STATUS OF IMPLEMENTATION OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) IN THE MANAGEMENT OF PUBLIC SECONDARY SCHOOLS IN MATHIRA WEST DISTRICT, KENYA

BY

WANJAU ALICE MUMBI

Reg. No. EMED/5034/13

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KARATINA UNIVERSITY

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DECLARATION

Declaration by the student

This project report is my original work and has not been submitted for any award in any other university.

Signature …… Date: ……

Wanjau, Alice Mumbi

Reg. No. EMED/5034/13

Declaration by Supervisors

This project report has been submitted for examination with our approval as the university supervisors.

Signature ……Date: ……

Dr. Kimiti R. Peter

Department of Planning and Administration and Curriculum Studies

Karatina University

Signature …….Date: ……

Prof. Mbugua Zachariah K,

Department of Psychology and Communication Technology

Karatina University

DEDICATION

I dedicate this research project to my daughters, Eunice and Grace for always believing in me and reminding me to press on, this helped me to stay focused throughout my entire master's degree education programme. Your love and motivation kept me strong when the going got tough.

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ABSTRACT

ICT implementation in school management has been advocated as the remedy for the realization of desired outcomes and to providing effective solutions to educational problems that are difficult to solve through traditional approaches. However, although secondary schools have invested in setting up ICT infrastructure, it is doubtful that these facilities are being used effectively in the management of schools. This study investigated the implementation of ICT in management of public secondary schools in Mathira West District, Kenya. The study looked at the availability of ICT facilities, the extent of ICT use in control of finances, application in correspondence and management of human resources in secondary schools in Mathira West District. The study adopted a descriptive survey design. The target population for this study consisted of all the 16 principals of public secondary schools in Mathira West District. Census technique was used since the population was a manageable number; therefore all the 16 schools in the district were included in the study. Data was collected by means of a questionnaire that was administered to the principals of the sampled schools. Piloting of the research tools was conducted in two (2) schools in the neighbouring Tetu district. The collected data was coded, scored and then keyed in the computer for analysis with SPSS and the results were presented in form of tables, charts and graphs. The study established that majority of schools did not make use of basic computer hardware and software, the use of ICT in management of school finances and stores is poor. The study also established that the use of ICT in communication with stakeholders is very low. These findings provides valuable contribution to the stakeholders in education on the benefits of implementing ICT in management practices as well as add to knowledge for use by future researchers about the role of ICT in management of secondary schools.

TABLE OF CONTENTS

DECLARATION ii

DEDICATION iii

ACKNOWLEDGEMENT iv

ABSTRACT v

LIST OF TABLES ix

LIST OF FIGURES x

ABBREVIATIONS AND ACRONYMNS xi

CHAPTER ONE: INTRODUCTION 1

1.1 Background to the Study 1

1.2 Statement of the Problem 3

1.3 Purpose of the Study 4

1.4 Research Objectives 4

1.5 Research Questions 5

1.6 Significance of the Study 5

1.7 Scope and Limitations of the Study 6

1.8 Assumptions of the Study 6

1.10 Theoretical Framework 6

1.11 Conceptual Framework 8

CHAPTER TWO: LITERATURE REVIEW 10

2.1 Introduction 10

2.3 Status of ICT Infrastructure in Secondary Schools 11

2.4 Use of ICT in Financial management of Secondary Schools **13**

2.5 Use of ICT in Management of Human Resources **14**

2.6 Use of ICT in Communication in Schools **17**

CHAPTER THREE: RESEARCH METHODOLOGY……....**19**

3.1 Introduction **19**

3.2 Research Design **19**

3.3 Location of the Study **20**

3.4 Target Population **20**

3.5 Sampling Procedure and Sample Size **20**

3.6 Instruments **21**

3.7 Validity and Reliability **22**

3.7.1 Validity of the Instruments **22**

3.7.2 Reliability of the Instruments **22**

3.8 Data Collection Techniques **23**

3.9 Ethical Considerations **23**

3.10 Data Analysis **24**

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND DISCUSSION…....**25**

4.1 Introduction **25**

4.2 Demographic Characteristics of the Respondents **25**

4.2 Status of ICT Infrastructure **27**

4.3 Extent of use of ICT in Management of Finances **29**

4.4 Use of ICT in Management of Human Resources **30**

4.5 Use of ICT in Communication in Secondary Schools **31**

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS…...**33**

5.1 Introduction **33**

5.2 Summary of the Findings **33**

5.3 Conclusions **34**

5.4 Recommendations **34**

5.5 Suggestions for Further Research **35**

REFERENCES **36**

APPENDIX A: PRINCIPALS QUESTIONNAIRE **41**

APPENDIX B: RESEARCH PERMIT...……..43

LIST OF TABLES

Table 3.1: Target Population.....18

Table 4.1 Demographic Characteristics of the Respondents 25

Table 4.2 Availability of ICT hardware and software in secondary schools.....28

Table 4.3 Use of ICT in Management of Finances.....29

Table 4.4 Use of ICT in Management of Human Resources.....30

Table 4.5 Use of ICT in Communication in Secondary Schools.....31

LIST OF FIGURES

Figure 1.1 Conceptual Framework 8

ABBREVIATIONS AND ACRONYMNS

AST : Adaptive Structuration Theory

BOM : Board of Management

DEO :District Education Officer

ICT : Information and Communication Technology

KESSP : Kenya Education Sector Support Program

LAN : Local Area Network

MIS : Management Information Systems

NCST : National Council of Science and Technology

SPSS : Statistical Package for Social Sciences

UNESCO : United Nations Scientific and Cultural Organization

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Across the world, schools are increasingly embracing Information Communication Technology (ICT) applications in line with the information age (Tearle, 2004). Administration and management applications of ICT are increasingly gaining popularity in schools due to their capabilities in facilitating administrative activities from data storage to knowledge in management and decision making (UNESCO, 2010). Wango (2009) adds that the quality of education can be enhanced through improved school administration and management and that ICT cannot be ignored in view of the current global revolution in education due to the changing nature of work, the realities of the information age, new global partnerships and awareness of technological changes (Feldner, 2003; Steyn & Kamper, 2001).School management is a key determinant for the realization of desired outcomes and ICT is increasingly being viewed as important in all spheres of education, including academic achievement.

