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**FACTORS AFFECTING IMPLEMENTATION OF THE NATIONAL ICT STRATEGY FOR EDUCATION AND TRAINING IN SECONDARY SCHOOLS IN BOMET AND NAROK COUNTIES (KENYA).**

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REG. NO: D53/10559/2008**

*A Research Project Submitted to the Department of Management Science, School of Business as a Partial Fulfillment of the Degree of Master of Business Administration of Kenyatta University.*

MAY, 2011

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*Factors affecting  
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## DECLARATION

This research project is my original work and has not been presented for the award of a Degree or any other award in any other university.

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## **DEDICATION**

To my husband Josef, my son Ryan and my mother Felicity. May the almighty God bless you for your prayers and entire support.

## **ACKNOWLEDGEMENT**

Special thanks go to my Supervisors for their effort, guidance and support in this work. I would like to acknowledge all my lecturers in the Department of Management Science and colleagues in the Master of Science project management class of 2008, Kenyatta University for their fruitful contributions and encouragement.

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## ABSTRACT

Kenya has made remarkable progress putting in place an ICT policy framework and implementation strategy, complete with measurable outcomes and timeframes. The process has the benefit of sound advice from officials and stakeholders and perhaps more importantly strong leadership from the office of the permanent Secretary of the Ministry of Education. However, universal implementation is challenging. Despite its early lead in the past decade, Kenya's ICT sector has lagged behind its East African neighbors Tanzania and Uganda. While the benefits of ICT in government cannot be disputed, there are several concerns about its success as well as the strategies to be adopted in implementation of systems. In this study, the characteristic challenges that Ministry of Education face, which make ICT implementation fail to succeed were identified and synthesized. This resulted in a rich picture of ICT implementation experience that helped in identifying possible solutions. The recommendations include suggestions for increasing the impact of factors for success while reducing the impact of factors for failure and use of available good practice. Data collection was through use of questionnaires and unstructured interviews and the data is of both qualitative and quantitative nature. Analysis of data was through descriptive statistics like standard deviation, mean, frequency and mode. Bomet County and Narok County have 12 secondary schools which were selected for implementation of ICT which forms the total population. The major findings of the study were that training of teachers in ICT is wanting. Funding was not enough too and it needed to be increased. Although computers were fairly enough, they were mostly not being used for content delivery. Leadership and management style of the school administration served to enhance or hinder ICT implementation. The study recommends training of teachers urgently in ICT education and increase of funds through the Ministry of Education advocating for more funds for ICT implementation, for example from CDF. The study also recommends constant monitoring and evaluation of the project for effective ICT implementation. Lastly, the school administration should encourage and provide teachers with opportunities to use ICT in their teaching.

## **ABBREVIATIONS AND ACRONYMS**

**EASSy** – East African Submarine Cable system

**EFA** – Education for All

**EM** –Emerging Markets

**GDP** – Gross Domestic Product

**ICT** – Information Communication Technology

**IT** – Information technology

**KESSP** – Kenya Ministry of Education Sector Support Program

**MDG** – Millennium Development Goals

**NE** –New Economies

**NEPAD** – New Partnership for Africa Development

**NGO** – Non Governmental Organization

**OLPC**- One Laptop Per Child

**VC** – Venture Capital

**CDF**- Community Development Fund

**No.** - Number

## DEFINITIONS OF KEY TERMS

**Information and Communication Technology**-Umbrella term to mean computing (software and hardware), telecommunications (mobile, fixed, internet) and broadcasting.

**Information Technology**-It is the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by microelectronics-based combination of computing and telecommunications.

**Project**- It is a temporary endeavor undertaken to create a unique product, service or result

**Management**- It is an array of different functions undertaken to accomplish a task successfully.

**Project Management**-It is the application of knowledge, skills, tools and techniques within a framework of project activities in order to satisfy the requirement of project goals

**Training**-Acquisition of knowledge, skills and competencies as a result of the teaching of vocational or practical skills and knowledge that relate to specific useful competencies.

**Leadership**- Process of getting things done through people

**Infrastructure**-Is the basic physical and organizational structures needed for the operation of a society, or enterprise or the facilities necessary for an economy to function.

**Implementation**-The realization of an application for execution of a plan, idea, mode, design, specification, standard, algorithm or policy.

## CHAPTER ONE

### 1.0 INTRODUCTION

#### 1.1 Background of Study

The attribution of ICT to economic and human development has attracted a lot of interest among academics, businesspeople, policy makers, regulators, and investors. It is worthwhile, therefore to study the various factors that affect the implementation or diffusion of ICTs. This is particularly so because ICT contributes to economic development (Piatkowski, 2002). Information & Communication Technology (ICT) is the World's fastest growing economic activity; the sector has turned the globe into an increasingly interconnected network of individuals, firms, schools and governments communicating and interacting with each other through a variety of channels and providing economic opportunities transcending borders, languages and cultures. ICT has opened new channels for service delivery in areas such as e-government, Education, e-health and information dissemination.

Since 1980's integration of ICTs in Education has been compulsory in the developed nations. This is not so in the developing nations such as Kenya where ICT integration in Education is considered more recent, small scale and experimental. Wanjira, (2009) says that 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 misused Ford (2007); Kessy (2006).

According to *infoDev* report (2007), there is a great deal of variance in ICT policies for education among the African countries. South Africa for example clearly is unique in terms of being able to move its ICT agenda forward. Several of the countries of North Africa that have

both resources and high bandwidth connectivity with Europe have also been able to make excellent progress implementing their ICT plans. Those countries that are steadily moving to sustainable economies constitute another group making remarkable progress. Perhaps the largest group is made up of those countries that are in transition from a sustained period of conflict and economic instability and are looking to ICT applications to help them meet myriad challenges—particularly the development of their human resource capacity. They are among the neediest in terms of assistance. And, unfortunately, there remains a group of countries that are still plagued with political instability and internal conflicts that make progress on the ICT for education agenda impossible.

Throughout the world, ICTs are changing face of education. It has been argued that the transformation of education may be the most important of the many practical revolutions sparked by computer technology. The growth of ICT adoption by the various sectors of economy in Kenya has in the recent past been enormous. This has meant that various organizations are rethinking about the role of ICT in their services and responding by implementing ICT projects. However to reap the benefits of ICT, these projects need proper project management for success.

In Kenya, the Ministry of Education developed Kenya Education Sector Support Program (KESSP) in 2005 that featured ICT as one of the priority areas with the aim of mainstreaming ICTs into the teaching and learning process. The National ICT Policy embedded this intent as a national priority and provided the impetus for the ministry to develop its sector policy on ICT in Education. The ministry moved quickly and, in June 2006, introduced the National ICT Strategy for Education and Training. The Ministry of Education was given the mandate to lead the monitoring and evaluation of the strategy's implementation, guided by overall government policies on education and ICT, specific education strategic documents for implementing its mandate, and global goals such as Education for All (EFA) and the Millennium Development Goals (MDGs). This mandate is carried out through a ministerial ICT committee that meets monthly and reports quarterly on progress. The committee is chaired by the Permanent Secretary and supported by the ministry's ICT Unit. It has representation from stakeholders involved in implementing the strategy and mobilizing resources such as donors and private sector partners. Another key part of the implementation strategy is the Kenya ICT Trust Fund formed in 2004,

with the aim of spearheading ICT initiatives in education. It's mandate is to mobilize funds and in-kind resources for the purpose of setting up computer laboratories and providing ICT materials, curriculum and content in all Kenyan secondary schools in 4-5 years through various implementing agencies.

The National ICT Strategy for Education and Training has fourteen components or rather objectives to be implemented. For the purpose of study, only four will be looked at with relevance to secondary schools. In 2008/2009, the Ministry selected three schools per district and each was given 1.5 million shillings. This money was to cater for buying of computers, installation of local area network and Management Information System and training. Bomet and Narok Counties are counties in Rift valley province and each of them has 6 schools selected for implementation of the project. The two counties share the same characteristics.

## **1.2 Problem Statement**

The Ministry of Education policy framework indicates that there are a number of challenges concerning implementation of ICT in Kenya. Most secondary schools have some computer equipment; however, this could consist of one computer in the office of the school head. Very few secondary schools have sufficient ICT tools for teachers and students. Even in schools that do have computers, the student-computer ratio is 150:1. Most of the schools with ICT infrastructure have acquired it through initiatives supported by parents, the government, NGOs, or other development agencies and the private sector, including the NEPAD e-Schools program. Attempts to set up basic ICT infrastructure in primary schools are almost negligible.

Numerous studies have noted the weak relationship of visions and strategy formulation to strategy implementation. Gichoya, (2005) indicates that over the last few years, Kenyan government has initiated some capital investment towards set up of installation of ICT infrastructure in Education sector. Funding for these investments has been through partnerships between government and development partners. The foreign funding component constitutes the largest percentage of this investment in terms of technology. The government contribution is usually in the form of technical and support staff and facilities. Despite this, implementation and integration of ICT projects is not successful.

Gakuu (2008) indicates that while a lot of attention has been directed toward acquisition of ICT equipment, little has been done to integrate them into teaching and learning. There are challenges that revolve around the lack of clear policies and action plans on the use of ICT both at the school level and at a national level. Farrell, (2007), in his findings indicates that Kenya has made remarkable progress putting in place an ICT policy framework and implementation strategy, complete with measurable outcome and timeframe but universal implementation has been challenging. There has been no consolidated documentation of what is actually happening in Africa in the area of neither ICT Education, nor comprehensive baseline data on the state of ICT use in education in Africa against which future developments can be compared, Glen (2008).

This study therefore sought to establish the factors that have affected implementation of the ICT strategy for Education and Training in Secondary Schools in Bomet and Narok Counties. This way it will help reduce the knowledge gap on the status and crucial factors that have affected the implementation of ICT in Kenyan Schools.

### **1.3 Objectives of Study**

#### **1.3.1 General objective**

The general objective of the study was to find out the factors affecting implementation of ICT Strategy for education and training in Secondary Schools in Bomet and Narok County.

#### **1.3.2 Specific objectives**

- a) To find out how the leadership and management styles of head teachers affect implementation of ICT strategy.
- b) To determine how infrastructure affect implementation of ICT Strategy in Bomet and Narok county Secondary Schools.
- c) To examine the availability of training for staff taking part in implementation of ICT Strategy in Bomet and Narok county Secondary Schools.

- d) Investigate how availability of finance affects implementation of ICT Strategy in Secondary Schools in Bomet and Narok Counties.

#### **1.4 Research Questions**

The following are the research questions that the researcher was trying to answer in the course and the end of the study.

- a) How do leadership styles of head teachers affect implementation of ICT Strategy in Secondary Schools in Bomet and Narok Counties.
- b) How does infrastructure affect implementation of ICT Strategy in Secondary Schools in Bomet and Narok Counties
- c) How does availability of finance affect implementation of ICT Strategy for Education and training in Bomet and Narok county Secondary Schools.
- d) How has availability of training for staff affected implementation of ICT Strategy for Education and training in Secondary Schools in Bomet and Narok Counties.

#### **1.5 Significance of study**

The knowledge gained would be used for better planning and implementation of ICTs for Education by the Ministry of Education together with the parties involved in implementation of the projects at the national level. The school heads and teachers under secondary schools are likely to gain benefit too because some of the factors that have led to unsuccessful implementation of the projects are within their capacity. This Research will also attempt to contribute to the research in this area with an evaluation of current practice in educational institutions in Kenya with a view to establishing best practice in educational ICT deployment projects. The NGO's will be able to use the findings to make informed decisions regarding funding of ICT Education projects.

## **1.6 Scope of Study**

This study was carried out in Bomet and Narok Counties in Rift valley Province. It focused on government sponsored secondary schools in the counties which were selected for the implementation of ICT project. The total population is 12 Secondary Schools. The factors that affect the successful implementation of ICT projects in these schools were looked into. The beneficiaries of the research findings and recommendations are the Ministry of Education, teachers, NGO's and scholars engaged in related research.

## **1.7 Assumptions of study**

This study assumed that the correspondents would not lie or be biased so that at the end the findings would be objective.

The money given to the various schools have been used for the project only.

