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**“ADOPTION AND UTILISATION OF COMPUTER TECHNOLOGY IN
PUBLIC SECONDARY SCHOOLS: CASE OF MERU SOUTH DISTRICT,
KENYA”**

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DECLARATION

I declare that this project report is my original work and has not been submitted anywhere else for the award of Master of Arts in Rural Sociology and Community Development.



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The project has been submitted for examination with my approval as University Supervisor.



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ABSTRACT

Information and computer technology (ICT) has found relevance in various applications. Among these applications is in schools where it is applied in aiding learning. It has enabled the dissemination of learning materials through on-line means enabling many learners to participate in schooling system. This has mostly been applied in developed countries. In Kenya, the application of ICT in school learning is relatively new. It has mainly been applied in urban and/ or private schools creating a pool of computer literate students. The case is different in most public schools due to a number of reasons. The government introduced the school computerization programme to bridge this gap but little progress has been achieved. This study geared towards understanding the level of ICT adoption and utilization in public rural secondary schools, and factors influencing it in Meru South district. Four schools were purposively selected for the case study. School principals, ICT trainers and students were interviewed over various issues relating to computer technology adoption, usage and challenges.

The study findings revealed that less than half (45%) of the schools in the district have adopted ICT in learning or administrative tasks. The schools that have adopted have done it in the recent past through the support of NGOs and private entities or through generated fees. The government computerization programme had not benefited any of the schools in Meru south. The computers are mainly used for administrative and learning purposes. Even where adopted, the computers are only used to teach ICT studies but have not been used for teaching other subjects. Among the limitations facing the adoption and utilization of ICT in learning in public schools is lack of adequate staff to train ICT courses with most having basic or no skills; energy; failure to prioritize ICT studies; preference for other courses that are easier to pass or with sufficient materials and tutors; and lack of adequate number of computers such that students taking ICT studies

have to share the few available computers. Similarly, the schools lack adequate computer labs, are not well maintained due to financial and technical constraints while turnover rate of ICT teachers may discourage students from pursuing ICT studies. Hence it can be argued that the adoption of ICT in public secondary schools in Meru south is influenced by factors such as the number of ICT qualified teachers, attitude towards ICT, energy sources, infrastructure (labs/space), finances/support from external sources and course/subject options. Utilisation on the other hand is related to number of ICT qualified teachers, attitude both among students and teachers towards ICT, exposure and awareness, competing needs, energy sources, infrastructure (labs/space), course options, maintenance costs, interest among students, priorities on how to use computers, number of computers available in the school, networking status, and connectivity to other services such as internet.

While a number of students who join secondary schools have basic computers skills which they can utilize in pursuing IT careers, there is need for schools to address the glaring challenges identified by the study, build capacity for training ICT studies and sensitize parents and students on the importance of IT in future careers. Importantly, schools should be supported to invest in sufficient number of computers. The Ministry of Education should also gear up by incorporating computers studies in the teachers training programmes as a strategy on increasing the number of computer literate personnel who can teach ICT studies.

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LIST OF ACRONYMS

CT-Computer technology

ICT-Information and Communication Technology

IT- Information Technology

E- LEARNING- Electronic Learning

IBM- International Business Machine

STI- Science Technology and Innovation

PSE- Personal and Social Education

DEO- District Education Officer

SPSS- Statistical Package for Social Sciences

NGO- Non Government Organization

KNEC- Kenya National Examinations Council

CD-ROM- Compact Disk Read Only Memory

USB (Universal Serial Bus)-A connection port on the computer that can host up to 126 devices.

DVD- Digital Video Disk

CAL- Computer Assisted Learning

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Technology plays a fundamental role in wealth creation, improvement of the quality of life, real economic growth, and transformation in any society. For example, the industrial revolution technology tremendously benefited the United Kingdom and France in the 19th century, and also helped transform the United States from an agrarian economy into an industrial super power in the 20th century. India has also emerged as an industrial leader due to Information and Communication Technology (Thijs,1997).

ICT is an umbrella term that denotes a diverse set of technological tools and resources used to communicate, create, disseminate, store and manage information. These technologies include computers, the internet, broadcasting technologies and telephony (Ragnar Audunson, 2003). ICT is meant to empower people in a knowledge based society by expanding access to information. Within the education system it has emerged as a major teaching tool in many countries. This is because it enhances the access to online materials such that learners and teachers do not have to be in one place due to educational programming over radio or television; and teachers do not have to rely on printed materials and other physical media stored in libraries since a wealth of learning materials is available on the internet that can be accessed by unlimited number of people.

Teleconferencing technologies enable instructions to be received simultaneously by geographically dispersed learners (synchronous learning). ICT also facilitates access to resource persons-mentors, experts, researchers and professionals over the world.

ICT has also been used to enhance teacher training. For instance, the internet through institutions like cyber teacher training centers have provided professional development opportunities to in-service teachers in South Korea, while large scale radio and television based teacher based education programmes are in use in China (Thijs, 1997).

Education is the cornerstone of sustainable development. It is the foundation to building a modern and thriving society and is the primary mechanism that empowers communities and citizens to fully participate in development and prosperity. While the right to education is recognized as fundamental for each citizen, access to it is not guaranteed. In the developing nations such as Kenya, the essential building blocks for education systems are suffering from deficiencies.

Increased enrollment in primary and secondary school presents significant challenges like overcrowding in classrooms, text book shortage and other resources and low teacher /pupil ratio which have undermined the quality of teaching and learning. The traditional chalk and talk method that is teacher-centred limits creativity and innovation, curtailing the learners ability to advance on their own-and yet still remains the preferred approach. ICT can help respond to these challenges and create the environment that is conducive for effective and quality education systems

Achieving Universal basic education is one of the country's main development objectives. The Dakar Framework of action for education for all (EFA) adopted in 2000 as a roadmap to meet the education for all Goals by 2015, highlights the role of information and communication technologies in supporting EFA goals. The technologies have great potential for knowledge dissemination, effective learning and the development of more efficient education services.

ICT can also help to accelerate teacher training as the world is facing an acute and growing shortage of teachers ,with another 15-35 million needed to achieve Education for all by 2015,over and above the existing currently 60 million (US department of Labor ,1999)

ICTs have been touted as potentially powerful enabling tools for educational change and reform. when used appropriately ,different ICTs are said to help expand access to education,strengthen the relevance of education to the increasingly digital workplace and raise education quality by among others helping make teaching and learning into an engaging, active process connected to real life

ICT training in schools not only helps learners' access information but also prepares them for working life. This is because computers, internet and related technologies have become common technologies in work places. and familiarization with their application makes them competitive in the job market.

Most of the public secondary schools are located in rural areas which are characterized by lack in the eye of the urban dweller. These rural areas must be developed so that ICTs are adopted for wider economic and social development. Thus community development in the rural areas must focus on ICT which will play a role in informing people and thus creating a nation that is empowered.

Regardless of whether ICT has positive or negative effects on the society,the one thing that's certain is it has forever altered our perception of what a society is by making the world a global village.

1.2 The Problem Statement

Many countries around the world have adopted computer technology for various applications in education system. However, the level of adoption in primary and secondary schools in Kenya has been low and slow. This can be attributed to various reasons relating to financing, infrastructure, maintenance, inadequate capacity for ICT training, inadequate number of computers, attitude, interest, exposure, priorities, and lack of energy among others. For instance, the computerization program in many schools has mainly been facilitated by private individuals and non-government agencies. The government through the ministry of education has in the recent past shown interest in supporting schools computerization program with the sole purpose of producing competent ICT professionals and creating an equitable education system but its role has remained relatively low. Similarly, the infrastructure for computerization is poor and the cost of buying and maintaining computers rather high for many schools to afford. This has placed schools in different levels of technology adoption continuum with urban and high cost private schools being well off than public schools (Sanya, 2001).

Public schools in rural areas are the most disadvantaged owing to the fact that even other associated factors such as energy sources are limiting. Where computers have been acquired, they are rarely used for education purposes. Instead, they are used for training basic skills like word processing, spreadsheets and databases or for administrative purposes. The implications of the poor ICT status and use in schools is two-fold: 1) students cannot access on-line educational materials and have to rely on printed materials that are in most cases not up to date, and 2) sharing and exchange of materials by teachers in different schools can only be physically undertaken despite being challenged by distance between schools. This is unlike in urban areas where networking of schools has

been possible and sharing of educational materials between schools, and teachers and students is getting relatively easy.

With the introduction of free primary and secondary education there is a strain on available resources and facilities as the number of students increase. The pupil to teacher and pupil to textbook ratios especially in densely populated areas are worrying. While computer technology can help ease the challenge by rolling out digital learning materials, the high costs of obtaining and maintaining computers in schools remains a challenge.

With inadequate training and access to ICT, students not only face the challenge of accessing learning materials but have limited exposure to career choices. This implies that they will continue pursuing non-IT careers. They will also not be in a position to take advantage of the emerging job market in the IT sector, nor venture in ICT related businesses. Similarly, it will be difficult to generate the much needed computer literate labour force for driving the country towards achieving the Vision 2030. It is on this basis that this study is conceptualized with the aim of assessing the level of computer technology adoption and utilization in public secondary schools in Meru South district. Meru South district represents a typical rural setting in Kenya and is hoped that the study will provide adequate information to assist the school computerization process.

1.3 Objectives of the study

The broad objective of the study is to assess the adoption and utilization of computer technology in public secondary schools in order to provide recommendations for enhancing effective school computerization and optimal utilization.

1.3.1 Specific Objectives

The specific objectives of the study are to:

- Assess the factors influencing the adoption of computer technology in public secondary schools in Meru South District;
- Assess the level of utilization in schools that have adopted computer technology.
- Examine the factors influencing the utilization of Computer Technology in the Public Secondary Schools

1.3.2 Research Questions

- i. What are the challenges facing adoption of Computer Technology in Public secondary schools?
- ii. What are the challenges facing utilisation of Computer technology in Public secondary schools?

1.4 Study Justification

Computer technology is crucial in enhancing education, professional/career development and development of the nation. Effective computerization further enhances building and instilling of skills for job creation among the young people which will be instrumental in the country's efforts to achieve the Vision 2030. It is in the secondary schools that all students must access computer skills since not all get a chance to join the colleges. By exploring the adoption and utilization of CT technologies in public secondary schools, this study provides useful information for strengthening the computerization process as a step towards strengthening information sharing and building IT capacity for the development of the nation. No studies have been undertaken to assess adoption and utilization of computer technology in rural areas despite the emphasis on creating a computer literate society by 2030.