According to Young and Dulewicz (2008), management involves organising, planning, staffing, directing and controlling, where the aim of a manager is to maximise the output of the organisation through administrative implementation. Management is an executive function which puts into action the policies, plans and decisions within the framework set by the administration (Brennen, 2007). Wango (2009) feels that management is a major determining factor of the quality of education and thus is essential in improving school performance.

Gray and Smith (2007) observe that the 21st century requires effective and dynamic school management that is ready to embrace technology; this will improve the quality of management which will consequently influence school performance. Agreeing with this observation Jankowski (1996) emphasizes the crucial role that can be played by ICT in monitoring and tracking systems, parental alert software, development planning, business management, timetabling and communications all of which, if used properly can result into improved educational outcomes. School principals can also incorporate ICT in information systems like salary processing, results and registry management system, fees tracking records and payment system to assist in record keeping, examination and financial management of the schools, stores and purchases management (Tibagye, 2000). ICT has caused a major paradigm shift in how we collect, store, retrieve, and analyze information in every industry and can also be integrated in school management (Jankowski, 1996; Maki, 2008).

Rapid developments in ICT have resulted in significant changes in the way the world operates and communicates. Faced with this situation, policy makers in many countries around the world have impressed on the need of educational reforms; in particular there has been increasing pressure on education managers to acquire new technologies. Developed nations such as Canada, the United Kingdom, the United States and the European Union have put in place ICT classroom, school and system-wide information management processes, freeing teachers from clerical tasks, making information flow more efficient and transparent inside the educational system, and helping policy-makers with more timely and accurate decision-relevant data. Studies the Greece, Netherlands, Malaysia and South Africa corroborate the fact that school managers require facilitation with appropriate ICT facilities and related infrastructure

to optimize their administrative engagements (Visscher, 2003; Tearle, 2004).Even many developing nations have embraced ICT. In Africa, concerted efforts have been made by many governments to initiate ICT integration in schools through their respective ministries of education, Uganda, Senegal and Zimbabwe interconnectivity programme has improved accessibility and quality of management in those countries. (Carlson & Firpo, 2001).

In Kenya a baseline survey conducted by Oloo (2009) on ICT use in secondary schools in Kenya found out that the use of computers in the schools surveyed was mainly examination processing followed by teaching of basic computer skills. The survey also established that only a few schools had purchased schools management software which was used with varying success. Most principals lacked training on sue of management software. The most common modules bought by schools were examination, timetabling and accounting modules. Our society, without exception, is in transition towards an information society due to the enormous impact of these technologies in all facets of life. However, the importance and use of ICT in schools in Kenya differ from one district to the other due to a number of factors including academic, economic, political, and cultural levels of development. This study therefore investigated the utilization of ICT in effective management of secondary schools in Mathira West District, Nyeri County.

1.2 Statement of the Problem

The successful implementation of free education policies in Kenya has resulted in an enormous increase in student enrolment as well as the number of teaching and non-teaching staff in secondary schools. This growth has created immense challenges in

the areas of budgeting, collection of student data, recording of results and effective keeping of school records, as schools struggle to handle the increased management demands of large population of students and staff. ICT integration in school management has been advocated as the antidote in providing effective solutions to school management. Secondary schools have indeed responded by investing heavily in ICT infrastructure. Unfortunately despite this noble effort, it has been doubtful that ICT facilities are being used effectively in the management of schools. This apathy towards use of ICT is evidenced in Mathira West District by reported cases of fraudulent loss of school finances, delay in processing students' records, poor communication, poor record keeping and retrieval, poor purchases and supplies management. Few studies have been undertaken to document aspects of ICT application in school management. The past studies have addressed the impact of ICT upon classroom and curriculum practices but have not addressed the role ICT in managing schools. This study therefore intends to examine the utilization of ICT in effective management of secondary schools in Mathira West District, Nyeri County.

1.3 Purpose of the Study

The purpose of this study was to investigate the implementation of information communication technology (ICT) in management of public secondary schools in Mathira West District, Nyeri County.

1.4 Research Objectives

The following objectives guided the study:-

i. To establish the status of ICT infrastructure in secondary schools in Mathira West District.

ii. To find out the extent of use of ICT in management of finances in secondary schools in Mathira West District.

iii. To establish the use of ICT in management of human resources in secondary schools in Mathira West District.

iv. To determine the use ICT in communication in secondary schools in Mathira West District.

1.5 Research Questions

The following were the research questions that guided the study:-

i. What is the status of ICT infrastructure in secondary schools in Mathira West District?

ii. What is the extent of use of ICT in management of finances in secondary schools in Mathira West District?

iii. How is ICT used in management of human resources in secondary schools in Mathira West District?

iv. How is ICT used in communication in secondary schools in Mathira West District?

1.6 Significance of the Study

The findings of this study may be used by the Ministry of Education policy formulators as a basis for reference on implementation of ICT in management of secondary schools. The findings of the study provides baseline information that can be used by future researchers with the same interest and open a window for education stakeholders and parents on identifying areas of concerns in laying a firm foundation for ICT in management of secondary schools. The findings may also elicit areas of

focus to scale-up benefit of ICT in management of schools that may eventually open opportunities for quality education provision.

1.7 Scope and Limitations of the Study

This study was carried out in Mathira West District in Nyeri County. Factors such as availability of ICT facilities, extent of use of ICT in control of finances, how ICT has been applied in management of human resources and correspondences and use of ICT in organization of the curriculum were studied. Due to limitations of time and money the study was only carried out in Mathira West District in Nyeri County which may affect generalization of research findings. Additionally, implementation of ICT in secondary schools may be affected by multiple factors which this study did not control.

1.8 Assumptions of the study

The study was based on the following assumptions:-

i. Principals in secondary schools were aware of implementation of ICT in secondary schools and have made efforts towards its implementation.
ii. The respondents would give honest and truthful responses to the questionnaire items.
iii. Implementation of ICT in secondary schools positively impacts on school management practices.