## **1.8 Limitations of the Study**

- a) Being an ICT study, its time bound, several changes might take place before the researcher concludes the findings.
- b) Financial constraints will be experienced, especially during data collection.
- c) The time available to cover all the schools might not be enough since the schools are far apart.
- d) The respondents might not be co-operative

To overcome the first problem of changes in the schools before the conclusion of the study, the researcher will try to carry out the study as fast as possible to minimize the possibility. On financial constraints, the little available resources will be used efficiently to minimize for unnecessary spending. For example, two or three schools will be covered in a day depending on proximity. The problem of uncooperative respondents will be dealt with through being patient and use of suitable language.

# CHAPTER TWO

## LITERATURE REVIEW

### 2.0 Introduction

A project is a series of activities (investments) that aim at solving particular problems within a given time frame and in a particular location Bartle (2007). The investments include time, money, human and material resources. Before achieving the objectives, a project goes through several stages

Project management is the application of knowledge, skills tools and techniques to project activities to meet project requirements. This includes work processes that initiate, plan, execute control and close work. During these processes tradeoffs must be made among the scope, quality, cost and schedule. It includes both administration tasks for planning, documenting and controlling work and leadership tasks for visioning, motivating and promoting work associates Kloppenburg (2009).The purpose of project management is to achieve successful project completion with the resources available. One characteristic of a project is that it has a lifecycle. All projects pass through five phases namely; Conception, definition, Planning and Organization, Implementation and finally project-clean up phase.80-85% of the project work is done in the implementation phase.ICT Projects in the Ministry of Education have not been successfully implemented in Kenya.

### 2.1 Implementation of projects

Implementation of a project is a step where all the proper planned activities are put into action. It consists of the processes used to complete the work defined in the project management plan to accomplish the project's requirements. It involves coordinating people and resources, as well as integrating and performing the activities of the project in accordance with the project management plan. The deliverables are produced as outputs from the processes performed as

defined in the project management plant, maintaining and use of the final product of project Bartle (2007). The phase is usually the longest in the project lifecycle and typically consumes the most energy and most resources. The project takes shape; it involves the construction of actual project result, actual reorganization takes place. At the end of the phase the result is evaluated according to list of requirements that was created in the definition stage. Philips (2003) points out that during implementation, project monitoring and control should be carried out therefore the need to implement a range of management processes. Often, a smoothly run project gets a black eye because of problems in implementation. The major overall problem with implementation is that you don't always realize the complexity associated with deploying the solution. Therefore, many of the implementation details need to be planned ahead of time. You cannot start planning for implementation at the same time that you are actually implementing

## **2.2 ICT Implementation and Project Management**

Projects are, more than ever, a fact of life for voluntary organizations. Changing patterns of funding, particularly the impact of the Community Fund, mean that it is becoming ever more common for agencies to develop their work and secure funding by developing specific projects. Funders in their turn are asking for details of how projects will be managed, with some beginning to expect agencies to use one or another established project management system. Technical projects are more common. Many organizations are getting involved in IT and internet based projects which bring high risks and costs, and take managers into technical developments where they may not feel confident. Against this background, there is a clear need for project management expertise, yet the voluntary sector has no great tradition of using formal methods of project management. This may be a reflection of a reasonable record of success: we haven't suffered from high profile project failures, especially IT project failures. A string of troubled projects has plagued the commercial and statutory sectors and driven the adoption of a more systematic approach, Lasa Information System team (2003).

According to Macapagal (2010) Projects that focus on the effective use of ICT have emerged in the last three decades of 20<sup>th</sup> century. Studies have shown that ICT projects have high failure rate

because of their poor design and management. Government leaders must the process of managing projects and be aware of tools available to raise their success rate.

ICT Projects typically result in development and installation of a new software product but not every project is pure development project. Many projects are “hybrids” that is they are composed of multiple independent subprojects that must be managed separately. There is difference between new development, enhancement, conversion and other sub-project types in ICT. It follows that each type also requires different project management.

### **2.3 Factors influencing implementation of ICT strategy for education and training in Kenya**

The factors affecting implementation of the ICT projects in the strategy are many but for the purposes of the study only four relevant factors will be looked into.

#### **2.3.1 Leadership and Management style of School Administration**

The overall leadership challenges of ICT integration in schools and universities may be symbolized by the rapidly-emerging delivery of fully online courses to secondary school students in many countries. Coleman (2008) decries the lack of expert instructional design behind the distribution of online courses to secondary schools.

What school conditions should educational leaders sustain in order to assure the efficacy of ICT development, and what are the barriers to realizing those conditions? Evolving approaches in the field several studies address the challenge of organizational coordination to support ICT sustenance in schools. Aczel (2008), for example, have called for service-providing agencies to coordinate efforts in order to reduce the developmental overlaps and duplication of effort. They are concerned that organizational roles be appropriately matched to local needs and cultures, suggesting that such coordination is especially critical in developing countries. They urge cross-organizational coordination in planning, the management of online, distance learning initiatives.

Younie (2006) offers an analytical review of the relationship between national ICT policy and local classroom implementation. She believes that the connection between the two tends to be tenuous, resulting from a failure to grasp the complexity of national policy implementation

across a diverse patchwork of locally-administered schools. Stronger leadership at both levels is needed to counter a prevailing "if we regulate, they will implement" frame of mind.

Addressing the reality of local-to-national policy alignment, Mee (2007) discusses what she views as a counterproductive conflict between centralized national ICT leadership and localized curriculum development. She suggests that ICT ranks among the most powerful educational reform tools available to achieve the "Education for All" goals of the United Nations. Because of severe resource constraints, especially in developing countries, she advocates for close program collaboration across government entities, the private sector, and local schools.

Chadwick and Valenzuela (2007) urge program developers to account for unique regional cultural attributes in educational ICT development. How can leadership best be applied to ensure the most effective advancement possible for the productive use of ICTs in schools? Notwithstanding the advocacy already mentioned for cross-level organizational cooperation, several studies suggest that the nexus of responsibility rests with the local school principal (head). This tenet appears to apply regardless of the nation studied. Ashfari (2008) affirm that the most critical agent for technological transformation in the school curriculum is the local school principal. He suggests that school heads possess a greater need for training in transformational leadership than for management and technology.

Gulbakar (2007) reports that massive educational technology investments have produced little evidence of success, resulting from a lack of planning especially at local levels. He discovered that, although school teachers and administrators feel technically competent with ICT tools, neither group expresses satisfaction about the efficacy of curricular integration. He opines that Educational leaders, especially school administrators, are poorly equipped and trained not only to lead to ICT integration but also to assess its costs and benefits. He stresses the importance of effective measurement for quality assurance in the design and distribution of open and flexible online courses to higher education students.

Gulati (2008) questions the massive investment in Internet-based ICT in developing countries, especially considering the high, concomitant investment requirements in such areas as infrastructure, teacher training, and curriculum development. As for the educational opportunity

created by ICT investment, Gulati suggests that the track record has been poor -- and poorer still for the most indigent sub-populations within these countries. Remedies are hard to find, but unless a broad range of investments is coordinated in a manner that responds to regional cultural realities, narrowly focused spending will fail to produce desired results. He argues that the distribution of material can "add value" only if accompanied by sustained leadership at all levels of the educational hierarchy.

### **2.3.2 Infrastructure**

Infrastructure means more than computer network capacity. There is literature related to the newer tools under the contemporary discussion of ICT: mobile phones, hand-held digital assistants, ubiquitous laptop computer distribution, Web 2.0 utilities and "thin client" technologies.

In a recent BBC broadcast of the program, *Digital Planet*, Gareth Mitchell (2009) discussed impending initiatives to upgrade Internet access for several African countries. These projects promise to speed-up access and lower costs of connecting to high-speed internet backbones. For the moment such projects, such as Nigeria's MainOne Cable Company and the Eastern Africa Submarine Cable System (EASSy), will only reach selected countries and leave unsolved the challenge of last-mile links to individual homes and schools. Nevertheless, the infrastructural climate in Africa promises to change dramatically during the coming year. Educators will need to ready themselves for this shift in network infrastructure. Challenges and constraints impacting progress among the steepest challenges confronting the development of access to a well-connected infrastructure appears to be a lack of effective leadership and planning, not only at the local educational level but also in the higher reaches of policy-making..

Rumble (2007) report on the organization and structure of open schooling efforts in India and Namibia. In these, as in many countries, investments in ICT infrastructure suffer from the relatively low status accorded by government, educators and the general public to computer networked modes of teaching and learning. Much of the literature on this theme addresses the

inequitable distribution of ICT resources within and across nations. This issue is commonly labeled the "digital divide." Educators sometimes think of the digital divide as a particular phenomenon of the developing world, but it also exists within the national boundaries of developed countries.

An American-based project, One Laptop per Child (OLPC), attempts to address this problem. In the Democratic Republic of Congo, Banza (2006) affirms that OLPC's \$100 (US) laptop may, on the surface, seem to offer a viable resolution of the resource scarcity confronted by African schools. To citizens of affluent countries, \$100 for a laptop computer may seem cheap, but in Congo, this sum represents more than one month's teacher salary. Additionally, this amount fails to account for the cost of ancillary resources such as materials, curriculum and professional development required for effective implementation. (Moreover, the \$100 price tag has already escalated to more than \$200.). Momanyi (2006) describes the network computing lag experienced in developing countries in comparison to the developed world. As African educators increasingly declare their intention to invest in ICT, nationally-coordinated initiatives to plan, set policy and develop collective purchasing strategies are urged.

Writing respectively in global and American contexts, Ameil (2006) and Davis, (2007) caution against thinking about the "digital divide" in simple terms of computers and software. They have suggested that educational leaders need to consider the full scope of resources necessary for effective ICT integration. Ironically, high-poverty schools tend to possess better computer-to-student ratios than low-poverty schools. These data, however, simply count computers; they say little or nothing about the condition of those computers or the uses to which they are put. However, children in relatively affluent schools have superior access to technology in their homes. (An interesting subtext of this study suggests that early-grade reading achievement is negatively associated with frequent use of reading software.) Various strategies have been employed in different countries as incentives for schools to become well-connected to data networks although the Internet is acknowledged as an important source of learning.

Ryle (2008) report from Indonesia that cultural values and existing infrastructural constraints can inhibit the implementation of Internet connectivity. Young Indonesians are slow to abandon cultural norms in order to embrace digital tools for networked learning. Several strategies reveal

themselves in the literature to improve access to the learning benefits of ICT: one-to-one ubiquitous laptop computing initiatives, a migration from fixed computers to mobile devices, increased reliance on digital resources accessible "in the cloud" (Web 2.0), and a re-dedication to traditional technologies such as broadcast radio.

Hoffman (2007) and McHale (2006) describe the establishment of two American school district-wide wireless network projects that support multiple laptops, one in Ohio and the other in Maryland. Notwithstanding increased security concerns, wirelessly-connected laptops substantially elevated access to networked ICT resources. The wireless network in Maryland provides service to portable laptop carts that are provided on-demand to classrooms. This approach comes close to offering the advantage of a one-to-one laptop ratio without requiring the purchase of a unique computer for each student. Looking ahead, an evolution of wireless networking capacity toward service of mobile devices, in addition to computers, is anticipated.

Several observers have suggested that resource-poor regions of the world should retain their commitments to analog technologies such as radio and broadcast television. Kinuthia, (2008), says that, Infrastructure and know-how already exists for these technologies, and they can be augmented by other strategies to promote engaged learning and student interaction. He regards the digital divide as a "knowledge divide" which traditional technologies are well-positioned to address. Investment in low-bandwidth digital audio technology is necessary where high-speed Internet access is unavailable. ICT resource and investment models appropriate for the developed world do not apply in developing countries because these models have not been designed with equitable distribution in mind.

Gle, (2007) observes that most countries in Africa have, or are in the process of, liberalizing their telecommunications policies to enable more competition and diversity of service providers in the industry. While this is having the effect of lowering the cost of access to information and telecommunication infrastructure, the *costs of connectivity remain unaffordable* for most Education institutions. Furthermore, there are *huge gaps between urban and rural areas* in terms of access to ICT infrastructure. There is a general lack of human resource capacity to provide ICT training and equipment servicing, and there is also a lag between the availability of ICT infrastructure and the ability of agrarian societies to integrate it to benefit national development.

