

**THE IMPACT OF INFORMATION AND COMMUNICATION TECHNOLOGY  
(ICT) INTEGRATION IN EDUCATION IN THE SIX (6) NEPAD E-SCHOOLS IN  
KENYA**

**BY:**

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## DECLARATION

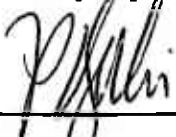
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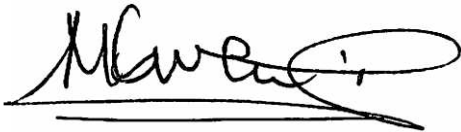
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## **DEDICATION**

I wish to dedicate this work to my wife Consolata Achieng' and children Oscar Ochieng' and Ernest Owino for their tolerance and support throughout my study.

## **ACKNOWLEDGEMENT**

I wish to express my sincere gratitude to my supervisors Mr. Peter Nzuki, Department of Educational Studies, University of Nairobi and Dr. Joyce Mbvesa, Department of Educational Studies, University of Nairobi for valuable time they spent guiding me through this study.

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I also wish to thank the most sincerely the Principals, Teachers and students of the six (6) Nepad e-schools for their cooperation during questionnaire administration and filling.

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## **ABSTRACT**

Information and communication technologies (ICT) have become common place entities in all aspects of life. Across the past twenty years the use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavour within business and governance. Within education, ICT has begun to have a presence but the impact has not been as extensive as in other fields.

In this study, the researcher sought to find out how the use of ICT in education lends itself to more student-centered learning settings. The study seeks to determine the various impacts of ICT on contemporary secondary education in Kenya as well as potential challenges.

The study was conducted through survey method. The researcher sought permission from the Ministry of Education in Kenya to collect research data from the sampled schools since all of them were public secondary schools. The researcher constructed questionnaires which were used to collect data from various respondents in the sampled Nepad e-schools in Kenya.

The researcher used three categories of respondents in each school namely; the administrators, the teachers and the students. The completed questionnaires were then coded, entered into the computer using Statistical Package for Social Scientists (SPSS) and then analysed.

The study revealed that both students and teachers have developed a positive attitude towards the use ICTs and related accessories in the teaching/learning process. This was reflected by the frequency of use of the facilities and the interest as indicated by the respondents. The study also found out that the schools under study were already using educational management software for various processes undertaken in the schools.

The study also revealed some challenges faced by the schools. Notable challenges included lack of funding to support the purchase of the technology to improve access, lack of training among teachers to adopt ICT as teaching tools and lack suitable e-content for various subjects.

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## **LIST OF ABBREVIATIONS**

<b>DVD</b>	<b>Digital Video Disc</b>
<b>EMIS</b>	<b>Educational Management Information System</b>
<b>FPE</b>	<b>Free Primary Education</b>
<b>ICT</b>	<b>Information &amp; Communications Technology</b>
<b>IRI</b>	<b>Interactive Radio Instructions</b>
<b>ISP</b>	<b>Internet Service Providers</b>
<b>KESSP</b>	<b>Kenya Education Sector Support Programme</b>
<b>MOE</b>	<b>Ministry of Education</b>
<b>NEPAD</b>	<b>New Partnership for Africa Development</b>
<b>ODE</b>	<b>Open and Distance Education</b>
<b>SAS</b>	<b>Support Application Systems</b>
<b>UPE</b>	<b>Universal Primary Education</b>
<b>VCD</b>	<b>Video Compact Disc</b>
<b>VSAT</b>	<b>Very Small Aperture Terminals</b>



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## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background**

The vision of the Government of Kenya is to facilitate ICT as a universal tool for education and training. In order to achieve this vision every educational institution, teacher, learner and the respective community should be equipped with appropriate ICT infrastructure, competencies and policies for usage and progress. It calls for recognition of the fact that ICT provides capabilities and skills needed for a knowledge-based economy. It also calls for transforming teaching and learning to incorporate new pedagogies that are appropriate for the 21<sup>st</sup> century.

The Ministry of Education's (MOE) mission is to facilitate effective use of ICT to improve access, learning and administration in delivery education programmes and services. The principal objective will be to integrate ICT in the delivery of education and training curricula.

Although not exhaustive, the range of ICT that have been used in the delivery of education to improve access, teaching, learning, and administration includes: Electric Board, Audio Cassette, Radio for Interactive Radio Instructions (IRI), Video/TV-Learning, Computer, Integrated ICT infrastructure and Support Application Systems (SAS). These systems are in use, at various degrees, in most parts of Africa (Charp, 1998). This plan envisages use of these digital components to improve access and quality in the delivery of education in Kenya.

The major challenge in respect to this component is limited digital equipment at virtually all levels of education. While the average access rate is one computer to 15 students in most of the developed countries, the access rate in Kenya is approximately one computer to 150 students (EMIS, 2005).

Whereas most secondary schools in Kenya have some computer equipment, only a small fraction is equipped with basic ICT infrastructure. In most cases equipment of schools with ICT infrastructure has been through initiatives supported by the parents, government, development agencies and the private sector, including the NEPAD E-Schools programme. Attempts to set up basic ICT infrastructure in primary schools are almost negligible.

According to “ICTs in Education Options Paper”, one of the main problems is limited penetration of the physical telecommunication infrastructure into rural and low-income areas. Specifically, the main challenge is limited access to dedicated phone lines and high-speed systems or connectivity to access e-mail and Internet resources.

The EMIS Survey (2003/2004) indicated that over 70% of secondary schools and a much larger proportion of primary schools require functional telephones. Indeed, many parts of Kenya cannot easily get Internet services because of the poor telephone networks. About 90% of secondary schools need to establish standard Local Area Networks (LANs) in order to improve sharing of learning resources.

Alternative and appropriate technologies for access to Internet resources, including wireless systems remain quite expensive. Indeed, a small proportion of schools have direct access, through Internet Service Providers (ISPs), to high-speed data and communication systems.

Furthermore, very few schools in the rural areas use wireless technology such as VSAT to access e-mail and Internet resources. Nearly all of the 6 NEPAD e-Schools are in rural areas and are expected to enjoy internet connectivity through VSAT technology.

While other countries have reported up to 41% of integration of ICT to teaching and learning, the proportion remains substantially low in Africa, Kenya included. Integration aims at the use ICT to support teaching and learning in the delivery of the various curricula to achieve improved education outcomes. Because ICT is interactive media, it facilitates students to develop diversified skills needed for industrialization and a

knowledge-based economy. It also allows teachers and learners to proceed at different paces depending on the prevailing circumstances.

As a first step, the Ministry of Education has initiated a major ICT project in Secondary schools meant to equip over 200 secondary schools with ICT infrastructure for integration of ICT in teaching/learning process ( KESSP, 2004). Three schools have been chosen in every district of Kenya.

## **1.2 Statement of the Problem**

Conventional/traditional methods of teaching in Kenyan Secondary Schools is limiting quality of education and access to educational resources among the school- going age children as well as in tertiary levels and here is urgent need to enhance both pedagogical and technical skills in delivering content at various levels.

Although not exhaustive, the range of ICT that have been used in the delivery of education to improve access, teaching, learning, and administration includes: Electric Board, Audio Cassette, Radio for Interactive Radio Instructions (IRI), Video/TV-Learning, Computer, Integrated ICT Infrastructure and Support Application Systems (SAS) in some African countries.

The Ministry of Education in collaboration with development partners such as NEPAD and the private sector under the umbrella of ICT Trust have since the year 2003 put in place a number of initiatives to support the use of ICT in teaching/learning process.

This initiative has seen a total 220 secondary schools getting donations in terms of equipment and funding to set up the necessary infrastructure required for effective integration of ICT in Education and Training.

Out of this, seven (7) schools were supported by NEPAD e-schools initiative while the remaining 213 schools are supported by the Government of Kenya.

The Government of Kenya and her development partners have therefore injected colossal amount of money in this project of equipping secondary schools with ICT infrastructure.

However the impact of the project is yet to be determined in terms of improving quality of education and access to educational resources.

Preliminary findings by the Ministry of Education indicate that a number of schools had difficulty in implementing the programmes due to:

- i. Lack of basic technical skills among teachers and students to handle the ICT equipment.
- ii. Lack the necessary skills and drive by the school administrators and managers in some schools to spearhead the technology in their schools.
- iii. Lack of adequate funds by the Government to roll out the project to many schools.
- iv. Lack of funds by the schools to purchase and maintain the ICT infrastructure

The present study therefore sought to find out the impact of ICT integration in education and the challenges faced during implementation.

### **1.3 Purpose of the study**

The goal of this study was to determine the impact of using ICT equipment to support delivery of content in secondary schools and school administration compared to the conventional methods such as lecture methods, observations and group work activities.

The study also attempted to discover challenges and problems that the schools may have encountered in the process of implementing the ICT-based teaching/learning programmes.

#### **1.4 Research Objectives**

The overall objective of this study was to investigate the general impact of the use of ICT-based teaching/learning process in secondary schools considering the students, teachers and administrative perspectives.

The study sought to achieve the following specific objectives:

- i) To determine the behavioral change among learners in the ICT-based teaching/learning environment.
- ii) To determine the behavioral change among teachers in the ICT-based teaching/learning environment.
- iii) To determine whether the use of ICT in Schools has enhanced management of records and finances in schools.
- iv) To identify challenges schools are facing in the implementation of the ICT project



### **1.5 Research Questions**

The research questions for this study consisted:

- i) What is the attitude of teachers in the use of ICT-based teaching/learning process?
- ii) What is the attitude of students about ICT-based learning/teaching process?
- iii) Is there significant improvement in delivery of administrative educational services?
- iv) Are there major problems hindering the implementation of the ICT-based learning/teaching method in schools?

### **1.6 Scope of the Study**

This study was confined to the six (6) Nepad e-schools since the schools acquired the standard ICT equipment approximately three years ago (2005).

The study was also limited to the six schools out of the possible 220 due to difficulties in reaching all the 220 schools which are spread in all the districts in Kenya. This required a lot of time and money to complete the study.

### **1.7 Significance of the Study**

The study was important due to the following reasons;

- i) It revealed the success or failure of the ICT projects in secondary schools and provided recommendations on the way forward.
- ii) It provided valuable information to the Ministry of Education (the custodian of education in Kenya). This can be used to improve educational planning and implementation processes.
- iii) The findings of the study will be used as a basis for seeking further funding to support ICT-based teaching in secondary schools. This will benefit the schools, the students, the teachers and the general school communities.
- iv) The study revealed possible challenges schools are facing in the ICT project and provide possible solutions to the challenges detected.

## **1.8 Definition of terms**

### **i) Nepad e-schools:**

Six secondary schools and one primary school in Kenya which were piloted by the Nepad e-schools initiative, an e-learning project commissioned by Nepad e-commission among member countries. The project aims at integrating ICT in the learning/teaching process.

### **ii) ICT integration in Education & Training:**

The use of information and communication technologies in teaching/learning process with a view to improving delivery of educational content as opposed to the conventional lecture method. The focus is on the use of ICT as a teaching tool by teachers in all the subjects offered in secondary school curriculum

### **iii) ICT infrastructure:**

Various electronic components that are used to set up a computer laboratory to be used for integrating ICT in education and training.

### **iv) Computer laboratory:**

A teaching/learning room equipped with computers and related accessories.

### **v) Computer Network:**

A collection of computers and other devices which are connected to each other for purposes of sharing resources and transferring information.