1.10 Theoretical framework

The theory that guided this study was the Adaptive Structuration Theory (AST) of DeSanctis and Poole(1994). Adaptive Structuration Theory is based on Anthony

Giddens' (1984) structuration theory. Adaptive structuration theory (AST) has been used for a number of years in the information systems discipline to study the use of new technologies in organizations, West and Turner (2000). Proponents of AST contend that developers and users of these systems (ICT) hold high hopes for their potential to change organizations for the better, but actual changes often do not occur, or occur inconsistently. AST examines the change process from two vantage points: firstly, the types of structures that are provided by advanced technologies, and secondly the structures that actually emerge in human action as people interact with these technologies (efficiency, quality, consensus, commitment and effectiveness). Proponents of AST contend that developers and users of these systems (ICT) hold high hopes for their potential to change organizations for the better, but actual changes often do not occur, or occur inconsistently. Likewise, for the case of Mathira West district, schools have invested greatly in computer infrastructure but the actual impact has not greatly been realized. Perhaps for this reason, communication among the stakeholders is paramount. DeSanctis and Poole, (1994) add that the past decade has brought advanced ICT, which have revolutionized organizational management activities through sophisticated technologies.

According to Huber (1990) the impact of technology on management can only be realized through effective implementation of technology. It therefore requires research in order to establish the actual levels of ICT application and its use in management in Mathira West District secondary schools. AST points out that people adapt systems to their particular work needs, or they resist them or fail to use them at all; and there are wide variances in the patterns of computer use and consequently their effects on decision making and other outcomes. The setup of the information systems to be used in management is meant to cut across all departments of the school; that is from the

non-teaching staff, teachers to the administrators. However, it is not clear the extent to which schools use ICT to suit their particular needs despite the expected efficiency of implementation of ICT in management.

1.11 Conceptual Framework

The conceptual framework represented in Figure 1.1 shows the diagrammatic representation of interaction of variables. The independent variables of the study includes; availability of ICT facilities, control of finances, management of human resources, correspondence with stakeholders, stores and supplies management.

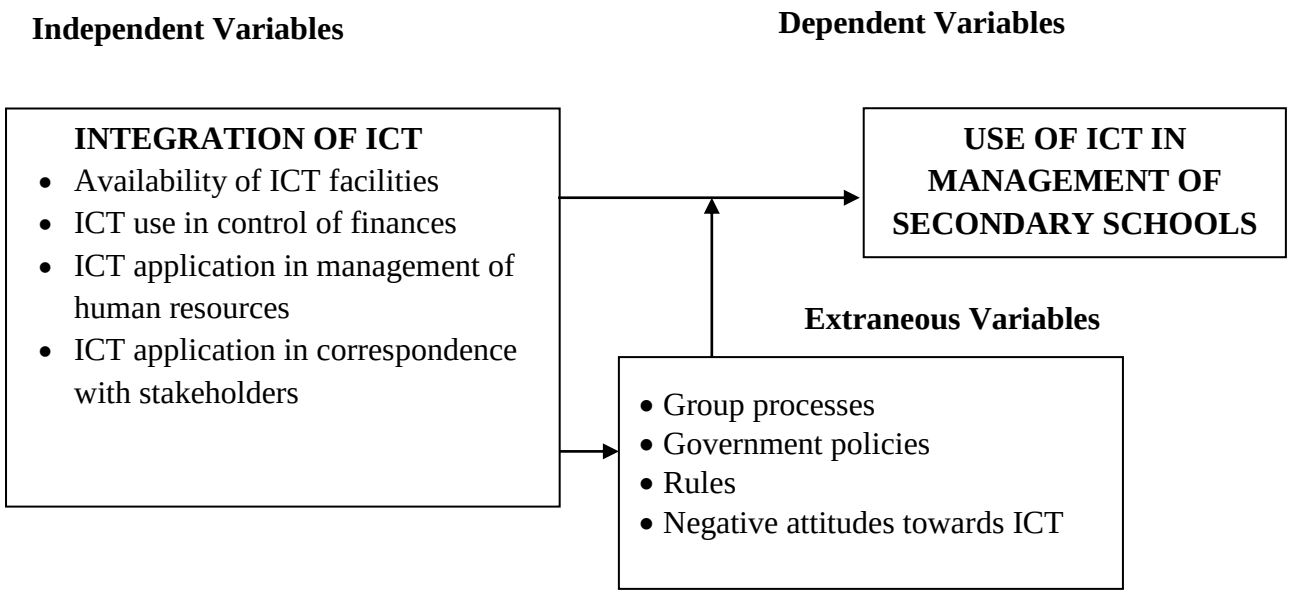

Figure 1.1 Conceptual Framework

1.12 Definition of Operational Terms

This section contains definitions of key terms as used in the study.

Administration a term used to refer to the people in the top management of schools in this study the principal and deputy principal of secondary schools.

Communication refers to correspondence, mails and information in a schools

ICT infrastructure refers to computers, fax machines, photo copiers, projectors, printers, internet connectivity, modems, and other computer related accessories that are used in secondary schools.

Integration refers to incorporation of technology in the running of secondary schools

Management refers to organization of different systems in a school, in this study refers to control of finances, management of human resources and communication with stakeholders

Planning refers to arrangements of activities, tasks, etc in a school set up

Principal refers to the head of the secondary school who is in charge of day to day running of the school.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter consists of various scholarly works that were reviewed for the purpose of this study. It focuses on the availability of ICT facilities, hardware and software, extent of ICT use in control of finances, application of ICT in management of human resources and application of ICT in correspondence in secondary schools.

2.2 Overview of ICT Use in Schools

UNESCO (2000) defines ICT as a discipline and management technique used in information handling and processing that provides quality services to users. Bertin (2000) adds that the implementation of ICT ensures accuracy, timeliness and effectiveness of school management, that is, it allows easy flow of information and risk monitoring systems that are appropriate. The tasks of manually processing and storage of data of a large number of students, teachers and non-teaching staff, is not only tedious but is also likely to be marred with inefficiencies. Since the mid-1980s, the implementation of ICT in secondary around the world has rapidly increased. This adoption of ICT not only reinforces the teaching process, but also facilitates administrative transactions. According to Tearle (2004), studies in the United Kingdom, the Netherlands, Malaysia and South Africa corroborate the fact that school educators require facilitation with appropriate computer facilities and related infrastructure to optimize the application of ICT in their teaching and administrative engagements. The work of administrators has changed in organizations, including schools, from manual and mechanical to electronic data processing, storage, output, and communication hence the importance of ICT (Taylor & Hogenbirk, 2001). The

main ICT tool used in management is the computer, together with basic software packages especially MS Word, Excel, PowerPoint, or the equivalent open source packages, and access to email and the internet. In addition there are software packages designed specifically for school management, including timetabling, databases for learner records, systems for the recording of school development plans, syllabus completion reports, test data, school based assessment records, financial records, etc.