Djibouti, for example, is at the forefront with a digital telecom network with two earth stations and the landing point for three undersea cables linking to Asia, the Middle East, and Europe. However, the country has yet to develop an ICT education sector policy and has generally not yet benefited from these assets. African Ministries of Education have begun to be more proactive in co-coordinating and leading the development of ICT infrastructure in school systems as their ICT policies and implementation plans have taken shape. However, civil society, principally NGOs working with donor agencies, continues to play a major role in providing computers to schools and lobbying governments to take a leading role. The ICT policies place a great deal of emphasis on providing ICT infrastructure to secondary schools and, eventually, to primary schools as well. But implementing these policies and plans will require time and major infusions of resources.

### **2.3.3 Staff Training**

According to survey done by Farrell (2007), an estimated 61 different ICT-related teacher-training and professional development programmes, projects, and courses are under way in Africa. Since then, additional national and regional teacher professional development programmes have emerged. It is difficult to estimate the numbers of teachers with access to ICTs and who have been trained in their use for learning and teaching. Most countries surveyed have had some investment in developing the capacity of teachers to use ICTs as a teaching and learning resource through both in-service and pre-service programmes. Most teacher-training programmes in Africa involve the development of basic ICT skills, sometimes as an end in itself, although in some cases these include the application of ICTs as a learning tool for teachers. Teacher training often involves one-off, topic-led, short-term training programmes that aim to develop specific skills of teachers, but which do not necessarily comply with professional standards of competency development. The local development of indigenous digital or electronic education content in Africa is very limited. Within a formal school education context, this often refers to the development of digital curriculum content aligned with or directed by national

curriculum frameworks. In addition to print-based media, there are also examples of the use of video, audio, and computer-based multimedia formats.

The role of human capital in economic growth is widely acknowledged. Various empirical studies have found that human capital is positively correlated with GDP growth rates. Though infrastructure has often been regarded as the main barrier to bridging the Digital Divide, research suggests that affordability and Education are equally important factors. To measure the overall ability of individuals to access and use ICTs, one has to go beyond the traditional focus on telecommunication infrastructure, such as mobile phones and fixed telephone lines. Research has also shown that Internet use is closely linked to education.

Thompson (1998) says that there is importance of embedding ICTs throughout teacher education curriculum in a manner that reflects “technology-across-the-curriculum” strategies recommended for effective schooling. Prior research has suggested that the extensive and persistent use of such constructivist techniques as electronic portfolios, shared workspace, project-based research in teacher education point to more positive attitudes and more effective subsequent use of ICT in schools.

Barak (2006) questions the efficacy of teacher preparation for the successful application of ICTs in school classrooms. If the quality of teaching depends, in some significant measure, on the way teachers were taught, it may reasonably be argued that teacher education programs treating ICT as a separate phenomenon of study will probably result in the unimaginative subsequent integration of technology into the school curriculum. Several studies address the question of school conditions that greet emerging teachers as they transition from their programs of professional preparation to actual classroom teaching practice.

In a Norwegian context, Krumsvik (2006) concluded that contemporary public and political support for ICT implementation schools has not been matched by educational results. Krumsvik offers several possible scenarios for a more productive pathway forward. ICT needs to be better developed as a vehicle for the ongoing development and support of practicing teachers. In other words, ICT techniques should be embedded in the education programs that prepare teachers to integrate ICT into their own classroom teaching.

According to Lebaron (2009) further research appears to be needed across a variety of dimensions. Research focusing on the particular needs of teacher education in the developing world seems to be particularly scant. Deeper research is needed on the relationship between teacher education and effective ICT integration in schools. From a more practical viewpoint, a deeper knowledge base on "best practice" in teacher education would inform better program development targeted on the needs of education's ultimate clients: elementary and secondary school students. Absent from the current research base is information about optimizing the contributions of institutional stakeholders of ICT integration. For example, what are the most appropriate roles for local school administrations, national and regional governments, the private sector, NGOs and professional associations in providing for best practices possible?

#### **2.3.4 Finance**

Greenwood (1997) says that financial markets play an important role in collecting and aggregating savings and then redistributing it for productive purposes. A developed financial market is evidently critical for the 'new economy (NE)'; a "new economy" is an economy driven by modern technology. In particular, the value of venture capital (VC) investments is especially important as it finances start-up companies, which tend to predominantly utilize new technologies and ideas (as the experience of dot.coms suggests). Equity markets represent the second important channel for financing the 'new economy'.

However, like in any other emerging markets (EM), the financial market in Kenya was not well developed to finance ICT projects. Sound management and effective oversight which bring about confidence in financial markets is critical to the success of such markets; hence their potential to spur growth in ICTs. ICT systems and particularly telecommunications systems are very expensive and require enormous capital outlay to deploy.

According Gilles (2002), the makers of public policy have a responsibility to develop and maintain an enabling regulatory environment that encourages investment by private organizations and businesses in ICT infrastructure. One reason for the apparent lack of benefits from the diffusion and adoption the new economy (NE) in transition countries is still the relatively small value of IT investments – The question is, why doesn't even this small

investments yield positive returns? There are suggestions that developing countries, as opposed to developed countries, have not been able to profitably use ICT products and services due to the lack of complementary investments in infrastructure, human capital, and Research and Design.

Akhtar (2007) says that, one aspect of development programs that is often neglected is sustainability. The long history of development aid has shown that too many projects and programs start with a bang but all too soon fade out with a whimper, to be quickly forgotten. This is true for many ICT-based educational projects as well. In many instances, these projects are initiated by third party donors—such as international aid agencies or corporations—and not enough attention is paid to establishing a mechanism by which the educational institution or community involved can pursue the project on its own or in partnership with other stakeholders after the initiating donor exits.

### **2.3.5 REVIEW OF PREVIOUS STUDIES**

According to Wong (2006), school principals need better to inform themselves of their teachers' perceptions. Based on a survey of Hong Kong primary school headmasters and teachers, heads appear to be significantly more sanguine about the success of ICT integration than the teachers working under their supervision. Educational leaders should take this divergence of view into account when developing and resourcing curriculum projects. In view of the foregoing, how are educational leaders trained for effective leadership? He believes that the professional development of educational leaders should be supported by a thorough analysis of ICT impact on curriculum.

Regardless of the most appropriate venue for leadership, several studies examine the image of ICT implementation in schools. The picture is mixed. Based on a self-reporting survey of teachers in two suburban Texas elementary schools, current ICT practice poorly serves contemporary student learning needs. Despite state-level prescriptions for technology integration across the curriculum, very little innovative practice seems to be filtering down to local classrooms. This finding is reflected in Brazil where de Fatima (2007) suggests that creative implementation has been hampered by poor decisions about the local deployment of ICT

resources. She worries about insufficient attention to measures, such as ongoing professional development, that would sustain the beneficial effects of initial technology investments.

Gulbakar (2007) reports that massive educational technology investments have produced little evidence of success, resulting from a lack of planning especially at local levels. He discovered that, although school teachers and administrators feel technically competent with ICT tools, neither group expresses satisfaction about the efficacy of curricular integration. He opines that Educational leaders, especially school administrators, are poorly equipped and trained not only to lead to ICT integration but also to assess its costs and benefits. He stresses the importance of effective measurement for quality assurance in the design and distribution of open and flexible online courses to higher education students.

Ouma (2010) indicates that planning for learning and adaptation during implementation is important. Any project will require many adjustments during its life. Project managers should not overly detail a project strategy, as this may hinder adjustments during implementation. Sound design is important with monitoring information providing a clear input to management decision-making and often an emphasis on the early gains to be had from monitoring and on institutional procedures that encourage the use of monitoring data to trigger further implementation decisions.

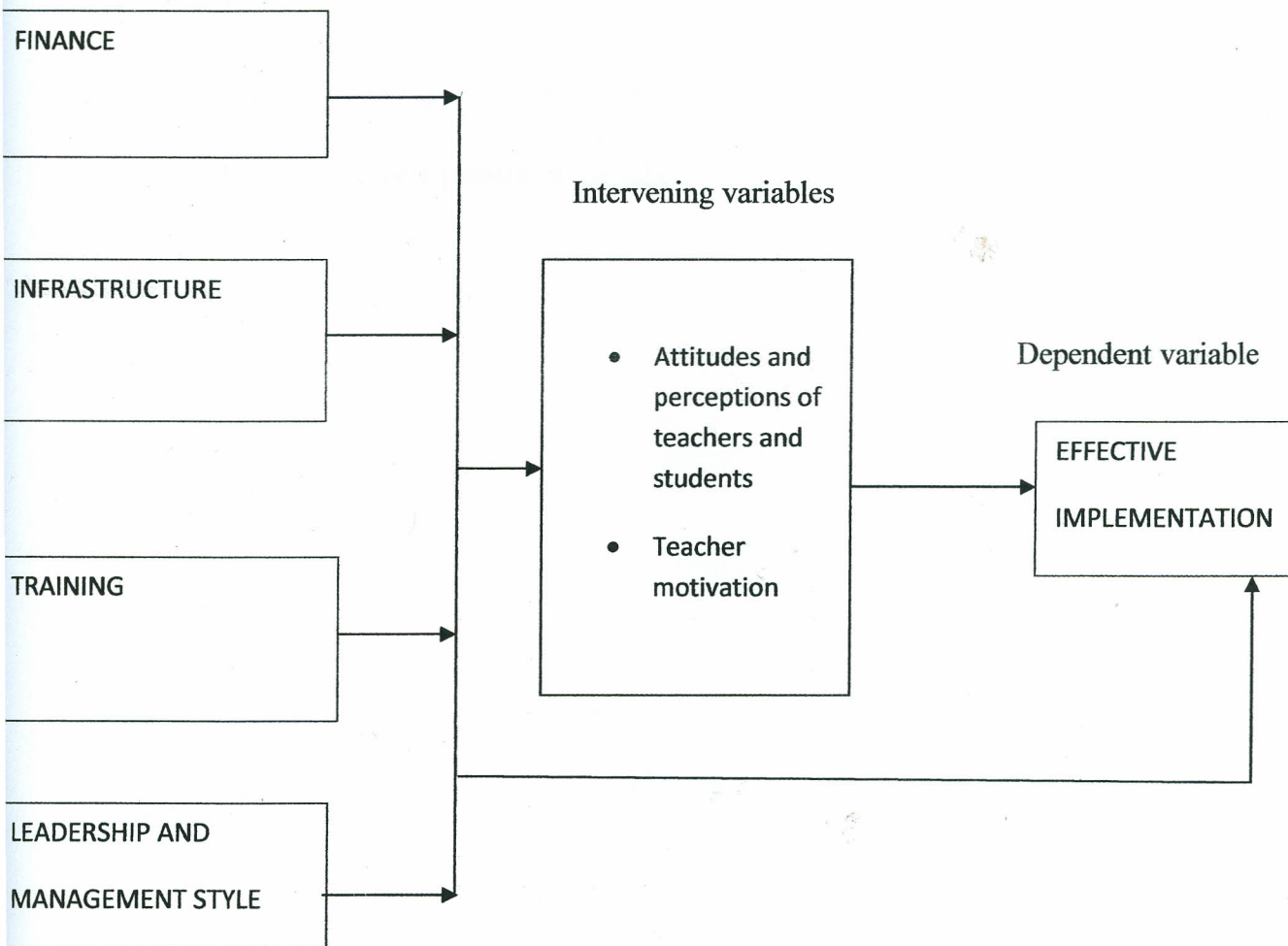
Wanjira (2009) says that in Kenya as elsewhere, ICT can play a significant role in equalizing opportunities for marginalized groups and communities. But the paradox is that for those groups that are unable to cross the technology divide, ICT is yet another means to further marginalize them. Education has a major role to play in resolving this paradox, but education itself is affected by the paradox. Thus, unless ICT becomes part of both the delivery and content of education, the disadvantage will deepen and development will suffer. But the failure to use ICT is itself a result of the digital and knowledge divides that exist, and their causes are deeply embedded in the complex historical and socio-cultural context of the country.

## 2.4 Conceptual Framework

The following factors affect implementation of ICT education projects. These factors form the independent variables for this study. The figure below depicts a presentation of this study's conceptual framework.