### **vi) Free Primary Education**

A Government of Kenya project targeting improvement in quality and access to educational services at primary school through provision of educational materials and services at Government costs.

## **1.9 Basic assumptions**

The researcher made the following basic assumptions during the study;

The three year post-implementation period was adequate to see tangible outcome from the ICT project in secondary schools.

The six schools sampled provided a true representation of the rest of the 220 secondary schools implementing the ICT project.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

Information and communication technologies (ICTs)—which include radio and television, as well as newer digital technologies such as computers and the Internet—have been touted as potentially powerful enabling tools for educational change and reform. When used appropriately, different ICTs are said to help expand access to education, strengthen the relevance of education to the increasingly digital workplace, and raise educational quality by, among others, helping make teaching and learning into an engaging, active process connected to real life.

However, the experience of introducing different ICTs in the classroom and other educational settings all over the world over the past several decades suggests that the full realization of the potential educational benefits of ICTs is not automatic (Blurton, 2002). The effective integration of ICTs into the educational system is a complex, multifaceted process that involves not just technology—indeed, given enough initial capital, getting the technology is the easiest part, but also curriculum and pedagogy, institutional readiness, teacher competencies, and long-term financing, among others.

Since the 1980s integration of ICTs in education has been compulsory in the developed nations. This is not so in developing nations such as Kenya, where ICT integration in education is considerably more recent, small-scale and experimental in most of the developing countries including Kenya (Riffel, 1997).

It is however, generally recognized that adoption of computers in education has progressed, in nearly identical pattern, from acquisition of basic computer skills, computer aided teaching, communications and research, to usage in every subject. This has been accelerated by convergence of the computer and telecommunication technologies, particularly e-mail and Internet.

This progression has been a result of various efforts, and a wide variation on the levels of ICTs integration to education curriculum, as determined by social and economic conditions of individual countries and regions. It is worthwhile pointing out that most developing countries including Kenya are largely at the basic levels of integration. Furthermore, most developing countries currently place emphases, on new dimensions, pedagogical approaches and teaching and learning that would enhance knowledge in interactive and self directed ways. This is commonly referred to as interactive education.

Whereas the impact of ICTs on the education goals is still inconclusive, reported observations include rapid expansion of knowledge, improved examination outcomes, enhanced communication and technical efficiency, as well as greater decentralization in the delivery of education services. It is not in doubt, however, that ICT has the potential to play a more powerful role in increasing resources and improving the environment for learning (Cadle, 2004).

ICTs can also play a role in preparing students to acquire skills, competencies and socio skills that are fundamental for competing in the emerging global “knowledge” economy.

With respect to the great concern about the digital divide, it will be noted that access to ICT facilities is currently one of the major challenges in Africa, Kenya is no exception. While the ratio of one computer to 15 students is the norm in most developed countries, the ratio in Africa stands at one computer to 150 students (KESSP, 2004). This ratio is even wider in disadvantaged regions and areas. It will also be recognized that access to ICTs varies according to the various sub-sectors of education. In Kenya, the ratio for university and colleges is one computer to 45 students, one computer to 120 students at

secondary school level while access at the primary school level remains much more limited at one computer to 250 students.

In addition, the limited and uncoordinated approach to imparting appropriate ICT skills and competencies to teacher's remains a major barrier in the integration of ICT in education in Africa generally, and in Kenya in particular.

While equal opportunities for access to ICT are provided in Africa, girls are disadvantaged through a wide range of constraints that include choice of subjects, limited computers, and increasing attrition at various levels of education ( Karroulis ,2000).

## **2.2 Education Policy Framework**

According to Sessional Paper No. 1 of 2005, entitled "A Policy Framework For Education, Training and Research", the overall goal of education is to achieve Education For All (EFA) by 2015 in tandem with national and international commitments. The short-term goal is to attain Universal Primary Education (UPE) by 2010 and to increase the transition rate, from primary to secondary schools, from 47% to 70%. In addition, the policy envisages expansion of capacity for universities to enroll an average of 5,000 students annually. In addition, the policy provides commitment for enhancement of access, quality and equity in delivery of education services at all levels.

Equally important, the policy provides commitment to ensure that learning needs for all are met through appropriate learning and life-long skills by 2015. In order to realize these policy objectives, commitment is made to integrate ICTs in the delivery of the education curricula, to strengthen Open and Distance Education (ODE) and to promote effective and efficient administration at all levels of education.

The Government consequently introduced Free Primary Education (FPE) in 2003 that has led to an 18% increment in enrolment, from 5.9 million pupils in 2002 to 7.2 million in 2004 in public schools (MOE, 2007).

### **2.3 National ICT Strategy For Education and Training**

The Government of Kenya has put in place the *National ICT Strategy For Education and Training*. The Strategy outlined information systems to be driven by the education sector that include operationalization of the Education Management Information System (EMIS). EMIS, the Strategy envisages, will be used to collect and process data required for improvement of education policy, planning, implementation and monitoring. It also encompasses provision of online examinations, processing admissions for primary and secondary schools and online dissemination of school and other educational curricula.

Some major components of the strategy include;

- i. Digital equipment
- ii. Connectivity and network infrastructure
- iii. Technical support
- iv. Harnessing emerging technologies
- v. Digital content development
- vi. Integration of ICTs in education
- vii. Training (capacity building including professional development)
- viii. Research and development
- ix. Partnerships and resource mobilization
- x. Legal and regulatory framework, and
- xi. Monitoring and evaluation.

## **2.4 New Partnership For Africa Development (NEPAD) E-Schools Programme**

New Partnership for Africa Development (NEPAD) was initiated to address challenges facing African countries and it has identified ICT infrastructure as a priority area of action for inducement of conditions for sustainable development. NEPAD policies and programmes related to ICTs are implemented by E-Africa Commission, which was established in 2002.

In 2003, NEPAD prioritized efforts towards bridging of the digital divide between Africa and the developed world. This fast tracking of ICTs identified 6 areas of high priority. One of these is NEPAD e-Schools Programme whose objective is to integrate ICT in the delivery of education curriculum at secondary and primary school levels in order to improve access, quality and equity in education among member states. The implementation plan envisaged coverage of secondary schools in 5 years and primary schools in 10 years.

To this end, The Government of Kenya launched the Nepad e-schools programme in september 2005 at Isiolo Girls High School, one of the six (6) Secondary Schools identified as pilot schools for the project.

## **2.5 Conceptual Framework**

ICT is a generic term referring to technologies which are being used for collecting, storing, editing and passing on information in various forms (Karroulis, 2000). A personal computer is the best known example of the use of ICT in education, but the term multimedia is also frequently used. Multimedia can be interpreted as a combination of data carriers, for example video, CD-ROM, floppy disc and Internet and software in which the possibility for an interactive approach is offered (Jones, 1999).



Generally, the following functions of the use of ICT in education are described in literature (Koszalka. 2000).

1. **ICT as object.** It refers to learning about ICT. Mostly organised in a specific course. What is being learned depends on the type of education and the level of the students. Education prepares students for the use of ICT in education, future occupation and social life.
2. **ICT as an 'assisting tool'.** ICT is used as a tool, for example while making assignments, collecting data and documentation, communicating and conducting research. Typically, ICT is used independently from the subject matter.
3. **ICT as a medium for teaching and learning.** This refers to ICT as a tool for teaching and learning itself, the medium through which teachers can teach and learners can learn. It appears in many different forms, such as drill and practice exercises, in simulations and educational networks.
4. **ICT as a tool for organisation and management in schools.**

The variables of interest in this study include:

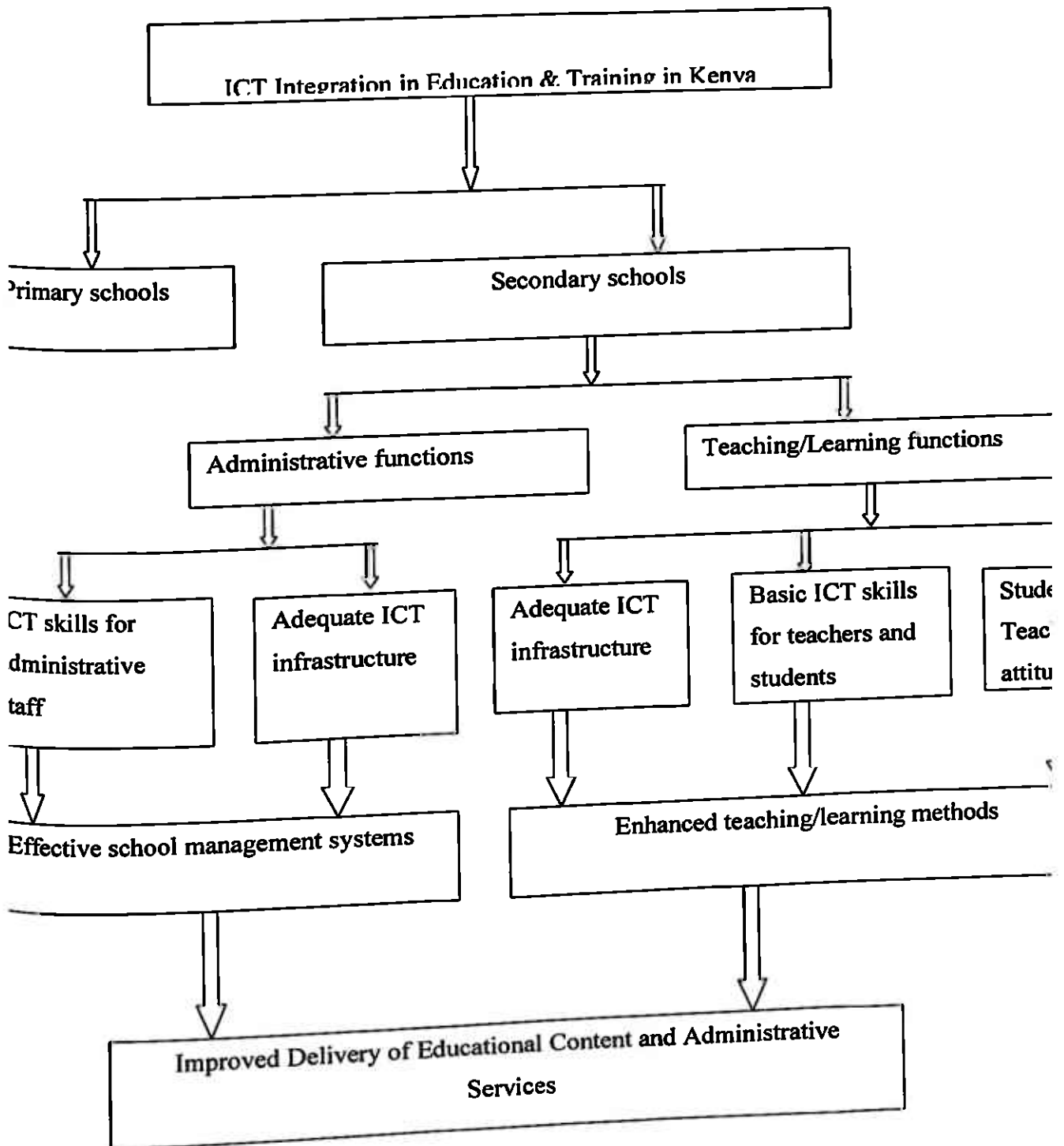
- i) **Frequency of use of computer laboratory by teachers for teaching/learning.**
- ii) **Frequency of use of use of computer laboratory by students for their own study.**
- iii) **Improvement in delivery of administrative services in the schools**

It is envisaged that the use of ICT in teaching/learning process will enhance delivery of content across the various subjects taught in secondary schools by increasing access to learning materials among the learners.

