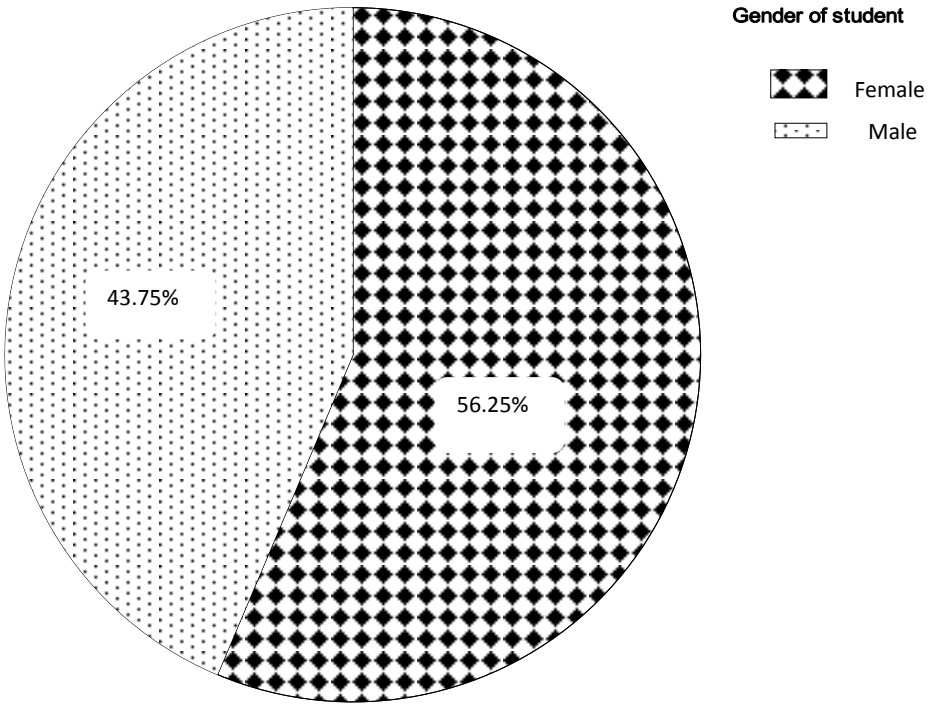


Figure 4.1 Gender of Students

From figure 4.1 it can be observed 56.25% of the respondents were female while 43.75 were male students.

Table 4.1: Type of school

		Frequency	Percent
	Girls boarding	2	15.38
	Mixed day/boarding	5	38.46
	Mixed day	5	38.46
	Mixed boarding	1	7.69
	Total	13	100.0

Source: Researcher 2011

From the table 4.1 it can be observed that majority of the students respondents belonged to mixed day school and mixed day/ boarding as 38.46% of the respondents belonged to this category, while 7.69% of the respondents were in mixed boarding schools. From the table it can also be seen that 15.38% of the respondents were in girls' boarding schools.

4.2.2 Teacher gender and area of specialization

Figure 4.2 gives the gender distribution of the teachers who participated while table 4.2 and figure 4.3 gives the area of specialization of the teacher.

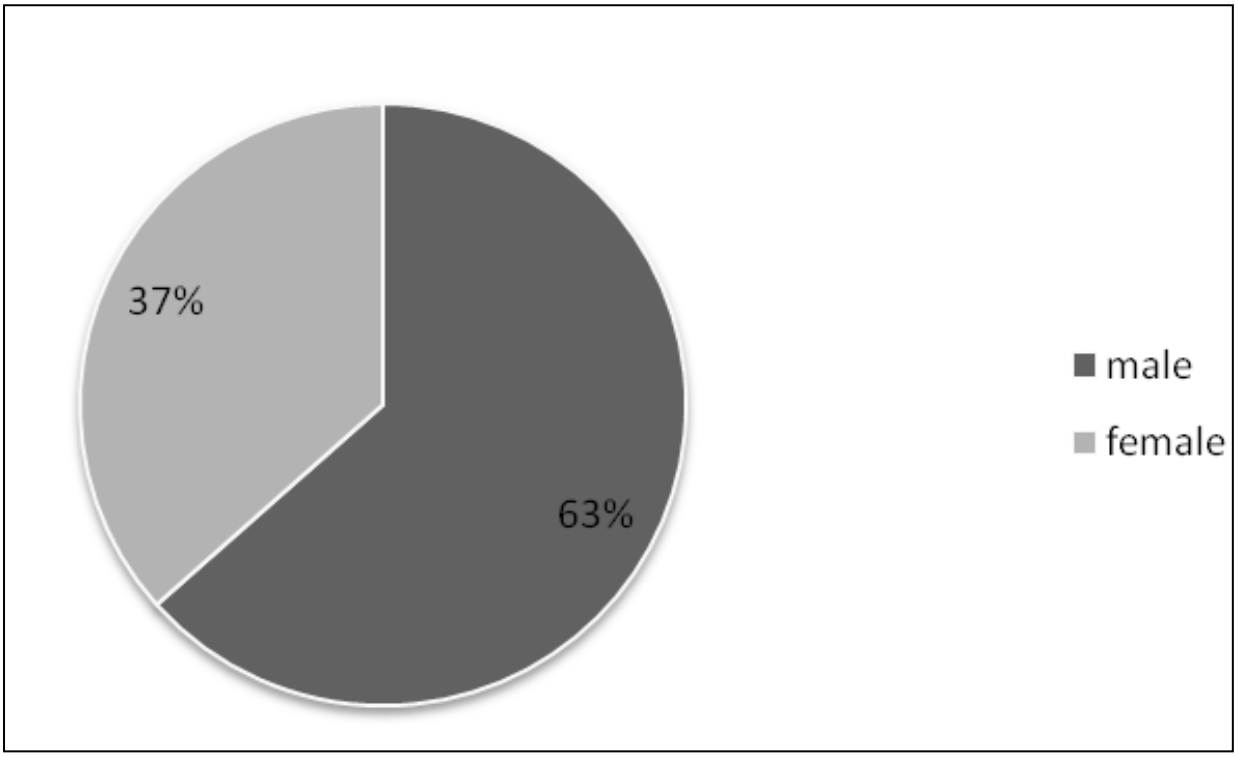


Figure 4.2: Gender of teacher

It can be observed from figure 4.2 that majority of the teacher respondents' were male as they consisted of 63% of the respondents as compared to 36% of the respondents who were female.

Table 4.2: Teaching subjects

		Frequency	Percent
	Language	15	28.8
	Mathematics	12	23.1
	Sciences	20	38.5
	Humanities	5	9.6
	Total	52	100.0