**Figure 2.1 Conceptual framework**

Independent variables



Source; Researcher (2011)

The dependent variable is effective implementation of ICT strategy for Education and training while the independent variables are the factors that affect implementation of the strategy; availability of finance, infrastructure, Training, and lastly leadership and management style. The independent variables explain the variation in the dependent variable. Effective implementation of ICT Education projects therefore is dependent on the factors above. The intervening variables explain the relationship between the dependent and independent variables.

The indicators of dependent variable are;

- Network availability
- Number of schools with electricity supply
- Level of training of teachers in ICT generally
- Number of teachers specialized in teaching ICT
- Number of computers present in the school

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.0 Introduction**

This chapter presents the research methodology that was used to achieve the objectives mentioned earlier. The research design, the target population, data collection and analysis are discussed.

#### **3.1 Research Design**

The research design used in the study is descriptive survey. This is the most appropriate as the researcher was out to study affairs as they exist so as to be able to recommend improvements.

#### **3.2 Population of the study**

The total population is 12 Secondary Schools in Bomet and Narok Counties. These schools are public (government sponsored) and they form the target population. Each county has 6 secondary schools. The study was based on survey research and so a census was taken on the 12 schools. According to Mugenda and Mugenda (1999) when the target population is so small, selecting a sample would be meaningless therefore they advise on taking the whole population. Four questionnaires was given to each school.

#### **3.3 Data collection methods**

The study depended on both primary and secondary sources of data. Primary data was collected by use of questionnaires (appendix II). The questionnaires had both closed and open ended questions seeking information concerning the dependent variables. The researcher used drop and pick method whereby the tools were dropped in a day and collected later on. The secondary data was collected from reports, libraries, internet, and other publications. The target respondents were head teachers/deputy head teachers, Teachers in charge of ICT, and heads of Arts and Science Departments in their respective schools.

### **3.4 Data Analysis and Presentation**

The data obtained was entered into statistical package for social sciences (SPSS). The researcher analyzed data using descriptive statistics methods. These methods involved use of measures of central tendency such as mean, mode, and median, they give the summary statistics of variables studied. Measures of variability like frequency distribution were used. Frequency distribution was represented graphically by diagrams like, pie charts, histograms and bar graphs to give meaning to the data. Kombo (2006).

## CHAPTER FOUR

### DATA ANALYSIS AND FINDINGS

#### 4.1 Introduction

This chapter presents the overall research findings of the study from the analysis of the primary data collected. The results have been summarized and presented in form of narratives, tables, pie charts and bar graphs. Descriptive statistics were used to analyze some of the close ended questions in the questionnaire.

#### 4.2 Background Information

This section included the gender of respondents, type of school they are teaching in, the subjects taught, position held in school and the level of training in Education course.

##### 4.2.1 Response Rate

The questionnaires were administered to 12 secondary schools in Bomet and Narok counties. Each school was given 4 questionnaires making them a total of 48.

**Table 4.1 Response Rate**

	<b>Number</b>	<b>Percentage</b>
Returned	36	75
Not Returned	12	25
<b>Total</b>	<b>48</b>	<b>100</b>

Source: (Research Data, 2011)

Every attempt was made to make sure all the questionnaires were completed and returned but it was not possible. 36 questionnaires were completed and returned which represent a response rate of 75% which is considered sufficient enough for the study.

#### 4.2.2 Gender of Respondents

Respondents were required to indicate their gender. The following table summarizes the results.

**Table 4.2: Gender of respondents**

<b>Gender</b>	<b>Frequency</b>	<b>Percentage</b>
Male	24	66.67
Female	12	33.33
<b>Total</b>	<b>36</b>	<b>100</b>

Source: (Research Data 2011)

More male teachers (66.57%) than female teachers took part in the study. This does not necessarily mean that there are more male teachers than female teachers in secondary schools. It was found out that most of the teachers in charge of ICT and heads of Departments were males.

#### 4.2.3 Type of School

The type of school was also to be indicated by the respondents. 100% of the schools were provincial schools. It can be deduced that the project focused mainly on provincial schools leaving out the district schools.

#### 4.2.4 Position held in school

The following table summarizes the positions held by the respondents in their respective schools.

**Table 4.2 Respondents positions**

<b>Position</b>	<b>Frequency</b>	<b>Percentage</b>
Head teacher	2	5.56
Deputy head teacher	11	30.56
Head of Department	23	63.89
<b>Total</b>	<b>36</b>	<b>100</b>

Source: (Research Data, 2011)

Most respondents were heads of departments (63.89%).

#### **4.2.5: Subjects taught**

The subjects taught by each teacher varied and they were a total of 14 combinations as below.

**Table 4.3: Subjects taught**

<b>Subject Combination</b>	<b>Frequency</b>	<b>Percentage</b>
Maths/ Computer Studies	4	11.11
Maths/ Biology	2	5.56
Maths/ Business Studies	2	5.56
Maths/ Physics	2	5.56
Maths/ Geography	1	2.76
Chemistry/ Computer Studies	2	5.56
Chemistry/ Biology	3	8.33
Physical Education Computer Studies	2	5.56
Computer studies	4	11.11
C.R.E/ Geography	2	5.56
C.R.E/ History	2	5.56
Kiswahili/ History	2	5.56
English/ Literature	4	11.11
Biology/ Agriculture	4	11.11
<b>Total</b>	<b>36</b>	<b>100</b>

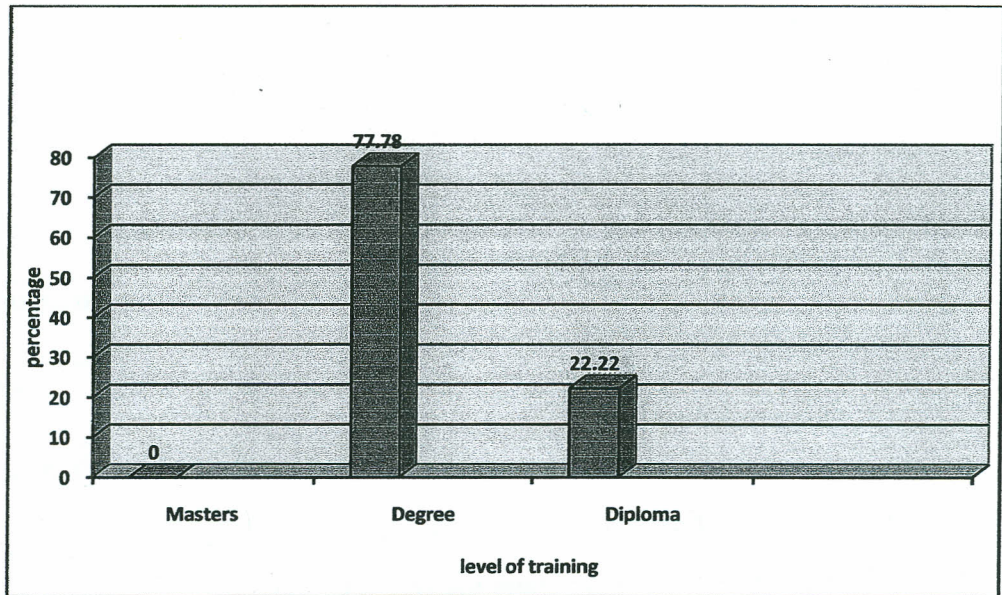
Source: (Research Data, 2011)

The highest percentage (11.11%) was of teachers teaching; Maths/Computer studies, Computer studies, English Literature and Biology/ Agriculture. It can be said that these combinations the most common in the schools under study. The lowest was Maths/ Geography combination with a percentage of 2.76% meaning it is somewhat a rare combination.

#### 4.2.6 Level of training in Education course

Respondents were asked to indicate the course level in Education training.

**Figure: 4.1 Level of training in Education course**



Source: (Research Data, 2011)

The majority of teachers held Bachelors Degree in Education; they form 77.78% of total target population. It was found out that no teacher participating in the study held a Masters Degree and the remaining 22.22% had Diploma in Education.

#### 4.3 Staff Training

##### 4.3.1 General training in ICT

It was found out that in general; 100% of the teachers have some kind of training but the level of literacy varied as depicted in the table below.

**Table 4.4 level of training in ICT**

<b>Highest Level of Training in ICT</b>	<b>Frequency</b>	<b>Percentage</b>
Proficiency level	10	27.78
Certificate	2	5.56
Diploma	9	25
Degree	4	11.11
Done as a unit only in College	11	30.56
<b>Total</b>	<b>36</b>	<b>100</b>

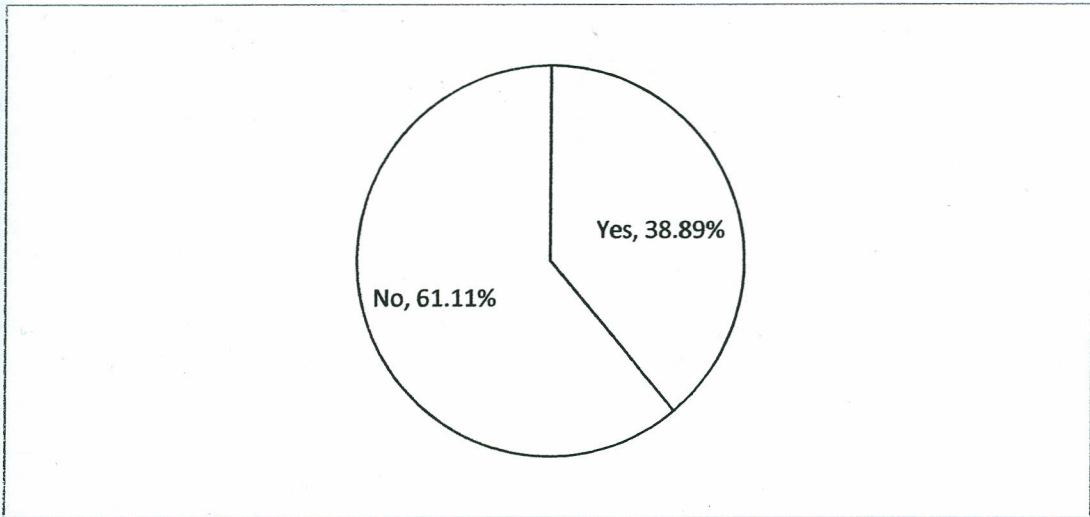
Source: (Research Data, 2011)

The majority of teachers (30.56%) did ICT just as a unit in college and most felt that the training was far much inadequate and could not enable a teacher to use it in his career. The teachers who were teaching computer subject were okay with their training and it emerged that in all the schools studied, each had only one teacher teaching computer and most of them had Diploma in teaching computer.

#### **4.3.2 ICT Training offered by Ministry of Education**

The respondents were asked whether they had received any training since the start of the project. The training had to be related with the project. The findings are summarized in the figure below.

**Figure 4.2: ICT Training since the start of the project**

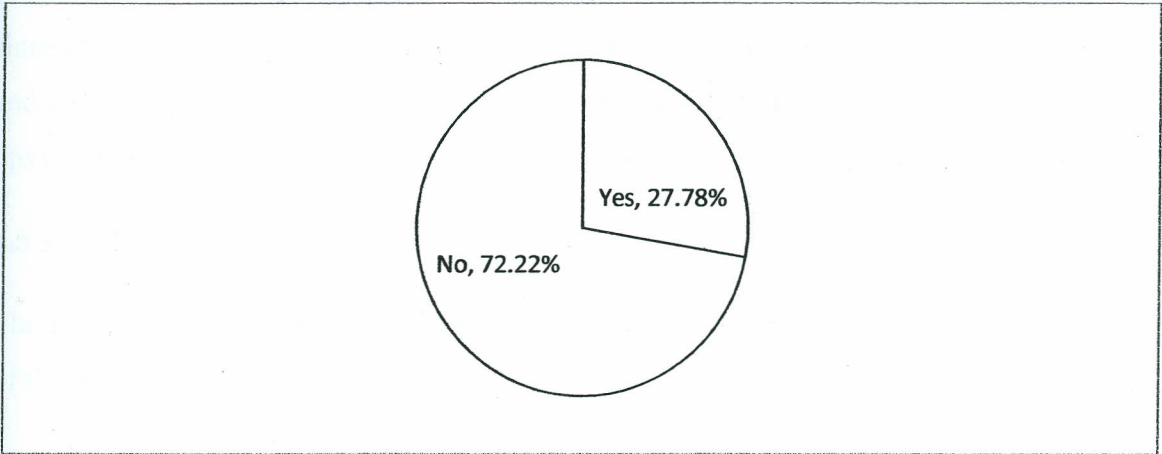


Source: (Research Data, 2011)

61.11% had not which is the majority had not received any training since the start of the project. The other 38.89% said they had received training. All the teachers who taught computer studies had received some training of which they were 33.33%. This shows that only 5.56% of the teachers who had training were not teachers of computer studies of which is a very low percentage. The teachers who taught computer studies were generally referred to as teachers in charge of ICT.