1.5 Scope and Limitations of the study

The study has examined economic , social and technological issues that affect adoption and utilization of Computer technology in secondary schools. Demographic factors like religion which influences adoption and utilization of CT have not been explored .The study area was Meru south district because it is one of the districts that have the highest number of secondary schools that have adopted computer technology . Adoption of computers in schools in Meru South is at 45% as compared to other districts whose adoption is at or below 40% .

Despite the desire to conduct this study and inform relevant departments for purposes of strengthening the computerization process in schools the number of schools that have adopted the technology are few to make an effective sample size for statistical inference.

1.6 Definition of terms

Computer Technology- Technology that uses a computer machine to manipulate data according to set instructions

Information and Communication Technology- technology that includes communication devices like telephones and use of all computer driven devices

Adoption - Refers to acquisition of Computers

Utilisation - Defines the usage of computer technology

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter reviews relevant literature to the study by various scholars. It reviews studies that have been conducted in and outside Kenya. The thematic areas covered are ICT applications in Education, Advantages of ICT in education, ICT/CT adoption in schools and factors influencing the adoption, the level of ICT utilization in schools and challenges facing the adoption and utilization of computer technology in public schools.

2.1 ICT applications in education

According to Jon and Rupert (2005), computer studies were launched in 1996 as an examinable subject in secondary education. The topics taught in this cause are computers and their components, use of computers, basic computer concepts, word processing, programming, fundamentals of spreadsheets, application areas, data bases, networks, data communications, and the impact of computer technology on society in Kenya today.

In January 2008, Kenya became the third country in the African country to launch e-learning facilities in secondary schools. The programme by Intel, and whose only other beneficiaries are South Africa and Nigeria, was launched at Kamiti Secondary school in the outskirts of Nairobi. The programme enables students to be taught through information communication technology (ICT) and is a collaboration effort between the ministry of education and several local and multinational ICT companies.

Technology is a crucial part of research during project work in science-based subjects and it brings home firsthand information on natural disasters such as

tropical hurricanes, earthquakes, and volcanic eruptions, giving the learner an opportunity to perceive the dramatic effects of such phenomena.

Computers can also be used to necessitate easier communication within and outside the school. Schools which have websites like Braeburn and others and almost all students have email addresses, communication is made easier. Teachers can be able to transfer notes in soft copy to the students, and the students can hand over assignments over the internet making the teachers work easier. In addition, communication between the various departments is made easier.

The use of Computer Based Instructions in secondary schools in Kenya, specifically in rift valley province was explored by Edward et. Al (2008). Computer based instruction has been incorporated in some schools to facilitate the teaching of accounts. The teaching of double entry course in schools is an area that is faced with the problem of poor performance and a dislike of the subject by students due to the inappropriate teaching methods often used by teachers (Tanui 2003). Most of the classrooms are usually teacher-centred and hence give students fewer opportunities or roles to play in the classroom discourse. (Kiboss, 2000; Tanui 2003). Recent studies by the cognitivists and constructivists suggest that learners can be actively involved in the learning process by the use of Computer Based Instruction.

In Green Garden High school, a private school located in the suburbs of Nairobi, Technology was first introduced in this institution in the years 1996-1998. According to the founder his intention was to show students and teachers how to use the computer to access resources. He revealed that the recruitment of girls in school is based on their motivation to work with technology. The use of technology is also apparent in the administrative and academic setting. From

2002, "Computer Rooms" were called "Room eLearning" in reference to the exclusive use of technology for learning and teaching. (Tanui 2003)

According to the founder, the emphasis should be placed on the use of technology to teach other disciplines such as biology, chemistry, physics, and math. That's the reason why the school is equipped with high tech tools like Smart Board, video projectors, educational programs (Cyber School) Students use the computer to read / write their emails and acquire new knowledge on the web. Training sessions for teachers are held on Wednesdays to give them basic skills about how to use technology to teach. And now, many of them use technology to illustrate the basic concepts of their lessons (Chemistry, Physics, Biology and so on.)

In terms of challenges, the head of the school recognizes that computers can distract students. Instead of following the course; the students want to check their mail, listen to music, and play electronic games. It is therefore urgent to redirect their attention on the course. He also stressed the need to establish their own educational content and "customize" the e-tutorials that the school purchases on other markets in Europe or Asia. African voices should be put on the soundtrack of the e-Tutorials.

For the school director, technology must be seen as a necessity today by the students. In conclusion, all the staff felt that the use of technology reduces the workload of teaching and makes understanding of abstract concepts easier to the students by showing practical and animated phenomena explained in lessons.

ICT is powerful in presenting, or representing information in different ways. This can be through different forms (text pictures or tables and graphs) or by enabling changes to be shown dynamically such as in mathematical modeling or by helping visualization of complex processes in science.

Information can be manipulated easily on a computer so that a pupil can make changes and evaluate the effect of those changes. This can be where the information is of the same type such as text in word-processing (Snyder, 1993; Breese et al, 1996) or numbers in spreadsheets (Mann and Tall, 1992); or where it is in different forms such as between tables and text (Aisworth et al, 1997)

Observing changes in a graph when changes are made to the table of numerical information on which the graph is used or by manipulation an algebraic formula and observing how a graph of that function changes on a computer or graphic calculator can develop pupils' understanding of mathematical relationships. Computer tools can help students manipulate complex data-sets. This then provide a context for effective discussion which in turn can help to develop mathematical understanding (Cobb and McClain 2002). 'Visualization tools' can help learners to picture scientific ideas (Jonassen, 2000) or to develop conceptual understanding.

Computer aided education is useful for instructing children with learning difficulties. According to Pauline Clayton (1994) children with dyslexic can be assisted in Mathematics and Numeracy. There are several software packages that can be used; this programme reinforces the skills and ease difficulties. A project carried out on the same concluded that those with learning difficulties in maths 'need to understand what they are doing and have a reason for doing it' Hasselbring and Moore (1996) in *Developing Mathematical Literacy through the use of contextualized learning environments* also notes that maths is taught in a 'decontextualized manner'. Their study found that the students gains occurred because the materials used focused on the students' everyday use of maths and this facilitated the students' appropriate transfer of their Mathematical knowledge to solving everyday problems.

ICTs such as videos, TVs and multimedia computer software can provide challenging and authentic content that will engage the student in the learning process. Networked computers with internet connectivity can increase learner motivation as it combines the media richness and interactivity of other ICTs with the opportunity to connect with real people and to participate in real world events. This improves the quality of education (Engauge. north central regional educational laboratory,1997)

Basic skills are the foundation for higher order thinking and can be facilitated through drill and practice using ICTs. Educational television programmes such as Sesame Street are used to teach alphabet, colors, numbers etc. This is computer assisted instruction which focuses on mastery of skills and content through repetition and reinforcement.

Institutions like cyber teacher training centre in south korea are taking advantage of internet to provide better teacher professional development opportunities to in-service teachers. It is self directed, self paced web based content for primary and secondary teachers. Online tutorials are offered with some courses requiring occasional face to face meetings. In china large scale radio and television based teacher based education programmes are conducted by the china central radio and TV University amongst others. (Thijs, 1997)

2.2 Advantages of ICT/CT in education

If well designed and implemented ICT supported education can promote the acquisition of knowledge and skills that will empower students for lifelong learning. It enables new ways of teaching and learning -from teacher centered which is characterized by memorization to learner centered.

Computer learning-students mobilize the tools for calculation, analysis of information thus providing room for student enquiry, analysis and construction of new information-they learn as they do making learning less abstract and more relevant to the learners real life situation thus increased learner engagement. It is also a just in time learning where one can choose what to learn when they need to (Thijs, 1997).

Collaborative learning encourages interaction among students, teachers, and experts. It expands the learning space to include not just peers but also mentors and experts from different fields.

It offers an Integrative approach to teaching and learning where there is no separation between theory and practice that characterizes the normal classroom. Exploration and discovery is encouraged.

Motivation and self-esteem are important factors that can allow the less privileged to take up learning again (Yves 2006). Learning motivation to a large extent depends on the social context of the learner, especially for the most disadvantaged. In many social contexts, the obvious levers of motivation – such as increased employability or increased income – may not be sufficient to motivate people to learn. New levers have to be found to enhance the motivation of disadvantaged categories, linked not only to professional development but also to personal, emotional and social elements. Therefore, new levers of motivation should be focused not only on careers, but also on self-esteem (Aceto et al 2004).

Using ICT can result in pupils experiencing an increased commitment to the learning task, enhanced enjoyment and interest in their learning, and an enhanced sense of achievement and self-esteem (Cox, 1997). Many pupils

perceive that ICT use at school enhances their learning potential, their achievement goals and their long-term college and job prospects.

Though (Rudd, 2001) observes that there has been difficulties in establishing hard evidence of positive outcomes of the use of ICT which has led to criticisms that studies in this area rely on anecdotal evidence, through reporting on teachers' and pupils' personal feelings about the value of ICT, It could be argued, however, that these perceptions of teachers and pupils are themselves important factors, as they will also have an impact on motivation and attitudes to learning.

Robert et al (2004) observes that ICT can have an impact on students beyond their traditional school subjects. A number of studies have established that computers can have a positive effect on student motivation, such as their attitudes towards technology, instruction, or the subject. Kulik and Kulik (1991) for example did an analysis and found out that students using computer tutorials also had significantly more positive attitudes toward instruction and the subject matter than did students receiving instruction without computers. The findings corresponds to that in a comparative study conducted in physics classes in Kenya, where two randomly assigned classes used computer-based instruction, while a third equivalent group did not. Students in the computer sections learned physics concepts better and expressed positive attitudes about their physics learning, as ascertained in the interviews at the end of the lessons.

Further, students also learn new skills that go beyond traditional school knowledge. Many technology advocates argue for the inclusion of a more sophisticated set of 21st Century skills in the curriculum in order to promote economic development. They claim that use of ICT can support learning of such skills as technology literacy, information management, communication, working

in teams, entrepreneurialism, global awareness, civic engagement, and problem solving.