Source: Researcher 2011

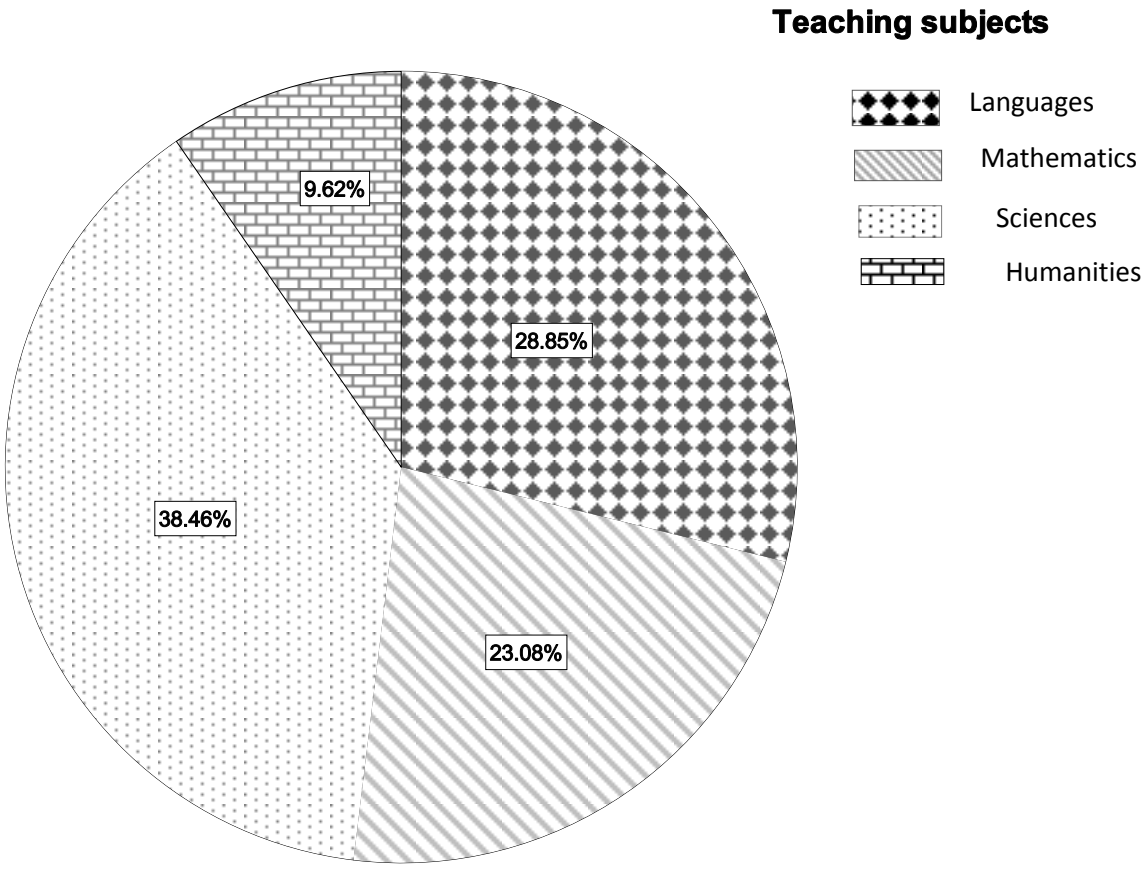


Figure 4.3: Teacher area of specialization

From figure 4.3 it can be observed that 38.46% of the teacher respondents specialized in teaching sciences, 28.08% of the respondents were language teachers while 9.62% were humanity teachers. Those teachers who teach mathematics consisted of 23.85% of the respondents. The implication here was that more humanity teachers needs to be trained in computers in order to be at par with their counterparts in science and language departments

4.2.3 Age group of teachers

The results about the age of the teachers are as shown in table 4.3

Table 4.3: Teacher Age Group

Age group		Frequency	Percent
	25 or less	15	28.8
	26-35	20	38.5
	36-45	16	30.8
	46-55	1	1.9
	Total	52	100.0

Source: Researcher 2011

From table 4.3 it can be observed that age group 26-35 had the highest number of respondents as 38.5% of the respondents belonged to this group while the 36-45 group was at the second place with 30.8%. The teachers who had 25 years or less were 28.8% of the respondents while there was only one respondent who belonged to 46-55age group. The purpose of this data was to ensure that the information gathered was representative of all the teacher population across all the age groups.

4.3 ICT Facilities

One of the objectives of this study was to find out the level to which schools in the study area have established ICT infrastructure for use in enhancing teaching and learning. This was done through investigation on computer adequacy, adequacy of printing facilities, availability of overhead projectors and the availability of internet services in the school.

4.3.1 Computer adequacy

When the students and teachers were asked about the adequacy of computers in their schools the result was as in figure 4.4.

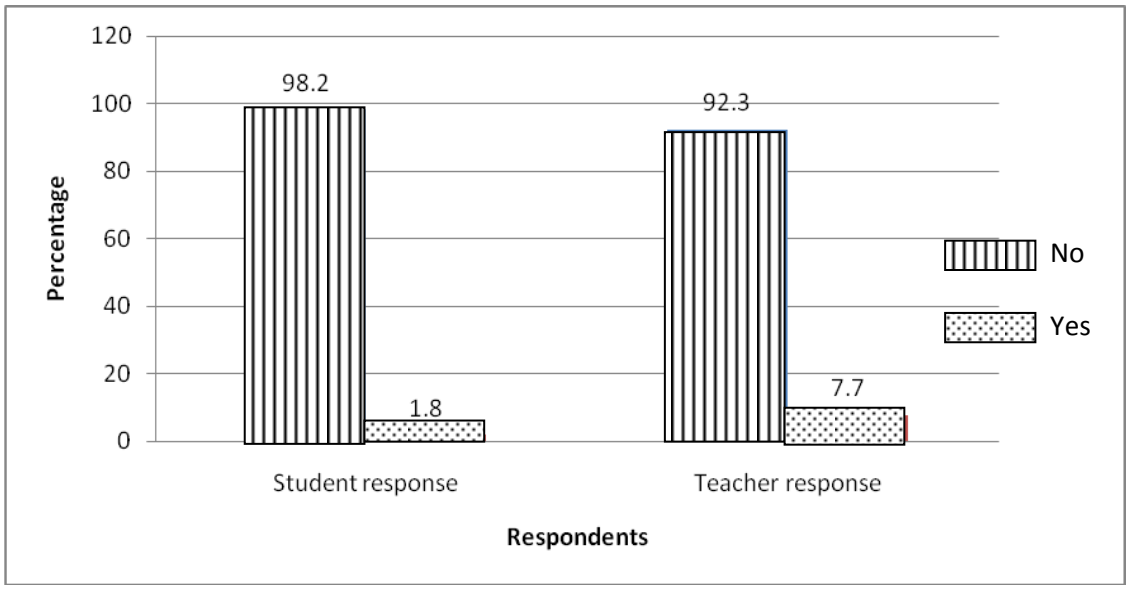


Figure 4.4 Computer adequacy

From figure 4.4 it can be seen that almost all the teachers and the students who participated in the study indicated that the number of computers in the schools were not enough. For the students 98% indicated that computers were not enough while for the teachers 92% indicated that the computers in their school were not enough. This was a true reflection of the information given by the principals in the schools. The number of computers in the schools ranged from 0 to 25 although in some of the schools there were one to three computers which were used for administrative purposes only.

4.3.2 Printing facilities

The respondents were asked about the printing facilities in their school and the response was as in figure 4.5

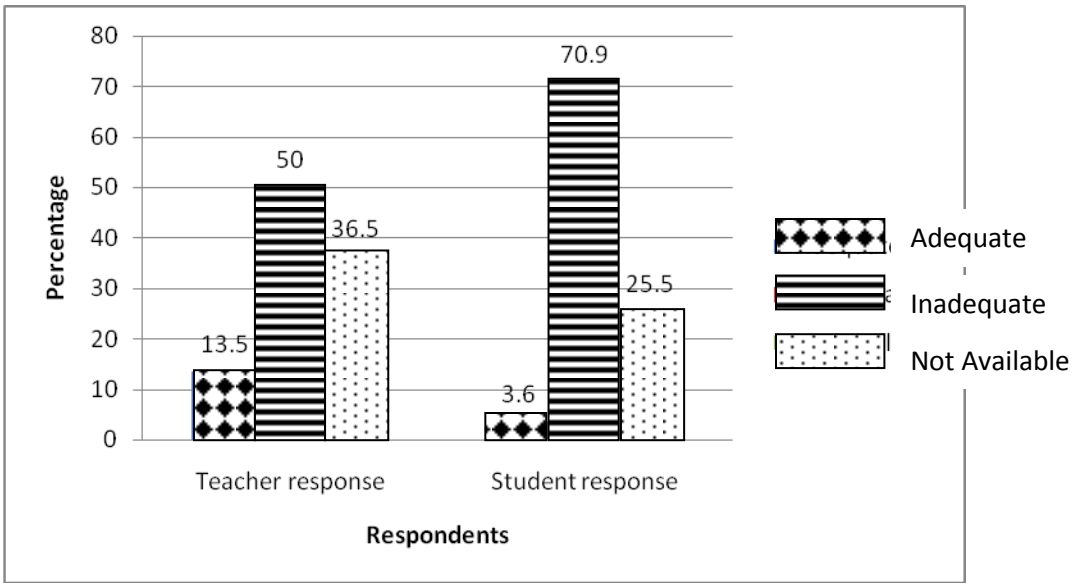


Figure 4.5 Printing Facilities

From figure 4.5 it can be seen that 36.5% of the teachers indicated that the printing facilities were not available as compared to 25.5% of student respondents who gave the same answer. It is also observed that 70.9% of the student respondents indicated that the printing facilities were inadequate as compared to 50% of the teachers who gave the same answer. The number of the respondents who indicated that the facilities were adequate was very low standing at 13.5% for the teachers and 3.6% for the students.