In the developing countries the utilization of ICT in educational management and administration still remains at an early stage. After several years of effort, Kenya promulgated a National ICT Policy in January 2006. The Ministry of Education developed a Kenya Education Sector Support Program (KESSP) in 2005 that featured ICT as one of the priority areas with the aim of mainstreaming ICTs into the teaching and learning process. The use of ICT in the school environment is considered to be part of the extensive technological modernization of administration and education, according to MOEST(2005), as well as electronic government (e-Government) and electronic learning (e-Learning). The introduction of innovative technological applications in schools is connected with changes, not only at the level of teaching and learning, but also in carrying out administrative tasks in schools.

2.3 Status of ICT Infrastructure in Secondary Schools

Recording data electronically, storing it centrally, and sharing it with colleagues are vital to reducing workloads through available ICT structures (Devon, 2004). ICT would have impact on the management of education institutions; it increases efficiency and accountability to institutional resources. For cases of missing marks in the registrars' departments, if efficient MIS is developed and fully put to utilization,

such problems would be eliminated. Devon (2004) points out that in respect to management of students' affairs; there are various types of information systems that can be available in making informed decisions at all levels and in improving efficiency of operations, such as executive decision making management information system, collaborative information systems, electronic messaging systems, group decision support system. These would enable multiparty participation in the school activities through information management (Huseman & Miles, 1988).

The ministry's policy framework indicates that there are a number of challenges concerning access to and use of ICT in Kenya, including high levels of poverty, limited rural electrification, and frequent power disruptions. The core problem is that Kenya lacks adequate connectivity and network infrastructure. Although a small number of schools have direct access to high-speed connectivity through an Internet service provider, generally there is limited penetration of the national physical telecommunication infrastructure into rural and low-income areas. Consequently, there is limited access to dedicated phone lines and high-speed connectivity for e-mail and the Internet. Even where access to high-speed connectivity is possible, high costs remain a barrier to access. As well, very few schools can afford to use VSAT technology. Roughly 10% of secondary schools with computers are able to share teaching resources via a LAN. As a solution to these access problems, the ministry hopes to leverage the e-government initiative of networking public institutions countrywide to facilitate connectivity for the educational sector (Farrell, 2007).

2.4 Use of ICT in Financial management of Secondary Schools

ICT management systems have been developed to assist in financial management through customized management information systems (MIS) which have been used to enhance financial transactions in schools. The exact nature of financial management varies from school to school in light of local circumstances. The financial manager in the school (bursar) will take responsibility of implementing the finance policies of the school, financial processing and monitor the budget on daily basis as well as relieving the head teacher from the necessity of having to carry out some other financial and resource management tasks. Victoria (2002) asserted that ICT can provide means for communicating financial information to the governing body (administration) to help them with decision making.

The use of financial software, therefore, the bursar a good indication about the direction of the business at school and a means of comparing data with previous months, terms and years (Gbenga, 2003). This gives a baseline for effective decision making, say, about how fees should be collected, how salaries should be paid and how to carry out other procurement services in the school. (Gbenga, 2003) stated that the use of ICT, for accounting purposes, needs a standard software installed on interlinked computers where all transactions can be automatically logged on the computer to assist in fees payments, payrolls, procurements. A networked ICT environment with information systems can be used in the flow of data and information from one department to another in the school, for example from the bursar's office, to the principal's office which results into improved administrative and operational efficiency of the school. Samer and Sambamurthy (2006) contended that the absence of such systems in the school may result into the following problems;

delays in decision making due to high cycle time in business transactions, high Inventory, poor utilization of financial and other school resources.

The development of a standard payroll computer system has made the bursar's role easy. Payroll is a list of employees receiving regular pay. A computerized payroll system includes a defined set of interdependent items and rules that stipulate the pay conditions of a given organization, such as salary structure, tax schedules, benefits and allowances, frequency and pay dates of an employee. A payroll system can be defined as a computer system used by an organization to process and pay the wages of employees. In a networked environment, all duties will be easier done automatically with the command from the bursar. From this point of view it means that ICT will be important to those who are involved in all types of school finance management (Passey, 1999). There have been very few studies or reports into financial aspects of ICT for managers in schools.

2.5 Use of ICT in Management of Human Resources

ICT have important roles to play in making school administration less burdensome and more effectively integrated to the official information flow about students, curricula, teachers, budgets and activities through the educational system information pipelines. They are also a good means for informing community members (parents, politicians, and researchers) about educational news and policies.

Some of the constraints in the management of schools include the problem of controlling large population of students as well as conducting examinations on a large scale. The fact that the schools are witnessing a tremendous growth in pupils'

enrolment has made the management of schools complex thereby, creating challenges ranging from the management of students and staff, community relations, supervision of instruction to the management of school finance. Supporting these observations Kuria (2011) argued that there was no time in the history of secondary school education in Kenya when principal have been faced with such multitudes of challenges. Okello (2012) agreed with these views and reported that administrative functions in schools are becoming increasingly complex in terms of enrolments, population mobility and social problems. This complexity requires the use of powerful administrative tools resulting in better communication, efficient operations and better personal services. One of such tools is ICT. The evolution of the ICT and its capability to handle diverse kinds of problems has made easy the mounting challenges created by the staggering development in secondary school education management.

The school principal needs to be well informed in ICT application for effective management of the school. This is necessary in the areas of budgeting, collection of student data, recording of results and effective keeping of school records. Data of various types could be programmed into the computer. Data on staff, teaching and learning could also be done though the effective use of ICT in schools. The introduction of ICT in the management of education could became an antidote in providing effective solutions to educational problems that would have been difficult, if not in possible to solve through human manual efforts.

Commenting on the relevance of data in the educational system Kuria (2011) argued that effective recordkeeping is vital to educational development. In addition, he

emphasizes that, it will be an impossible task to plan and administer any institution in which kept. Consequently, the educational planners and administrators need to have adequate and accurate data of student enrolment, school personnel i.e. academic and non-academic staff and school records for effective planning and management of schools.