According to the world links programmes in Africa, where secondary school teachers and students use networked computers to support student-centered pedagogy, it has been reported by the programme officers that the students learned communication skills, knowledge of other cultures, collaboration skills, and internet skills. In addition to these self-reported data, a connected study in Uganda used a specially designed performance assessment to directly measure student learning of these skills. The study found that World Link schools outperformed the non-World-Link schools on measures of communication and reasoning with information

Robert (2004) observes that an important Millennium Development Goal is to achieve gender equality. If girls are to leave school ready to participate equally in the economy, they too will need the benefits of ICT: increased knowledge of school subject and new skills, including ICT skills. However, much of the research in developing countries shows a gap indicating that boys have more experience with technology than girls and that girls are more anxious about technology than boys. Further, he observes, the fortunate thing is that studies also show that greater experience with computer results in improved attitudes among girls. Much technology-supported programs in developing countries focus on including girls' use of computers, and data on impact often shows no gender gap. For example, girls and boys learned equally from the use computers.

In the world Links evaluation, teachers reported no difference between girls and boys in a wide range of learning outcomes related to computer use. In Andhra Pradesh (India, Wagner and Daswani have reported that poor girls learn more than boys in a non-formal ICT-based literacy program, when controlled for

schooling, ICT can benefit very diverse types of students. There is also quite consistent evidence, at least in the Western research literature, that students with disabilities, indigenous (minority language speaking) students, and students from low income homes all experience growth in their sense of self esteem and autonomy in their learning when given access to computers in the context of student-centered pedagogy.

Many governments are using the introduction of ICT as a way of providing teachers with new skills and introducing new pedagogy into the classroom. For example, teachers in the Rift valley province secondary schools talked about earlier are being exposed to new methods of instructing students taking account causes. From the study conducted in these schools, results indicated that The findings of this study have shown that teachers perception of the use of CBI do not just imply changing roles and style of teaching for the teachers but also better learning and social skills for the students (Hudson, 1997,1999). There is evidence to this also in the literature to the effect that despite the negative perception observed in the use of CBI in schools, the technology has potential for classroom instruction because the teacher is able to prepare worthy lessons with adequate class activities and learning aids (Kiboss, 2000). This has major implication for the whole-school policy for the integration of the CBI in the school curriculum. From the data collected, there is a general consensus that the use of CBI in teaching double entry in school accounting benefited in that it empowered the learners not only to socialize but also to learn the subject. This and other earlier studies will no doubt give a head start to the country's recent effort to integrate IT in the school curriculum (Republic of Kenya, 1999).

Olu G. (2008) conducted a study in Nigeria about the effects of information technology on the achievements of Secondary School students in the country. The study involved three experimental groups and a control group. The 200

computer literate senior students were taught by graduate language teachers who are computer literate. The students were taught three methods of teaching namely: lecture, discussion and discussion with internet exploration. The student's achievements in special skills of essay writing specifically in expression, organization of ideas, contents and mechanical accuracy were determined.

The findings of the study showed that the achievement of students instructed with discussion method with internet exploration was higher than those taught with the discussion and lecture methods and the control group. This finding supports the claim of Green and Gilbert (1995) that information technology skills will enhance student's communication skills. It also buttresses the assertion of Jarson (1997); all who believe that information technology will improve the quality of education offered to students as well as student's communication skills in writing and speaking. The finding of the study also shows that discussion method alone is better than lecture method because students in the discussion method performed significantly better than those instructed with lecture method and the control group.

The study revealed that the students exposed to internet exploration were able to find many relevant materials that serve as supplementary reading materials than students who were instructed with discussion without access to internet and lecture method group. In addition, the students in the discussion group with internet facility were able to discuss the materials collected from the internet. They were asked to summarize some of the materials collected from the internet identifying main and supporting ideas.

This study has shown that the problems of mass failure in English Language can be solved by teaching the students with good teaching methods and instructional

materials. The study has demonstrated that information technology, specifically internet exploration, can improve students' performance in essay writing. As a result of the findings of the study, it was concluded that discussion method, with internet exploration will enhance students' performance in essay writing

2.3 ICT/CT adoption in schools and factors influencing the adoption.

Computers were introduced to Kenya in the 1970s and the Internet became available in 1993 (Ford, 2007). As of March 2008, 7.9% of the population was accessing the Internet, with the majority being government and private sector employees. Beyond these users, cybercafés are the major providers of Internet service for the majority of the population. While there are over 30 Internet Service Providers in Kenya and the number continues to grow, access is still limited, especially in rural areas (Internet World Stats, 2009).

In a study by Wabuye (2003), results indicated that while ICT has penetrated many sectors including banking, transportation, communications, and medical services, the Kenyan educational system seems to lag behind. The study found that computer use in Kenyan classrooms is still in its early phases, and concluded that the perceptions and experiences of teachers and administrators do play an important role in the use of computers in Kenyan classrooms. This highlighted the need to provide pre-service and in-service training programs to enable them to successfully teach using computers in the classrooms is pertinent. Wabuye's study also determined that the government and the MoEST needed to review both teacher preparation and staff development programs, as well as develop a revised national plan to implement ICT into the curriculum.

In another study, (Momanyi, Norby, and Strand, 2006) conducted a survey analysis to determine the technology goals and needs in schools in Kenya. Findings in their study indicated that the respondents considered equipping secondary schools with computer technology as being important, but that it was less important to equip primary schools with computers. (Ford, 2007) reports that Kenya has approximately 19 890 primary schools, many of which are in rural areas. Of those, only 15% have electricity and only 500 schools have computers albeit with limited Internet access. There are about 4000 secondary schools with 85% of those being located in rural areas. 65% of those schools have electricity. Only about 750 schools have an average of 10 computers each although connectivity is limited. There are 22 teacher-training colleges, most offering some ICT curricula and technology integration. Many of these colleges have between 20-60 computers and trained ICT tutors but Internet connectivity is limited and mostly available though dialup.

For most developing nations, the dynamic nature of technology is difficult to keep up with, often forcing teachers to use traditional teaching methods and less effective instructional technology techniques. Kessey et al suggest seeking concessions with companies such as Microsoft® for discounted software. Alternatively, the use of Open Educational Resources (Johnstone, 2005) and Open Source Software (Coppola and Neelley, 2004) is an option that allows users to freely create and distribute software and educational resources without the prohibitive costs or licensing limitations. Progress has been made with using open source computer operating systems and software being localized to the languages and contexts with examples of Microsoft® and Google® which now have Kiswahili applications.

Kessy, Kaemba, and Gachoka, (2006) and Ford (2007) discuss several reasons for under use of ICT in education in the African context. The cost of adopting ICT including acquiring hardware and software, setting up setting up

telecommunication networks, and the maintenance and repair of facilities is often prohibitive for developing nations. Kessy et al. recommend privatization as a means to enhance competition and reduce cost. In general, African countries have poor infrastructure including unreliable transportation, limited electricity supply, and broadcast and telecommunication facilities. This makes it difficult for institutions to maintain Internet connections and in the case of Kenya electricity is not government subsidized making it relatively expensive at an average cost US\$ 0.08/KWh compared to US\$0.02/KWh.

To be effectively adopted, ICT requires good governance and appropriation of allocated government funds and foreign aid. In many developing nations lack of ICT policy, poor ICT project management, and corruption has led to ineffective implementation, adoption of different systems and standards, duplication of effort, and waste of technology resources. Efforts are often uncoordinated and initiatives are often in competition with each other rather than complementing each other. In addition there are many unsustainable ICT programs where schools have computers that do not work as resources that are often redirected and misuse (Ford, 2007; Kessy et al., 2006).

The cultural context of ICT adoption, language barriers, and attitudes toward ICT affect the rate at which it is adopted. Perceived difficulty in the integration of ICT in education is based on the belief that technology use is challenging, its implementation requires extra time, technology skills are difficult to learn, and the cost of attaining and maintain resources is prohibitive (Fourie and Alt, 2002). For instance, as Ford (2007) notes humanities teachers are the most resistant to computers. Limited skilled human resources and students' limited computer knowledge which is precipitated by the reluctance or inability for schools to introduce ICT often result in limited use of resources, creating a vicious cycle (Kessy et al., 2006). Further, Ford (2007) states that in many instances teachers believe that using computers deprives students of the time needed to study for

their national examinations and that computers disrupt the traditional structure of the classroom.

Omwenga (2004) argues that Using ICT in education means more than simply teaching learners how to use computers. Technology is a means for improving education and not an end in itself. Thus, ICT should also be used to promote information literacy – the ability to access, use and evaluate information from different sources in order to enhance

Further, Omwenga observes that issues to do with education reforms are also hindering the effective implementation of I.C.T. He observes that even in situations where teachers have been trained in the use of I.C.T, the integration of these technologies in the teaching of subjects has been weak because of a number of reasons: Absence of systematic management support; Lack of ownership by schools; Lack of integration into existing curriculum and textbooks; Teacher overload and lack of incentives and motivation; Lack of ICT-based materials that are truly interactive for teachers to use; and Shortage of personnel.

The absence of policies and management support to the use of ICT in schools is hindering the progress of the use of ICT in the classrooms. It is not uncommon that one comes across computers in schools not being used because they are out of order and there is no technical support to repair them; the computers cannot be accessed because they are locked away in computer rooms after school hours; or there is lack of funds for developing educational software to make the hardware become productive.

There is a need for a framework for ICT education in schools because realizing the potential benefits of ICT has been shown over the years to be difficult to achieve unless it is clear what capabilities the students are being expected to develop in the course. Without a clear overview of the learning processes required to develop such capabilities, there is a tendency for ICT to be “bolt on”,

time-consuming and costly to implement and its benefits remain unclear or dubious.

Margaret et al (2005) argues that Educators are not immune to the technology hype that rages all over the world. The pressure to get online or to give students access to the newest technology can be strong. Administrators who feel overwhelmed may make hasty or ill-conceived purchasing decisions. Careful planning for technology use is essential because technology is expensive; few schools have the luxury to change their hardware and software configurations after making a hefty financial commitment. Administrators can work with the technology planning team and consult with computer experts in the community to ensure sound decisions.

Technology purchases sometimes are made without consideration of the school's learning goals. Administrators and teacher-parent organizations seeking to define a meaningful role for technology in their school system need to put their initial energy into defining these goals. Although learning goals will be reviewed and updated based on current research, the effort should be made to stick to the goals and insist that technology purchasing be brought into line with them.

Administrators sometimes fail to budget enough funds for hardware, software, maintenance, professional development, on-site technical support, and the services of an educational technologist to provide support for integrating technology into the curriculum. Careful planning is essential to develop a technology budget that provides for all such factors.

When new technologies are adopted, learning how to use the technology may take precedence over learning through the technology. "The technology learning curve tends to eclipse content learning temporarily; both kids and teachers seem to orient to technology until they become comfortable," note Goldman, Cole, and Syer (1999). Effective content integration takes time, and new technologies may

have glitches. As a result, "teachers' first technology projects generate excitement but often little content learning. Often it takes a few years until teachers can use technology effectively in core subject areas" (Goldman, Cole, & Syer, 1999).