Furthermore, the use of ICT in schools as an administrative tool is meant to enhance delivery of educational services to the learners and other stakeholders.

With proper integration of ICT in teaching /learning process, the quality of learning and access to education will be improved. Currently the Government of Kenya has implemented e-schools project in 213 secondary schools and one primary school. This is depicted in figure 1 below.

**Figure 1: Conceptual framework for ICT Integration in Education & Training in Kenya**



## **CHAPTER FOUR**

### **RESEARCH DESIGN AND METHODOLOGY**

#### **3.1 Research Design**

The research was conducted through survey. The researcher developed questionnaires for various respondents namely students, teachers and school administrators. This method was suitable since it gave the researcher opportunity to collect both quantitative and qualitative data from the respondents.

#### **3.2 Target population**

The researcher sampled six (6) schools which have been identified as purposeful sample since they already have the basic requirements for ICT integration courtesy of Nepal. The sampled schools originated from seven out of the eight provinces and therefore reflect a national representation.

Furthermore the schools have a gender balanced representation with three of them being Girls' Schools and the other three are Boys' Schools (See appendix E)

### **3.3 Sampling design**

The sample comprised of six (6) schools which were equipped by the NEPAD e-schools project funds in the pilot phase for the ICT project in Secondary schools.

The schools were sampled purposely since they already had the necessary ICT infrastructure required to integrate ICT in education and training.

The population for this study comprised form four (4) students, teachers and administrators sampled randomly as follows:

- i) Forty (40) girls in each of the three Girls' schools
- ii) Forty (40) boys in each of the three Boys' schools.
- iii) One (1) teacher in each subject offered in the school.
- iv) Two (2) administrators in each school

Form four students had been sampled purposely since they had been in the schools longer than the other students from the time the schools received the ICT equipment from NEPAD in 2005. Teachers were chosen since they are the implementers of the e-schools project for teaching/learning process while administrators were chosen as implementers and supervisors of the project. Each group provided valuable information regarding the project progress.

### **3.4 Data Collection Instrument**

This study involved empirical and qualitative data collection approaches. Data was collected from primary sources using interviews, surveys and observation. Interviews were conducted among the teachers, students, administrators and education officials. Data was also collected by review of secondary documents such as national examination results.

The Survey Questionnaire composed of three parts:

- Part 1 was the students' questionnaire and only a randomly chosen sample of forty students were asked to fill up the forms.
- Part 2 was filled up by one teacher from each of the subjects offered in the school.
- Part 3 of the questionnaire was filled out by a school Head/Deputy head and the head of ICT or relevant department in the sampled schools.

### **3.5 Data Collection Procedure**

The researcher sought approval from the Ministry of Education to collect data from the sampled schools (see appendix A).

The researcher then made appointments with the relevant authorities in the sampled schools. The researcher then developed a schedule for data collection together with the data collection clerks to cover all the sampled schools. The data collection was conducted between in June and July 2008.

The questionnaires were administered as follows:

- i. Student questionnaires were given out to the sampled students to fill in the presence of the researcher or research assistant.
- ii. Teachers' questionnaires were given out to the sampled teachers to fill in the presence of the researcher or research assistant.
- iii. Administrators' questionnaires were given out to the sampled respondents to fill in the presence of the researcher or research assistant.

### **3.6 Data Analysis**

Data collected was entered, coded and analyzed using Statistical Program for Social Scientists (SPSS). The quantitative data was then analyzed using descriptive statistics tools such as percentages, frequency distribution, means and standard deviation.

The data was finally presented in tables.

Analysis was based on individual research questions using appropriate statistical tests.

Students' attitudes towards ICT-based learning/teaching were measured using frequency distribution graphs. Variables included the number of students who choose a particular response from the choices.

Teachers' attitudes towards ICT-based learning/teaching were measured using frequency distribution tables. The variable included the number of teachers who choose a particular response from the choices.

Use of ICT to support administrative functions was analyzed using frequency distribution tables based on number of respondents choosing a particular response.

Problems hindering use of ICT-based teaching/learning were analyzed using frequency distribution tables based on the number of respondents who chose various responses from the questionnaire.

## CHAPTER FOUR

### DATA PRESENTATION AND ANALYSIS

#### 4.1 Introduction

This chapter presents findings and analysis of the research. The findings are presented in tables showing percentages and mean scores.

#### 4.2 Response Rate

The response rate was as follows:

Two hundred and forty (240) students responded out of the expected 240 (100%), 70 teachers responded out of the expected 84 teachers (83%) and 11 administrators responded out of the expected 12 administrators (92%). This response rate was considered reasonable for data analysis.

#### 4.3 Analysis of Students Responses

##### 4.3.1 Gender of student respondents

On the gender of the student respondents the study revealed that the majority of the respondents were females (54.2%) while males were (45.8%) as shown in table 1.

**Table 1: Gender of student respondents**

Gender	Frequency	Percentage
Male	110	45.8
Female	130	54.2
<b>Total</b>	<b>240</b>	<b>100.0</b>

##### 4.3.2 Experience in the use of computers

The study sought to investigate on the number of years that the respondents had been using computers. From the study the respondents said that they had been using computers for between 2 and 4 years (42.1%), said more than 4 years (21.3%), less than 2 years (19.6%) while 17.1% of the respondents said that they had been using computers for less than 1 year as shown in table 2.

**Table 2: Experience in the use of computers**

<b>Duration</b>	<b>Frequency</b>	<b>Percentage</b>
Less than 1 year	41	17.1
1-2 years	47	19.6
2-4 years	101	42.1
More than 4 years	51	21.3
<b>Total</b>	<b>240</b>	<b>100.0</b>

#### **4.3.3 Accessibility to ICT Facilities**

The researcher also sought to find out the ICT facilities which were available in the schools. From the findings, the ICT facilities that were found to be accessible or used in the schools were desktop computers (79.2%) TV (77.5%), overhead projector (73.3%), black and white printer (62.1%), computer speaker (59.2%) and radio/cassette player (58.8%) as shown in table 3.



**Table 3: Accessibility to ICT Facilities**

Item	Yes		No		Total	
	Frequency	%	Frequency	%	Frequency	%
Overhead projector	176	73.3	54	26.7	240	100
TV	186	77.5	64	22.5	240	100
VCD	97	40.4	143	59.6	240	100
VHS	56	23.3	184	76.7	240	100
DVD	0	45.8	240	54.2	240	100
Video camera	62	25.8	146	74.2	240	100
Photo camera	94	39.2	78	60.8	240	100
Radio/cassette player	141	58.8	99	41.3	240	100
Digital photocopier	86	35.8	154	64.2	240	100
Multimedia projector	71	29.6	169	70.4	240	100
LCD projector	51	21.3	189	78.8	240	100
Desktop computers	190	79.2	50	20.8	240	100
Laptops	62	25.8	178	74.2	240	100
Handheld/PDA	8	3.3	232	96.7	240	100
Color printer	100	41.7	140	58.3	240	100
Black and white printer	149	62.1	91	37.9	240	100
Dot matrix	33	13.8	207	86.3	240	100
Laser printer	43	17.9	197	82.1	240	100
Ink jet	37	15.4	203	84.6	240	100
Bubble jet printers	4	1.7	236	98.3	240	100
Scanner	92	38.3	148	61.7	240	100
CD writer	88	36.7	152	63.3	240	100
Computer speaker	142	59.2	98	40.8	240	100

#### 4.3.4 Use of computers and related ICT infrastructure in various subjects

The study further investigated on the subjects where computers and related ICTs are used. From the findings, the respondents said that the classes that computers and related ICTs were used were Computer studies (62.1%), Sciences (32.1%), Mathematics (5.4%) and Humanities (0.4%) as shown in table 4.

**Table 4: Use of computers and related ICT infrastructure in various subjects**

<b>Subject</b>	<b>Frequency</b>	<b>Percentage</b>
Computer studies	149	62.1
Mathematics	13	5.4
Sciences	77	32.1
Humanities	1	0.4
<b>Total</b>	<b>240</b>	<b>100.0</b>

#### 4.3.5 Ease of use of required ICT tools and facilities for schoolwork

The study sought to investigate whether the student was able to use the required ICT tools and facilities to do their subject/schoolwork. From the findings 67.1% of the respondents said that they were able to use the required ICT tools and facilities that were needed in doing the subject schoolwork, while 32.9% of the respondents said that they were not able as shown in table 5.

**Table 5: Ease of use of required ICT tools and facilities for schoolwork**

<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
Yes	161	67.1
No	79	32.9
<b>Total</b>	<b>240</b>	<b>100.0</b>

#### 4.3.6 Utilisation of computers by location

From the findings, the study revealed that in the schools computers were used in the computer laboratory (95%), both classroom and laboratory (2.9%) while 2.1% of the respondents said that computers in their schools were used in the classroom only. This information is further presented in table 6.

**Table 6: Utilisation of computers by location**

<b>Location</b>	<b>Frequency</b>	<b>Percentage</b>
In class room	5	2.1
In computer laboratory	228	95.0
In both classroom and laboratory	7	2.9
<b>Total</b>	<b>240</b>	<b>100.0</b>

#### 4.3.7 Activities where Computers are commonly used

The study also sought to find out the favorite activities where students use computers. From the findings, the respondents reported that their favorite activities using computers were finding and researching information (82.1%), E-mailing (64.2%), surfing the internet (61.7%), using educational software (55.8%) and playing games (51.3%) as shown in table 7.

**Table 7: Activities where Computers are commonly used**

Activity	Yes		No		Total	
	Frequency	%	Frequency	%	Frequency	%
Find and research information	197	82.1	43	17.9	240	100
E-mail	154	64.2	86	35.8	240	100
Chat	63	26.3	177	73.8	240	100
Download music	113	47.1	127	52.9	240	100
Play games	123	51.3	117	48.8	240	100
Surf the internet	148	61.7	92	38.3	240	100
Use educational software	134	55.8	106	44.2	240	100
Write papers	48	20	192	80	240	100
Write computer programs	68	28.3	172	71.7	240	100
Draw and paint	73	30.9	167	69.6	240	100
Make presentations using PowerPoint	80	33.3	160	66.7	240	100

#### 4.3.8 Average weekly hours for use of computers and related ICT facilities by students

The study sought to investigate on the average number of hours per week of normal school hours that the respondent was able to use computers and related ICTs to do the studies. From the findings, 58.8% said that they were able to use computers and related ICTs to do the studies for less than 2 hours per week, 30.4% of the respondents indicated between 2 and 4 hours per week, while 10.8% of the respondents reported that they were able to use computers and other related ICTs for more than 4 hours per week. This information is presented in table 8.

**Table 8: Average weekly hours for use of computers and related ICT facilities by students**

Duration	Frequency	Percentage
Less than 2 hours	141	58.8
2-4 hours	73	30.4
More than 4 hours	26	10.8
<b>Total</b>	<b>240</b>	<b>100.0</b>

#### 4.3.9 Access to Internet

The study revealed that 62.5% of the respondents had access to the Internet while 37.5% of the respondents reported that they had no access to the internet.

This is represented in table 9.