One cannot over-estimate the utilization of ICT in everyday activities of the school. Vijay (2012) noted that ICT assists the school administrator to meet the task of school management in the areas of curriculum and instruction, school community relationship and school business operations. In support of this Mohan (2012) argued that the introduction of ICT in schools enhances the daily school routine, programme, updating the evaluation of school programmes, solving individuals' or groups' as well as staff development.

There is no doubt therefore, that secondary school education has become more complex and hence its management demands more from the managers. The enormous rise in the number students in schools as well as the multiplicity of programmes have made school principals to handle large quantity of data which they must process speedily to provide information for the teaching service commission and ministry of education for effective management and decision making. Hence the use of ICT in the management process is imperative for sustainable development. It has however been observed that in many public secondary schools tools like computer, internets and other telecommunication technologies that can aid teaching and learning are hardly used or not available. It is against this background that this study intends to examine

the utilization of information and communication technology (ICT) in the effective management secondary schools in Mathira West District.

2.6 Use of ICT in Communication in Schools

The use of ICT in the school environment is considered to be part of the extensive technological modernization of administration and education, according to MOEST, (2005), as well as electronic government (e-Government) and electronic learning (e-Learning). The introduction of innovative technological applications in schools is connected with changes, not only at the level of teaching and learning, but also in carrying out administrative tasks in schools. According to Tusubira (2005) any modern institution of higher learning is critically dependent on the smooth operation of the new innovations of ICT. Supported in its entirety by the communication technology, information spread vastly become faster and cheaper. It should however, be noted here that if ICT facilities like word processors, electronic databases, e-mail and management information systems are put in place, they can result in more efficient communications (Sibangani, 2006). However ICT application depends on the existence of ICT infrastructure, people's skill and knowledge. Internet can help link the school with the Ministry of Education offices to make the transfer of documents, new regulations and queries more efficient throughout the system. It can also help in improving the flow of information to the community through web sites and with regular well-designed information sheets.

At the national and county level, policy-makers may consider the introduction of ICT at all three levels (classroom, school, system) as a great opportunity to acquire and to distribute information through the system and from the general public to the

classroom teacher. A coordinated effort can achieve economies of scale and compatibility of information processes and flows at all levels. Principals in secondary schools need effective and fast communication and accessibility to information as Wiley (2003) remarks. Principals' can correspond through e-mail and the internet, creating websites for school marketing. They can save time while using a program to communicate to parents, teachers, students, other school administrators, business executives, suppliers and the wider community. Effective educators must possess ICT knowledge.

2.7 Summary of Literature Review

The reviewed literature indicates that implementation of ICT in school management cannot be over emphasized. The implementation of ICT ensures accuracy, timeliness and effectiveness of school management, that is, it allows easy flow of information and risk monitoring systems that are appropriate. The tasks of manually processing and storage of data of a large number of students, teachers and non-teaching staff, is not only tedious but is also likely to be marred with inefficiencies. ICT would have impact on the management of education institutions; it increases efficiency and accountability to institutional resources. The use of financial software can give the bursar a good indication about the financial health of a school and a means of comparing data with previous months, terms and years. This gives a baseline for effective decision making, say, about how fees should be collected, how salaries should be paid and how to carry out other procurement services in the school. Lastly ICT have important roles to play in making school administration less burdensome if effectively implemented.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the specific procedures that were used in the study. They include; the research design, target population, sampling technique and sample size, instrumentation, piloting, data collection procedures and data analysis procedures.

3.2 Research Design

This study adopted a descriptive survey design. Kombo and Tromp (2006) define a descriptive survey as a method of research which gathers data at a particular point in time with the intention of describing the nature of existing conditions of, or determining specific information. This method was thought to be an effective way of collecting data from a large number of sources relatively cheaply and within a short time. It is the most appropriate for this study in regard to the population and variables under study.

Gray (2004) regards the descriptive survey research design as a useful tool for educational fact finding. Cohen and Manion(2000) add that a wide range of educational problems can be investigated in descriptive research. Since this study sought to obtain descriptive and self-reported data from schools on ICT, the descriptive research design was the most appropriate. This design can obtain information that can be analysed to extract patterns and to make comparisons.

3.3 Location of the Study

The study was carried out in Mathira West District in Nyeri County. Mathira West District borders Nyeri Central, Mukurweini, Mathira East and Kieni West districts. The district is situated approximately 150 kilometres from Nairobi on the eastern slopes of Mt. Kenya. The main economic activities in the district include coffee and tea growing and small scale horticulture. The district was chosen as a research site because of the existence of many and different categories of secondary schools; national, county and district. These schools are likely to display a large spectrum of levels of ICT integration.

3.4 Target Population

The target population for this study consisted of all principals of public secondary schools in Mathira West District. The district has 13 district secondary schools, 2 County and 1 national school. The study targets all public secondary schools as shown in Table 3.1.

Table 3.1: Target Population

Category of School	No. of Principals
National	1
County	2
District	13
Total	16

3.5 Sampling Procedure and Sample Size

This section consists of the sampling procedure and sample size used in the study. The study employed census technique because the entire population was a manageable number. All the 16 principals of public secondary schools in Mathira

West District were included in the study. The district had 16 secondary schools which fall into three categories, namely, national, county and district. The researcher proposed that the study would obtain reliable and accurate information from all levels, thus avoiding biases. A summary of the sample size is shown in Table 3.2

Table 3.2 Sample Size

Category of School	**No. of Principals Sampled**
National	1
County	2
District	13
Total	16

3.6 Instruments

Data was collected by means a questionnaires that was administered to the principals of the public secondary schools in Mathira West District. The questionnaire consisted of 40 items and was divided into three sections. Section A had 5 items and gathered data on the on the respondents biographical information, section B had 15 items and sought information on availability of ICT infrastructure while section C had 20 items in likert scale and sought information on ICT applications in school management functions.

A questionnaire was preferred for collecting data because in such a questionnaire, the questions, their wordings and sequence of the items are fixed and identical to all respondents. This had the advantage of obtaining standard responses to items in the questionnaire, making it possible to compare between sets of data.

3.7 Validity and Reliability

This section discusses the validity and reliability of the research instruments.