Respondents were also asked to indicate whether they had received any training by the Ministry of Education before the start of the project. The chart below shows the findings.

**Figure 4.3 Training before the start of the project**

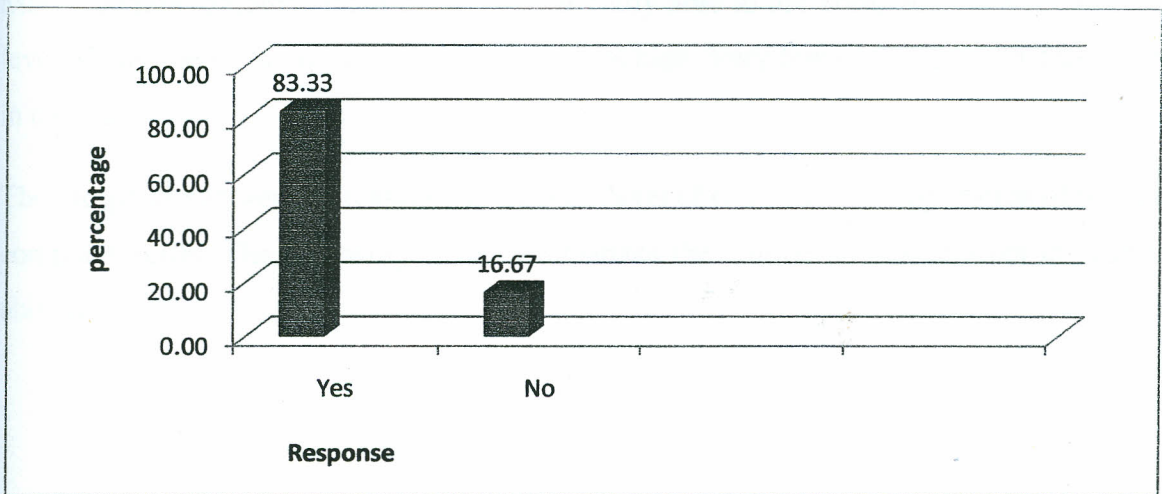


Source: (Research Data, 2011)

27.78% of the respondents had received training before the start of project while the 72.22% had not had any training. This shows that training of teachers in ICT is really wanting. Most respondents felt that there should have been a thorough training of teachers before the start of implementation process of the project in order to prepare them adequately.

The question whether there had been any monitoring and evaluation done by the Ministry of Education was asked and the graph below summarizes the results.

**Figure 4.4: Monitoring and evaluation of the project**



Source: (Research Data, 2011)

83.33% of the schools reported that Ministry of Education does Monitoring and Evaluation of the project although all of them felt that the visits were too few, some having had only one visit since the start of the project. 16.67% of the schools reported that there had not been monitoring and evaluation done. Good monitoring and evaluation practice means frequent visits and follow ups of the project in order to provide checks and identify problem areas and possible solutions.

### 4.3.3 Ability to use computers

The respondents were required to rate their ability to use the computer and below is a summary of the responses.

**Table 4.5: Computer use capability**

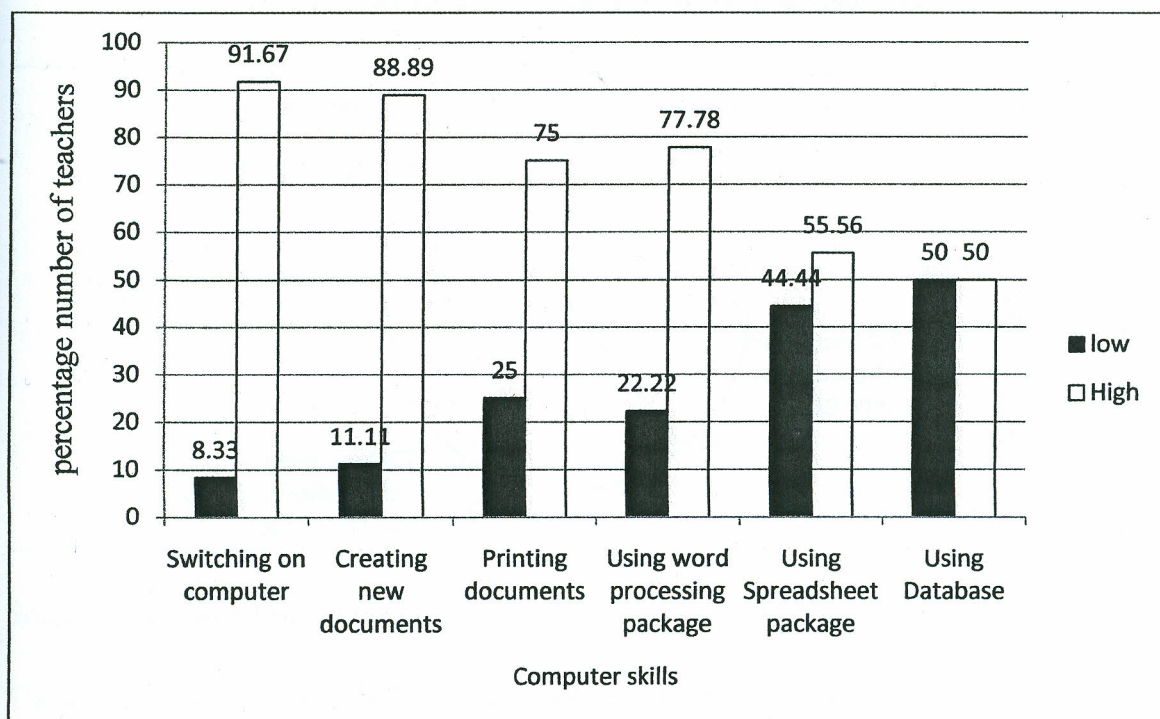
Rating	Frequency	Percentage
Good	15	41.67
Fair	20	55.56
Poor	1	2.78
<b>Total</b>	<b>36</b>	<b>100</b>

Source: (Research Data, 2011)

Most teachers (55.56%) rated themselves as fairly able to use computers which show that their level of confidence in the use of computer is not high. Very few (2.78%) felt that they were poor in computer use.

The respondents were then asked to rate their level of confidence in application of the following computer skills. The following graph summarizes the number of respondents in each level of ability.

**Figure 4.5: Level of confidence in computer skills**



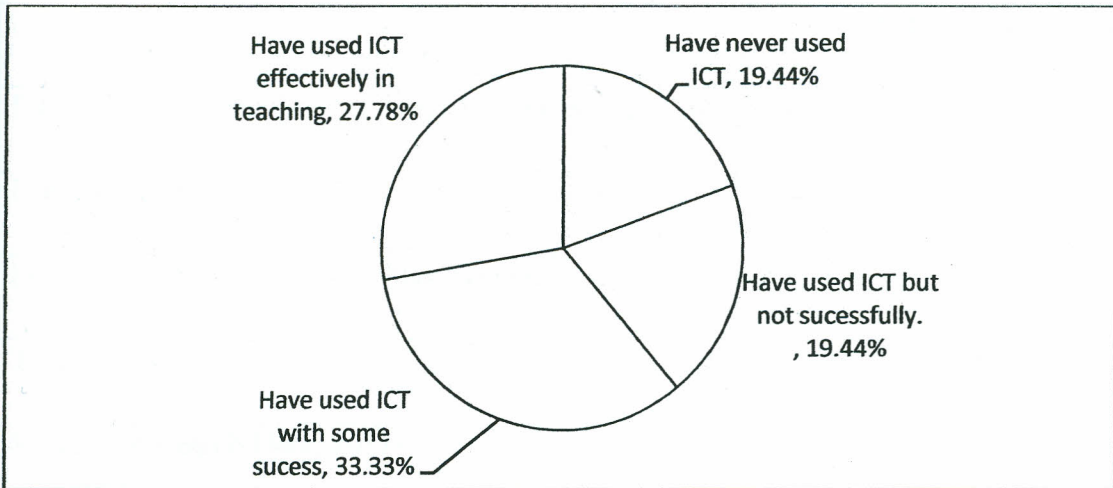
Source: (Research Data, 2011)

A very high percentage of teachers (91.67) had high confidence in switching on the computer and creating of new documents (88.89). Few teachers knew how to use database. Since all the teachers in charge of ICT had high confidence in application of all the computer skills presented, it meant that only 16.67% of the other teachers knew how to use database.

#### 4.3.4 Application of ICT Training

Respondents were asked how they had applied ICT training as teachers. This was to show their experience with teaching using ICT. The chart below summarizes the results.

**Figure 4.6: Application of ICT in teaching**



Source: (Research Data, 2011)

Those who had not used ICT in their teaching formed 19.44%, those who had used ICT in teaching but without success were 19.44%, those who had used ICT in teaching with some success were 33.33% and those who had used ICT effectively in teaching formed 27.78%. Therefore most teachers had tried using ICT in their teaching with little success. Those who had tried using ICT before without success had reasons for the lack of success ranging from not being conversant with how to use to not having the right tools like software. Generally, those who have not tried using ICT and those who did without success forms a total of 39% and they form a group of teachers who need to be supported and trained on use of ICT.

100% of the respondents agreed that the use of ICT in teaching enhances teaching. This shows that the teachers know the benefit of using ICT in their teaching but there are factors which hinders some of them not to use. They were then required to fill a table, ticking the statement they agreed with. Below is the table and the summary responses.

**Table 4.6 ICT Education Awareness**

	Frequency	Percentage
I think ICT can enhance teaching but I am not sure how	9	25
I am aware that some ICT uses enhances teaching in my subject	12	33.33
I know which uses of ICT enhances teaching in my subject	15	41.67
<b>Total</b>	<b>36</b>	<b>100</b>

Source: (Research Data, 2011)

From the results, most teachers (41.67%) know which uses of ICT enhances teaching in their subjects, but 33.33% of these teachers are teachers in charge of ICT. The teachers who do not teach computer studies but know which uses of ICT enhance teaching in their subjects are actually 8.34%. It shows that some teachers could know how to use the computer itself but do not know exactly how to use it for delivery of their subject content.

#### **4.3.5 Suggestions concerning teacher training on ICT**

Suggestions on what the respondents thought should be done on training of teachers in ICT was asked and a total of 4 suggestions were given in general. The following table summarizes the suggestions given. 32 respondents gave only 1 suggestion while the other 4 gave 2 each.

**Table 4.7: Suggestions on teacher training on ICT**

<b>Suggestions</b>	<b>No. of times mentioned</b>	<b>Percentage</b>
In-service training in ICT for teachers in the field and for those in College, provide proper training in ICT Education	20	55.56
Ministry of Education to offer regular workshops and seminars, training teachers in ICT	9	25
Ministry of Education to provide enough ICT equipment and relevant software	8	22.22
Each county to organize how it will fund training of its teachers in ICT	3	8.33

Source: (Research Data, 2011)

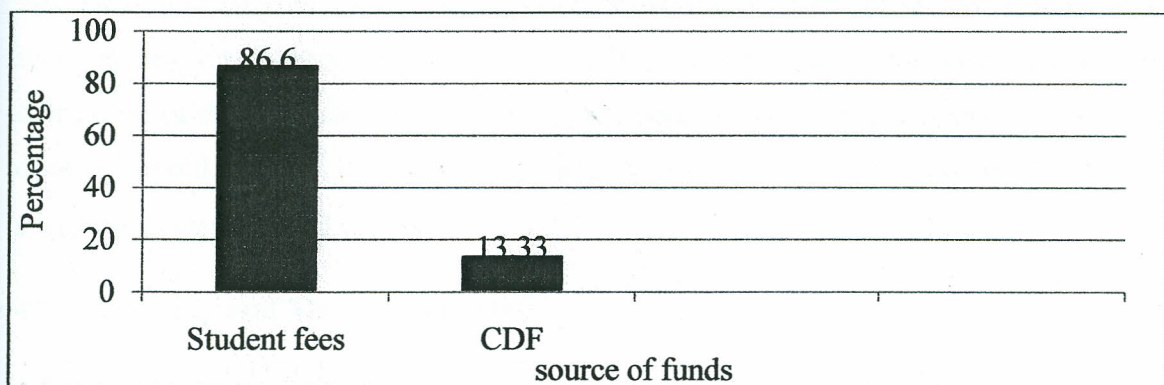
The percentage row total is out of 100% that is, the total number of respondents (36). The suggestion that the Ministry of Education should provide in-service training for training for teachers already in the field was mentioned the by 55.56% of the respondents. This could be done during holidays for different subjects. For those in college most felt that proper training in ICT education was lacking in most colleges, the Ministry should come up with a relevant curriculum for these colleges offering Education course.