4.3.3 Internet facilities

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

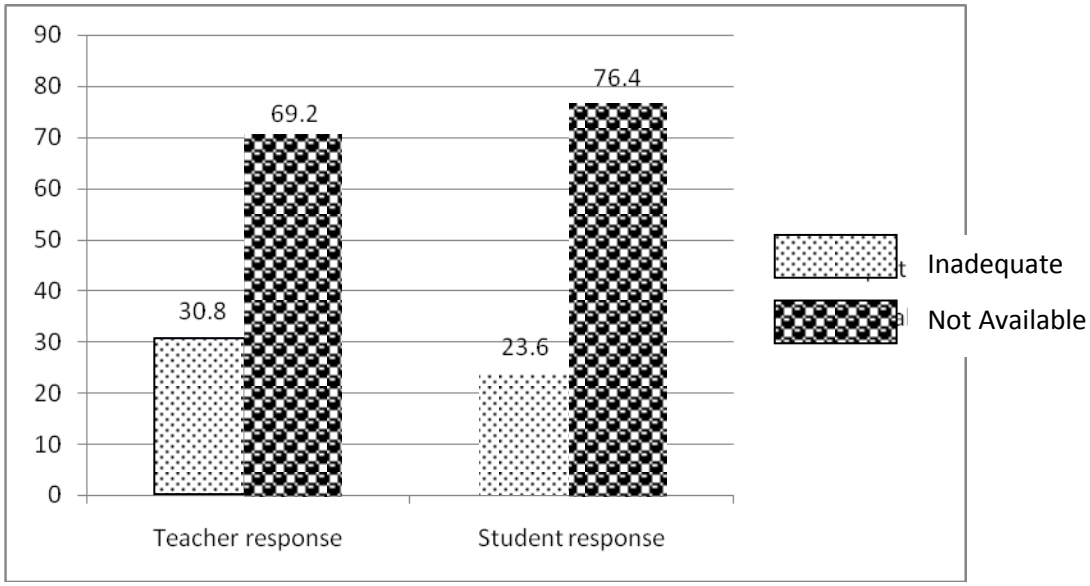


Figure 4.6: Internet Facilities

From figure 4.6 it can be seen that 76.4% of the student respondents were of the opinion that the internet facilities in their school were inadequate as compared to 69.2% of the teachers who gave the same answer. The teachers percentage who indicated that there were no internet facilities was 30.8% while the percentage of student respondents who gave the same answer was 23.6%.

4.3.4 Projector availability

An investigation on projector facilities available in the school yielded the results shown in figure 4.7 below.

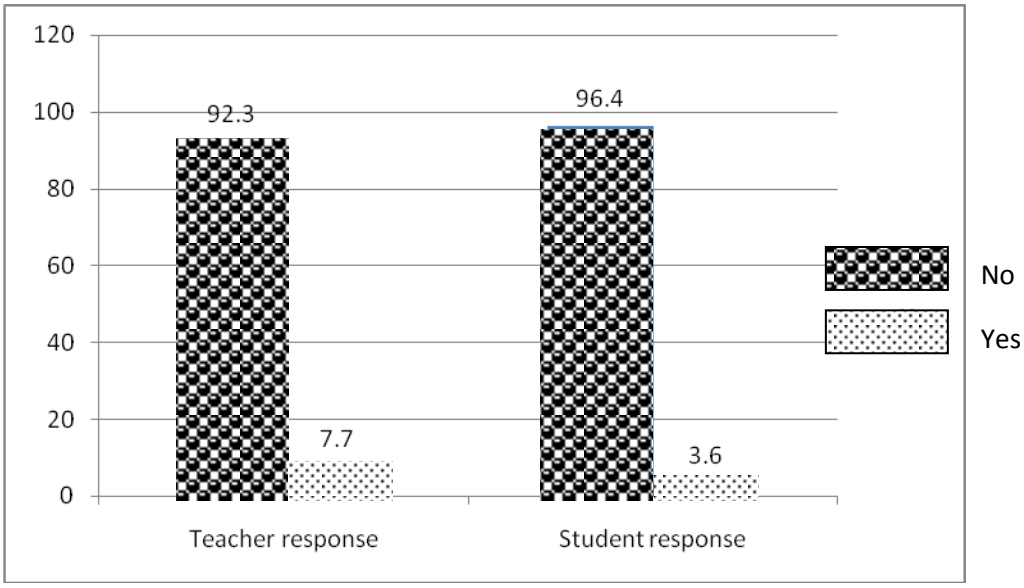


Figure 4.7: Projector Availability

Almost all the teacher respondents and student respondents indicated that their school did not have an overhead projector. From the figure, it can be observed that 92.3% of the teacher respondents indicated that there were no overhead projectors in the school while 96.4% of student respondents gave the same answer. Overhead projectors are very useful when teaching a very large group of students.

4.4 Students and teachers ICT skills

4.4.1 Students ICT Skills

The students were asked if they could perform basic tasks on a computer in order find out the extent to which they are endowed with skills on ICT use. The students were asked if they were capable of creating and editing a document, saving a document, sending mail and opening a file. The results of the outcome are as shown in figure 4.8 below.

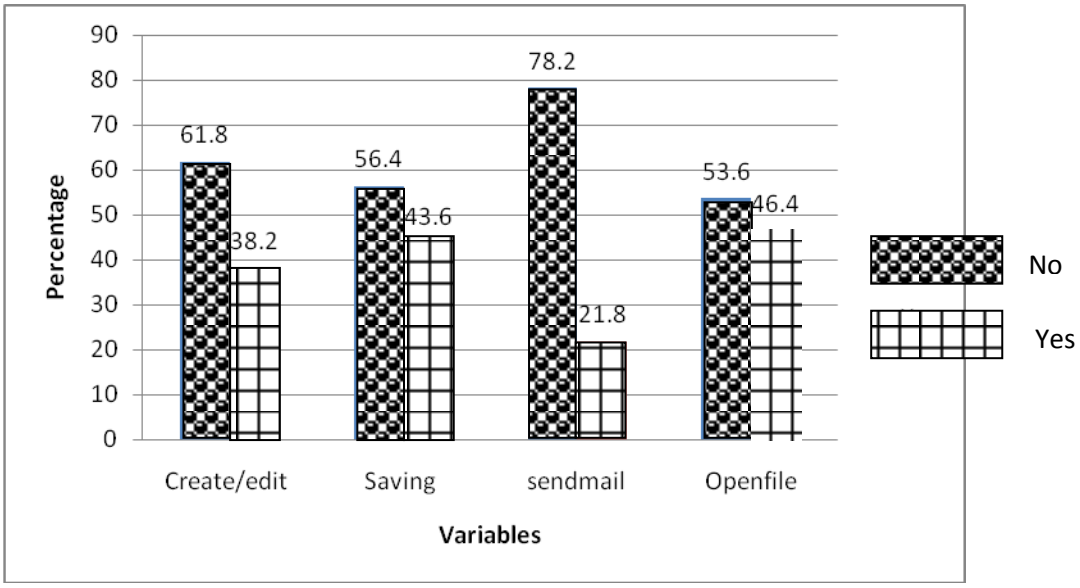


Figure 4.8: Student ICT Skills

Figure 4.8 indicates that 21.8% of the respondents could send emails on a computer while 78.2% did not have this skill. The skill which had the highest number of respondents that acknowledged that they were capable of performing was opening a file where 46.4% of the respondents indicated that they could execute the task as compared to 53.6% who could not. On the tasks involving creating/editing and saving of a document the respondents who indicated that they were capable of performing the tasks were 38.2% and 43.6% respectively.