3.7.1 Validity of the Instruments

Mugenda and Mugenda (2003) define validity as the accuracy and meaningfulness of inferences which are based on the research results. Orodho (2008) adds that validity ascertains whether a research instrument is measuring what it is supposed to measure. The questionnaire was presented to the supervisor to evaluate its validity with regard to the degree to which the variables to be tested are presented as well as the instruments overall appropriateness for use. Validity of the study instruments was ensured by including many items addressing different facets of the construct as possible (Joppe, 2000).

3.7.2 Reliability of the Instruments

The piloting of research instruments was done in two secondary schools. The pilot schools were not included in the final sample. Piloting was done to pre-test the instruments and revise if necessary. It is through the pilot study that the reliability of the instruments was ascertained. Reliability concerns the degree to which a particular measuring procedure gives similar results over a number of repeated trails (Orodho, 2008). Test-retest technique was employed and a reliability coefficient of 0.821 obtained. According to Mugenda and Mugenda (1999) a reliability coefficient of 0.7 or more implies a high degree of reliability. Items with reliability of 0.7 and above will be considered reliable for the study while those with correlation of less than 0.7 will be reframed.

3.8 Data Collection Techniques

Data collection refers to gathering specific information aimed at proving or refuting some facts (Kombo & Tromp, 2006). Before proceeding to collect data from the selected respondents the researcher first obtained an introduction letter from Karatina University and then proceeded to obtain a research permit to carry out the study in the area from the National Council of Science and Technology (NCST). A copy of the permit was given to the Sub County TSC Director of Education and Mathira West District Education Officer (DEO). These letters helped the researcher to access the schools, brief the principals on the purpose of the study and book appointments for data collection. Once permission was granted, the researcher met the respondents and explained the purpose of the questionnaires and made clarifications. The respondents were given the questionnaires to fill within a period of one week after which the researcher visited the schools and collected the filled questionnaires. The researcher assured the respondents that their responses would be treated in strict confidence and that the data would be used for the purpose of this study only.

3.9 Ethical Considerations

Ethical standards and their acceptability were considered throughout the interaction of the researcher with participants involved in the research. The purpose of the study was explained to the respondents when being orientated to the study. It was clearly stipulated to them that participation in the study was important but voluntary. They would not be subjected to any form of pressure to complete the questionnaire. The respondents were assured that the responses would be treated confidentially and anonymously. The researcher would not identify the responses on any questionnaire

as belonging to any specific person. All completed questionnaires would be destroyed by the researcher once the research report has been accepted.

3.10 Data Analysis

Kerlinger (1973) defines data analysis as categorization, ordering, manipulation and summarizing of data to obtain answers to research questions. Data collected was coded, scored, keyed into the computer and analyzed using descriptive statistics using Statistical Package for Social Sciences (SPSS). The results were presented by use of tables. Frequencies and percentages were used because they easily communicate the findings to majority of the readers (Gay, 1992).

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSION

4.1 Introduction

This chapter analyses the data that was collected, presents and offers the interpretation of the results from the findings. Data was collected from principals in public secondary schools in Mathira West District. This study targeted 16 secondary schools. Out of these, 15 schools responded, this is 93.75 % of the target population which is a good representation.

4.2 Demographic Characteristics of the Respondents

This section describes the demographic characteristics of the respondents in the study. Such a description is important in providing a clear understanding of the respondents and the institution of the study and which may have influenced the results based on the objectives of the study. The demographic characteristics covered in this section include; gender composition, age, level of education, level of ICT training and years of experience with ICT. The responses are provided in Table 4.1

Table 4.1 Demographic Characteristics of the Respondents

Characteristics		Respondents (n=15)	
		Frequency	**Percent (%)**
Gender	Male	10	66.7
	Female	5	33.3
Age (years)	41-50 Years	4	26.7
	51 and Above	11	73.3
Level of Education	Bachelor's Degree	4	26.7
	Master's Degree	11	73.3
Level of ICT Training	Informal training	11	73.3
	Formal training	4	26.7
Experience with ICT	Less than 1 Year	2	13.3
	1 - 5 Years	6	40.0
	More than 5 Years	7	46.7

Information on Table 4.1 indicates that majority of the respondents, 66.7% were male and 33.3% were female. These results are probably due to the large number of district schools which are mixed day schools. The results agreed with Mukundi (2010) who observed that males dominate the headship of mixed secondary schools. This can be attributed in part to a society that is yet to fully embrace gender responsive policies.

The study sought to establish the age of the principals in secondary schools in Mathira West District. Majority of the principals (73.3 %) were aged above 51 years while 26.7% were aged 41-50 years. These results indicate that older principals were more than younger ones. This could perhaps be due to the recent government directive that increased the retirement age from 55 to 60 years (GoK, 2004); as a result the percentage of older principals was set to increase.

The study investigated the principals' level of Education. Majority (73.3%) had master's degrees while 26.7% had bachelor's degrees. The high number of principals

with masters could be due to the establishment of several universities that are now offering school based and distance learning programmes; this have enabled more teachers to pursue advanced education (Wekesa, 2012).

The research sought to find out the respondents' level of ICT training. Majority of the respondents (73.3%) indicated having received training informal training while 26.7% had formal training in ICT. The large numbers of principals having informal training could be related to the fact that ICT was not emphasized in teacher training institutions until recently. This is in agreement with Tearle (2004) who observed that the rapid developments in ICT have resulted in significant changes that have been increasing pressure on education managers to acquire new technologies.

The study sought to find out the principals experience with ICT. Majority of the respondents, 46.7% had more than 5 years' experience, 40.0% had between 1 - 5 years' experience while 13.3% indicated that they had less than 1 year experience. These results could probably be attributed to the in service training that was conducted by the ministry of education that aimed to equip school administrators with ICT skills (Oloo, 2009).