**Table 9: Access to Internet**

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	150	62.5
No	90	37.5
<b>Total</b>	<b>240</b>	<b>100.0</b>

#### 4.3.10 Use of the internet for surfing websites

The study sought to investigate on how often the respondents used the internet for surfing websites in the school. From the findings, 41.3% of the respondents said that they never used the internet for surfing websites in the school, 24.6% said they use the internet several times a week, 24.2% said that they use the internet for browsing, 7.5% of the respondents said once in a month, while 2.5% of the respondents said that they used the internet for surfing websites in the school daily. This information is presented in the table 10.

**Table 10: Use of the internet for surfing websites**

<b>Duration</b>	<b>Frequency</b>	<b>Percentage</b>
Never	99	41.3
Once a month	18	7.5
Once a week	58	24.2
Several times a week	59	24.6
Daily	6	2.5
<b>Total</b>	<b>240</b>	<b>100.0</b>

#### 4.3.11 ICT Items Possessed By the Students

The study sought to investigate whether the respondents possessed certain ICT items such as mobile phones, and handheld PDAs among others. From the findings, the majority of the respondents (75%) said that they only possessed e-mail addresses.

This is represented in table 11.

**Table 11: ICT Items Possessed By the Students**

Item	Yes		No		Total	
	Frequency	%	Frequency	%	Frequency	%
Mobile phone	83	34.6	157	65.4	240	100
Handheld/PDA	3	1.3	227	94.6	240	100
Email address	180	75	50	25	240	100
Personal website/webpage	18	7.5	212	92.5	240	100

#### 4.3.12 Regularity of Using Email Service

On the regularity of sending/receiving e-mails, 32.5% of the respondents said that they sent emails a few times every month, 24.6% of the respondents said that they never send/receive emails, 24.2% said they use the service a few times every week and those who said that they never sent emails, 15.8% said they use e-mail service a few times every year, while a small proportion of respondents comprising of 2.9% reported that they sent emails a few times every day. This is represented in table 12.

**Table 12: Regularity of Using Email Service**

Period	Frequency	Percentage
A few times every day	7	2.9
A few times every week	58	24.2
A few times every month	78	32.5
A few times every year	38	15.8
Never	59	24.6
<b>Total</b>	<b>240</b>	<b>100.0</b>

#### 4.3.13 Use of applications for purposes other than classroom learning

The respondents were to state their level of skills in the use of basic applications for purposes other than classroom learning. The findings were presented using the mean score for easier interpretation.

From the findings, the study revealed that the majority of respondents had basic skills in basic internet browsing, word processing-prepare documents, spreadsheets and presentation tools (PowerPoint) as these variables had a mean score ranging from 2.7-3.5, which in the response scale of 1-5, this means that the majority of them were good in the use of basic applications for purposes other than classroom learning.

The study also revealed that the majority of respondents had no basic skills in graphics, use of chatting platform and web page designing as these variables had a high mean score ranging from 4.1- 4.4, which means that the majority of respondents had no capacity in the use of basic applications for purposes other than classroom learning as shown in table 13.

**Table 13: Use of computer applications for purposes other than classroom learning**

Application	Excellent (%)	Very good (%)	Good (%)	Fair (%)	No capacity (%)	Mean
Word processing-prepare documents	24.6	15.4	17.9	15.8	26.3	3
Spreadsheets	16.3	19.6	15.8	18.3	30	3.3
Presentation tools (PowerPoint)	12.5	14.6	20.4	16.7	35.8	3.5
Basic E-mailing	22.5	18.8	20.8	15.8	22.1	2.9
Basic internet browsing	29.6	16.3	22.1	14.2	17.9	2.7
Graphics	2.9	4.6	22.1	22.1	48.3	4.1
Web page designing	1.7	4.2	12.1	19.6	62.5	4.4
Use of chatting platform	4.6	5.4	13.3	18.3	58.3	4.2

#### 4.3.14 Use of Existing Applications for Learning Both Inside and Outside the Classroom

The study also sought to investigate the respondents' level of skills in the use of existing applications for learning both inside and outside the classroom. From the findings, the researcher found out that the respondents were fair in the use of applications (word processing, spreadsheets respectively) in classroom learning of specific subjects and also use of various applications for doing assignments and lessons as they had a low mean score of 3.3 and 3.5 respectively.

It was also clear that the respondents had no skills in the use of internet resources to prepare homework, research, lessons, or for collaborative school projects, E-mailing for telecollaboration/online collaborative projects, exchanging assignments and lessons, commenting on papers used in school and also for developing basic and static webpage for schoolwork as they had a high mean score of 3.6, 3.8 and 4.3 respectively.

This is presented in table 14.

**Table 14: Use of Existing Applications for Learning Both Inside and Outside the Classroom**

Application Area	Excellent (%)	Very good (%)	Good (%)	Fair (%)	No capacity (%)	Mean
Use of applications (word processing, spreadsheets, etc.) In classroom learning of specific subjects	16.7	18.3	16.3	15	33.8	3.3
Use of various applications for doing assignments and lessons	10.4	14.6	23.8	21	30.4	3.5
E-mailing for telecollaboration/online collaborative projects, exchanging assignments and lessons, commenting on papers used in school	7.5	9.2	23.3	12	48.3	3.8
Use of internet resources to prepare homework, research, lessons, or for collaborative school projects	11.7	13.3	20.4	15	39.2	3.6
Developing basic and static webpage for schoolwork	2.9	4.2	12.1	21	60	4.3



#### 4.3.15 Advanced-Use of ICTS to Create and Develop New Applications, Contents and Learning Materials.

The study further sought to determine the skill level of respondents in the advanced-use of ICTs to create and develop new applications, contents and learning materials. The findings were also presented using mean scores for easy interpretation.

From the findings, the study revealed that the majority of respondents had no skills in the use of statistical tools for analysis, programming, database development and management, advanced website designing, maintenance and use for teaching/learning, developing educational software and new applications, developing and operating e-learning or online learning platforms, setting up and moderating discussion groups and chats and also in creating web-based and ICT-based multimedia materials. This was true as all these variables had a high mean score ranging from 3.9-4.5, which was a clear indication that the majority of respondents had no capacity in the use of advanced-use of ICTs. This is shown in table 15.

**Table 15: Advanced Use of ICTS to Create and Develop New Applications, Contents and Learning Materials.**

<b>Application Area</b>	<b>Excellent (%)</b>	<b>Very good (%)</b>	<b>Good (%)</b>	<b>Fair (%)</b>	<b>No capacity (%)</b>	<b>Mean</b>
Use of statistical tools for analysis	2.1	7.1	9.6	15	66	4.4
Programming	7.5	9.6	15	13	55	3.9
Database development and management	5.8	14	12	11	57	3.9
Advanced website designing, maintenance and use for teaching/learning	2.5	5.4	9.2	15	68	4.4
Developing educational software and new applications	4.2	3.3	12	18	62	4.3
Developing and operating e-learning or online learning platforms	6.7	7.1	13	16	58	4.1
Setting up and moderating discussion groups and chats	6.3	5.4	11	17	60	4.2
Creating web-based and ICT-based multimedia materials	2.1	3.3	8.8	17	69	4.5

#### 4.4 Analysis of Teachers' Responses

##### 4.4.1 Response rate

Out of the expected 84 respondents, 70 respondents returned the questionnaires. This translates to 83% being the response rate.

##### 4.4.2 Location of the school

The study sought to find out the type of the area where the schools were located. From the findings, 48.6% of the schools were located in semi-urban areas, 27.1% of the schools were located in the urban areas, while 24.3% of the schools were located in the rural areas. This information is represented in table 16.

**Table 16: Location of the school**

Area	Frequency	Percent
Urban	19	27.1
Semi-urban	34	48.6
Rural	17	24.3
<b>Total</b>	<b>70</b>	<b>100.0</b>

##### 4.4.3 Gender of the teacher respondents

On the gender of the respondents (teachers), the study revealed that the majority of respondents were males as shown by 64.3%, while 35.7% of the respondents were females. This is presented in table 17.

**Table 17: Gender of the teacher respondents**

Gender	Frequency	Percentage
Male	45	64.3
Female	25	35.7
<b>Total</b>	<b>70</b>	<b>100.0</b>

#### 4.4.4 Age of the teacher respondents

The age of the respondents was also investigated in the study where the researcher found out that 75.7% of the respondents were aged between 30-50 years , 21.4% were under 30 years while 2.9% of the respondents were over 50 years.

This is represented in table 18.

**Table 18: Age of the teacher respondents**

Age	Frequency	Percentage
under 30 years	15	21.4
30-50 years	53	75.7
over 50 years	2	2.9
<b>Total</b>	<b>70</b>	<b>100.0</b>

#### 4.4.5 Number of Years in the Service

The study also sought to investigate on the number of years that the respondents had been in the teaching service. From the findings in the above table, the majority of the respondents (30%) said that they had been in the service for 10-15 years, 27.1% said less than 5 years, 24.3% said over 15 years, while 18.6% of the respondents said that they had been in the teaching service for 5-10 years.

This information is further presented in table 19.

**Table 19: Number of Years in the Service**

Duration	Frequency	Percentage
less than 5 years	19	27.1
5-10 years	13	18.6
10-15 years	21	30.0
over 15 years	17	24.3
<b>Total</b>	<b>70</b>	<b>100.0</b>

#### 4.4.6 Educational Level

On the education level of the teacher respondents, the study revealed that the majority of the respondents (teachers) were undergraduates (44.3%), postgraduates (27.1%, diploma holders (17.1%), while 11.4% of the respondents said that they had other levels of education e.g. certificate. This is presented in table 20.

**Table 20: Educational Level**

Education level	Frequency	Percentage
Postgraduate	19	27.1
Undergraduate	31	44.3
Diploma	12	17.1
Others	8	11.4
<b>Total</b>	<b>70</b>	<b>100.0</b>

#### 4.4.7 Location of use of Computers in the School

The study sought to find out where computers were used in the school by the respondents. From the findings, 91.4% of the respondents said that computers were used in the computer laboratory while 14.3% said that they use computers in the teachers' lounge. This is further presented in table 21.

**Table 21: Location of use of Computers in the School**

Location	Yes		No		Total	
	Frequency	%	Frequency	%	Frequency	%
Teachers lounge	10	14.3	60	85.7	70	100
In my office	7	10	63	90	70	100
Administrators office	22	31.4	48	68.6	70	100
Classrooms	2	2.9	68	97.1	70	100
Computer laboratory	64	91.4	6	8.6	70	100
Library	7	10	63	90	70	100

#### 4.4.8 Use of ICT as a teaching tool in other subjects

The study sought to investigate on the subjects where ICT is used as a teaching tool in the schools. From the study, ICT was used as a teaching school in the majority of the schools to teach subjects such as Computer Studies 57.1%), Sciences (42.9%) ,Humanities (25.7%, Mathematics (22.9%) and others as shown in table 22.

**Table 22: Use of ICT as a teaching tool in other subjects**

Subject	Yes (%)		No		Total	
	Frequency	%	Frequency	%	Frequency	%
Computer	40	57.1	30	42.9	70	100
Mathematics	16	22.9	54	77.1	70	100
Science	30	42.9	40	57.1	70	100
Humanities	18	25.7	52	74.3	70	100
Languages	12	17.1	58	82.9	70	100
Art	2	2.1	68	97.1	70	100
Music	5	7.1	65	92.9	70	100

#### 4.4.9 Duration of using computer in the school

The study sought to investigate the duration for which the schools had used computers. From the findings, 47.1% of respondents reported that the school has had computers for 2-5 years, 30% of the respondents said that they had been using computers for a period less than 2 years, while 22.9% of the respondents said that they had been using computers for over 5 years. This information is further presented in table 23.