4.4.2 Teachers ICT Skills

The teachers skills in the use of computer were evaluated by asking them their level of skills in the use of some computer programs and utilization of internet and the result are as shown in table 4.4 below.

Table 4.4: Teacher skills

	Programming	Power point	Spread sheet	Word processing	Internet browsing
Weak	61.5	36.5	38.5	30.8	23.1
Average	23.1	34.6	19.2	21.2	28.8
Good	9.6	25	30.8	26.9	30.8
V. good	5.8	3.8	11.5	21.2	17.3

Source: Researcher 2011

As can be seen from the table, most of the teachers indicated they did not have programming skills with the biggest portion indicating they were weak in programming followed by those who indicated that their skills could be rated as being average. From the table it is also seen that the majority of the respondents rated their skills in power point, spread sheet, and word processing as being weak. In internet browsing the majority of the respondents rated their skills as good followed by those who rated themselves as average.

4.4.3 Teachers' abilities in application of ICT in learning and teaching

In order to establish the capability of teachers utilizing ICT skills and general knowledge on particular areas where ICT is applied in teaching and learning the teachers were requested to respond to some statements and the results were as summarized in table 4.5 below.

Table 4.5: Teachers ICT application ability

	Situation	Resources	Progress	Presentation	Collaboration	Learning	Lessons	Software
SA	3.8	25	23.1	11.5	17.3	28.8	13.5	11.5
A	59.6	50	46.2	50	50	36.5	36.5	38.5
D	19.2	5.8	11.5	17.3	13.5	13.5	26.9	25
SD	17.3	19.2	19.2	21.2	19.2	21.2	23.1	25

When the respondents were asked if they knew the teaching/learning situations that were suitable for ICT use majority gave a positive answer. From the table it can be seen that those who agreed comprised of about 60% of the respondents. It can also be observed that a high number of teachers indicated that they could find curriculum resources from the internet. A close look at table 4.5 reveals that 75% of the respondents indicated that they could find useful curriculum resources on the internet as compared to 25% who could not. The percentage of the teachers who could use a computer to monitor the progress of student was about 69.3% while those who could utilize ICT in giving effective presentation were 61.5%. On the question of the teachers being able to use ICT in collaborating and their ability to use internet to support student learning the results were 67% and 65% respectively. From the table it can also be observed that the majority of the respondents indicated that they were not capable of preparing lessons involving use of ICT. The inability of the respondents to install software also had very high scores. A close look at table 4.5 reveal that 50% of the respondents could not prepare lessons involving use of ICT and the same percentage of the respondents could also not install educational software on a computer.

4.5 Factors that enhance the use of ICT

The availability of ICT staff in the schools that participated in the study was investigated as part of determining the factors that enhance the use of ICT.

4.5.1 Students and teachers opinion on availability of ICT staff

The students and teachers were asked about the availability of a tutor who serves as an ICT coordinator, a computer specialist who can be consulted and ICT assistant whose role is to assist students. The response of students' opinion on availability of ICT staff is as in figure 4.9.

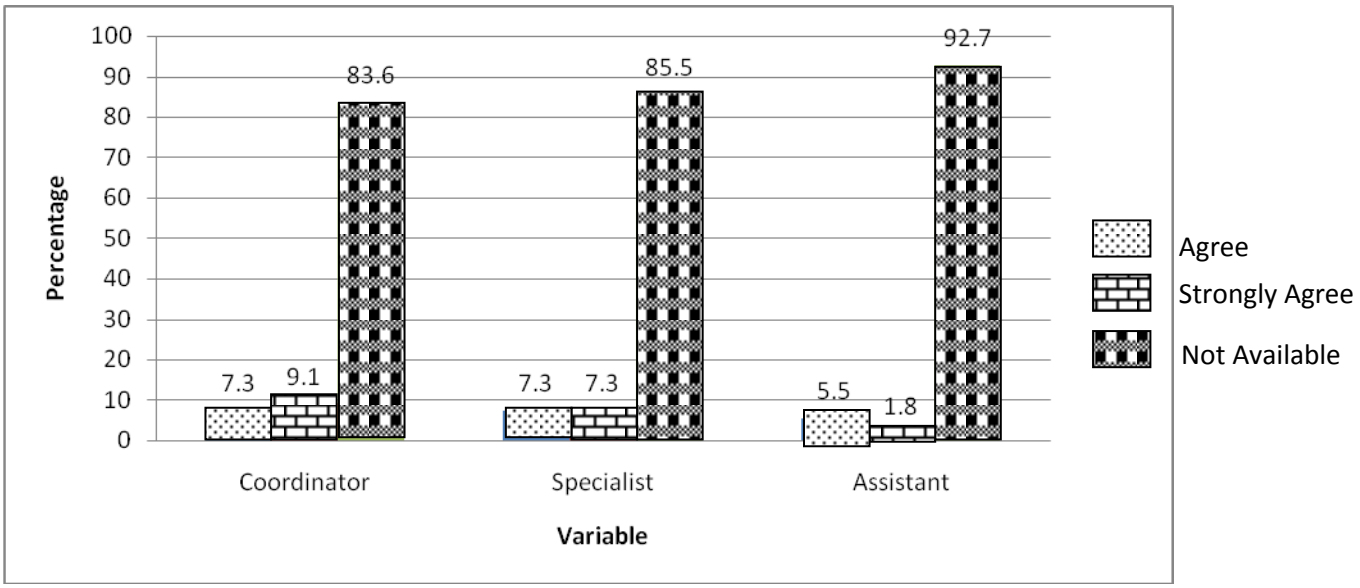


Figure 4.9: Student Opinion on Availability of ICT Staff

Figure 4.9 reveals that the availability of ICT staff in the secondary schools under investigation is almost non-existent. 83.6 of the students indicated that there was no ICT coordinator available in their schools. On the availability of a computer specialist and ICT assistant 85.5% and 92.7% respectively indicated that they were not available.