4.2 Status of ICT Infrastructure

The first research objective sought to find the status of ICT infrastructure in secondary schools in Mathira West District. The respondents were provided with 15 items which sought information on the status of ICT infrastructure, of which they were expected to indicate either "Available" or "Not Available". The scale measured the availability of ICT hardware and software. The findings are provided in Table 4.2

Table 4.2 Status of ICT Hardware and Software in Secondary Schools

ICT Hardware	Available		Not Available	
	Frequency	**Percent**	**Frequency**	**Percent**
Electricity infrastructure	15	100	-	-
Computer	13	86.7	2	13.3
Internet /e-mail infrastructure	3	20.0	12	80.0
School telephone	13	86.7	2	13.3
Digital/Video camera	5	33.3	10	66.7
Printer	13	86.7	2	13.3
Scanner	9	60.0	6	40.0
Fax machine	2	13.3	13	86.7
Copier	9	60.0	6	40.0
Surveillance camera	1	6.7	14	93.3
LCD Projector	6	40.0	9	60.0
ICT software				
Word processing	13	86.7	2	13.3
Spreadsheets	10	66.7	5	33.3
Databases	8	53.3	7	46.7
PowerPoint	7	46.7	8	53.3

Data on Table 4.2 indicates that all the secondary schools had electricity. Majority (86.7%) of the secondary schools indicated having computers, telephone and printers, 60% of the schools copier and scanner, 40% LCD projector, 33.3% digital/video camera, 20.0% internet /e-mail infrastructure, 13.3% fax machine and 6.7% surveillance camera.

These results are in agreement with Farrell (2007) who observed that the ministry's policy framework indicates that there are a number of challenges concerning access to and use of ICT in Kenya, including high levels of poverty and frequent power disruptions. The core problem is that Kenya lacks adequate internet connectivity and network infrastructure. Although a small number of schools have direct access to high-speed connectivity through an Internet service provider, generally there is limited penetration of the national physical telecommunication infrastructure into rural and low-income areas. Even where access to high-speed connectivity is possible,

high costs remain a barrier to access. School administration and management tend to use various software applications in their administration job purposes. Kawade (2012) observed that the most frequently used applications by school administration and management were Office tools such as Microsoft Office (Word, Excel, and PowerPoint), and tally. Higgins (2007) noted, administrators are familiar with range of software that handles information, particularly spread sheets and databases. Although this will be time -consuming, databases potentially offer much more efficient and effective ways to manage information that most schools currently use. Management Information System", is a sub-system of an education system whose aim is to collect, store, process, analyze and disseminate information (Susmita, 2007).

4.3 Extent of use of ICT in Management of Finances

The second research objective sought to gather information regarding the extent of use of ICT in management of finances in secondary schools. Utilization of ICT in management of school finances was measured by 6 items in five point likert scale that ranged from Never (N), Rarely (R), Undecided (U), sometimes (S) and Always (A). The findings are provided in Table 4.3

Table 4.3 Extent of use of ICT in Management of Finances

Control of school finance and stores	Never		Rarely		Undecided		sometimes		Always	
	Freq	%	Freq	%	Freq	%	freq	%	freq	%
Financial transactions	4	26.7	2	13.3	1	6.7	6	40.0	2	13.3
Students fees registers	5	33.3	5	33.3	-	-	5	33.3	-	-
Procurement documents	6	40.0	4	26.7	2	13.3	3	20.0	-	-
Tender process	6	40.0	6	40.0	1	6.7	2	13.3	-	-
Control of school stores	7	46.6	5	33.3	-	-	3	20.0	-	-
Library catalogue	8	53.3	5	33.3	-	-	1	6.7	1	6.7

Data on Table 4.3 clearly indicates that the use of ICT in management of school finances and stores in the district is low. Majority (86.6%) of the respondents indicated rarely using ICT in library catalogue, 80% did not use ICT in tender process, 79.9% in control of school store, 66.7% in procurement documents, 66.6% in student fees register and 40% in financial transactions.

These research findings are in agreement with a baseline survey conducted by Oloo (2009) on ICT use in secondary schools in Kenya that established that the use of ICT in schools was low. The survey also established that only a few schools had purchased schools management software which was used with varying success. Most principals lacked training on use of management software.

4.4 Use of ICT in Management of Human Resources

The third research objective of the study sought to find out the use of ICT in management of human resources. Use of ICT in management of human resources was measured by four items in a likert scale that ranged from Never (N), Rarely (R), Undecided (U), sometimes (S) and Always (A). The findings are provided in Table 4.4

Table 4.4 Use of ICT in Management of Human Resources

Use of ICT	Never		Rarely		Undecided		sometimes		Always	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Staff personal information records	9	60.0	3	20.0	-	-	2	13.3	1	6.7
Students' admission details	-	-	1	6.7	-	-	8	53.3	6	40.0
Staff responsibilities records	8	53.3	4	26.7	-	-	2	13.3	1	6.7
Communication with school Staff	7	46.7	5	33.3	-	-	3	20.0	-	-

Data on Table 4.4 shows that the use of ICT in management of human resources was low. The respondents indicated the use of ICT in management of human resources as follows;

80% rarely used ICT in staff personal information records, staff responsibilities records and communication. Only 6.7% rarely used of ICT in student admission details. These results agree with a survey by Oloo (2009) which established that only a few schools in Kenya had purchased schools management software. Most principals lacked training on use of management software. The most common modules bought by schools were examination, timetabling and accounting modules.

4.5 Use of ICT in Communication in Secondary Schools

The fourth research objective sought to find out the use of ICT in communication in secondary schools. Communication was measured by a four item likert scale that sought information on correspondence with, BOG, parents, PTA and education offices. The findings are provided in Table 4.5

Table 4.5 Use of ICT in Communication in Secondary Schools

Correspondence with stakeholders	**Never**		**Rarely**		**Undecided**		**sometimes**		**Always**	
	Freq	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**
BOG matters	8	53.3	6	40.0	-	-	-	-	1	6.7
Parents news letter	9	60.0	3	20.0	3	20.0	-	-	-	-
PTA matters	8	53.3	5	33.3	-	-	2	13.3	-	-
Education offices	7	46.7	6	40.0	-	-	-	-	2	13.3

Data on Table 4.5 shows that majority of the respondents, 93.3% rarely used ICT in correspondence with the BOG, 86.7 % rarely used ICT in correspondence with the education offices, 86.6% rarely used ICT on PTA matters and 80.0% rarely used ICT to send parents newsletters.

The findings are in agreement with Sibangani (2006) who observed that though ICT facilitates the smooth operation in institutions; its application depends on the existence of ICT infrastructure, people's skill and knowledge. Internet can help link the school with the Ministry of Education offices to make the transfer of documents, new regulations and queries more efficient throughout the system. It can also help in improving the flow of information to the community through web sites and with regular well-designed information sheets (Sibangani, 2006).

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter consists of the summary, conclusions and recommendations of the study. It also looks at areas that need further research based on the findings of the study.