**Table 23: Duration of using computer in the school**

Duration	Frequency	Percentage
Less than 2 years	21	30.0
2-5 years	33	47.1
Over 5 years	16	22.9
<b>Total</b>	<b>70</b>	<b>100.0</b>

#### 4.4.10 Weekly hours of computer accessibility

The study further sought to investigate on the hours per week that computers were accessible. From the findings 40% of respondents as shown by said that computers were accessible for more than 10 hours a week, 27.1% said 2 to 4 hours per week, 15.7% said less than 2 hours per week, 10% said 4 to 6 hours per week, while 7.1% of the respondents said that computers were accessible for 6 to 10 hours per week as shown in table 24.

**Table 24: Weekly hours of computer accessibility**

<b>Duration</b>	<b>Frequency</b>	<b>Percentage</b>
Less than 2 hours	11	15.7
2-4 hours	19	27.1
4-6 hours	7	10.0
6-10 hours	5	7.1
More than 10 hours	28	40.0
<b>Total</b>	<b>70</b>	<b>100.0</b>

#### 4.4.11 Use Computers Outside School Hours

The study also revealed that 88.6% of the respondents used computers outside school hours while 11.4% of the respondents said that they did not use computers outside school hours as shown in table 25.

**Table 25: Use Computers Outside School Hours**

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	62	88.6
No	8	11.4
<b>Total</b>	<b>70</b>	<b>100.0</b>

#### 4.4.12 Training on ICT before joining the teaching profession

The study sought to find out on whether the teacher respondents received any training on information and communications technology before joining the teaching profession. From the findings, the study revealed that 74.3% of the respondents had not received any training on Information and Communications Technology before joining the teaching profession while 25.7% of the respondents reported that they had received some training on ICT before joining the teaching profession. This information is presented in table 26.

**Table 26: Training on ICT before joining the teaching profession**

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	18	25.7
No	52	74.3
<b>Total</b>	<b>70</b>	<b>100.0</b>

#### 4.4.13 Expertise on various computer applications

The study also sought to investigate the respondents' expertise in the use of ICT facilities in various application areas.

The findings were presented using mean score for easy interpretation.

From the findings, the majority of the respondents reported that they were fair in the use of word processing, spread sheets, presentation tools (power point), E-mail, internet browsing and statistical tools as these areas had a low mean score ranging from 2.7 to 3.9, which in the response scale of 1 to 5, means that the majority of them were fair in the use of these facilities.

The study also revealed that the majority of the respondents had no capacity in the use of graphics, web page designing, programming, database management and project management as these variables had a high mean score ranging from 4.2 to 4.6 as shown in table 27.

**Table 27: Expertise on various computer applications**

<b>Application</b>	<b>Excellent (%)</b>	<b>Very good (%)</b>	<b>Good (%)</b>	<b>Fair (%)</b>	<b>No capability (%)</b>	<b>Mean</b>
Word processing	18.6	15.7	34.3	21.4	10	2.9
Spread sheets	10	10	25.7	28.6	25.7	3.5
Presentation tools (power point)	5.7	15.7	24.3	34.3	20	3.5
E-mail	20	20	30	15.7	14.3	2.8
Internet browsing	22.9	25.7	24.3	17.1	10	2.7
Statistical tools	1.4	7.1	15.7	42.9	32.9	3.9
Graphics	4.3	2.9	12.9	31.4	48.6	4.2
Web page designing	1.4	1.4	8.6	12.9	75.7	4.6
Programming	2.9	2.9	5.7	12.9	75.7	4.6
Database management	0	7.1	11.4	17.1	64.3	4.4
Project management	1.4	2.9	10	14.3	71.4	4.5

**4.4.14 Regularity of using computer applications**

The respondents were asked how often they used ICT tools for the purposes listed in table 28.

From the findings the majority of the respondents said that the purposes for which computers was used often include personal work, e-mail correspondence, internet browsing and in processing examination as these purposes had a low mean score ranging from 2.8 to 3 on a scale of 1 to 5..

The purposes that the majority of the respondents did not often use ICT tools, or they were never used or used once a week were in preparing lessons, making presentations/lectures, preparing reports, teaching subject and administrative work as these variables had a high mean score ranging from 3.5 to 4.1 on a scale of 1 to 5 as shown in table 28.



**Table 28: Regularity of using computer applications**

<b>Application area</b>	<b>Every day (%)</b>	<b>Very often (%)</b>	<b>Twice a week (%)</b>	<b>Once a week (%)</b>	<b>Never</b>	<b>Mean</b>
Preparing lessons	5.7	14.3	7.1	35.7	37.1	3.8
Making presentations/lectures	1.4	12.9	7.1	35.7	42.9	4.1
Preparing reports	1.4	38.6	5.7	14.3	40	3.5
Processing examination	4.3	50	7.1	14.3	24.3	3
Internet browsing	17.1	41.4	10	8.6	22.9	2.8
E-mail correspondence	15.7	41.4	5.7	15.7	21.4	2.9
Teaching your subject	2.9	14.3	18.6	31.4	32.9	3.8
Personal work	18.6	37.1	8.6	11.4	24.3	2.9
Administrative work	11.4	24.3	2.9	5.7	55.7	3.7

## 4.5 Analysis of Administrators Responses

### 4.5.1 Response rate

Out of the expected 12 respondents, 11 respondents returned the questionnaires. This translates to 96% response rate.

### 4.5.2 Location of the school

**Table 29: Location of the school**

Area	Frequency	Percentage
Urban	2	18.2
Semi-urban	6	54.5
Rural	3	27.3
<b>Total</b>	<b>11</b>	<b>100.0</b>

On the area where the school was located, the researcher found out that 54.5% of the schools were located in semi-urban areas, 27.3% were located in rural areas, while 18.2% were located in urban areas as shown in table 29 .

### 4.5.3 Gender of the administrator respondents

The study revealed that 54.5% of the administrator respondents were males while females comprised 18.2% of the respondents. This information clearly shows that the position of the administration in the schools in these areas was mostly dominated by males. This information is presented in table 30.

**Table 30: Gender**

Gender	Frequency	Percentage
Male	9	81.8
Female	2	18.2
<b>Total</b>	<b>11</b>	<b>100.0</b>

#### 4.5.4 Age of respondents

The age of the respondents was also investigated in the study where the researcher found out that 72.7% of the respondents (administrators) were aged between 30-50 years as while 27.3% were less than 30 years old as shown in table 31.

**Table 31: Age of respondents**

<b>Age</b>	<b>Frequency</b>	<b>Percentage</b>
under 30 years	3	27.3
30-50 years	8	72.7
<b>Total</b>	<b>11</b>	<b>100.0</b>

#### 4.5.5 Experience in the Teaching Service

On the number of years that the respondents had been in the teaching service, the study revealed that 36.4% of respondents as shown by had been in the service for 10-15 years, 27.3% had been in the service for less than 5 years, while the respondents who said that they had been in the service for 5-10 years and those who said over 15 years were 18.2% each. This information is presented in table 32.

**Table 32: Experience in the Teaching Service**

<b>Duration</b>	<b>Frequency</b>	<b>Percentage</b>
Less than 5 years	3	27.3
5-10 years	2	18.2
10-15 years	4	36.4
Over 15 years	2	18.2
<b>Total</b>	<b>11</b>	<b>100.0</b>

#### 4.5.6 Educational Level

The study investigated educational level of the respondents. From the findings, 45.5% of respondents were undergraduates while 27.3% of the respondents had post graduates and those who were diploma holders were 27.3% each. This information is further presented in table 33.

**Table 33: Education Level**

Education level	Frequency	Percentage
Post graduate	3	27.3
Undergraduate	5	45.5
Diploma	3	27.3
<b>Total</b>	<b>11</b>	<b>100.0</b>

#### 4.5.7 Availability of ICT department, Coordinator, Master plan and budget in the School

The researcher also found out from the respondents that in all the schools there was an ICT coordinator or head (100%), there was an ICT department or unit in the schools (90.9%), while the respondents who said that their school had an ICT master plan and that there was distinct budget for the implementation of the school ICT plan were shown by 45.5% each as shown in table 34.

**Table 34: Availability of ICT department, Coordinator, Master plan and budget in the School**

Item	Yes		No		Total	
	Frequency	%	Frequency	%	Frequency	%
Availability of ICT department or unit in the school	10	90.9	1	9.1	11	100
Availability of ICT coordinator/head	11	100	0	0	11	100
Availability of ICT master plan	5	45.5	6	54.5	11	100
Whether there is a distinct budget for the implementation of the school ICT plan	5	45.5	6	54.5	11	100

#### 4.5.8 The Source of Fund for ICT infrastructure in the School

The study also sought to investigate on the source of fund for ICT in the school. From the findings, the study revealed that 45.5% of the schools source their fund from school fees while the schools that source their funds from the government grant and from donations were shown by 27.3% each. This information is presented in table 35.

**Table 35: The Source of Fund for ICT infrastructure in the School**

Source	Frequency	Percentage
School Fees	5	45.5
Government grant	3	27.3
Donation	3	27.3
<b>Total</b>	<b>11</b>	<b>100.0</b>

#### 4.5.9 Location of the Computers in the school

The study also sought to find out where computers were located in the schools. From the findings, all the respondents said that computers in their schools were located in the computer laboratory, 81.8% of respondents said that computers in their schools were located in the administrators office, while the respondents who said that computers were located in the teachers' lounge and teachers office were 36.4% each as shown in table 36. There was no school where computers were found to be located in the classrooms.

**Table 36: Location of the Computers in the school**

Location	Yes		No		Total	
	Frequency	%	Frequency	%	Frequency	%
Computer laboratory	11	100	0	0	11	100
Classrooms	0	0	11	100	11	100
Teachers lounge	4	36.4	7	63.6	11	100
Teachers offices	4	36.4	7	63.6	11	100
Administrator's office	9	81.8	2	18.2	11	100
Library	2	18.2	9	81.8	11	100

#### **4.5.10 ICT Facilities Available In the School**

Respondents were asked to indicate which ICT facilities were available in their schools.

From the findings, the ICT facilities that were common in the schools were overhead projector and TV (100%), CD writer and computer speaker ( 90.9%) each, radio/cassette player and desktop computers (81.8%) of the respondents in each case, VCD, digital photocopier and scanner (72.7%) each, black and white printer and laser printer (63.6% ) each, and DVD.

The study also revealed that there were some ICT facilities that were not available in the most of the schools such as handheld/PDA which was not available in all the schools, video camera and photo (90.1%) each, VHS and inkjet ( 81.8%) each, LCD projector and laptop ( 63.6%) of the respondents in each case, multimedia projector, color printer and dot matrix printer (54.5%) in each case. This is further presented in table 37 below.