The teacher's opinion on availability of ICT staff is as in figure 4.10 below

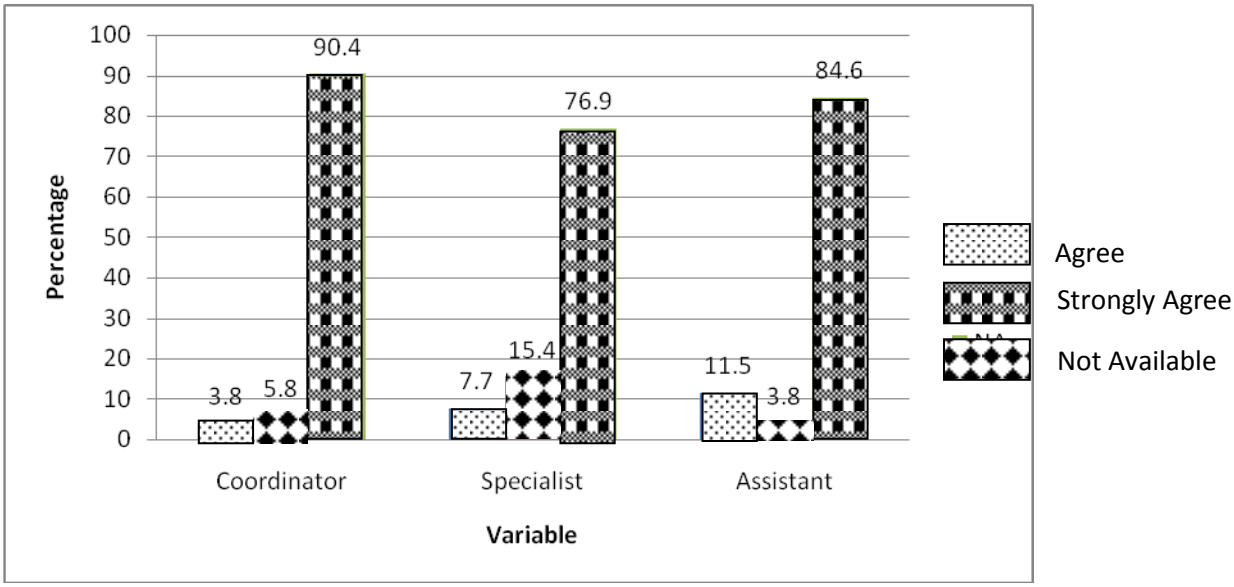


Figure 4.10: Teachers' Opinion on Availability of ICT Staff

The response of the teachers when asked about the ICT staff availability was very similar to that given by the students and the results portrayed that ICT staff in schools under investigation was non-existent. From the figure it can be seen that 90.4% of the respondent indicated that there was no ICT coordinator in their school, 76.9% indicated that computer specialist was not available while 84.6% of the respondent gave the same answer about the availability of ICT assistant.

4.5.2 Training and computer skills

The researcher was interested to find out how training affected the level of skills of the respondent. From table 4.6 there is overwhelming evidence that computer training plays a big role in determining the level of skills of the respondents.

Table 4.6: Training and computer skills cross tabulation

			Computer training		Total
			No	Yes	
Word processing	Weak	Count	12	4	16
		Expected Count	6.2	9.8	16.0
		% within Word processing	75.0%	25.0%	100.0%
	Average	Count	7	4	11
		Expected Count	4.2	6.8	11.0
		% within Word processing	63.6%	36.4%	100.0%
	Good	Count	0	14	14
		Expected Count	5.4	8.6	14.0
		% within Word processing	.0%	100.0%	100.0%
	V. good	Count	1	10	11
		Expected Count	4.2	6.8	11.0
		% within Word processing	9.1%	90.9%	100.0%
Total		Count	20	32	52
		Expected Count	20.0	32.0	52.0
		% within Word processing	38.5%	61.5%	100.0%

Source: Researcher 2011

From table 4.6 it can be observed that 38.5% of the respondents had not received any training in the use of computers as compared to 61.55 who had received training. Examining those respondents who indicated that they were weak in word processing reveals that 75% had not received any computer training while 25% had received training. From the table it is also observed that 90.9% 0f the respondents who indicated that they were excellent in word processing had received training as compared 9.1% who gave the same response but had not

received any training. The respondents with average word processing skills that had also not received training consisted of 63.6% of the respondents as compared to 36.4% who gave the same answer.

4.5.3 Correlation of Computer Skills

The researcher was interested in establishing the relationship between the different skills under investigation and the result was as shown in Table 4.7.

Table 4.7: Correlations of computer skills: N=52

		Word processing	Spread sheet	Internet browsing	Power point	Programming
Word processing	Pearson Correlation	1	.832**	.789**	.656**	.233
	Sig. (2-tailed)		.000	.000	.000	.096
	N	52	52	52	52	52
Spread sheet	Pearson Correlation	.832**	1	.805**	.832**	.456**
	Sig. (2-tailed)	.000		.000	.000	.001
	N	52	52	52	52	52
Internet browsing	Pearson Correlation	.789**	.805**	1	.746**	.274*
	Sig. (2-tailed)	.000	.000		.000	.050
	N	52	52	52	52	52
Power point	Pearson Correlation	.656**	.832**	.746**	1	.403**
	Sig. (2-tailed)	.000	.000	.000		.003
	N	52	52	52	52	52
Programming	Pearson Correlation	.233	.456**	.274*	.403**	1
	Sig. (2-tailed)	.096	.001	.050	.003	
	N	52	52	52	52	52
**. Correlation is significant at the 0.01 level (2-tailed).						
*. Correlation is significant at the 0.05 level (2-tailed).						

Source: Researcher 2011

From the table it can be observed that there is high correlation between the skills under investigation. The correlation between word processing and spread sheet skills is 0.832 as compared to 0.789 between the word processing and power point. It is also observed that the

correlation between the programming skills of the teachers and the other computer skills is not so clear. This is a clear indication that very few teachers have taken interest in acquiring specialized computer skills like programming. The significant correlation in score of teachers in the different computer skills is an indication that performance in one of the computers skills can be used to predict the scores in the other skills.

Table 4.8 Chi- Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	24.730[a]	3	.000
Likelihood Ratio	30.176	3	.000
Linear-by-Linear Association	19.561	1	.000
N of Valid Cases	52		
a. 2 cells (25.0%) have expected count less than 5. The minimum expected count is 4.23.			

Source: Researcher 2011

The chi-square table confirms that there is a very strong relationship between the respondents' skills in word processing and their training status with the p-value being significant to 0.000. The research also confirmed similar results for other computer skills like power point, spread sheet and internet use.

4.5.4 Teacher specialization and computer skills

As part of establishing the factors that determine the level of skills of the teachers, their level of skills were established bearing in mind their area of specialization and the results are as summarized in table 4.9 below.

Table 4.9: Word processing and teaching subjects Cross-tabulation

			Teaching subjects				Total
			Language	Mathematics	Sciences	Humanities	
Word processing	Weak	Count	8	2	4	2	16
		% within Word processing	50.0%	12.5%	25.0%	12.5%	100.0%
		% within Teaching subjects	53.3%	16.7%	20.0%	40.0%	30.8%
	Average	Count	2	1	6	2	11
		% within Word processing	18.2%	9.1%	54.5%	18.2%	100.0%
		% within Teaching subjects	13.3%	8.3%	30.0%	40.0%	21.2%
	Good	Count	3	5	5	1	14
		% within Word processing	21.4%	35.7%	35.7%	7.1%	100.0%
		% within Teaching subjects	20.0%	41.7%	25.0%	20.0%	26.9%
	V. good	Count	2	4	5	0	11
		% within Word processing	18.2%	36.4%	45.5%	.0%	100.0%
		% within Teaching subjects	13.3%	33.3%	25.0%	.0%	21.2%
Total		Count	15	12	20	5	52
		% within Word processing	28.8%	23.1%	38.5%	9.6%	100.0%
		% within Teaching subjects	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Researcher 2011

From the table it can be seen that the highest number of teachers who indicated that they were weak in word processing were specialized in teaching languages. The language teachers comprised of the 28.8% of the respondents and 50% of these respondents said that their skills were weak in word processing. It can also be seen that the highest percentage of language teachers indicated that they were weak in word processing with a figure of 53.3% falling in this category. Those who specialize in humanities comprised of 9.6% of the respondents and 12.5% of the respondents who indicated to be weak in word processing. From the table it can also be

seen that teachers specializing in mathematics have the highest score in word processing skills with 33.3% of them indicating they were very good and 41.7% rating them selves as being good. The science teachers also appear to be highly skilled in word processing as they were in second position in terms of scores with 25% indicating to be very good and the same percentage indicating that they were good.