5.2 Summary of Findings

The study established that ICT infrastructure in secondary schools was average; all the secondary schools had electricity, 86.7% indicated having computers, telephone and printers, 60% copier and scanner, 40% LCD projector, 33.3% digital/video camera, 20.0% internet/e-mail infrastructure, 13.3% fax machine and 6.7% surveillance camera.

The study found out that the use of ICT in management of school finances and stores in the district is low; 86.6% of the respondents rarely used ICT in library catalogue, 80% did not use ICT in tender process, 79.9% in control of school store, 66.7% in procurement documents, 66.6% in student fees register and 40% in financial transactions.

On the use of ICT in management of human resources the study found out that it was low; 80% rarely used ICT in staff personal information records, staff responsibilities records and communication. Only 6.7% rarely used ICT in student admission details.

The study found out that schools hardly used ICT in communication with stakeholder; 93.3% rarely used ICT in correspondence with the BOG, 86.7 % rarely used ICT in

correspondence with the education offices, 86.6% rarely used ICT on PTA matters and 80.0% rarely used ICT to send parents newsletters.

5.3 Conclusions

From the findings and the objectives of this study it can be concluded that;

The status of ICT infrastructure in secondary schools in Mathira West District is not yet fully developed as indicated by the fact that some schools are yet to install computers, telephone, internet/e-mail infrastructure, printers, scanners, LCD projectors, digital/video cameras, copiers, fax and surveillance cameras. Additionally, a significant number of schools indicated that they did not make use of basic computer software such as word processing, spreadsheets, databases and power point.

From the findings of the study it can be concluded that the use of ICT in management of secondary school finances and stores in the district is poor. Less than 50% of the respondents indicated using ICT in the following areas; financial transactions, students' fees register, procurement documents, tender process, control of school fees and library catalogue. The study found out that schools hardly used ICT in communication with stakeholder and that that the use of ICT in correspondence with stakeholders is very low; majority of the respondents indicated they did not use ICT in correspondence with the; BOG, parents, PTA and education offices. These results indicate a marked lack of use of ICT in communication with stakeholders.

5.4 Recommendations

i. There is need to improve the status of ICT infrastructure in secondary schools by installing more hardware and software.

ii. Secondary schools should be encouraged to use ICT in management of finances and stores.

iii. Secondary schools should incorporate use of ICT in management of their human resources.

iv. Use of ICT in communication in secondary schools should be enhanced in order to improve efficiency and cost.

5.5 Recommendation for Further Research

On the basis of the findings and conclusion of this study the following recommendations can be made.

i. Further studies ought to be carried out to investigate the levels of ICT literacy among the various categories of staff employed in secondary schools.

ii. There is need to establish the attitudes of secondary school employees towards use of ICT

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APPENDIX A

PRINCIPALS QUESTIONNAIRE

This questionnaire is part of a research project to investigate ICT integration in secondary school in Mathira West District. For this study to be successful, your co-operation and honesty in responding to the items will be highly appreciated. Please be assured that the information you will provide is completely confidential and will be used for the purposes of this study only. Do not indicate your name or the name of your school. In all the sections tick appropriately.

Section A

1. Gender

   Male ( )

   Female ( )

2. Age :

   30 and below ( )

   30-40years ( )

   41-50 years ( )

   51 and above ( )

3. Education level

   Diploma ( )

   Bachelor's degree ( )

   Master's degree ( )

4. Level of ICT training

   No training at all ( )

   Informal training ( )

   Formal training ( )

5. Period of experience with ICT

No experience ( )

Less than 1 year ( )

1 to 5 years ( )

More than 5 years ( )

Section B. Availability of ICT hardware and software

Indicate the availability of the listed ICT hardware and software in your school

	ICT Hardware	**Yes**	**No**
6	Electricity infrastructure		
7	Computer		
8	Internet /e-mail infrastructure		
9	School telephone		
10	Digital/Video camera		
11	Printer		
12	Scanner		
13	Fax machine		
14	Copier		
15	Surveillance camera		
16	LCD Projector		
	ICT software		
17	Word processing		
18	Spreadsheets		
19	Databases		
20	PowerPoint		

Section C: ICT application in school management functions

Indicate your degree of agreement with the following statement: I use ICT in monitoring the listed management functions in my school. Never (N), Rarely (R), Undecided (U), sometimes (S) and Always (A).

		N	R	U	S	A
21	**Organization of the approved curriculum**					
22	School timetable					
23	Schemes of work					
24	Students' progress reports					
25	Learning sessions					
	Control of school finance and stores					
26	Financial transactions					
27	Students fees registers					
28	Procurement documents					
29	Tender process					
30	Control of school stores					
31	Library catalogue					
	Management of human resources					
32	Staff personal information records					
33	Students' admission details					
34	Staff responsibilities records					
35	Communication with school Staff					
	Correspondence with stakeholders					
36	Maintain correspondence on all Board of Governors (BOG)					
37	Parents news letter					
38	Maintain correspondence on all Parents Teachers Association (PTA) matters					
39	Maintain correspondence with education offices					
	Management physical facilities					
40	Monitoring the maintenance manuals for all physical facilities					

APPENDIX B

RESEARCH PERMIT

THIS IS TO CERTIFY THAT:
MISS. ALICE MUMBI WANJAU
of KARATINA UNIVERSITY, 1957-10101
karatina,has been permitted to conduct
research in *Nyeri County*

on the topic: *INTEGRATION OF INFORMATION COMMUNICATION TECHNOLOGY (ICT) IN MANAGEMENT OF PUBLIC SECONDARY SCHOOLS IN MATHIRA WEST DISTRICT, NYERI COUNTY*

for the period ending:
17th December,2015

Permit No : NACOSTI/P/14/1521/3392
Date Of Issue : 19th September,2014
Fee Recieved :Ksh 1000

Applicant's Signature

Secretary
National Commission for Science, Technology & Innovation

CONDITIONS

1. **You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit**
2. **Government Officers will not be interviewed without prior appointment.**
3. **No questionnaire will be used unless it has been approved.**
4. **Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.**
5. **You are required to submit at least two(2) hard copies and one(1) soft copy of your final report.**
6. **The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice**

REPUBLIC OF KENYA

National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

Serial No. A 3259

CONDITIONS: see back page