**Table 37: ICT Facilities Available In the School**

<b>Item/Response</b>	<b>Yes</b>		<b>No</b>		<b>Total</b>	
	<b>Frequency</b>	<b>%</b>	<b>Frequency</b>	<b>%</b>	<b>Frequency</b>	<b>%</b>
Overhead projector	11	100	0	0	11	100
TV	11	100	0	0	11	100
VCD	8	72.7	3	27.3	11	100
VHS	2	18.8	9	81.8	11	100
DVD	6	54.5	5	45.5	11	100
Video camera	1	9.1	10	90.9	11	100
Photo camera	1	9.1	10	90.9	11	100
Radio/cassette player	9	81.8	2	18.2	11	100
Digital photocopier	8	72.7	3	27.3	11	100
Multimedia projector	5	45.5	6	54.5	11	100
LCD projector	4	36.4	7	63.6	11	100
Desktop	9	81.8	2	18.2	11	100
Laptop	4	36.4	7	63.6	11	100
Handheld/PDA	0	0	11	100	11	100
Color printer	5	45.5	6	54.5	11	100
Black and white printer	7	63.6	4	36.4	11	100
Dot matrix	5	45.5	6	54.5	11	100
Laser printer	7	63.6	4	36.4	11	100
Inkjet	2	18.2	9	81.8	11	100
Scanner	8	1.7	3	98.3	11	100
CD writer	10	38.3	1	61.7	11	100
Computer speaker	10	36.7	1	63.3	11	100

#### 4.5.11 Duration of use of Computers in the school

The study sought to determine the duration that the schools had the computers. From the findings, 54.5% of the schools had computers for 2-4 years, 27.3% of the schools had computers for more than 6 years, while the schools that had computers for less than 2 years and for 2-6 years were 9.1% each. This information is further presented in table 38.

**Table 38: Duration of use of Computers in the school**

<b>Duration</b>	<b>Frequency</b>	<b>Percentage</b>
Less than 2 years	1	9.1
2-4 years	6	54.5
4-6 years	1	9.1
More than 6 years	3	27.3
<b>Total</b>	<b>11</b>	<b>100.0</b>

#### 4.5.12 Operating Systems Used In Schools

On the kind of operating systems used in the schools, the study revealed that 81.8% of the schools use Microsoft windows, while 18.2% of the schools use other operating systems alongside Microsoft windows as shown in table 39.

**Table 39: Operating Systems Used In Schools**

<b>Operating systems</b>	<b>Frequency</b>	<b>Percentage</b>
Windows	9	81.8
Others	2	18.2
<b>Total</b>	<b>11</b>	<b>100.0</b>



#### 4.5.13 The extent to which computers are networked in the school

The respondents were also asked to state the extent to which the computers in their schools were networked. From the findings in the above table, the researcher found out that in 72.7% of the schools only a small number of computers were networked, while in 27.3% of the schools the respondents said that all the computers were networked. This is represented in table 40.

**Table 40: The extent that computers are networked**

Item	Frequency	Percentage
All the computers are networked	3	27.3
Some of the computers are networked	8	72.7
<b>Total</b>	<b>11</b>	<b>100.0</b>

#### 4.5.14 Accessibility to ICT Facilities and infrastructure by the school

The respondents were also asked by the researcher whether schools have access to the facilities in the table below.. From the findings, the researcher found out that all the schools had access to reliable electricity (100%), 90.9% of the schools had access to mobile phone, 81.8% of the schools had access to internet, 72.7% of the schools had access to landline telephones, while the schools that had access to satellite connections and cable TV were (54.5%) each. The 81.8% of the schools had no access to fax machines as shown in table 41.

**Table 41: Accessibility to ICT Facilities and infrastructure by the school**

Item	Yes		No		Total	
	Frequency	%	Frequency	%	Frequency	%
Reliable electricity	11	100	0	0	11	100
Landline telephones	8	72.7	3	27.3	11	100
Mobile phone	10	90.9	1	9.1	11	100
Fax machines	2	18.2	9	81.8	11	100
Internet	9	81.8	2	18.2	11	100
Satellite connections	6	54.5	5	45.5	11	100
Cable TV	6	54.5	5	45.5	11	100

#### 4.5.15 Percentage of students that have access to the school computers

The study also sought to investigate on the approximate percentage of students that have access to the school computers. From the findings, 36.4% of respondents said that

50-75% of the students had access to school computers, 27.3% said 75-100% of the students had access to the computers while the respondents who said 10-25% and 25-50% of the students had access to school computers were 18.2% each. This information is further presented in table 42.

**Table 42: Percentage of students that have access to the school computers**

Range	Frequency	Percent
10-25%	2	18.2
25-50%	2	18.2
50-75%	4	36.4
75-100%	3	27.3
<b>Total</b>	<b>11</b>	<b>100.0</b>

#### 4.5.16 Percentage of Teachers That Have Access to School Computers

The approximate percentage of teachers who had access to school computers was also investigated in the study. From the findings, 36.4% of the respondents said that about 75% of the teachers had access to school computers, 27.3% said 100% of teachers had access to computers, 18.2% said about 25% of the teachers had access while the respondents who reported that about 10% and about 50% of the teachers had access to school computers was 9.1% each.

This is represented in table 43 below.

**Table 43: Percentage of Teachers That Have Access to School Computers**

% Range	Frequency	Percent
About 10%	1	9.1
About 25%	2	18.2
About 50%	1	9.1
About 75%	4	36.4
100%	3	27.3
<b>Total</b>	<b>11</b>	<b>100.0</b>

#### **4.5.17 Access to ICT Facilities after school hours by teachers and students**

The study sought to find out whether the teachers and students have access to ICT facilities after school hours. From the findings, 54.5% of the respondents reported that they were always accessible, 36.4% of the respondents said that they were sometimes accessible, while 9.1% of the respondents said that they were never accessible.

This is presented in table 44.

**Table 44: Access to ICT facilities after school hours by teachers and students**

<b>Accessibility</b>	<b>Frequency</b>	<b>Percent</b>
No, they are never accessible	1	9.1
They are sometimes accessible	4	36.4
They are always accessible	6	54.5
<b>Total</b>	<b>11</b>	<b>100.0</b>

#### **4.5.18 Implementation of the National ICT Strategy for Education and Training**

The study sought to find out how the schools have implemented the national ICT strategy for education and training. From the findings 81.8% of the respondents said by using ICT in teaching specific subjects while 63.6% said by offering separate computer courses, by using ICT in management and administration and also by training teachers on ICT (63.6%) each. This is presented in table 45 below.

**Table 45: Implementation of the National ICT Strategy for Education and Training**

Response	Yes		No		Total	
	Frequency	%	Frequency	%	Frequency	%
By offering separate computer courses	7	63.6	4	36.4	11	100
By using ICT in teaching specific subjects	9	81.8	2	18.2	11	100
By using ICT in management and administration	7	63.6	4	36.4	11	100
By training teachers on ICT	7	36.4	4	36.4	11	100

**4.5.19 Examinable ICT Courses**

The study also revealed that 72.7% of the schools offered examinable ICT courses, while 27.3% of the schools reported that they did not offer examinable ICT courses. This information is further presented in table 46.

**Table 46: Examinable ICT Courses**

Response	Frequency	Percentage
Yes	8	72.7
No	3	27.3
<b>Total</b>	<b>11</b>	<b>100.0</b>

**4.5.20 Students attitude towards the ICT-based Courses**

On the general attitude of the students towards ICT-based courses, the study revealed that 45% of the respondents said that it was excellent, 45% said that the attitude was good and while 9.1% of the respondents said that it was fair as shown in table 47.

**Table 47: Student Attitude towards the ICT-based Courses**

Attitude	Frequency	Percentage
Excellent	5	45.5
Good	5	45.5
Fair	1	9.1
<b>Total</b>	<b>11</b>	<b>100.0</b>

#### 4.5.21 Average Performance of Students in the ICT Courses

The study also sought to investigate on the average performance of students in ICT-based courses. From the findings, the majority of the respondents (54.5%) said that it was good, 36.4% said that it was excellent, while 9.1% of the respondents said that it was fair. This information is further presented in table 48.

**Table 48: Average Performance of Students in the ICT Courses**

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Excellent	4	36.4
Good	6	54.5
Fair	1	9.1
<b>Total</b>	<b>11</b>	<b>100.0</b>

#### 4.5.22 Improvement in Performance in Other Subjects Following Introduction of ICT-Based Teaching/Learning in the School

The study revealed that there was a significant improvement in performance in other subjects following introduction of ICT-based teaching/learning in the school. 90.1% of the respondents said there was improvement while 9.1% of the respondents said that there was no significant improvement in performance in other subjects following introduction of ICT-based teaching/learning in the school.

The study further showed that the subjects which had shown marked improvement as a result of introduction of ICT-based teaching/learning in the school were computer studies, French, Music, Physics, Geography, Sciences, Mathematics, Chemistry, Biology. Generally in all the subjects, there was an improvement as a result of introduction of ICT-based teaching/learning in the schools.

This is further represented in table 49.

**Table 49: Improvement in Performance in Other Subjects Following Introduction of ICT-Based Teaching/Learning in the School**

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	10	90.9
No	1	9.1
<b>Total</b>	<b>11</b>	<b>100.0</b>

#### **4.5.23 The purposes for which the school uses ICTs**

The researcher sought to investigate on the purposes that the schools use ICT. According to the respondents, 100% of the schools use ICT for learning enrichment or learning new things, 90.1%, of respondents indicated that ICT is used as teaching/learning tool for teaching specific subjects and for development of ability to use basic application programs (i.e. word processing, database management, spreadsheets, and presentation graphics), 81.8% for regular instruction and training for developing computer skills (teaching about computers-computer literacy, computer studies and programming), finding/accessing information and researching through internet, helping with school administration and management, using in test administration, scoring and analysis and tracking of student/pupil performance levels, instructional objectives mastered, instructional objectives currently active and suggested instructional activities each, for communicating with others (63.6%). This is presented in table 50.

**Table 50: The purposes for which the school uses ICTs**

Purpose	Yes		No		Total	
	Frequency	%	Frequency	%	Frequency	%
Learning enrichment or learning new things	11	100	0	0	11	100
Remedial learning	6	54.5	5	45.5	11	100
Regular instruction and training for developing computer skills (teaching about computers-computer literacy, computer studies and programming)	9	81.8	2	18.2	11	100
Finding/accessing information and researching through internet	9	81.8	2	18.2	11	100
Communicating with others	7	63.6	4	36.4	11	100
As teaching/learning tool for teaching specific subjects	10	90.9	4	9.1	11	100
Development of logic, reasoning, critical thinking and problem solving competence	6	54.5	5	45.5	11	100
Development of ability to use basic application programs (i.e. Word processing, database management, spreadsheets, presentation graphics e.t.c.)	10	90.9	1	9.1	11	100
For playing games and fun	6	54.5		45.5	11	100
Helping with school administration and management	9	81.8		18.2	11	100
Using in test administration, scoring and analysis	9	81.8		18.2	11	100
Tracking of student/pupil performance levels, instructional objectives mastered, instructional objectives currently active and suggested instructional activities	9	81.8		18.2	11	

#### **4.5.24 Number of hours the school has access to the internet per month**

The study also sought to investigate on the number of hours that the school had access to internet. From the findings the 30% of the respondents said that Internet was accessible throughout the month, 42% said it was accessible for 180 hours, 20% said 4 hours while 8% it was not accessible at all.

#### **4.5.25 Number of computers connected to the internet**

The number of computers connected to the internet was also investigated in the study. From the findings, the number of computers that were found to be connected to the internet was 25, 22, 19, 20, 23, and 24 computers.

Mean number of computers connected is 22 computers per school.

#### **4.5.26 Presence of school website**

It was also clear from the study that all the schools did not have a website.

#### **4.5.27 Availability of digital content/educational software applications (CDs, VCDs, and DVDs) for teaching and learning various subjects**

The study also revealed that 81.8% of the majority of the schools had digital content/educational software applications (CDs, VCDs, and DVDs) for teaching and learning various subjects as shown by of the respondents and the subjects covered were Sciences, Biology, Physics, Chemistry, Mathematics, English, History, Business Studies, Geography, Computer Studies, Literature, Fasihi, while 18.2% of the respondents said that their school did not have digital content/educational software applications (CDs, VCDs, and DVDs) for teaching and learning various subjects.