4.5.5 Computer skills and computer ownership

Table 4.10 gives the skills of the teachers in word processing bearing in mind their computer ownership status.

Table 4.10 Word processing and Own computer Cross-tabulation

			Own computer		Total
			No	Yes	
Word processing	Weak	Count	15	1	16
		% within Word processing	93.8%	6.3%	100.0%
		% within Own computer	39.5%	7.1%	30.8%
	Average	Count	6	5	11
		% within Word processing	54.5%	45.5%	100.0%
		% within Own computer	15.8%	35.7%	21.2%
	Good	Count	12	2	14
		% within Word processing	85.7%	14.3%	100.0%
		% within Own computer	31.6%	14.3%	26.9%
	V. good	Count	5	6	11
		% within Word processing	45.5%	54.5%	100.0%
		% within Own computer	13.2%	42.9%	21.2%
Total		Count	38	14	52
		% within Word processing	73.1%	26.9%	100.0%
		% within Own computer	100.0%	100.0%	100.0%

Source: Researcher 2011

From the table it can be observed that 42.9% of the respondents who own computers indicated that they were very good in word processing while 13.2% gave the same response but did not

own a computer. The table shows that 39.5% of the respondents who did not own computers were weak in computer skills as compared to 7.1% of the respondents who gave the same answer and they owned computers. From the table results it can be concluded that the ownership of a computer play substantial role in improving the computers skills of the teachers and this is in agreement with the researchers point of view in the section of literature review. The chi-square test also indicated that there is a significant relation between the variables as the p-value is 0.05.

Table 4.11 Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.606[a]	6	.050
Likelihood Ratio	13.199	6	.040
Linear-by-Linear Association	.528	1	.467
N of Valid Cases	52		

a. 8 cells (66.7%) have expected count less than 5. The minimum expected count is .21.

Source: Researcher 2011

4.5.6 Teachers Age and Computer Skills

The researcher was interested in finding out whether computer skills varied with the age of the teacher. Table 4.12 gives the proficiency of the teachers in word processing and their age.

Table 4.12: Word processing and Age of teacher

			Age of teacher				Total
			25 or less	26-35	36-45	46-45	
Word processing	Weak	Count	2	4	9	1	16
		% within Word processing	12.5%	25.0%	56.3%	6.3%	100.0%
		% within Age of teacher	13.3%	20.0%	56.3%	100.0%	30.8%
	Average	Count	2	6	3	0	11
		% within Word processing	18.2%	54.5%	27.3%	.0%	100.0%
		% within Age of teacher	13.3%	30.0%	18.8%	.0%	21.2%
	Good	Count	6	5	3	0	14
		% within Word processing	42.9%	35.7%	21.4%	.0%	100.0%
		% within Age of teacher	40.0%	25.0%	18.8%	.0%	26.9%
	V. good	Count	5	5	1	0	11
		% within Word processing	45.5%	45.5%	9.1%	.0%	100.0%
		% within Age of teacher	33.3%	25.0%	6.3%	.0%	21.2%
Total		Count	15	20	16	1	52
		% within Word processing	28.8%	38.5%	30.8%	1.9%	100.0%
		% within Age of teacher	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Researcher 2011

From the table it is observed that the teachers with 25years or less years and those with 26-35 years had the highest number of those very good in word processing with the two cases having 45.5% level of proficiency. It is also observed that the highest percentage of the 25years or less indicated that they were very good in word processing with 33.3% falling in this category. It is observed that only 6.3% of the 16 teachers within the age of 36-45 years indicated that they were very good in word processing while 56.3% and 18.8% indicated they were weak and average respectively. The low skills portrayed by the teachers of 36 years and above could be due to the fact that they were in colleges at a time when computers were non existent in the institutions. On the other hand the younger teachers have been exposed to computers during the college life and could have had some computer lessons in their course of training. They are likely to have been in training institutions when the use of e-mail was very fashionable (dotcom error) and this could have exposed them to use of computers. The fact that the older teachers may have been teaching in the rural set up where there are no high use computer could be the other reason for their low

skills. Attitude towards technology and general negative attitude towards learning new skills could also be a major contributor of their low skills.

4.5.7 Students utilization of ICT

The behavior of the students on use of computer is very important in determining their utilization of the facilities. When the students were asked on how they utilize computers when they have access and their accessibility of computers outside school their response was as shown in the table 4.13 below.

Table 4.13 Students utilization and access to ICT

	Outside	Sports	Typing	Supplement	Email	Social site	Games
SA	31.2	11	46.8	11	17.4	16.5	16.4
A	29.4	22	22	9.2	14.7	29.4	32.7
D	16.5	35.8	14.7	39.4	22	20.2	21.8
SD	22.9	31.2	16.5	40.4	45.9	33.9	29.1

Source: Researcher 2011

From table 4.13 it can be noted that 60.6% were in agreement that they could get access to ICT facilities outside school. When the students were asked if they use the internet to supplement the material given by their teachers, 80% indicated that they did not as compared to about 20% who did. When asked about visiting social sites like face book 45.9% of the students were in agreement that they visited these sites as compared to 54.1% who did not. 49.1% indicated that they like playing computer games while 33% indicated that they like browsing for international sports. It is clear from this response that when the students have access to computers they choose to concentrate on entertainment and neglect utilizing the internet facilities for academic

purposes. Even though appreciable percentage of the students did not indicate that they utilize the facilities for entertainment this did not translate to high number that was utilizing the facilities for academic purposes. This could be interpreted as being as a result of them having very little knowledge of computers and are yet to discover most of the entertainment being "enjoyed" by their counter parts. When the students were asked if they preferred typing their assignments 68.8% were in agreement. This can be seen as an indication of the students ambitions to utilize ICT in their academics. It should however be noted that with the low computer skills it might take time for it to be practical for the students to be requested to type their assignment. However for a start the teachers can give very small assignments to the students which are supposed to be typed. Another alternative is to request typed assignment that is supposed to be done in groups. This will enable the students who are very weak in computer skills to learn from those who are well endowed in computers skills. This will also be a practical way of utilizing the few computers available in some of the schools.

4.6 Challenges facing the use of ICT in teaching-learning processes

Apart from the infrastructure, knowledge of ICT and the factors that have been mentioned the research aimed to look for other challenges that surround the use of ICT in teaching and learning in the study area. The teachers and students mentioned that there was no proper program for using the ICT facilities in the schools even when they were available. This is a challenge because with no proper program the facilities are likely to be idle most of the time yet in most of the schools the computers were inadequate. Lack of proper program also may result in computers being occupied by some individuals for a very long time while others do not have any chance to use them. For the students without a proper program of using computer it may result in the

students spending a lot of time on the computer doing irrelevant things like playing computer games or watching pornographic materials especially when the computers are connected to the internet. The other challenge which came out was the irresponsible use of ICT facilities by the students. The major purpose of ICT facilities is for learning purposes and students are not supposed to look at the facilities as a source of entertainment. There was a considerable number of students who indicated that whenever they had access to a computer they preferred playing computer games. This is a clear indication that when the students have access to the computer facilities they are likely to resort to use them for entertainment and not for academic purpose. It was also the concern for some of the students that computer facilities in school lead to moral decadence as most of the students engage in viewing of pornographic materials instead of using the facilities for academic purposes. It is therefore a challenge for the school administration to ensure that computer facilities are utilized properly. The students cited lack of educational programs on the computers as a challenge in the utilization of the facilities. It is therefore necessary for the school administration to ensure that computers have relevant educative programs so as to enable the students to use the computers as learning facilities. Use of storage devices that were infested by viruses and general misuse of the ICT facilities were reported to be common. Infection of computers with virus leads to crashing of the computers which reduced further the number of computers available for use. It is therefore necessary to have ICT assistant who will ensure that computers facilities in the schools are used responsibly. It may also be necessary for students only to be allowed to use storage devices such as flash discs and memory card sticks with permission from the authority. Freedom of use of the storage devices without monitoring may also result in students using the devices to store pornographic materials and

accessing them on the computers. The students are likely to leave the same material on the computers thus resulting to other innocent students accessing the same.