2.4 The level of ICT utilization in schools

The use of ICT is mostly focused on supporting the subject content. ICT-based activities by pupils are far more to do with consuming than producing. These work individually more often than together. However, the impact of integrating ICT in teaching can be measured in pupil engagement, differentiation, and creativity and by the fact that less time is wasted, though the impact of ICT is very dependent on how it is used. Headmasters typically view ICT as a valuable tool for pedagogical development but very few of them actually experience this impact (Elnord 2006).

Educators may find impediments to evaluating the impact of technology. Such impediments include lack of measures to assess higher-order thinking skills, difficulty in separating technology from the entire instructional process, and the outdated of technologies used by the school. To address these impediments, educators may need to develop new strategies for student assessment, ensure that all aspects of the instructional process—including technology, instructional design, content, teaching strategies, and classroom environment—are conducive to student learning, and conduct ongoing evaluation studies to determine the effectiveness of learning with technology (Kosakowski, 1998).

2.5 Challenges facing the adoption and utilization of computer technology in public schools.

The aim of distance and online education is to widen access and equity and provide empowerment so as to narrow the distance between privilege and

poverty. Unfortunately many rural schools cannot cope with the high demand of such technology. "The changing economic social and technological conditions have created a demand for education which is less about providing people who are socially and economically disadvantaged with educational opportunities to develop their professional and technical knowledge and skills." (Evans 2000)

Kenya currently has 19,890 primary schools with an enrolment of 7.6 million pupils though with severe understaffing and huge class size; only 3000(15%) have electricity while only 500(2.5%) have at least one computer.; about 65% of the total number of pupils enrolled transit to post-primary school education-a majority to secondary schools, and the balance to elementary level artisan training institutions; there are approximately 4000 secondary schools with an enrolment of 1,000,000 pupils; 2600(65%) have electricity while only 750(19%) have computers, averaging 10 computers per school;85% of the secondary schools are located in the rural areas where a majority of Kenyans live. The entire education system is characterised by very low application of e technologies, most apparent in the resource-starved public education sector.(Tanui 2003)

Kenya Vision 2030 is the nation's new development blueprint for 2008 to 2030 which aims at making Kenya a newly industrializing, "middle income country providing high quality life for all its citizens by the year 2030" (NESC, 2007). The plan is to be implemented in successive five-year terms with the first plan covering 2008-2012. The education goals of the 2030 Vision are to provide globally competitive quality education and training and research for development. This is to be achieved through reducing literacy by increasing access to education, improving the transition rate from primary to secondary schools, and raising the quality and relevance of education. Other goals are the integration special needs education into learning and training institutions, and increasing the adult literacy rate to 80%. The government also aims to increase the enrollment in schools to 95% as well as the transition rates to technical

colleges and higher education to 8%. In addition, the rate of students joining universities should expand from 4.6% to 20% within this period, while simultaneously boosting emphasis on science and technology courses.

The government has specified the implementation strategies which include integrating early childhood into primary education, reforming secondary curricula, updating teacher education, and strengthening partnerships with the private sector. In addition, the government has goals to improve special needs programs and adult training program, and to revise the higher education curriculum. Specific educational development projects for 2012 are to increase the number of secondary schools by building 560 new secondary schools, to establish a teachers' recruitment program to employ 28,000 more teachers, to establish a computer supply program that will equip students with modern ICT skills, to build at least one boarding primary school in each constituency in the pastoral districts for nomadic populations, and to roll out the education voucher system program in five districts.

Vision 2030 also aims to capitalize on knowledge in science, technology and innovation (STI) in order to function more efficiently, improve social welfare, and promote democratic governance. STI is to be applied in all the sectors, and the education and training curricula in the country will thus be modified to ensure that the creation, adoption, adaptation and usage of knowledge becomes part of formal instruction. A new incentive structure will also be developed to support the use of STI in specialized research centers, and universities.

In Kenya, Jon and Rupert (2005) observe that ICT has suffered several setbacks due to lack of resources. For example, according to computer use guidelines, physics facilities should include computer laboratories/classrooms, at least one computer for every two students and one printer to every four computers, printing stationeries, blank diskettes and storage diskettes. All computers should

be IBM compatible. Such requirements, he notes, are unattainable by most Kenya schools. Only privileged private schools and established provincial and national schools might be in a position to offer this course to their students. The few less endowed schools that offer this subject largely depend on donations of usually obsolete models of computers, which are housed in poorly built computer laboratories or in a small section of a normal classroom.

Further, he observes, the lack of qualified teachers, of maintenance technicians, and of electricity and the relatively high cost of the needed equipment, account for the fact that only 2% of the schools that register candidates for the Kenya Certificate of Secondary Education (KCSE) offered this course in 2001.

Abigail (2001) note that the greatest limitation to the use of technology in Kenya is poor infrastructure. Provision of telephone facilities still remain s far below the current demand. Many of the lines that exist are either out of date or dysfunctional, interrupting connections to the information superhighway. The use of electricity is limited mainly to urban centres. Therefore, few rural schools are able to incorporate the use of computers; Meru South being no exception since most of the schools are located in the rural areas.

In the urban centres where technology is used with relative ease today, during the dry months, the water levels in the hydroelectric power-generating plants, which produce bulk of Kenya's energy, usually fall very low causing a shortfall in energy production. Power-rationing programs are then put in place, and this limits accessibility to the use of computers (Abigail 2001).

Kiragu Maina, a programme officer with Kenya Connect, an organization responsible for provision of Computers to Secondary schools at reduced rates, and which is responsible for enhancing computer technology in two schools in

Meru South by providing 11 computers to Akithi Secondary school and 21 computers to Burieruri observes that as it is, most schools in peri-urban and semi-rural locations also suffer the additional handicap of not being able to access infrastructural resources such as electricity and telephone connections, thus further compounding negatively their ability to access information and relevant educational material.

According to Abigail (2001) Kenya's government has the responsibility of providing education to all its citizens. However, faced with two tough challenges relating to relevance and financing of education, it hopes that through provision of relevant education, it can produce the badly needed employable workforce. Unfortunately, it does not have adequately trained personnel to make this dream a reality across the educational spectrum. Besides, there are no resources available to in-service teachers in order for them to cope with these high demands.

Further, to help finance education in the country, in 1988 the government adopted the policy of cost sharing in the sector. The costs were to be shared among the three main stakeholders in education: the governments, parents, and the communities. This was done through the establishment of strong Parents and Teachers Associations as well as Boards of Governors. However, this hasn't solved the problem of the inability to meet the high cost of education in the country. Currently 57 percent of public expenditure goes toward primary education while 16.2 % percent goes toward secondary education. This amount is not adequate and cannot pay for the equipment for technical subjects as well as IT.

Moreover, the bulk government subsidies are in form of teachers' salaries, leaving no money for development expenditure. Consequently, high school fees

are levied on students, many of whom are from poor families and are unable to pay these fees as well as pay for books and equipments. This has led to poor quality education in areas where parents are predominantly poor and are, therefore, not in a position to contribute meaningfully towards expenditure in education. In these areas technology advancement lags behind because money set aside for improving or acquiring equipment is very little.

In comparing computer use between Braeburn School, a high cost private school, and Burieruri Secondary school in Meru south, it has been noted that the use of technology in Braeburn is no different from that in other private schools in Britain or the United States. While here, one realizes that IT is the fastest growing department in the school, enjoying a bigger budget because of the high cost of IT equipment. Braeburn also ensures that staff members are adequately equipped to incorporate IT in their areas of specialization.

In Burieruri School, a public school in Meru, the introduction to computers has largely being facilitated by sponsors. Technology at this school is not fully integrated into the learning process because the curriculum is heavily loaded and teachers are ill prepared to handle related content. Every teacher's main aim, like any other public school in the country is to ensure that the curriculum content is adequately covered before exam time. Besides, large size classes, poor terms and conditions of work, and low pay leave most teachers overworked without motivation. Electricity tariffs in the country are very high, and to leave computers running for long periods of time are likely to burden the already tight budget lines for such a school. Because of the size of the students' population, and the inadequate number of computers, the use of the facility is strictly controlled.

Many studies refer to the need for educational institutions to be adapted to the requirements of the knowledge society and to the way the digital generation is learning by using technologies intuitively in their everyday life. The latter is very different from their lives at schools, and this is exactly one of the problems: it is not that students do not want to learn but rather that their learning environment is radically different (Jacobs & Veen 2005: 26-28; Cabrera & punie 2006).

The digital generation is making use of web logs, social networking sites and podcasting, outside the formal learning environments. As the number of these informal and non-formal learning experiences on-line rises dramatically, more attention should be paid to these trends as these experiences are often as valuable as formal ones in terms of skills development and knowledge building and sharing (Helios 2006).

Learning with, for instance, mobile game technologies can indeed make learning more pleasant and more effective. Naismith et al (2004) report on a mathematics video game that used the Nintendo Game Boy Advance system to supplement traditional curricula and teaching methods. Drills in addition and subtraction were presented as a game with advanced scoring and recordkeeping, character creation and variable difficulty levels. Findings of the "Skills Arena" project were that students completed three times more exercises compared to what would be expected with traditional worksheets.

Moreover, teachers found the activity was easy to administer and control. Another example of more pleasant learning was the "BBC Bitesize" initiative, which provided revision materials via mobile phones, using a downloadable Java game and SMS text messages. It proved to be so popular that the BBC had to start charging for SMS, which then led to a sharp drop in the number of users. Other problems identified with delivering learning content via mobile phones

were related to the limitations of the mobile phones themselves (small screens, memory capacity, battery); to the lack of localized content which meant that certain questions were not relevant to particular students and to compatibility across devices despite the use of Java as a cross-platform environment (Naismith et al, 2004: 20-21).

2.6 Theoretical Framework

2.6.1 Theory of planned behaviour (Ajzen)

The theory of planned behavior emphasizes that human behaviors are governed not only by personal attitudes, but also by social pressures and a sense of control.

Applying Azjen's theory to the motivation of teachers to use ICT, the uptake of ICT in one's teaching will depend upon the teacher's positive intention to use ICT. This will be influenced by the teacher's beliefs about the value of ICT and beliefs about the control he or she has in his or her professional practice. The attitude 'towards using ICT in one's teaching will also be influenced by the personality traits of the individual teacher. Five major factors have generally been regarded as sufficient to describe people's wide variety of trait descriptions: Extraversion-introversion; Agreeableness; Conscientiousness; Emotional stability; and Culture (Norman (1963) in Ajzen (1988), p19).