This is represented in table 51.

**Table 51: Availability of digital content/educational software applications (CDs, VCDs, and DVDs) for teaching and learning various subjects**

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	9	81.8
No	2	18.2
Total	11	100.0



## **CHAPTER FIVE**

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

#### **5.1 Summary of the findings**

From analysis of students responses, the study found out that 42.1% of the students had used computers for between two and four years. The ICT facilities that were accessible most schools were desktop computers (79.2%), TV (77.5%), overhead projector (73.3%), black and white printer (62.1%), computer speakers (59.2%), and radio/cassette player (58.8%).

The study also revealed that computers and related ICTs are used for teaching/learning in various subjects as follows Computer studies (62.1%), Sciences (32.1%), Mathematics (5.4%), and Humanities (0.4%).

The study further revealed that 67.1% of the students were able to use the required ICT tools and facilities in doing the subject schoolwork, while 32.9% of the respondents said that they were not able use the facilities. The study revealed that in the schools computers were used in the computer laboratory (95%), both classroom and laboratory (2.9%) while 2.1% of the respondents said that computers in their schools were used in the classroom only. According to the findings, students' favorite activities with the computers include finding and researching information (82.1%), E-mailing (64.2%), surfing the internet (61.7%), using educational software (55.8%) and playing games (51.3%).

The study also revealed that 58.8% of the students were able to use computers and related ICTs to do the studies for less than 2 hours per week, 30.4% of the respondents indicated between 2 and 4 hours per week, while 10.8% of the respondents reported that they were able to use computers and other related ICTs for more than 4 hours per week..

The study also revealed 75% Of the students possessed e-mail address. Regarding basic skills in internet browsing, word processing, spreadsheets and presentation tools (PowerPoint), the study revealed that the students were good in the use of basic applications for purposes other than classroom learning as reflected by the mean score ranging from 2.7 - 3.5on the response scale of 1 – 5.

From the teachers, the study revealed that the gender of the respondents (teachers, males were 64.3% while 35.7% of the respondents were females. The study also revealed that 75.7% of the teachers were aged between 30-50 years, 21.4% were under 30 years while 2.9% of the respondents were over 50 years.

The study revealed that computers were used in the computer laboratory (91.4%) and teachers' lounge (14.3%). The study also revealed that the majority of the schools had been using computers for 2 to 5 years and the computers were available for more than 10 hours per week.

The study also revealed that ICT was used as a teaching tool to teach subjects such as Computer Studies (57.1%), Sciences (42.9%), Humanities (25.7%), Mathematics (22.9%) From the findings, 47.1% of the teachers have used computers for 2-5 years, 30% for a period less than 2 years, while 22.9% of the teachers have used computers for over 5 years. The study also revealed that 74.3% of the teachers had not received any training on Information and Communications Technology before joining the teaching profession while 25.7% of the teachers had received some training on ICT before joining the teaching profession.

From the findings, the majority of the teachers said that they were fair in the use of word processing, spread sheets, presentation tools (power point), E-mail, internet browsing and statistical tools as these areas had a low mean score ranging from 2.7 to 3.9, which in the response scale of 1 to 5, means that the majority of them were fair in the use of these facilities.

The study further revealed that areas where teachers use computers often include personal work, e-mail correspondence, internet browsing and in processing examination as these purposes had a low mean score ranging from 2.8 to 3 on a scale of 1 to 5. On the other hand, the purposes that the teachers did not often use ICT tools, or they were never used or used once a week were in preparing lessons, making presentations/lectures, preparing reports, teaching subject and administrative work as these variables had a high mean score ranging from 3.5 to 4.1 on a scale of 1 to 5.

From the administrators, the study revealed that 54.5% of the schools were located in semi-urban areas, 27.3% were located in rural areas, while 18.2% were located in urban areas. The study further revealed that 54.5% of the administrator respondents were males while females comprised 18.2%. It was revealed that 72.7% of the respondents (administrators) were aged between 30-50 years as while 27.3% were less than 30 years old

It was also found out that there was an ICT coordinator or head in the schools (100%), there was an ICT department or unit in the schools (90.9%), while the schools that had an ICT master plan and a distinct budget for the implementation of the school ICT plan was reflected by 45.5% each. The study revealed that 45.5% of the schools source their fund from school fees while the schools that source their funds from the government grant and from donations were found to be 27.3% each. According to the administrators, 81.8% said that computers in their schools were located in the administrators office, 36.4% said that they were located in teachers' lounge and teachers' offices.

The study found out that the ICT facilities that were common in the schools were overhead projector and TV (100%), CD writer and computer speaker (90.9%) each, radio/cassette player and desktop computers (81.8%) of the respondents in each case, VCD, digital photocopier and scanner (72.7%) each, black and white printer and laser printer (63.6%) each.

The study also revealed that there were some ICT facilities that were not available in the most of the schools such as handheld/PDA which was not available in all the schools, video camera and photo (90.1%) each, VHS and inkjet (81.8%) each, LCD projector and laptop (63.6%) of the respondents in each case, multimedia projector, color printer and dot matrix printer (54.5%) in each case.

The study also revealed that that all the schools had access to reliable electricity (100%), 90.9% of the schools had access to mobile phone, 81.8% of the schools had access to internet, 72.7% of the schools had access to landline telephones, while the schools that had access to satellite connections and cable TV were (54.5%) each. 81.8% of the schools had no access to fax machines. The study found out that 50-75% of the students had access to school computers, 27.3% felt that 75-100% of the students had access to the

computers while 18.2% said 10-25% and 25-50% of the students had access to school computers respectively.

The study revealed that 81.8% of the respondents were implementing the National ICT Strategy by using ICT in teaching specific subjects while 63.6% said they were implementing the strategy by offering separate computer courses and 63.6% of respondents said through using ICT in management and administration and through training teachers on ICT respectively.

The study also revealed that 72.7% of the schools offered examinable ICT courses, while 27.3% of the schools reported that they did not offer examinable ICT courses.

On the general attitude of the students towards ICT-based courses, the study revealed that 45% of the respondents said that it was excellent, 45% said that the attitude was good and while 9.1% of the respondents said that it was fair. The study also found out that there was good students' performance in the Computer Studies as a subject and there was also significant improvement in performance in all the other subjects following the introduction of ICT based teaching/learning in the school especially in. The study revealed that 45.5% of the schools source their fund from school fees while the schools that source their funds from the government grant and from donations were found to be 27.3% each. The study also sought to investigate on the average performance of students in ICT-based courses. It was revealed that 54.5% said that it was good, 36.4% said that it was excellent, while 9.1% of the respondents said that it was fair.

The researcher also found out that all the schools did not have a website. The study also revealed that 81.8% of the schools had digital content/educational software applications (CDs, VCDs, and DVDs) for teaching and learning various subjects and the subjects covered include Sciences, Biology, Physics, Chemistry, Mathematics, English, History, Business Studies, Geography, Computer Studies, Literature, Fasihi, while 18.2% of the respondents said that their school did not have digital content/educational software applications (CDs, VCDs, and DVDs) for teaching and learning various subjects.

## **5.2 Conclusions**

From the study, the researcher concluded that both students and teachers had developed a positive attitude towards ICT-based teaching learning methods. The researcher also concluded that introduction of ICT based teaching/learning in schools has contributed to improvement in students' performance in a number of subjects notably in French, Music, Physics, Geography, Sciences, Mathematics, Chemistry, Biology.

The researcher also concluded that the schools faced some challenges in the implementation of ICT projects. Notable among these challenges are inadequacy of ICT facilities such as handheld PDAs, video cameras, photo camera, VHS, printers, LCD projectors, Computer laptops, multimedia projectors, colour printers, dot matrix printers, lack of relevant software for teaching various subjects especially sciences, lack of qualified ICT teachers and lack of appropriate educational management software and necessary training for teachers and administrators. .

## **5.3 Recommendations**

Based on the above findings, the researcher recommended that secondary schools should be assisted to acquire necessary ICT infrastructure in order to implement ICT-based teaching/learning methods fully. The schools should also have well ICT trained teachers/trainers as well as a continuous training programme targeting serving teachers. The study also recommends that the students should be allowed to use computers and other related ICT equipment for more hours for self-directed learning. This can only be possible if the schools have enough computers. The Government should assist the schools to obtain reliable and affordable internet connectivity. The researcher also recommends that teachers should be in-serviced on ICT integration regularly to improve their skills. Finally the researcher recommends addition of ICT facilities I schools to enhance access to the facilities by students and teachers.

#### **5.4 Suggestions for further research**

During this study, the researcher identified some areas that require further research. Notable areas include the contribution of ICT integration in improvement of performance in national examinations. Another area that requires further research is the availability and suitability of relevant educational software for teaching all the subjects in the secondary education curricula.

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## **APPENDICES**

- A. Authorization letter from MOE to collect data from schools**
- B. Sampled Schools**
- C. Students' questionnaire**
- D. Teachers' questionnaire**
- E. Administrators' questionnaire**

## Appendix A: Authorization letter from MOE to collect data from schools

### MINISTRY OF EDUCATION

Telegrams: "EDUCATION", Nairobi

Telephone: Nairobi 318581

Fax: 214287



REPUBLIC OF KENYA

JOGOO HOUSE "B"

HARAMBEE AVENUE

P. O. BOX 30048-00100

NAIROBI

When replying please quote

June 25, 2008

Ref. No.:

#### AUTHORITY TO COLLECT RESEARCH DATA FROM SIX NEPAD e- SCHOOL

Authority is hereby granted Mr. Joseph O. Ogutu to collect research data from six NEPAD e-Schools Group as follows:

1. Isiolo Girls
2. Maranda High School
3. Menengal High
4. Chavakali High
5. Mumbi Girl
6. Wajir High School

Accord him necessary assistance.

A handwritten signature in black ink, appearing to read 'C.A. Ondiek'.

C.A. ONDIEK (MRS)

FOR: PERMANENT SECRETARY

**Appendix B: Sampled Schools**

<b>SCHOOL</b>	<b>PROVINCE</b>	<b>DISTRICT</b>
1. Maranda High School	Nyanza	Bondo
2. Isiolo Girls Secondary	Eastern	Isiolo
3. Chavakali High School	Western	Vihiga
4. Mumbi Girls Secondary	Central	Murang'a
5. Menengai High School	Rift Valley	Nakuru
6. Wajir Girls Secondary	North Eastern	Wajir

## Appendix C: Students' Questionnaire

This questionnaire is designed to help the researcher collect data from sampled secondary schools in Kenya in order to undertake a study on the impact of use of ICT in learning/teaching process.

Kindly answer the questions below to your best knowledge and honesty to enable the researcher obtain accurate data.