CHAPTER FIVE:

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter gives the summary of the study, implication of the findings, conclusions, recommendation for policy and practice and recommendations for further study

5.2 Summary of the Major Findings of the Study

From the findings there was a strong indication that the use of ICT in learning and teaching in most of the secondary schools in the study area is limited. In most of the secondary schools the students and the teachers were in agreement that the infrastructure was inadequate. The printing facilities were also not adequate or were totally unavailable. Internet facilities were not available in the schools. Overhead projectors were also a facility that was not available in the schools. The percentage of the students who indicated that they did not have the skills to create/edit a document, save a document, send mail and open a file was quite high. This is a clear indication that most of the students did not have any basic idea on use of computers. The investigation on the teachers skills revealed that most of the respondents were weak in power point, spread sheet and word processing.. It was also noted that the older teachers are less endowed in computers skills when compared to the younger teachers. This was revealed by looking closely at the word processing skills of the teachers in age group 36-45 years who themselves as being weak as compared to those in age group 25 or less years and 26-35 years respectively. The science and mathematics teachers had high scores in computers skills while the result indicated that the

humanities were the least skilled. The female teachers were found to be superior in computer skills as compared to men. Investigation on the ability of the teachers to apply ICT skills in learning and teaching indicated that most of the teachers knew the teaching/learning situations that were suitable for ICT use. The investigation on the ability of the teachers to utilize the internet to get the relevant curriculum material revealed that many of them were capable of getting relevant curriculum materials from the internet. When the teachers were asked about there ability to use ICT in collaborating and their ability to use internet to support student learning, many of them gave a positive response. Preparation of lessons involving use of ICT was a challenge to many teachers as half of them indicated they did not have this ability.

There are several factors that came out as having an influence in the utilization of ICT in learning and teaching. The availability of ICT personnel was found to be almost non existent and this is believed to be a big hindrance in utilization of ICT in learning and teaching even in the schools where computers are available. The availability of ICT staff is important in ensuring that ICT facilities are not vandalized by students or any other person accessing the facilities. Their availability will also ensure that the students utilize the facilities for only useful academic purposes. Training status of the teachers was found to have a very high influence on the teachers ability to use a computer. The teachers who owned computers were found to be more skilled in computer application skills despite there being no relationship between computers ownership and the computer training status of the teachers. This appeared to prove the researchers view that ownership of computer may help the teachers acquire relevant computer skills even when they have not received any formal computer training. However, the relationship between computer skills and computer ownership was not strong as compared to that of training status and computer skills. This is an indication that training teachers in computers is very important and

has no substitute. The ownership of computer may be used mainly in putting the skills learned in class into practice and acquiring new skills. The researcher on the other hand feels that the ownership of computer may have a higher contribution to the teachers skills if they were utilizing the skills more often in their schools.

5.3 conclusions

The following conclusions were made from the study:

1) The study has shown that in most of the schools there are no adequate ICT facilities and therefore this makes it impossible to incorporate ICT in learning and teaching in the schools

2) In the schools where ICT facilities were available there was no proper utilization of the facilities partly because of lack of ICT staff.

3) Most of the students seemed to engage in entertainment whenever they accessed computers as compared to using the computers for academic benefits and this makes the ICT facilities academic benefits to be minimal.

4) In schools where ICT facilities were available some of the students indicated that educative programs were not installed on the computers and also the internet facilities were reported to be inadequate if not available. This therefore acted as a hindrance in the utilization of the facilities by the teachers and students as a learning tool.

5) The access to pornographic material through ICT facilities came out as a concern from the students. It was therefore clear that availing ICT facilities to the students without any proper control to their use may cause moral decadence of the students and the entire society with little academic gain being realized

5.4 Recommendations

In view of the various factors that emerged from this study, the researcher made the following recommendations:

i. The government need to help secondary schools have access to electricity from the national grid as in some of the school this was cited as being a major hindrance to use of ICT.

ii. There is need for schools with ICT facilities to address the issue of lack of ICT staff as this will ensure that the facilities are in good working conditions and are utilized responsibly and optimally by the students and staff.

iii. The use of ICT facilities by students should be closely monitored so that the students only engage in useful academic activities when using the ICT facilities. In this connection the accessibility to pornographic materials should be prohibited and students found engaging in such activities should receive harsh punishment. The students should also be discouraged from loading computer games on the facilities and playing them, visiting social sites and engaging in many other non academic activities whenever they have access to school ICT facilities.

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

v. The students should be advised on responsible use of ICT facilities in order to ensure that there is no addiction to the use of computers at the expense of engaging in other non important activities like games.

vi. The culture of use of computer facilities should be encouraged in school so as to narture the skills possessed by some of the teachers and the students. This can be done by encouraging

the use of power point during meetings school. The teachers should also be encouraged to type their own work instead of depending on the secretary.

vii. The teachers should be encouraged to acquire enough computer skills at the time they are in college. This can be achieved by the lectures encouraging typed presentations, presentation of projects and research papers using power-point, giving assignments whose materials can only be found on the internet and encouraging the students to hand in their assignments through mail.

5.5 Recommendations for Further Research.

i. A study to be done on utilization of ICT facilities where such facilities are well established

ii. A similar study to be conducted in the private secondary schools and also in middle level colleges.

iii. This study to be done on a different geographical area in Kenya.

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APPENDIX 1

RESEARCH AUTHORIZATION

REPUBLIC OF KENYA

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telegrams: "SCIENCETECH", Nairobi
Telephone: 254-020-241349, 2213102
254-020-310571, 2213123,
Fax: 254-020-2213215, 318245, 318249
When replying please quote

P.O. Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke

Our Ref: **NCST/RRI/12/1/SS011/1017**

Date: **9th August, 2011**

Kamau George Kamau
Kenyatta University
P. O. Box 43844 00100
NAIROBI

RE:RESEARCH AUTHORIZATION

Following your application for authority to carry out research ***Constraints in the use of information communication Technology in teaching-learning process in secondary schools in Nyandarua South District.*** I am pleased to inform you that you have been authorized to undertake research in Kenya for a period ending 30th April 2012.

You are advised to report to **The District Commissioner** and **District Education Officer Nyandarua Suth District** before embarking on the research project.

On completion of your research project you are advised to submit **one hard copy and one soft copy** of your thesis/ project to this office.

P.N NYAKUNDI
FOR:SECRETARY/CEO

Copy to:

The District Commissioner
Nyandarua South District

District Education Officer
Nyandarua South District

APPENDIX 2

QUESTIONNAIRE FOR THE TEACHER

School:

SECTION 1: Demographics

1. Gender Male Female

2. Age

   25years or less ☐ 26 -35 years ☐ 36-45 years ☐ 46-55 years

3. Indicate your highest academic level

   PhD Master Degree level☐ Undergraduate Degree leve☐ Diploma level

   Other ☐

4. For how long have been teaching in this school

   Less than a year ☐ 1-5 years☐ 6-10 years ☐ 11-15 years☐ More than 15 years

5. What are your teaching subjects

Languages ☐ Mathematics☐ Sciences ☐ Humanities ☐

6. Do you own your own computer?

   Yes ☐ No ☐

SECTION B: Knowledge and skills in ICT

7. Have you ever received any for of training in ICT

Yes ☐ No ☐

8. How do you rate you're your computer expertise in the following areas

	Very Good	Good	Average	Weak
Word processing				
Spread sheets				
Internet browsing				
Presentation tools (Power point)				
Programming				