#### **4.4 Funding**

##### **4.4.1 Source of funds**

Respondents were asked whether their schools had sourced funds elsewhere apart from the Ministry of Education.

**Figure 4.7: Source of funds**



Source: (Research Data, 2011)

41.67% of the schools reported that they had sourced funds elsewhere while the remaining 58.33% had not sourced any funds anywhere else. For those who had sourced, 86.6% of them said they came from student fees while for 13.33% it came from CDF.

100 % of the respondents felt that the funds were not sufficient. All the schools sourced funds for repair and maintenance from student fees. Auditing of the funds from the Ministry was also done.

#### 4.4.2 Improvement of funding

The respondents were required to give suggestions on what they think the government should do to improve funding despite limited resources. The following table summarizes the suggestions given.

**Table 4.8: Suggestions on how to improve funding**

Suggestion	Frequency	Percentage
Government to advocate for CDF allocation to ICT in schools	11	30.56
Ministry of Finance to allocate more funds to Education Ministry for ICT implementation.	12	33.33
Encourage NGO's and private companies to help in ICT funding of schools.	7	19.44
Corruption and Embezzlement of funds in the Ministry of Education should be stopped.	2	5.56
Encourage parents to cost share in training of teachers in ICT and equipping of schools.	4	11.11
<b>TOTAL</b>	<b>36</b>	<b>100</b>

Source: (Research Data, 2011)

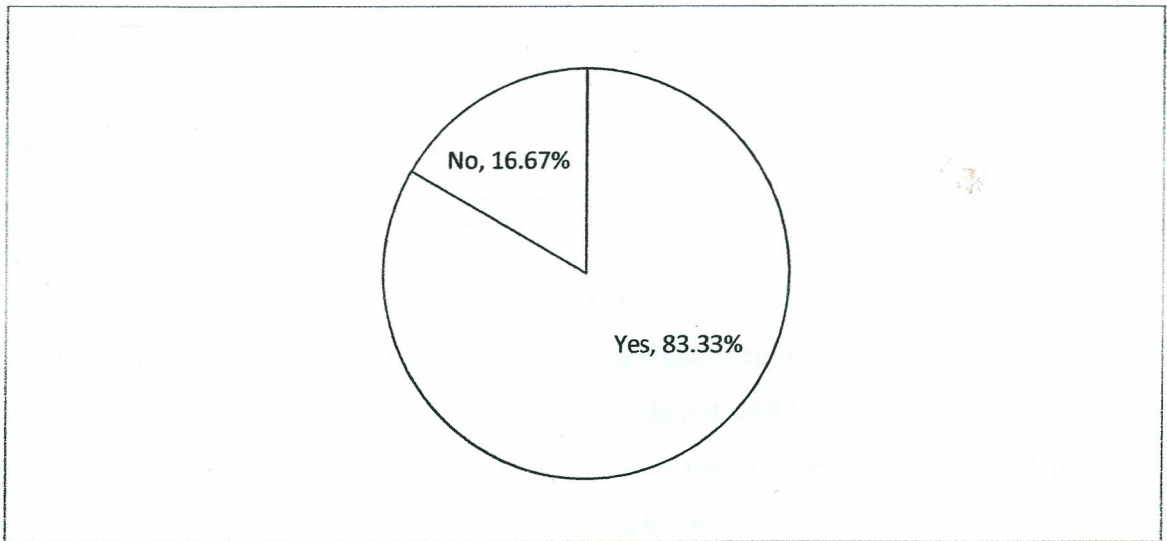
30.56% of the respondents were of the opinion that the government should do more by providing more money for example through CDF for ICT implementation but also be keen on fighting corruption of these funds. These respondents thought that if proper management of funds was done it would lead to more investors and NGO's funding the projects. In a way, all the suggestions were related.

#### 4.5 Leadership and Management style

##### 4.5.1 Effect of leadership and management on ICT implementation

The question whether Leadership and Management style affected implementation of ICT in schools was asked. The responses are depicted in the chart below.

**Figure 4.8 Opinions on effect of leadership and management**



Source: (Research Data, 2011)

Most respondents (83.33%) thought that it affected while 16.67% thought it does not affect. For those who thought it affected, they were required to explain how and the following is a summary of the explanations given.

**Table 4.9: How leadership and management style affect ICT implementation**

Suggestion	Frequency	Percentage
Corruption in the officials affects funds available for implementation	6	20
Unfair distribution of resources at the Ministry level hampers with universal and effective ICT implementation	3	10
Prioritization of ICT implementation, if it is not deemed to be of much importance then implementation may be hindered	4	13.33
Attitude affects implementation e.g negative attitude towards ICT by school administration affects implementation negatively	6	20
School administration that gives teachers freedom to use and learn ICT and also encourage its use definitely promotes ICT implementation.	11	36.67

Source: (Research Data, 2011)

Most respondents (36.36%) thought that the kind of freedom that the school administration give to its teachers contribute to the success of implementation of ICT. For example if a school administration has positive attitude towards ICT, then it will tend to give freedom for teachers to use ICT equipment and encourage its members to use ICT and also see to it that it provides whatever is needed so long as it is within its reach. Only 10% thought that unfair distribution of resources by leaders affect ICT implementation.

#### **4.5.2 School administration's extent of ICT education encouragement**

Respondents were also asked the extent to which the use of ICT is encouraged by their school administration. The table below was to be filled by the respondents and the following are the findings.

**Table 4.10: Extent of encouragement on ICT use**

Extent of encouragement of ICT use	Ranking								Mean
	1		2		3		4		
	Never		Sometimes		Often		Very often		
	No.	%	No.	%	No.	%	No.	%	
Encourages teachers to use ICTs in class	0	0	22	61.11	10	27.76	4	11.11	22.5
Provides opportunities to experiment ICT	3	8.33	17	47.22	16	44.44	0	0	21.25
Encourages teachers to discuss experiences with ICT in education	5	13.86	19	52.77	7	19.36	5	13.86	21.0
Encourages coordination of the use of ICT in various sections	3	8.33	17	47.22	14	38.89	2	5.56	21.75
Encourages professional development with respect to use of ICT in education	6	16.6	10	27.76	13	36.11	7	19.44	22.5

Source: (Research Data, 2011)

The highest mean is 22.5 therefore, it means that most school administrations encourage their teachers to use ICT in class and also encourage professional development with respect to ICT Education. This indicates that may be the teachers have limited knowledge in ICT Education that is why they are encouraged. Fewer administrations encourage coordination of the use of ICT in various sections within the school.

## 4.6 Infrastructure

### 4.6.1 Electricity supply

All the schools under study reported that they had electricity supply.

### 4.6.2 Number of Computers

The respondents were required to indicate the number of computers present in their schools.

**Table 4.11 Number of computers in each school**

<b>Number of Computers in each school</b>	<b>Frequency</b>	<b>Percentage</b>
19	2	16.67
20	1	8.33
24	1	8.33
25	4	33.33
26	2	16.67
28	1	8.33
30	1	8.33
<b>TOTAL</b>	<b>12 schools</b>	<b>100</b>

Source: (Research Data, 2011)

The number ranged from 19 to 30 with most schools having 25. This shows that the computer numbers is fairly high.

Respondents were also asked to state whether their schools had computers before the start of the project and 16.67% schools reported that they had none while 83.33% had. The schools which had computers were required to state the number and below is a summary of the findings.

**Table 4.12 Number of computers before the start of the project**

<b>Number of computers in each school</b>	<b>Frequency</b>	<b>Percentage</b>
2	4	40
3	3	30
5	1	10
4	2	20
<b>Total</b>	<b>10</b>	<b>100</b>

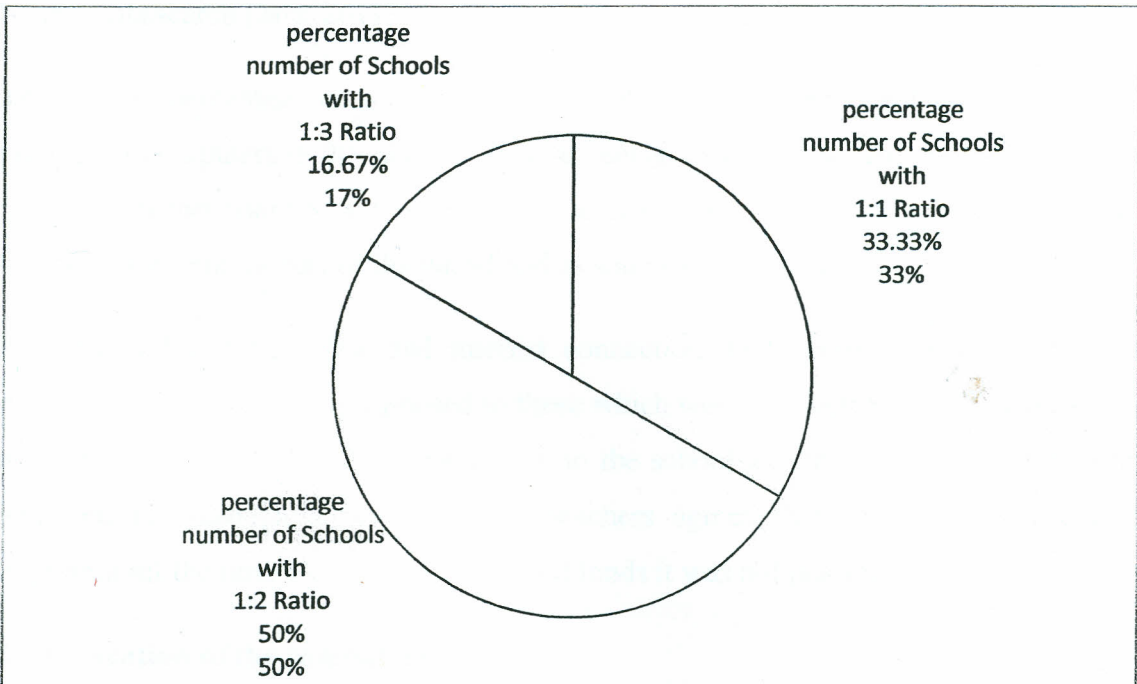
Source: (Research Data, 2011)

Actually the computers were very few and mostly not used for teaching purposes but mainly administrative purposes.

#### 4.6.3 Computer use

In all the schools, the computers were used for learning and administration purposes. For those used for learning purposes, the respondents were required to give the ratio of computers to students in one class sitting. The figure below shows the findings.

**Figure 4.9: Ratio of computers to students in one class sitting**



Source: (Research Data, 2011)

The highest ratio was 1:3 which is fair. 50% of the schools had a ratio of 1:2 making frequency of the ratio the highest. This shows that the computers are fairly enough in most schools.

#### 4.6.4 Internet connection

Respondents were asked if all the computers present were internet connected and in all the schools under study, not all of the computers were connected.