Research into people's attitudes that might influence their adoption of certain behaviours has shown that "the attitude toward behaviour is determined by salient beliefs about that behaviour, termed behavioural beliefs"(Ajzen, 1988, p 120). In relation to teachers, these beliefs might include the effects on their role as a teacher, the impact on pupils' motivation, the impact on the teachers' influence in the school, how the behaviour might affect other teachers and so on. Furthermore, we might expect that teachers' attitudes towards using ICT can be influenced by the information they have about the value of ICT, their previous

experiences in using ICT, their expertise in using ICT and the expectation that it will contribute to their pupils' learning.

The component, subjective norm, included in Ajzen's theory, represents the perceived social pressures on the individual, referring to people's beliefs concerning other people's attitudes towards the behaviour and how important their opinions are. In our case this would be the teachers' perception of the social pressure to use or not use ICT. For example, they may be influenced by requirements of the national curriculum or by their colleagues' use of ICT. In many previous studies, in other domains, attitudes have proved to be more influential than subjective norms but in the case of using ICT in one are teaching, because of the immense and growing pressures from educational reforms, parents, pupils and the media, it is likely that subjective norm will have a greater impact on teachers' use of ICT.

The 'perceived behavioural control' component refers to the extent to which teachers believe themselves to be capable of using ICT in their teaching which "is assumed to reflect past experience as well as anticipated impediments and obstacles" (Ajzen, 1988, p132). This factor may be influenced by locus of control, which was discussed earlier (Blumenfeld, 1992). The inclusion of this component in Ajzen's theory means that if teachers are not confident about their own IT skills then they may feel unable to use ICT in their lessons. Empirical studies about teachers' uptake of ICT include those focusing on measuring their attitudes towards ICT for personal and teaching purposes, as well as others focusing on a range of factors which might influence them to take up the use of ICT. The latter are discussed in Cox, Preston and Cox (1999).

2.6.2 Constructivism theory

Constructivism theory was advocated by John Dewey at the turn of the century. He rejected the notion that schools should focus on repetitive, rote memorization.

Instead he proposed a method of "directed living" in which students would engage in real-world, practical workshops in which they would demonstrate their knowledge through creativity and collaboration. Students should be provided with opportunities to think for themselves and articulate their thoughts

Constructivism is child-centred; it proposes that learning environments should support multiple perspectives and interpretations of reality, knowledge construction, context rich and experience based activities' (Jonassen 1991, p.28). Constructivism focuses on knowledge reproduction. Jonassen notes that one constructs knowledge from one's experiences, mental structures, and beliefs that are used to interpret objects and events.

He further states that an important component of constructivist theory is to focus a child's education on authentic tasks. These are tasks which have 'real-world relevance and utility, that integrate those tasks across the curriculum, that provide appropriate levels of difficult involvement 'and because it would be impossible for all students to become masters of all content, so 'instruction is anchored in some meaningful, real-world context' (Jonassen 1991, p 29)

The instruction of computer based instruction in Kenyan schools has been based in this theory. Tanui (2003) observes that the theory supports the idea that computer is a machine that has the capability to motivate students to learn by reducing the teacher's verbal interaction in the classroom while encouraging learner participation. He further describes the computer as the technology that is totally permeating society and creating new conceptions, new forms of interpretation, new ways of instruction and new inputs into people's lifestyles.

2.6.3 Motivational theory:

Motivational theory has been well documented over many years. Motivation can be divided into two categories: Intrinsic and extrinsic (Deci & Ryan 1985).

Intrinsic motivation is a natural tendency to seek out and conquer challenges as we pursue personal interests and further our capabilities, intrinsically motivated learners do not require incentives as the activity itself is rewarding. Extrinsic motivation can be seen when we do something for reward or to avoid punishment.

Motivational theorists have predominately fallen into two main categories of behaviorist and humanistic. The behaviorist view is, as from the work of Skinner, a simplistic one. Motivation is split into rewards and incentives. Rewards are objects or events supplied as a result of particular behavior and incentives are events, which discourage or encourage behavior.

From this we can see that the predominant behaviorist view is one of extrinsic motivation. This is perhaps the most common method of motivation used within a classroom situation. Learners are frequently asked to complete tasks with competition and higher grades used as an extrinsic motivational tool. Detentions or contact with parents are also used in this way.

The humanistic view of motivational theory has a more complex model as described by Abraham Maslow (Maslow, 1970). Maslow focuses on the intrinsic motivational model. He talks about 'self actualization' or the seemingly inherent human need to fulfill their potential. Maslow's hierarchy of needs is a model, which is well used within the educational field, and programs of self-efficacy and personal development have been integrated into curriculums within areas such as citizenship and Personal and Social Education (PSE). This need to develop one's personal skills or interests is also commented upon in ICT motivational research. In a recent report Facer shows that:

"In the home young people choose what they use the computer for and they are thus very motivated to learn to use the computer for their chosen activities" (Facer 2000).

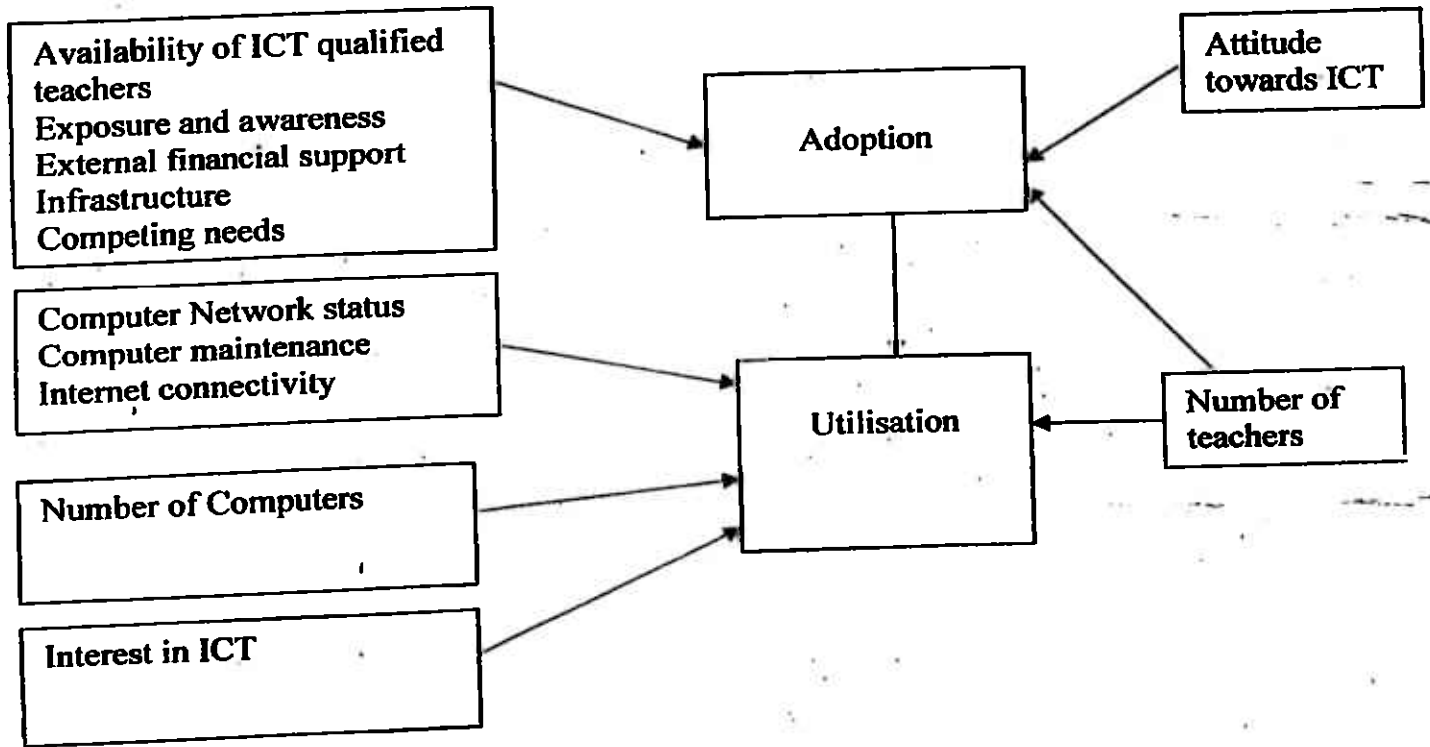
This type of intrinsic motivation occurs in most learners when they are to some extent 'in control' of their use of the computer as a cognitive tool. This perception of how much control learners have over events in which they are involved will affect their attitudes to ICT use (Cox 1999). Davis; Bagozzi and Warshaw (1989) developed the technology Acceptance Model that links the perceived usefulness of the system with ease of use and attitude towards final use. They tested this model on a sample group and concluded that perceived usefulness was very strongly linked with attitude toward 'intention of use' of the system.

Cox in his explanation of technology acceptance model in relation to motivational theory describes increased motivation in computer system use as leading to:

- A greater interest and involvement in learning
- Greater self-esteem
- Determination to achieve specific tasks
- Spending more time on the learning task
- Trying to do better than one's peers
- Achieving more control over one own learning (Cox 1999)

2.7 Conceptual Framework

The study has two independent variables (adoption and utilization) and several dependent variables as indicated below.



CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Chapter three provides details of the study site and the sample size. The chapter further details on the study design and sampling method that was employed in selecting the schools and respondents. The chapter also provides the data analysis used in analyzing the collected data.

3.2 Study Site

Meru south is located in Eastern province. In 1992 it was split from the former larger Meru district along with Meru central, Meru North and Tharaka district (figure 1). The former Meru South district has been sub-divided into Meru South and Maara district. This study is however based on schools in the former Meru South district.