9. In the table below, respond by ticking the appropriate response by making use of the following key

SA- Strongly Agree A- Agree D- Disagree SD- Strongly Disagree

Statement	SA	A	D	SD
I can prepare lessons that involve the use of ICT by students				
I know which teaching/learning situations are suitable for ICT use				
I can find useful curriculum resources on the internet				
I can use a computer in monitoring students progress				

I can use ICT in giving effective presentation/explanations				
I can use ICT for collaborating with others				
I can install educational software on my computers				
I can use the internet to support student learning				

SECTION C: Adequacy of ICT resources and personnel

10. According to you do you think the computers in the school are enough?

Yes ☐ No ☐

11. Comment on the adequacy of internet facilities in the school

Available and Adequate Available but inadequate Not available

12. Does the school have an overhead projector

13. Yes ☐ No ☐

14. Comment on the adequacy of the printing facilities in the school

Available and Adequate ☐ Available but inadequate ☐ Not available ☐

15. Indicate the availability of the following personnel in the ICT department

Personnel	Available	Available sometimes	Not available
A tutor who serves as an ICT coordinator			
A computer specialist who is consulted			
ICT assistant to assist students			

16. List any other challenge in the use of the ICT in the school?

……

……

……

17. What factors would enhance the use of ICTs in enhancing teaching and learning in the school?.....

    .....

18. What possible recommendations would you make towards increasing the use of ICTs in enhancing teaching and learning in secondary schools?

……

……

APPENDIX 3

STUDENT QUESTIONNAIRE

SCHOOL:

Gender of student: Male ☐ Female ☐

SECTION A: ICT Skills and knowledge

1. Can you open a file on a computer?

   Yes ☐ No ☐

2. Are you able to create/edit a document on a computer?

   Yes ☐ No ☐

3. Can you save a computer document?

   Yes ☐ No ☐

4. Do you know how to write and send e-mails?

   Yes ☐ No ☐

SECTION B: Students utilization of ICT facilities

5. Are you registered with any of the social sites like facebook?

   Yes ☐ No ☐

6. Do you have your own storage device like a flash disc or memory card?

   Yes ☐ No ☐

7. In the table below, respond by ticking the appropriate response by making use of the following key

SA- Strongly Agree A- Agree D- Disagree SD- Strongly Disagree

Statement	**SA**	**A**	**D**	**SD**
I like playing computer games when I access the computer				
I like visiting social sites like facebook whenever I am on the internet				
Most e-mails I receive from friends rarely address academic issues				
I usually use the internet to supplement what the teacher gives in class				
I would prefer if the teachers allowed as to type our assignment on the computer				
I like browsing the internet to get international sports news				
I can easily get access to a computer when out of school				

SECTION C: Adequacy of ICT resources and personnel

8. According to you do you think the computers in the school are enough?

Yes ☐ No ☐

9. Comment on the adequacy of internet facilities in the school

Available and Adequate ☐ Available but inadequate ☐ Not available ☐

10. Does the school have an overhead projector

Yes ☐ No ☐

11. Comment on the adequacy of the printing facilities in the school

Available and Adequate ☐ Available but inadequate ☐ Not available ☐

12. Indicate the availability of the following personnel in the ICT department

Personnel	Available	Available sometimes	Not available
A tutor who serves as an ICT coordinator			
A computer specialist who is consulted			
ICT assistant to assist students			

13. List any other challenge in the use of the ICT in the school?

……

……

14. What factors would enhance the use of ICTs in enhancing teaching and learning in the school?

……

……

15. What possible recommendations would you make towards increasing the use of ICTs in enhancing teaching and learning in secondary schools?

……

……

APPENDIX 4

INTERVIEW SCHEDULE FOR THE PRINCIPAL

1. How many students are in the school currently?
2. Is there ICT department in the school?

   Yes ☐ No ☐

3. Are there internet facilities in the school?

   Yes ☐ No ☐

4. How many computers are in the school
5. How are the computers distributed for use by students, teachers and for administrative purpose
6. Do you think there is need for in-service training for teachers on the use of ICT in education?

   Yes ☐ No ☐

7. Do students have access to printing and photocopying services
8. Is there ICT library in the school?

   Yes ☐ No ☐

9. If the school has ICT library comment on the level of equipment
10. Are there overhead projectors in the school?

    Yes ☐ No ☐

11. If yes, are they enough?

    Yes ☐ No ☐

APPENDIX 5

OBSERVATION CHECKLIST

UNIT OF OBSERVATION	COMMENTS
ICT infrastructure in place Computer laboratory Processor speed Type of monitors in use State of maintenance	
Access to ICT infrastructure Access of ICT infrastructure to students Access of ICT infrastructure to teachers	
Technical support Availability of technical support	
Use of ICTs to enhance teaching and learning Teachers use of ICT Students use of ICT	

APPENDIX 6

PROJECTED BUDGET

ITEM	UNIT	UNIT COST Kshs.)	TOTAL (Kshs.)
Lap top	1	60,000.00	60,000.00
Digital camera	1	10,000.00	10,000.00
Printing of research instruments			
Check-lists	20	5	100.00
Questionnaires	300	20	6,000.00
Flash disks	2	1,000.00	2,000.00
Compact Disc.	10	20.00	200.00
Stationery,			
Pens	10	20.00	200.00
Pencils,	10	10.00	200.00
Rubbers	6	20.00	120.00
Proposal			
Typing	500	20.00	10,000.00
Printing	500	10.00	5,000.00
Photocopying	1,000	2.00	2,000.00
Binding	8	50.00	400.00
Transport	-	-	12,000.00
Project			
Typing	500	20.00	10,000.00
Printing	500	10.00	5,000.00
Photocopying	1,000	2.00	2,000.00
Draft binding	10	100.00	1000.00
Final project binding	6	500.00	3000.00
Miscellaneous	-	-	12,000.00
Total direct costs			**129,220.00**
Overheads			**12922.00**
Grand total			**142142.00**

APPENDIX 7

LIST OF SECONDARY SCHOOLS

No.	Name	Category	Status	Zone
1	Karima	Girls boarding	Public	Ndunyu-njeru
2	Nandarasi	Mixed boarding	Public	Ndunyu-njeru
3	Kitogo	Mixed boarding	Public	Ndunyu-njeru
4	Ndunyu-njeru	Mixed day	Public	Ndunyu-njeru
5	Mukungi	Mixed day/boarding	Public	Ndunyu-njeru
6	Mikaro	Mixed day	Public	Ndunyu-njeru
7	St sharon	Mixed day/boarding	private	Ndunyu-njeru
8	Kiambariki	mixed day	Public	Ndunyu-njeru
9	Kirarwa	mixed day	Public	Ndunyu-njeru
10	Kimuri	Mixed day/boarding	Public	Murungaru
11	Plain Hill	Mixed day/boarding	private	Murungaru
12	Wheatland	Mixed day/boarding	Private	Murungaru
13	Murungaru	Mixed day	Public	Murungaru
14	Kihumbu	Mixed day	Public	Murungaru
15	Magomano	Girls boarding	Public	Engineer
16	Muruaki	Mixed boarding	Public	Engineer
17	Mwenda-andu	Mixed day/boarding	Public	Engineer
18	Rugongo	Mixed day	Public	Engineer
19	Kinja	Mixed day	Public	Engineer

20	Gathaara	Mixed day	Public	Engineer
21	High star	Mixed day	Public	Engineer
22	St Michael	Mixed day	Public	Engineer
23	Mutamaiyu	Mixed day	Public	Engineer
24	Engineer wisdom	Mixed day/boarding	Private	Engineer
25	Dima complex	Mixed day/boarding	Private	Engineer
26	Iganjo memorial	Mixed day/boarding	Private	Engineer
27	Abercrest	Mixed boarding	Private	Engineer
28	Mwiteithia	Mixed day	Public	Engineer