*Fill in or put a tick as appropriate.*

1. Name of school: \_\_\_\_\_
2. Address: \_\_\_\_\_
3. Gender                      Male
- Female
4. How many years have you been using computers?
  - Less than 1 year
  - 1-2 years
  - 2-4 years
  - More than 4 years
5. Please indicate whether you have/have no access and using/not using the following in your schoolwork:

Equipment	Access (have physical access)	
	Yes	No
Overhead projector		
TV		
VCD		
VHS		
DVD		
Video camera		
Photo camera		
Radio/cassette player		
Digital photocopier		
Multimedia projector		
LCD Projector		
Computers:		



In both classrooms and laboratory [ ]

In the library [ ]

9. What are your favourite activities using computers? (Check as many as applicable)

Find and research information [ ]

E-mail [ ]

Chat [ ]

Download music [ ]

Play games [ ]

Surf the Internet [ ]

Use educational software [ ]

Write papers [ ]

Write computer programs [ ]

Draw and paint [ ]

Make presentations using PowerPoint [ ]

Others (Please specify ) \_\_\_\_\_

10. If you are using computers and related ICTs, how many hours on the average per week of normal school hours are you able to use these computers and related ICTs to do your studies?

Less than 2 hours [ ]

2-4 hours [ ]

More than 4 hours [ ]

11. Do you have access to Internet?

Yes [ ]

No [ ]

12. How often do you use the Internet for surfing websites in your school?

Never [ ]

Once a month [ ]

Once a week [ ]

Several times a week [ ]

Daily [ ]

13. Please check if you have any of the following?

- Mobile phone
- Handheld/PDA
- Email address
- Personal website/webpage

14. How often do you use and send email

- Many times every day
- A few times every day
- A few times every week
- A few times every month
- A few times every year
- Never

15. Please indicate your level of skills in the use of the following computer applications:

*(Tick as appropriate)*

	Excellent	Very Good	Good	Fair	No Capability
<b>I. BASIC – SIMPLE USE OF APPLICATIONS FOR PURPOSES OTHER THAN CLASSROOM LEARNING</b>					
Word processing –prepare papers					
Spreadsheets					
Presentation tools (PowerPoint)					
Basic E-mailing					
Basic Internet browsing					
Graphics					
Web page designing					
Use of chatting platform					
<b>II. INTERMEDIATE – USE OF EXISTING APPLICATIONS FOR LEARNING BOTH INSIDE AND OUTSIDE THE CLASSROOM</b>					
Use of applications (word processing, spreadsheets, etc.) in classroom learning of specific subjects					
Use of various applications for doing assignments and lessons					

E-mailing for telecollaboration/online collaborative projects, exchanging assignments and lessons, commenting on papers used in schools					
Use of Internet resources to prepare homework, research, lessons, or for collaborative school projects					
Developing basic and static webpage for schoolwork					
<b>III. ADVANCED – USE OF ICTS TO CREATE AND DEVELOP NEW APPLICATIONS, CONTENTS, LEARNING MATERIALS, ETC.</b>					
Use statistical tools for developing formulations and packages					
Programming					
Database development and management					
Advanced website designing, maintenance and use for teaching/learning					
Developing educational software and new applications					
Developing and operating e-learning or online learning platforms					
Setting up and moderating discussion groups and chats					
Creating web-based and ICT-based multimedia materials					

Any other comments:

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*Thank you for your cooperation.*



## Appendix D: Teachers' Questionnaire

This questionnaire is designed to help the researcher collect data from sampled secondary schools in Kenya in order to undertake a study on the impact of use of ICT in learning/teaching process.

Kindly answer the questions below to your best knowledge and honesty to enable the researcher obtain accurate data.

*Fill in or put a tick as appropriate.*

1. Name of school: \_\_\_\_\_
2. Address: \_\_\_\_\_
3. e-mail address: \_\_\_\_\_
4. Type of area where school is located:
  - Urban
  - Semi-urban
  - Rural
5. Gender: Male   
Female
6. Age in years:
  - Under 30
  - 30-50
  - Over 50
7. Number of years in the service:
  - Less than 5
  - 5-10
  - 10-15
  - Over 15
8. Educational level:
  - Post Graduate
  - Undergraduate
  - Diploma
  - Others (specify) \_\_\_\_\_
9. Where do you use computers in the school?
  - Teachers lounge
  - In my office
  - Administrators office
  - Classrooms
  - Computer laboratory
  - Library
  - Others (please specify) \_\_\_\_\_

10. In which subjects do you use ICT as a teaching tool? (check all that apply)

- Computer [ ]
- Mathematics [ ]
- Science [ ]
- Humanities [ ]
- Languages [ ]
- Art [ ]
- Music [ ]
- None [ ]
- Others (please specify) \_\_\_\_\_

11. How many years have you been using computers?

- Less than 2 years [ ]
- 2-5 years [ ]
- Over 5 years [ ]

12. How many hours per week are computers accessible to you?

- Less than 2 hours [ ]
- 2-4 hours [ ]
- 4-6 hours [ ]
- 6-10 hours [ ]
- More than 10 [ ]

13. Do you use computers outside school hours?

- Yes [ ]
- No [ ]

14. Did you receive any training on information and communications technology before you joined the teaching profession (pre service)?

- Yes [ ]
- No [ ]

If yes, please indicate the qualification:

Title of training received	Qualification ( E.g Certificate, Diploma, Degree etc)

15. Please rate your expertise in the use of the following:

(Tick as appropriate)

	Excellent	Very good	Good	Fair	No capability
Word processing					
Spread sheets					
Presentation tools (Power point)					
E-mail					
Internet browsing					
Statistical tools					
Graphics					
Web page designing					
Programming					
Database management					
Project management					

16. How often do you use ICT tools in the following purposes :

(Tick as appropriate)

	Every day	Very often	Twice a week	Once a week	Never
Preparing lessons					
Making presentations /lectures					
Preparing reports					
Processing examination					
Internet browsing					
e-mail correspondence					
Teaching your subject					
Personal work					
Others (specify)					
Administrative work					

Any other comments

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*Thank you for your cooperation.*

## Appendix E: Administrators' Questionnaire

This questionnaire is designed to help the researcher collect data from sampled secondary schools in Kenya in order to undertake a study on the impact of use of ICT in learning/teaching process.

Kindly answer the questions below to your best knowledge and honesty to enable the researcher obtain accurate data. The information provided will be treated confidentially.

*Fill in or put a tick as appropriate.*

17. Name of school: \_\_\_\_\_

18. Address: \_\_\_\_\_

19. e-mail address: \_\_\_\_\_

20. Type of area where school is located:

Urban

Semi-urban

Rural

21. Gender: Male

Female

22. Age in years:

Under 30

30-50

Over 50

23. Number of years in the teaching service:

Less than 5

5-10

10-15

Over 15

24. Educational level:

Post Graduate

Undergraduate

Diploma

Others (specify) \_\_\_\_\_

25. Do you have an ICT Department or Unit in your school?

Yes

No

26. Is there an ICT Coordinator/Head?

Yes [ ]

No [ ]

27. Does the school have an ICT Master Plan?

Yes [ ]

No [ ]

28. Is there a distinct budget for the implementation of the school ICT plan?

Yes [ ]

No [ ]

29. What is the source of fund for ICT?

Fees [ ]

Government grant [ ]

Donation [ ]

Savings [ ]

Others (specify) \_\_\_\_\_

30. Please indicate the number of staff with basic ICT skills

Category	Total number	Number with basic ICT skills
Teaching staff		
Technical staff		
Non-teaching staff		
Administrative		

31. Where are the computers located in your school?

Computer laboratory [ ]

Classrooms [ ]

Teachers' lounge [ ]

Teachers offices [ ]

Administrator's office [ ]

Library [ ]

Others (please specify) \_\_\_\_\_

32. Please indicate the number of staff who have pursued ICT training within the last 3 years.

Category	Total number	Number trained
Teaching staff		
Non-teaching staff		
Administrative		

33. Please check under the appropriate column if the following ICT facilities are available in your available school. Also please indicate number of units available (to be collected with the help of a technical person)

Equipment	Availability		No. Of Units
	Yes	No	
Overhead projector			
TV			
VCD			
VHS			
DVD			
Video camera			
Photo camera			
Radio/cassette player			
Digital photocopier			
Multimedia projector			
LCD Projector			
<b>Computers:</b>			
Desktop			
Laptop			
Handheld/PDA			
Colour printer			
Black and white printer			
Dot matrix			
Laser printer			
Ink jet printer			
Scanner			
CD writer			
Computer speaker			

34. How long has the school had the computers?

- Less than 2 years [ ]
- 2 – 4 years [ ]
- 2 – 6 years [ ]
- More than 6 years [ ]

35. What kind of operating system do you use in schools?

- Windows [ ]
- Linux [ ]
- Apple Macintosh [ ]
- UNIX [ ]
- MS DOS [ ]
- Others \_\_\_\_\_

36. Are your computers networked?

- Yes [ ]
- No [ ]

37. If yes, what is the extent?

- All the computers are networked [ ]
- Some of the computers are networked [ ]

38. Does your school have access to:

Item	Yes	No
Reliable electricity		
Landline telephones		
Mobile phones		
Fax machines		
Internet		
Satellite connections		
Cable TV		

39. In your opinion, what is the approximate percentage of student access to the computers?

- Less than 10% [ ]
- 10% -25% [ ]
- 25% - 50% [ ]
- 50% - 75% [ ]
- 75% - 100% [ ]

40. About what percentage of teachers have access to the school computers?

- Less than 10%      [ ]
- About 10%        [ ]
- About 25%        [ ]
- About 50%        [ ]
- About 75%        [ ]
- 100%             [ ]

41. Do your teachers and students have access to the use of ICT facilities after school hours?

- No, they are never accessible      [ ]
- They are sometimes accessible      [ ]
- They are always accessible        [ ]
- They are accessible at a fee        [ ]

42. How does your school implement The National ICT Strategy for Education and Training? *(Please check all that apply)*

- By offering separate computer courses      [ ]
  - By using ICT in teaching specific subjects      [ ]
  - By using ICT in management and administration      [ ]
  - By training teachers on ICT                      [ ]
  - Others (please specify) \_\_\_\_\_
- 

43. Does your school offer examinable ICT courses?

- Yes                [ ]
- No                [ ]

44. What is the general student attitude towards the ICT courses?

- Excellent        [ ]
- Good            [ ]
- Fair             [ ]
- Poor            [ ]

45. What is the average performance of students in the ICT courses?

- Excellent        [ ]
- Good            [ ]
- Fair             [ ]
- Poor            [ ]



46. Is there significant improvement in performance in other subjects following introduction of ICT-based teaching/learning in your school?

Yes [ ]

No [ ]

If yes, which subjects have shown marked improvement?

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47. For what purposes does your school use ICT? (You may check more than one purpose as applicable and indicate the level of schooling where such purposes apply.)

	Yes	No
Learning enrichment or learning new things		
Remedial learning		
Regular instruction and training for developing computer skills (i.e. teaching about computers-computer literacy, Computer studies and programming)		
Finding/accessing information and researching and researching through Internet		
Communicating with others		
As teaching/learning tool for teaching specific subjects		
Development of logic, reasoning, critical thinking and problem solving competence		
Development of ability to use basic application programs (i.e. word processing, database management, spreadsheets, presentation graphics e.t.c.)		
For playing games and fun		
Helping with school administration and management		
Using in test administration, scoring and analysis		
Tracking of student/pupil performance levels, instructional objectives mastered, instructional objectives currently active and suggested instructional activities		
Others (Specify)		

48. How many hours in a month does your school access the Internet? \_\_\_\_\_

49. How many computers are connected to the Internet either as: \_\_\_\_\_

50. Does your school have a website?

Yes [ ]

No [ ]

51. Does your school have digital content/educational software applications (CDs, VCDs & DVDs) for teaching and learning various subjects?

Yes [ ]

No [ ]

52. If yes, please list down the subjects covered.

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Any other comments:

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*Thank you for your cooperation*