**Table 4.13: Number of computers connected to the internet**

<b>Total number of computers in a school</b>	<b>Number of computers connected with internet</b>	<b>Percentage</b>
24	1	4.16
25	3	12
26	2	7.69
28	1	3.57

Source: (Research Data, 2011)

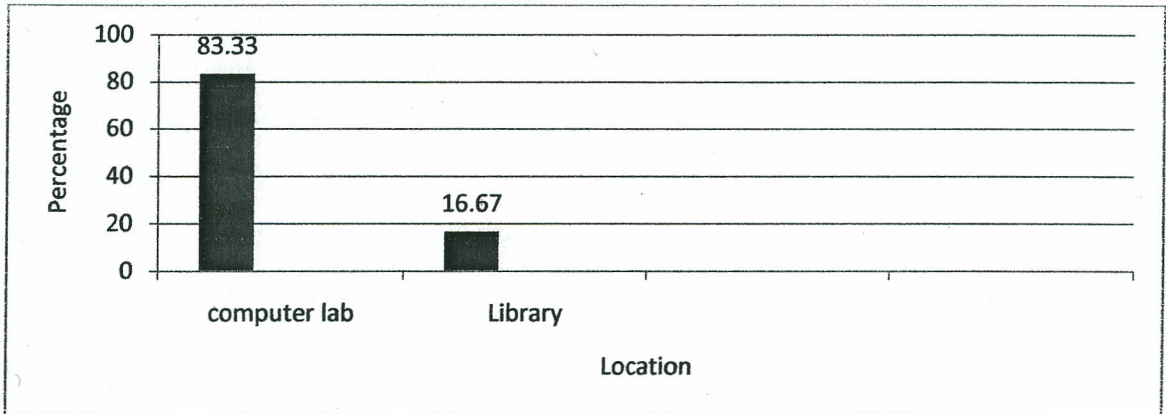
The highest percentage of computers connected to the internet in a school is 12% of the total number of computers in that school. This percentage is quite low. The respondents expressed the need for internet connection in their school since it would help them in several ways for example link them up with the rest of the world and as source of information.

It was noted that very few had internet connection. Only computers which had connection throughout were counted as opposed to those which were connected occasionally. Some teachers in charge of ICT had personal computers in the school and they occasionally connected them with internet through a modem. Most teachers agreed that internet connection was quite important all the time but because of limited funds it was not possible to connect all.

#### **4.6.5 Location of the computers**

In most schools the computers for learning purposes were located in a computer lab.

**Figure 4.10: Computer locations**



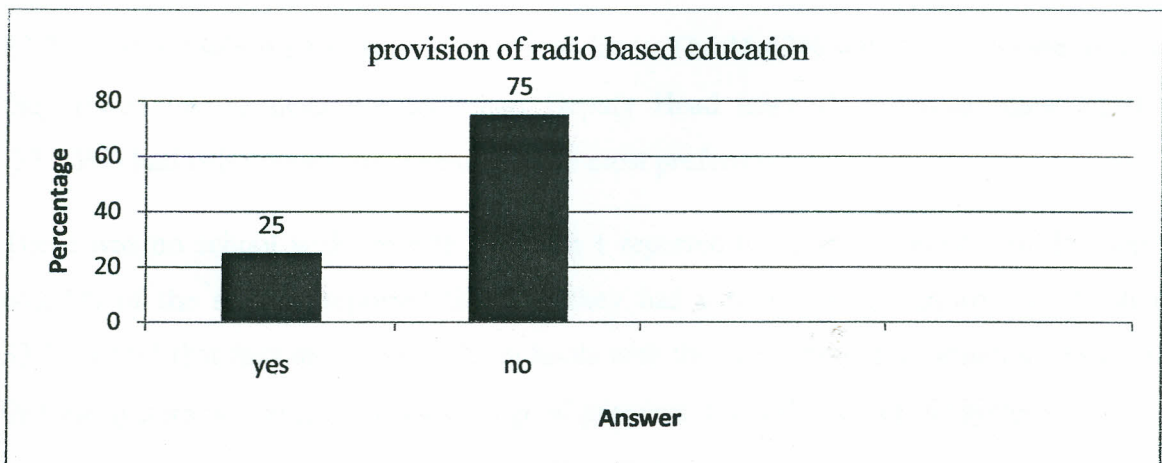
Source: (Research Data, 2011)

83.33% of the schools had a computer lab for the use of computers while the other 16.67% had their computers in the library. 8.33% of the 16.67% schools actually had the computers in the library but they were covered not because they were out of order but they were not being used at all.

#### 4.6.6: Provision of Radio-based education

The question of whether the schools provided radio-based education for its learners was asked and the following are the findings. and 75% said no while 25% said yes.

**Fig 4.11: Provision of radio-based education**



Source: (Research Data, 2011)

For the schools that provided radio-based education, 100% said that their main type was radiobroadcast education and not interactive. These schools use radiobroadcast on occasional basis decided by the school. The content is both mainstreamed and scheduled in the national curricula. The broadcast was through Kenya Broadcasting Cooperation (KBC) and it provided the timetables of these programmes. When asked why the schools couldn't mainstream their timetable with that of the broadcast, majority said they had tried with no success since there were some difficulties for example in timing.

#### 4.6.7 Means of communication

The schools which had school telephone line were required to state the type(s) of lines they had and below is summary.

**Table 4.14: Type of telephone line present in each school**

Type of telephone line present	Number of schools	Percentage
Fixed line only	2	16.67
Fixed line and cell phone	3	25
Cell phone only	4	33.33
No School Telephone line	2	16.67
<b>Total</b>	<b>12</b>	<b>100</b>

Source: Research Data

83.33% of the schools had school telephone lines. The 16.67% without telephone lines said that they relied on the head teacher's and Deputy Head teacher's personal lines. Most schools (33.33%) had cell phone only meaning it the most preferred.

There was no school with website although 1 reported to be in the process of developing one. 66.67% of the schools reported that that they had a Management Information System while 33.33% said that they didn't have. All schools with the management information system reported that the system was in use. This shows good progress in installation of the system.

#### 4.7 Ranking of ICT implementation factors

The respondents were asked to rank the factors (training, infrastructure, funding, leadership and management style) in order of how they thought they affected implementation of ICT in schools..

**Table 4.15: Ranking of factors affecting implementation of ICT in Schools**

Factor	Ranking								Mean
	1		2		3		4		
	Least important		Fairly important		Important		Most important		
	No.	%	No.	%	No.	%	No.	%	
Staff training	8	22.22	7	19.44	10	27.78	11	30.56	<b>24</b>
Funding	5	13.86	2	5.56	11	30.56	18	50	<b>26.5</b>
Leadership and management style	9	25	17	47.22	3	8.33	6	16.67	<b>19</b>
Infrastructure	12	33.33	12	33.33	10	27.78	2	5.56	<b>18.5</b>

Source: (Research Data, 2011)

The highest mean was 26.5 meaning funding was a factor deemed most important by many teachers and most of them said that because enough funds means good infrastructure and staff training would be possible. Infrastructure was the factor that was thought to be least important (mean of 18.5) in implementation of ICT in the schools.

#### 4.8 General recommendations

Recommendations were given at the end of the questionnaire and they were a total of five recommendations. Some gave only one while others gave more than one.

**Table 4.16: Recommendations**

<b>Recommendation</b>	<b>Number of times recommended</b>	<b>Percentage</b>
The government should provide enough ICT resources.	20	55.56
The Ministry should in-cooperate school curriculum with ICT.	6	16.67
Conduct workshops and training of teachers who are already in the field and incorporate relevant ICT training in teacher education.	14	38.89
The Ministry should help in providing internet connection	6	16.67
Corruption in the Ministry of Education should be stopped	2	5.56

Source: (Research Data, 2011)

The most suggested recommendation (55.56%) was for the government to invest in ICT seriously in schools, so that ICT resources would be enough. The schools which were selected for the project were just few; that is only 3 per district. It was suggested therefore that the government should now look at the schools left out and help them to implement ICT.

#### **4.9 Effective ICT Implementation**

This was the dependent variable and the following were the indicators of the dependent variable.

##### **4.9.1 Network availability**

Only 11.11% of the schools had some computers with internet connection. The number of those connected varied with the schools. The school with the highest percentage of internet connected computers had 12% of its computers connected. This percentage is quite low and for effective implementation, percentage should be high. This means implementation with respect to internet connection has not been effective.

##### **4.9.2 Number of schools with electricity supply**

All schools under study had electricity supply; therefore effective implementation has been effective with respect to supply of electricity.

### **4.9.3 Level of training of teachers in ICT generally**

Most teachers (30.56%) reported that they had done ICT as a unit. This, they thought was not sufficient enough to enable them use the knowledge gained in their teaching subjects. Most of the teachers in charge of ICT had diploma and few of them a degree. The teachers who do not teach computer studies felt that they need to be offered thorough training in order to use ICT effectively in their teaching. Implementation of ICT strategy therefore, has not been effective in that respect.

### **4.9.4 Number of teachers specialized in teaching ICT**

Each school had only one teacher teaching computer therefore, since the schools were 12, the number of teachers were 12 too.

### **4.9.5 Number of computers present in schools**

The number of computers in each school ranged from 19 to 30. Most schools had 25 computers and also a ratio of 1:2 in a class sitting. This shows that the number of computers is fairly high and sufficient.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter gives a summary of major findings of the study, conclusions of the study are provided and recommendations for improvement and for further research have been made.

#### **5.2 Summary of Findings**

The purpose of the study was to investigate the factors affecting implementation of the National ICT strategy for Education and Training in Bomet and Narok Counties. In specific, the study was set out to find out how leadership and management styles affects implementation of ICT; to determine how infrastructure affects implementation of ICT; to examine the availability of training affects ICT implementation and to investigate how availability of finance affects implementation of ICT in selected schools in Bomet and Narok Counties.

##### **5.2.1 Background Information**

The response rate was 75% which was sufficient enough for study and more males (66.67%) than females took part in the study. 100% of the schools were provincial schools. The subjects taught by the respondents varied greatly and they were a total of 14 combinations. 77.78% of the respondents had Degrees in Education course.

##### **5.2.2 Training of staff**

The study found out that all the teachers had received some kind of training in ICT but most felt that their training was inadequate such that it could not really help them especially in teaching. Most teachers (30.56%) reported that they did ICT as a unit in college. All the teachers teaching computer studies either had a Diploma or Degree in ICT. 5.56% of the teachers had Certificate in ICT. Majority (61.11%) of the teachers reported that they had not received any training since the start of the project while 27.78% said that they had been trained. Most of those who had received training were actually teachers in charge of ICT. On the level of confidence in application of some computer skills, switching on the computer was the skill that most respondents (33) had

high level of confidence. The use of database as a computer skill proved to be a skill not exhibited by many; 18 respondents knew how to use database but in the 18, 12 were the teachers in charge of ICT so only 6 of the other teachers knew how to use database. 33.33% of the teachers said that they had applied ICT in their teaching with some success forming the largest percentage but 19.44% had never used ICT in teaching and 19.44% had tried using ICT but without success. This lot forms 38.89% which is quite high. Those who had used ICT effectively in teaching formed 27.78% of which a larger percentage of them were teachers in charge of ICT.

### **5.2.3 Funding**

The study found out that since the project was funded by the government, the funds therefore came from the Ministry of Education but still it was not enough to run the project. 7 Schools reported to have sourced funds elsewhere; 86.67% sourced from school fees while 13.33% sourced from CDF. The other 5 schools did not look for additional funds but just managed the available. When asked to give suggestions on whether they thought something should be done concerning project funding, most (33.33%) were of the opinion that the Ministry of Finance should allocate more funds to the Ministry of Education to aid ICT implementation. Auditing of funds was reported to be done in all the schools.

### **5.2.4 Leadership and management style**

When asked whether leadership and management style affected implementation of ICT, most respondents (30) felt that this factor affected implementation of ICT in schools while a minority of 6 respondents felt that it did not affect ICT implementation. For those who felt that it did affect, they were required to state how. 36.67% of the teachers were of the opinion that a school administration that gives freedom for teachers to use and learn ICT and also encourage its use definitely promotes ICT implementation. The extent to which school administration encouraged ICT use was investigated. Most teachers (58.33%) said that their school administration sometimes encouraged use of ICT, 47.22% said that sometimes their school administration sometimes provided opportunities to experiment with ICT, 55.56% said that their school administration sometimes encourages teachers to discuss experiences with ICT Education, 47.22% said their school administration encouraged coordination of use of ICT in various

sections and 36.11% said that their school administration often encourages professional development in ICT Education.