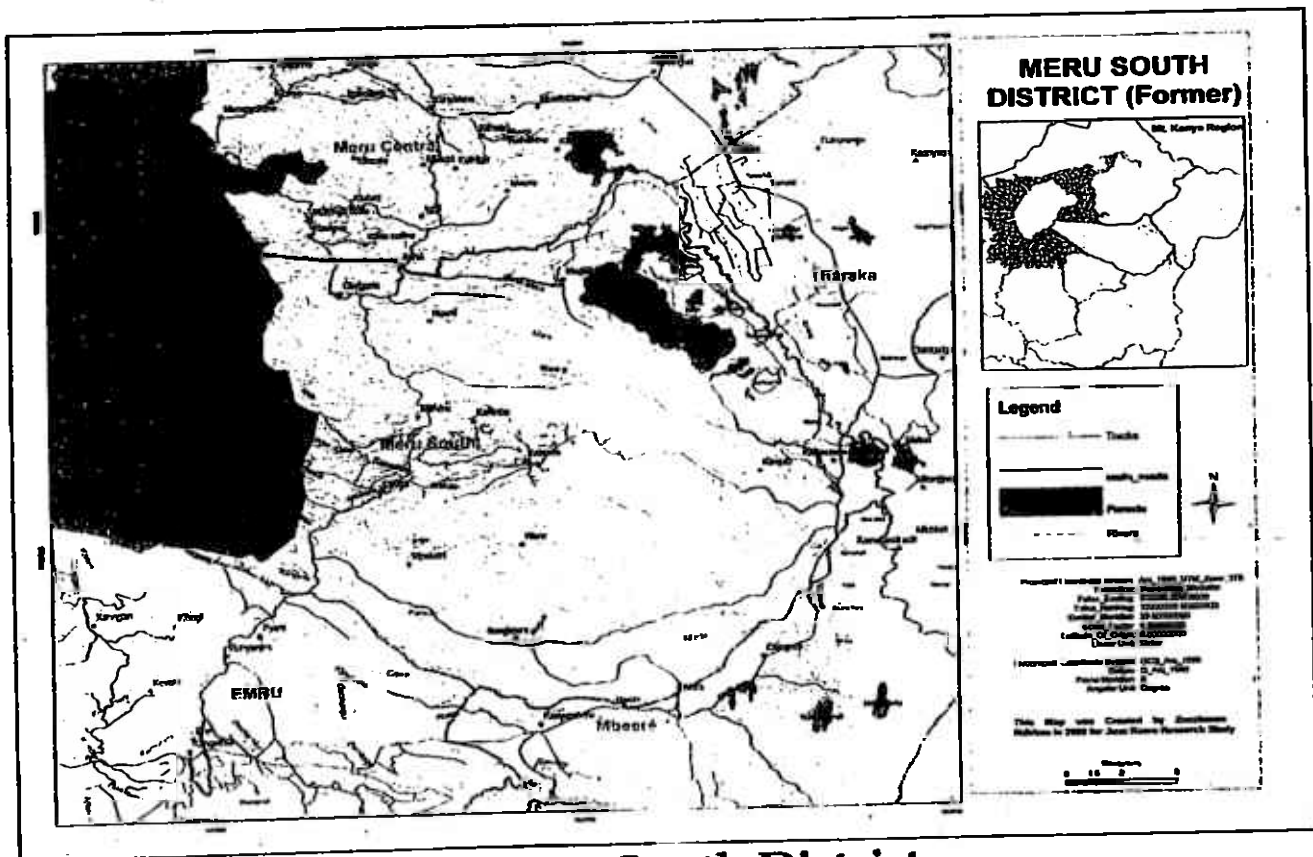


Figure 1: Location of Meru South District

The people of Meru South district are predominantly Christian whose main economic activities revolve around small scale farming owing to the cool highland climate and a notable number of rivers that supply adequate water. The main cash crops grown are tea and coffee although dairy and subsistence farming is also practiced.

The district has a number of boarding secondary schools and a few day schools.. The district was selected because it has a large number of secondary schools that have adopted CT and it was amongst the first districts that adopted CT.

3.3 Population

According to records from the DEOs office , The district has 248 primary schools including private and public and 55 secondary schools. The public secondary schools in the district formed the study population.

3.4. Study Design

A survey design was used which involved administering questionnaires to students, teachers and principals of selected secondary schools. The questionnaires were used because of the capability to reach many respondents in a short time.

3.5 Sampling design and size

Purposive sampling, which enables one select samples based on the purpose of the research, was employed to select the schools that have adopted computer technology based on information provided by the District Education officer. This comprised a visit to the District Education Officer for a list of secondary schools in the district that have adopted computer technology. Four (4) schools were randomly selected due to ease of access. From among them comprised two (2) girls' secondary schools, one (1) boys' secondary school and a mixed secondary school. Fifteen of the students were males and twenty five females with Fifteen being in form two, fifteen in form three, and ten in form four.

The study respondents were a school head or their representative, an ICT teacher from the four schools and forty students. Further discussions were held with the DEO to gather data on education statistics.

3.6 Methods of Data collection

The data collected was both qualitative and quantitative.

The study had two sources of data: Primary data from interviews with teachers and students captured through use of questionnaires and secondary data collected from records at the DEOs office. The questionnaires had both open and closed ended questions and the purpose of the study was clearly explained to the respondents. The open ended questions were very important in helping the respondents give the situation as it was, in their own words.

3.7 Unit of analysis.

The unit of analysis was public secondary schools

3.8 Unit of observation

The data was collected on teachers and students

3.9 Data Analysis

Quantitative data collected from the student's questionnaire was analysed using SPSS. Excel was used to analyse some data from the principal's questionnaire.

Qualitative data was also coded and analysed into Percentages, Frequencies and ratios for easy understanding.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.0 Introduction

Chapter four provides the findings of the study from the four case studies in Meru South district. They reflect the views of heads of schools or their representatives, ICT teachers and students most of whom are pursuing ICT studies.

4.1 The ICT Situation in Schools

4.1.1 Computer adoption in the district

Statistics held by the District Education Office indicated that there are 55 secondary schools in Meru South district ranging from government supported boarding schools to day schools. Out of these, only 22 have managed to acquire some computers that can be used for administrative or teaching purposes. This is equivalent to 45% which can be termed fair for a rural setting. There is however need to promote school computerization programme in rural areas in order to enable many schools acquire them and offer IT related studies.

4.1.2 Available computers and accessories for students use

The student population ranged between 724 and 930 per school. Computers for use in learning ICT skills on the other hand ranged between 20 and 30 with an average of 24 computers per school (table 1). Comparing the number of available computers to student population, it emerged that a single computer serves at least 28 students. Such a computer-student ratio is not sufficient for effective computer training.

Table1: Student population versus available computers in schools

| School | Student population | Computers available to students | Computer-Student ratio |
|------------------------------|---------------------------|--|-------------------------------|
| Kajiunduthi Mixed Sch. | 750 | 20 | 1 : 38 |
| Chogoria Girls School | 930 | 30 | 1 : 31 |
| Our Lady of Mercy Girls Sch. | 550 | 20 | 1 : 28 |
| Chogoria Boys | 724 | 25 | 1 : 29 |
| Average | 739 | 24 | 1 : 31 |

Source: Questionnaire February 2010

Additionally, computers accessories (printers and projectors) are few. One school had a printer and the rest had a printer and a projector. The accessories are mainly used for administrative work. It was only in 1 school where the accessories were used for teaching purposes.

4.1.3 Source and year of computerization

The year of acquisition varied in the four schools although information revealed they were acquired in the period between the year 2003 and 2008. This indicates that ICT studies are relatively new in the schools.

The computers were acquired from various sources. Only one school had invested in computers using the finances raised through schools fees while the rest were supported by Non Governmental Organizations or private entities. None of the schools was supported by the government through the schools computerization programme.

Table 2: Year of acquisition and source of computers

| School | Year of computer Acquisition | Source |
|-------------------|------------------------------|-----------------------|
| Kajiunduthi | 2003 | NGO |
| Chogoria Girls | 2008 | NGO & Private company |
| Our lady of mercy | 2004 | school purchased |
| Chogoria Boys | 2005 | NGO & school purchase |

Source: Questionnaire February 2010

4.1.4 Availability of computers for teachers in the staffroom

Of the four schools none had computers for teachers to use in the staffroom or at their workstation. This means that the teachers share computers with students or have their work done by the computer teachers or the school secretary. Thus even if teachers have basic knowledge in computers, they don't rely on them in offering most subjects. Instead, they rely on oral presentations and hard copy materials as the medium of instruction.

4.1.5 Capacity in ICT Skills

The ICT capacity was assessed by considering the schools principal's capacity for IT skills; and number of computer literate teachers who can expose students to ICT skills. It emerged that all the schools principals had basic computer skills, which could be a contributing factor to ICT adoption in the school. The school principals expressed positive attitude to offering ICT studies at secondary school level since it enables students acquire valuable skills for future applications. It however emerged that despite the high student population in the schools the number of competent teachers was low. Three schools had 2 ICT teachers and the fourth had one. This implies lack of adequate capacity to expose students to ICT

studies effectively. The schools therefore prioritize the level and number of students undertaking ICT related studies.

An assessment of basic IT skills among teachers showed that at least 50% of them in any school had some knowledge about computers. Chogoria Boys High schools had the highest with 75% of the teachers being computer literate (table 3). The limitation is however that the level of competency might not be sufficient to render effective service.

Table 3: Percentage of computer literate teachers

| | Teacher population | No. of computer literate teachers | Percentage |
|-------------------|--------------------|-----------------------------------|------------|
| Kajiunduthi mixed | 30 | 18 | 60% |
| Chogoria girls | 49 | 25 | 51% |
| Our lady of mercy | 24 | 13 | 54% |
| Chogoria boys | 40 | 30 | 75% |

Source: Questionnaire February 2010

4.1.6 Computer utilization

Computers are mainly used to teach ICT studies, manage student data, analyze exam results and prepare communication memos. It is only in Chogoria Boys and Our lady of mercy where computers are used to manage the school finance. None of the schools use computers to manage school's inventory, probably due to the standard word processing and spread sheets software used rather than database and financial management oriented software. Computers are also used for entertainment in some schools.

Only Chogoria Girls uses them to offer non-ICT courses. This indicates that computers application and utilization in teaching is low and limited to ICT

studies. There is need for schools to explore ways of applying computer application in delivering other courses.

4.1.7 Reasons for computerization

Although teaching of ICT studies is being undertaken, the initial drive for computerization rarely focused on teaching or students learning purposes. The study found that computerization was mainly done for other purposes detailed in section 4.1.6 and the number adopted by them were low.

Use of computers in learning has been adopted along the way due to the need to prepare students for the KNEC exam as well as equip them with general computer literacy. It was revealed that none of the schools have more than 15 students sitting for KNEC ICT exams. Instead most students undertake them for general literacy purposes.

4.1.8 Challenges facing schools computerization

The study found that the school computerization programme faces several challenges. They relate to lack of adequate computer laboratories, power source, high maintenance costs due to frequent repairs and viruses attacks, lack of adequate skilled manpower to offer ICT courses, inadequate number of computers, and high turnover rate among ICT trainers.

For instance, of the four schools only one has an adequate computer laboratory with enough desks for placing the computers and for the users. Students share the limited available facilities. This could be a reason behind the low number of students taking ICT studies.

Three of the schools rely on the national grid for power implying that in case of power disruptions, it is difficult to train or use the computers. Only one school had invested in a generator as an alternative power source. There is also low prioritization and negative attitude to ICT studies among teachers. There is need to create awareness on the role of ICT in education and career development. Equally teachers need to be exposed to ICT skills to enable them stop shying away from IT.

4.1.9 Awareness and student exposure to ICT

All the schools sensitized parents and students on the relevance of ICT skills. This is instrumental in supporting school's ICT initiative. Apart from sensitization, two schools also try to expose all students to computer studies in the course of the 4years of secondary education while the other two limit computer studies to those sitting for KCSE ICT courses. There is therefore need to ensure that all students get some exposure to computer skills as a strategy for popularizing ICT.

4.1.10 Knowledge about ICT policy

Kenya adopted an ICT policy in 2004 that forms the benchmark for ICT development in the country. The study sought to assess how familiar those in position of making school decisions are with the policy. It emerged that only two of the school principals are familiar with it while the other two are not. Hence, there is need to sensitize school principals on ICT policy as a strategy for spearheading school computerization programme. One of the principals expressed the need for the policy to include the need for providing computers to schools in rural schools. This is to encourage more schools adopt ICT and therefore create the much needed IT capacity for developing the skills needed in achieving Vision 2030 goals.

4.2 The ICT Teaching Staff Views

4.2.1 Gender, specialization and experience in ICT

Three of the schools have male ICT teachers and only one has a female teacher. This could be due to the general feeling held by schools that computer studies are difficult and therefore a preserve of men. It therefore serves as an indicator of the ICT situation in the job market.

Three of the four have background training holding either a degree (1), Diploma (2) or a Certificate (1) in computer studies. The fourth had science background in addition to a certificate in computer studies.

The three teachers with qualifications in computer studies had less than 5 years of ICT training during which they had served in more than one school. This demonstrates the turnover rate among IT skilled personnel and the likely challenge many schools especially in rural areas have to bear with while implementing IT studies. This is because in Kenya most IT degree holders will shy away from teaching opting for careers elsewhere and thereby becomes challenging to maintain competent trainers in schools. It is therefore imperative for schools to build ICT capacity among teachers to teach ICT courses. Similarly, there is need to ensure that the Bachelor of education degree curriculum takes into consideration the need for IT skills so as to broaden the base of competent teachers in IT.

Table 4: Qualification, experience and years served in school

| Qualification | Experience | Years taught in that school |
|--------------------------------|-------------------|------------------------------------|
| Computer studies (Degree) | 2 | 3 weeks |
| Computer studies (Diploma) | 4 | 2.5 |
| Science (Degree) | 10 | 1 |
| Computer studies (Certificate) | 5 | 5 |

Source: Questionnaire February 2010

4.2.2 Operating system and peripherals used in the schools

The ICT teachers informed the study that the schools use windows operating system and with preference for Microsoft based software. This has made it expensive due to the requirement for license. Cost of software has been a major bottleneck to IT development in the country for many years.

Most computers owned by the schools have the necessary peripherals to support multimedia learning. These include CD-ROMs, USB ports, DVD writers (in some computers), speakers and floppy disks. Though some of the computers with such facilities are primarily used for administrative purposes, teachers can also take advantage of them to offer courses.

4.2.3 Computer to student ratio

Effective computer learning requires each student/learner to have access to a computer and have ample time to practice what they have learnt. However, as indicated in section 4.1 the schools have high student population and fewer computers. This necessitates sharing. The study found that normally for those taking ICT courses, three students share a computer in one school while in the

other three schools at least four students must share a computer. This makes it difficult for students to learn effectively. This calls for increasing the number of computers so as to reduce the student to computer ratio.

4.2.4 Computer Maintenance

Computer maintenance is a major limitation reported in the schools. This however can be alleviated if adequate measures are put in place on time to ensure that computers are in good working condition always. The study sought to understand how frequent the preventive and curative maintenance is carried out. It was found that although curative maintenance is supposed to be done as soon as a fault occurs, such incidences were responded to once in a term in three schools and monthly in one school. Two schools undertook preventive maintenance quarterly while still emphasizing curative maintenance once a term. Such a procedure can render computer laboratories dysfunctional. The delays in responding to curative maintenance are as a result of unavailability of computer technician and sometimes funds.

4.2.5 Levels exposed to computer studies and mastery of IT skills

Due to the fact that the number of computers is inadequate to facilitate learning for all students, the study investigated which groups are given priority for computer studies. In three of the schools all the four classes are exposed but at various time only form I and II students are taught.

Three schools offered three sessions of computer studies in a week while the fourth offered 4 sessions a week. Hence, students are exposed to computer studies for about 2 - 3hrs a week. This is unlike other subjects with at least 4 sessions a week. This can however be argued to be dependent on the purpose of the training and whether the course is examinable.

During these sessions three schools expose their students to practical and theory learning to ensure they acquire the relevant skills. Practical sessions are however limited by the workload required in marking the assignments especially if the number of students opting for computer studies is high with minimal time. This calls for allocating computer studies adequate time just as other subjects in order to allow teachers have enough time to offer guidance, and allow students assimilate the knowledge and acquire the necessary competency.

4.2.6 Challenges in offering ICT studies

Offering ICT studies carries with it several challenges. They include lack of enough teaching and reference materials, inadequate number of computers such that a lower number of students has to take the courses, lack of information back up, lack or non-functional computer networks, power disruption and surges, low capacity computers in terms of processing and memory, lack of consistent teachers due to high turnover rate, and few staff or one taking care of a large group of students which makes learning quite ineffective.

Nevertheless, the ICT teachers expressed positive attitude to ICT training and indicated that they provided serious guidance as with other subjects. They allow students have adequate time on computers (mostly under supervision) since there is no guarantee they can undertake constructive work on their own in the computer lab. This is also a measure of ensuring that computers are safely used and thereby minimizing damages. This however has the implication that students may not be having adequate time to train on their own.

4.2.7 ICT club in schools

The promotion of ICT courses requires sharing of information between stakeholders which is made possible through clubs where students can exchange

views and knowledge with other students where ICT is offered. However, only one school reported to have an ICT club. This is due to the fact that computers studies are relatively new in the schools and only a few have good experience to share; students are overburdened by other studies and therefore may not find sufficient time for ICT club activities; or its implementation (where tried) has not been successful.

4.3 Students' views

4.3.1 Computer studies at form four

None of the form four students interviewed majored in computer studies though one was taking them for general knowledge. Many dropped computer studies by the time they got to form four a situation that can be attributed to emphasis placed on computer studies in schools and society.

4.3.2 Motivation for computer skills

Students pursue computer studies for varied reasons. 88% indicated career development as the driving force while 10% wanted to acquire computer skills only. Only 2% opted to spare the time that would be used to learn computer skills for other subjects.

Table 5: The student's reason for taking computer studies

| Reason for pursuing Computer studies | Frequency | Percent |
|--|-----------|---------|
| for career & positive attitude | 35 | 87.5 |
| To save time for other subjects as can pursue computer studies in future | 1 | 2.5 |
| better computer skills | 4 | 10 |
| Total | 40 | 100 |

Source: Questionnaire February 2010

4.3.3 Previous knowledge and computer access out of school

Students who had prior computer knowledge before joining their current school were 75% while 25% had none. Similarly, 75% have access to computers outside school while out of school which enables them have a competitive edge in acquiring the IT skills. This indicates that there is high likelihood that they pursue computer studies owing to interest acquired during young stage or having been exposed to computer studies at the primary level. This calls for introduction of computer studies at primary level so that capacity and interest is created early in life. Similarly, parents should be sensitized to expose their children to computers early in life to enable them develop career interest.

The fact that most students had previous computer knowledge, teachers should take keen interest while handling students with varying skills and exposure otherwise those without may lack adequate motivation competing with their counterparts.

4.3.4 Computer use in school

Students reported using computers for various purposes in school. 90% used computers for Class work (typing notes and for CAL or e-learning) while 7.5% used them for playing games and 2.5% to chat and socialize on facebook. 75% of the students spend time working on computers in the lab during their free time.

Table 6: Main Computer Use by students

| Main computer Use | Frequency | Percent |
|---|-----------|---------|
| Classwork(typing notes,CAL,E-learning and practicals) | 36 | 90 |
| Play games | 3 | 7.5 |
| Chatting and facebook | 1 | 2.5 |
| | 40 | 100 |

Source: Questionnaire February 2010

4.3.5 Internet access and use

Access to internet by students was mostly from outside the school which enabled them access services like E-mail. 95% accessed reliable internet from cyber cafes or at home and only 5% had access to internet at school. 97% of those that accessed it mostly use it for chatting with friends and accessing social networks such as face book rather than for learning purposes.

4.3.6 Challenges faced by students pursuing computer studies

Students pursuing computer studies are faced by numerous limitations. 15% reported power rationing and failure and the fact that their schools have no alternative energy source; 30% reported lack of access to internet; 15% reported lack of software and hardware ; and 40% reported the low number of computers as their greatest challenge. They expressed the need for considering such issues in efforts to promote computer studies in schools.

CHAPTER FIVE

5.0 SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Findings

Meru South has approximately 55 secondary schools and only 25 of the schools have acquired computers. This translates to about 45% of the schools, which can be considered fair. Out of the four considered in this study, each had an average of 24 computers that are available to students despite the high student population ranging between 500 and 1000. In simple terms, the student - computer ratio is not sufficient to enable students undertake computer studies effectively since they have to share the few available ones.

Computer studies are relatively new in the schools. This is evidenced by the time when the schools acquired the computers between the year 2003 and 2008. Hence, it is conclusive that computer studies are relatively new in comparison to other subjects. This calls for emphasis to promote and popularize the studies among students. The reason behind it can be traced to the initial intention of computerization. The study found that adoption was mainly geared towards administrative aspects with learning being adopted along the way.

NGOs and private companies have been instrumental in the schools computerization having supported the schools to acquire computers. However, the government role is minimal in this endeavour. The government's schools computerization programme should be enhanced to reach many schools especially in the rural areas in order to bridge the digital divide existing between private schools that can invest in computers and public schools with limited resources.