### **5.2.5 Infrastructure**

All schools that benefited from the project had electricity supply as it was found out. The number of computers varied from school to school. The highest number of computers to be found in a school was 30 while the lowest was 19 computers. Most schools (33.33%) had 25 computers which is fair. 83.33% reported that they had computers before the start of the project but were mainly used for administrative purposes. The ratio of computer to students in most schools (50 %) was 1: 2. The highest ratio was 1:3 and the lowest was 1:1. 66.67% of the schools had no computers with internet connection while the 33.33% had internet connection in some of their computers. 1 school had 3 computers with internet connection which was the highest number and the lowest number was 1. 83.33% of the schools had built computer labs while rest were using library. 1 school actually had the computers in the library but they were covered since they were not being used. Radio-based education was found to be provided by 25% of the schools and it was on occasional basis. The content of the radiobroadcast was mainstreamed in the national curricula. 83.33% of the schools had school telephone lines and there was no school with a website. 66.67% of the schools reported that they had a management information system in use while the remaining 33.33% did not have one.

### **5.3 Conclusion**

Based on the summary of the findings the following conclusion can be made;

On training of staff, it can be concluded that, most teachers lack the adequate knowledge on how to use ICT in their teaching subjects. This lack of knowledge is due to the fact the training teachers who do not teach computer received, cannot help them to use ICT to teach. Also the Ministry of Education did not carry out extensive training of teachers in ICT before the start of the project. On funding, the funds are fairly enough though there was a general feeling that the funds were not really enough and that the government should increase funding so as enable schools for example to connect the computers with internet and acquire education software. The

embezzlement of funds was also found to be reason why the funds were not adequate for the project hence a call for corruption to be stopped.

On leadership style and management, if a school administration gives freedom teachers to experiment with ICT and also encourage use of ICT, then implementation of ICT will take place faster. Provision of opportunities to use ICT was found be crucial to ICT implementation. Finally, on infrastructure, it was found out that the computers in schools were quite enough but the presence of enough computers in the schools did not lead to their effective use, therefore it meant that for complete implementation, there were other factors involved. Very few computers were connected to internet yet internet connection is very important. A good number of schools had built computer labs which is also important in achieving complete implementation of ICT.

The study findings generally agrees with Gle (2007) who observes that in developing countries there is a lag between the availability of ICT infrastructure and ability to integrate it to benefit national development. Gulbakar (2007) reports that massive educational technology investments have produced little evidence of success, resulting from lack of proper planning especially at local level; which is in line with the study findings.

#### **5.4 Recommendations**

Based on findings of this study, various recommendations can be drawn. The recommendations are based on the findings from the study and are important for the ICT implementing bodies in schools.

The study found out that there was inadequate ICT training of teachers and recommends that for the teachers who are already in the field, in-service training in ICT Education should be provided as soon as possible. This training should be very relevant to enable teaching using ICT. Seminars and workshops should be carried out frequently on the same too. For those who are in college the Ministry of Education should see to it that the Education curricula is streamlined and that it provides adequate training in ICT Education in all the colleges offering Education course. Software which helps in training in how to use ICT in all the subjects should be made available by the Ministry of Education. Before the start of the project in the other schools, the Ministry of

Education should make sure that the teachers are given training first so that when the computers are installed, they are used effectively.

More funds should be channeled towards implementation of ICT. This could be through; the Ministry of Finance allocating more funds to the Ministry of Education for the purposes of ICT implementation in schools, the Ministry of Education could advocate for allocation of CDF to schools to aid ICT implementation, the government should encourage NGO's and private companies to help fund ICT implementation in schools and lastly corruption in the Ministry of Education should be stopped by all means possible.

The study recommends that the <sup>^</sup> in the school administration should be encouraged by the Ministry of Education to prioritize ICT in their plans. Corrupt leaders should be punished and sacked from their jobs regardless of the positions they hold. Constant monitoring and evaluation should be done by the Ministry so as to push school administrations to do what is required of the project for effective implementation.

The study recommends a real follow up of the project because providing the infrastructure alone may not necessarily lead to ICT implementation. The teachers need to be trained first and encouraged before they can be able to use the ICT equipment to teach. Internet connection should be improved because of the many benefits related to it for example; it is a source of information and links the school to the rest of the world.

The study also recommends that the since NGO's and are involved in funding the Ministry of Education for ICT Projects they should do a follow up in the ground, whether the projects achieves the objectives. The other institutions, through cooperate responsibility should really help in funding especially those schools which did not benefit from the project.

### **5.5 Recommendations for further research**

Further research can be done on the areas below;

- a) Similar research can be done on the rest of the rest of the counties across Kenya and the results compared.

- b) Further research could be conducted on ICT implementation where one compares implementation of ICT in urban and rural schools or private and public schools.
- c) Further research should be conducted to find out how the level of training in ICT of school administrators and managers affects implementation of ICT education in their schools
- d) Research could also be conducted on the role Monitoring and Evaluation in ICT education projects.

### **5.6 Limitations of the study**

- a) The head teachers who were supposed to complete at least one questionnaire in each school, but most of them could either find time or were not willing hence delegated to other teachers. This proved to be a limitation since it interfered with what was planned.
- b) Financial constraint was experienced. For example, the schools were far apart and so a lot of expenses were incurred in travelling
- c) Time constraint was experienced during data collection since the schools were almost closing for holidays. This meant that data collection time scheduled needed to be shortened a bit.

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## **APPENDIX 1**

### **COVER LETTER**

Dear Respondent,

My name is Florida Chepwogen and I am a student at Kenyatta University, Department of Business Administration. I am conducting a research on the Implementation of the ICT Strategy for Education and Training in Bomet and Narok Counties. I am going to use a questionnaire and your contribution to this study would be immeasurable to this area. The information obtained will be kept confidential and strictly used for academic purposes.

Thank you for investing your valuable time to participate.

Florida Chepwogen,

Adm. D53/10559/2008

School of Business,

Kenyatta University

FEBRUARY, 2011

APPENDIX II

RESEARCH QUESTIONNAIRE

**Instructions**

Do not write your name anywhere in the questionnaire. Any information you give will be used for academic purposes only. No individual responses will be reported but a summation of all responses. Please tick where appropriate or fill in the required information.

**A) Background information**

1. Your gender

Male

Female

2. Type of School

Provincial school

District School

3. What position do you hold in your School?

Head teacher

Deputy Head teacher

Head of Department  (please specify which department).....

4. Which subjects do you teach?

.....  
.....

5. Level of Training in Education

Masters

Degree

Diploma

Other.....

## B) Training

6 (a) Do you have training in ICT? (Please tick where appropriate)

No

Yes

(b) If yes, describe your level of literacy

Proficiency level e.g. workshop, seminar etc

Certificate e.g. KNEC Certification or equivalent

Diploma level e.g. KNEC Certification or equivalent

Degree level by recognized university

Other (Please specify)

(c) Have you received any training since the start of the project?

Yes

No

(d) Was there any training of similar nature before the start of the project?

Yes

No

(e) Is there any Monitoring and evaluation of the project by the Ministry of Education?

Yes

No

7. (a) How would you rate your ability to use computers

Good

Fair

Poor

(b) What is your level of confidence in application of the following skills in a computer (tick where appropriate)

Type of Skill	Low	High
Switching on computer		
Creating new documents		
Printing documents		

Using word processing package		
Using Spreadsheet package		
Using Database		

8. How have you applied your ICT training as a teacher? (tick where applicable)

- I have used not used ICT in my subject of teaching
- I have used ICT in my subject but not very successfully
- I have used ICT in my subject teaching with some success
- I have used ICT effectively in my teaching subjects

9(a) Do you think the use of ICT enhances teaching in your teaching subject?

- Yes
- No

(b) If yes, to which statement do you agree with?

	Agree
I think ICT can enhance teaching but I am not sure how	
I ++am aware that some ICT uses enhances teaching in my subject	
I know which uses of ICT enhances teaching in my subject	

10. Do you think anything should be done by Ministry of Education concerning teacher training in ICT? Please explain.

.....

.....

.....

.....

**C) Funding**

11.(a) Apart from the Ministry, has your school sourced funds for implementation of ICT Projects elsewhere?

Yes  No

(b) If yes, from where?

NGO`s

Own funding (school fees)

Others (please specify)

(b) Where does the school source funds for repair and maintenance of hardware?

Government

Student fees

Other.....

(c) Are the funds for the project sufficient?

Yes

No

(d) If no, please suggest ways in which you think the government should do in order to improve funding despite limited resources.

.....  
.....  
.....

(e) Is auditing of funds done?

Yes  No

**D) Leadership and Management Style**

12 (a) Do you think leadership and management styles have an effect on the implementation of ICT Education projects?

Yes

No

(b) If yes, please explain how

.....  
.....  
.....  
.....  
.....

13. What is the extent to which the use of ICT in Education is encouraged by the administration (tick appropriately)

	Never	Sometimes	Often	Very often
Encourages teachers to use ICTs in class				
Provides opportunities to experiment ICT				
Encourages teachers to discuss experiences with ICT in education				
Encourages coordination of the use of ICT in various sections				
Encourages professional development with respect to use of ICT in education				

### E) Infrastructure

14. Is there electricity supply in your school

Yes

No

15 (a). How many Computers are in your school?

.....

(b) Where there any computers before the start of the project?

Yes  No

If yes, how many.....

(b) How are the computers used?

For learning purposes only

For Administration purposes only

Both purposes

Not in use because they are broken down]

Not in use because of any other reason (please specify).....

(c). For those used for learning, what is the ratio of computers to students in one class sitting?.....

(d) Are they all Internet connected? If not state the number of those connected and not connected

Yes

No  Connected..... Not Connected.....

(e). Where are the computers located in your school?

In the computer lab

In the head teachers office

In the Library

16(a). Does your school provide radio-based education for its learners?

Yes

No

(b).If yes, please tick the main type

Radiobroadcast education

Interactive radio instruction

Both

(c)If yes, please indicate

Is the use of the radio-based education on an ad hoc or occasional basis decided by the school

Is the content of the radio based education both mainstreamed and scheduled in the national curricula

17. Does your school have a telephone line?

Yes

No

If yes, how many lines a) Fixed.....

b) Cellular.....

c) Fax.....

18. Does your School have a website? If yes please state the address

Yes  w.w.w.....

No

19 Is there a Management Information System in your school?

Yes

No

If yes, is it in use?

Yes

No

20. Using the scale below please rank the following factors in order of how you think they affect implementation of ICT projects.

1- Most important

2- Important

3-Fairly important

4-least important

Training of staff

Funding

Leadership and Management

Infrastructure

21. What recommendations would you give in order to effectively implement ICT projects in schools?.....

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-END-

Thankyou for participating

APPENDIX III

**RESEARCH BUDGET**

ITEM

AMOUNT in Ksh.

<b>1</b>	<b>PROPOSAL</b>	
	Typing, printing, photocopying and binding 48Pages @10.00*12	5,760.00
	Travelling and Communication costs	2000.00
	Internet research costs	500.00
	<b>TOTAL</b>	<b>8,260.00</b>
<b>2</b>	<b>RESEARCH PROJECT</b>	
	Production of research instruments 8 pages@2.00*50	800.00
	Telephone communication with supervisor and respondents	800.00
	Transport to various schools	4000.00
	Data analysis and preparation	2000.00
	Report preparation and presentation costs	5000.00
	<b>TOTAL</b>	<b>12,600.00</b>
	Contingency (10% of the total)	2,086.00
	<b>GRAND TOTAL</b>	<b>22,946.00</b>

## APPENDIX IV

### RESEARCH TIME SCHEDULE

*Weeks*

<i>Activity</i>	1	2	3	4	5	6	7	8	9	10	11	12
Pilot testing												
Data Collection												
Data Coding and Editing												
Data Entry												
Data Analysis												
Report Writing												
Submission of Report												

## APPENDIX V

### LIST OF SCHOOLS SELECTED FOR ICT IMPLEMENTATION IN BOMET AND NAROK COUNTIES

No.	School Name	County
1	Tenwek Boys High school	Bomet
2	Moi Siongiroi Girls	Bomet
3	Ndanai Secondary School	Bomet
4	Kapsogut Secondary School	Bomet
5	Kaplong Girls Secondary School	Bomet
6	Saseta Girls Secondary School	Bomet
7	Narok High School	Narok
8	Olomiran Girls Secondary School	Narok
9	Masai Girls High School	Narok
10	Kilgoris Girls Secondary School	Narok
11	Kilgoris Boys Secondary School	Narok
12	Kilgoris Secondary School	Narok

Source: Ministry of Education

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