Teachers in the four schools lack computers to work with and have to share the existing ones with students. About 50% of the teachers in the schools are not computer literate while others have basic skills only. The number of computer competent teachers is very low and could challenge the promotion of ICT studies even in the future. To popularize the usage of computer use in learning, there is need to provide opportunities for short term capacity building courses during weekends and holidays, and equipping teachers working stations with computers so that they can build confidence and competency in usage. This will also help build the capacity for teaching IT courses as well as its application in other subjects.

Computer utilization is mainly for student training and some administrative aspects. There is need for emphasis to use computers in teaching other subjects. However, this will require equipping the schools with additional accessories such as projectors and printers since the existing few cannot effectively serve the student population well.

Schools require sensitization on affordable software that can be used for administration work and learning purposes. This will be a step forward in popularizing computer usage in school's learning. Currently, the schools are using licensed software that may be unaffordable. Creating awareness among school heads about the availability of equally popular open source software might contribute to higher adoption and utilization.

Though students have interest in ICT, computer studies are yet to be popular in schools owing to the challenges involved. For instance, students tend to drop IT courses for other subjects probably due to the possibility of making it in the final examinations. To help students build interest and desire for IT careers, every effort should be made to see that there are adequate number of computers they

can learn with; there is enough teachers to offer guidance; IT subjects are accorded same time considerations as with other subjects especially due to the requirement for practical and theory sessions; the computer lab is adequate with necessary facilities for learning; there are available materials to work on; and computers are maintained (repaired on time) for effective operation. Enhancing computer networking and access to internet would add value to learning since students expressed familiarity with such services while out of school. Internet should be used to help students access reading materials.

Similarly, schools should be supported to invest in alternative energy sources to enable students continue with studies even in the face of power disruptions in the main national grid. Such would include helping them invest in solar panels or wind power as well as having a reserve generator. This will likely raise the number of IT interested Students to more than the average 15 who normally sits for the final KCSE ICT exam. Consideration of these requirements will facilitate offering ICT studies to most interested students at all levels rather than restricting to a few individuals or a certain class.

In addition to taking care of the above, the issue of maintaining qualified IT teachers is crucial. Most IT qualified personnel tend to change jobs leaving students without guidance, a situation that may demoralize them from majoring in ICT studies. Schools need to rethink of ways of motivating the few available IT staff for the sake of their students. This will lower the incidences of disruptions in learning.

Installing and maintaining a good network in computer labs will be the greatest opportunity that any school can have. It will ensure that resources are easily shared thus reducing costs of acquiring accessories. Teachers can also easily mark the students' work which is stored on different computers without having

to physically carry information from one computer to another. To ensure that the network is working teachers need expertise. With a network software can be installed which enable students to share the desktop with the teacher thus avoiding the use of projectors to teach.

Schools should promote ICT clubs as a strategy for exposing students to IT issues rather than confining it to class work. This will give room for discussions and sharing of opinions with their peers in other schools. Such an initiative will be a booster towards popularizing ICT studies among secondary school students in the district for they will get motivated by interacting with other students in symposiums and science congresses ,and after getting acquainted with the value of ICT in learning, society, daily life and career development.

Secondary schools should take advantage of the fact that many young people are getting familiar with computers at very young age. They also have access to computers either at home or during holidays. Taking advantage of such will enable schools popularize ICT studies. However, care should be taken not to forget the few who have no previous experience in computers. Emphasis should be placed on creating interest among such individuals and bringing them on board to pursue computer studies. Similarly, schools should continue sensitizing students, parents and any other actor who can influence students in majoring in IT courses as a strategy for creating the much needed IT competency in the country. The sensitization should also focus on creating awareness on how computers can be used for learning purposes, developing relevant skills for assisting one in life rather than just for social networking and games. Schools administration should therefore keep reminding parents the need to expose young people to computers at an early age so as to create a positive attitude early in life.

The study findings therefore show that the adoption of ICT in public secondary schools in Meru south has a lot to do with the number of ICT qualified teachers, attitude towards ICT, energy sources, infrastructure (labs/space), finances/support from external sources and course/subject options while utilization on the other hand is related to the number of ICT qualified teachers, attitude both among students and teachers towards ICT, exposure and awareness, competing needs (administrative vs learning), energy/power sources, infrastructure (labs/space), course options, maintenance requirements, interest among students, priorities on how and who to use the computers, number of computers available in the school, status of networking, and connectivity to other services such as internet.

5.2 Conclusion and Recommendations

With the study findings it is conclusive that the adoption of computer technology in Meru south is still low. This is because less than 50% of the secondary schools have computers. It is therefore conclusive that majority of students leaving fourth form in the district have no exposure to IT skills. There is need for the school computerization programme to put more effort in providing the necessary support. Similarly, schools should explore other avenues of obtaining and equipping with computers.

There is limited capacity to offer ICT courses in most schools evidence by the few staff concerned. Some of them are not fully qualified to effectively deliver. The Ministry of Education and institutions of higher learning need to take note of this need and integrate computer skills in their teacher training programmes. This will help motivate the growth of ICT in learning.

The secondary school curriculum has failed to adequately emphasis on ICT studies as with other subjects. There is need to ensure that all students are exposed to computer studies by the time they complete their secondary

education. This is an easier way of popularizing them. Similarly, there has been failure to accord ICT subjects' adequate time as with other subjects. The Ministry of Education should be in the fore front in advocating for it by allocating sufficient time for theory and practical sessions.

Utilisation of computers in schools is primarily geared towards administrative and learning purposes. They can further be used for several other applications especially learning if well maintained, networked, and adequate in numbers. This will however require having adequate number of skilled teachers who can implement it. The government should consider equipping schools with adequate number of computers; and training of teachers. The schools on the other hand should promote ICT through clubs where students can interact and share views. Schools should also take advantage of the few computers they have and maintain it in good working condition. With the introduction of fibre optic cable that is likely to enhance connectivity and reduce internet costs, the Ministry of Education and all other actors in education should re-think on ways on promoting connectivity in schools for learning purposes.

More teachers professionally trained in IT are required to meet the increasing demand for ICT learning in schools. If the government cannot employ enough teachers, it can rely on TSC recruited teachers but offer them the necessary IT training to enable them undertake the task.

Moreover, there is need to sensitise school principals and others in authority on the ICT policy. This will make them, as stakeholders be able to advocate for the issues relating to schools which lack in the policy. Eg the policy addresses government support of integration of IT training in schools, establishment of education networks and establishing ICT centres. It does not however state the

how-to. There is also need to sensitize, create awareness and encourage female students to take up IT courses.

To promote school computerization, there is need to sensitize on the availability of open source software that will provide adequate service at minimal cost. This will enable many schools to adopt computers and offer IT training to students.

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APPENDIX 1: PRINCIPAL'S INTERVIEW GUIDE

Information about the School

Name of School _____ Total Student
Population _____ Total Teacher population _____

Computers

How many computers does the school have? _____

How many computers do the students have access
to _____

Which year were the computers acquired?

Source of computers _____

Do teachers have their computers in the staffroom or at their workstation?

Yes

No

Does the school have the following accessories

projector

printers

if yes specify the number of printers _____ number of projectors _____

If yes in the above question how are they
used? _____

Computer literacy

Do you have basic computer skills?

Yes

No _____

What is your feeling towards Computer training in secondary schools?

Costly to offer and not very important at secondary level

Very useful and all students should acquire the skills

Only interested students should learn

How many ICT teachers does the school have? _____

How many teachers are computer literate? _____

Computer utilization

How are computers used in the school?

Manage student data,

To analyse results

To manage the inventory records

To manage school finance

Create memos to for communication

What was the main reason/motive behind computerization?

For what other purposes do you use the computer?

Are computers used to teach other subjects e.g. physics,
Maths _____?

Are students exposed to computer studies for KNEC examination purpose or for
creating general computer literacy?

Computer Infrastructure

Does the school have an adequate computer lab ie big enough for a normal
classroom

size? _____

What source of power does the school use to run the
computers? _____

What problems/challenges does the school face in adopting computer technology? _____

Awareness on Computer Technology

Does the school sensitise parents/guardians/school administrators on the importance of ICT studies? _____

Does the school sensitise students on the importance of ICT studies? _____

Are all students exposed to computer studies before they sit for KCSE? _____

Are you familiar with the ICT policy? _____ If yes, is there any change you would like on the policy? _____

APPENDIX 2: THE ICT TRAINER INTERVIEW GUIDE

Name of school: _____ Sex _____

Subjects' speciality _____

Personal Information

What are your ICT qualifications? _____

Experience in teaching computer courses? _____

How long have you taught in this school? _____

Do you attend regular upgrading ICT courses _____

Computers and operationalisation

Which operating system do you use? _____

Which categories of application software are used in the school or are available in the computers? (E.g Ms Word 2003) _____

What is the computer to student ratio? _____

How many operational/functional computers does the school currently have? _____

How often does the school undertake :

- Preventive maintenance? _____
- Curative maintenance? _____

In case of curative maintenance, how long does it take before the problem is acted upon? _____

What determines the cause of action above? _____

Do the computers have the necessary peripherals e.g. CD-ROMs, USB ports, DVD writers, speakers. _____ if yes
specify _____

Are computers mainly used for administrative/official work or for training students?

Computer training

Which class/form is taught ICT subjects? _____

How many sessions do you offer per week per class for the computer studies? _____

Are computers studies theoretical or practical oriented? _____

Are the computers networked? _____ does the network function? _____

What challenges have you faced in training of ICT courses in the school? _____

What is the perception of the school about ICT compared with teaching of other courses ie is it taken with seriousness as teaching of other subjects? _____

Are students allowed to access computers beside the class scheduled hours? _____ do you supervise them? _____ .

Does the school have an ICT club? _____ if

No.why _____

Thank you for your honest opinion.

APPENDIX 3: STUDENT'S INTERVIEW GUIDE

Name of school: _____ Class/form: _____
Sex of student _____ Subjects(compulsory & selectives)being undertaken:

Computer Knowledge and usage

Why do most students take computer studies? _____

Did you have prior computer knowledge before joining this school? _____

Do you have access to computers when you are out of school?

For what do you mainly use computers while at school?e.g play games,type notes, chatting etc _____

Do you spend time in the computer lab during free time? _____

Are computers studies theoretical or practical oriented? _____

Do students have access to internet? _____ If yes what do they mainly use it for? _____

State any challenges faced by computer students? _____

Thank you for your honest opinion.