

**APPLICATION OF INFORMATION COMMUNICATION AND
TECHNOLOGY IN SCHOOL MANAGEMENT PRACTICES IN PUBLIC
SECONDARY SCHOOLS IN RUIRU DISTRICT, KIAMBU COUNTY,
KENYA**

BY

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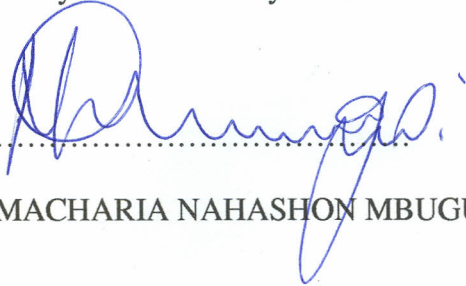
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DECLARATION

This project report is my original work and has not been presented for a degree in any other university.

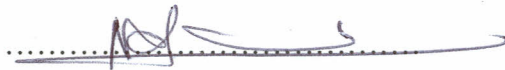


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DEDICATION

This work is dedicated to my wife, Nancy and my sons, Lewis and Shalom.

May it be an inspiration to them.

ACKNOWLEDGEMENT

I feel greatly indebted to everyone who helped in one way or the other to make this work a success.

My very special thanks go to my supervisors, Dr. Samuel N. Waweru and Dr. N. Ogeta for helping me give this work some shape. I was so short of ideas sometimes but whenever I approached them, I left their offices with a clear-cut way in which to follow.

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Lastly, my classmates in the M.ED class of 2010 deserve mentioning because they provided the necessary encouragement knowing that we had very much in common.

ABBREVIATIONS AND ACRONYMS

DEO- District Education Officer

ICT- Information Communication and Technology

NGO- Non Governmental Organization

SPSS- Statistical Package for Social Sciences

TSC -Teachers Service Commission

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ABSTRACT

After several years of effort, Kenya promulgated a national ICT policy in January 2006 that aims to “improve the livelihoods of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services. The policy emphasizes the application of ICT in school management and recognizes that senior managers in schools have a major impact upon classroom and curriculum implementation practices. The study’s major objective was to establish the application of Information Communication and Technology in school management practices in public secondary schools in the areas of personnel, financial, and strategic aspects. The specific objectives of this study were to assess the existing ICT components and infrastructure in public secondary schools, assess application of ICT in various management areas, establish the constraints faced in adoption of ICT in public secondary school management and propose strategies and interventions of improving application of ICT in public secondary school management. The study adopted a descriptive research design both qualitative and quantitative data were used to answer the research questions on the use of ICT in school management in public secondary schools. The study target population comprised of all the public secondary schools in Ruiru District and the subjects of the study were principals/deputy principals, Heads of Departments, teachers, bursars/accounts clerks and students. Ruiru District had 14 public secondary schools and the researcher conducted the research in all the schools since it was possible to collect data from all of them. Data were collected using questionnaires, interview schedules and an observation schedule. Qualitative data was obtained from open-ended items in the questionnaires and interview schedule. Data were analyzed both qualitatively and quantitatively. Data were presented in tables, and graphs. The study found out that only a small proportion, 4 (28.6%) of schools had computer laboratories/rooms. Majority (80.0%) of schools were using computers in timetabling as well as management of finances and storing of records/data on students enrolments and academic progress. Most (60%) principals were ICT illiterate and that there was minimal utilization of ICT in the management of public secondary schools in Ruiru. The main challenges facing the adoption of ICT in the management of public secondary schools were; principals ICT illiteracy and limited rural electrification. The study concluded that there was need for participatory approaches in the adoption of ICT and that for successful adoption of the use of ICTs in our education system required clearly laid down strategies and policies. The researcher therefore recommended that for effective access and use of ICT at least the basic infrastructure like computers, electricity and telephone services to be provided, training of school principals in ICT applications to be initiated, and computer studies to be made a compulsory subject in secondary level of education. The researcher further suggested that a comparative study be carried out to compare the adoption levels of ICT between public and private secondary schools.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Information and Communications Technology (ICT) is an umbrella term that includes any communication device or application, encompassing radio, television, cellular phones, computer and network hardware and software, satellite systems and so on as well as the various services and applications associated with them, such as video conferencing and e-Learning. Many countries around the world have established organizations for the promotion of ICTs, because it is feared that unless the lesser technologically advanced areas catch up with the state of art technology, the increasing technological advances will only serve to exacerbate the already-existing economic gap between technological "have" and "have not" areas. Internationally, the United Nations actively promotes ICTs for development as a means of bridging the digital divide. (Farrell 2007).

Information and Communication Technology (ICT) is relatively new in Kenya as compared to other developing countries and has caused a major model shift in processing, storage, analysis and retrieval of information in industry. The national policy which was promulgated in January 2006 has several sections which include information technology, broadcasting, telecommunications, and postal services. However, it is the section on information technology that sets out the objectives and strategies pertaining to ICT and education. The relevant

objectives in this section states that Government of Kenya will encourage the use of ICT in schools, colleges, universities and other educational institutions in the country so as to improve the quality of teaching and learning (Farrell 2007).

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 ICT into the teaching and learning. In June 2006, National ICT Strategy for Education and Training was introduced and the Ministry of Education took steps to support the implementation either by direct action or through the various institutions and agencies like Kenya ICT Trust Fund, formed in 2004, with the aim of spearheading ICT initiatives in education. Membership is open to public sector organizations, donor partners, civil society, as well as academic and other educational institutions such as Computer for Schools Kenya (CFSK) which is a charitable Non Governmental Organization (NGO) that work closely with the Ministry of Education in providing computers in schools through ICT equipments for schools programme. CFSK is working to empower youth and communities by facilitating the development of ICT infrastructure and capacity. It has regional centres in Embu, Mombasa, Machakos, Kiambu, Nyeri Meru, Nakuru, Kisumu and Kakamega (www.cfsk.org/home.htm).

Application of ICT in education is therefore the function of supporting teaching, learning and administration. Particularly, management issues associated with the

advances application of ICT and having the benefit of ensuring the smooth running of a school in terms of achievement of the school's vision, mission and objectives. Application of ICT to enhance the management function of any educational institution is paramount in addressing institutional objectives. It is clear that ICT implementation needs to address certain objectives that would improve school management practices, (Morgan, 1986).

→ ICT is increasingly being applied in educational institutions, and also established in professional and classroom practice. As a consequence, research activity geared towards developing and establishing ICT practices is increasing and becoming more vital. However, although teachers, educationists, companies and policy makers continue to take increasing interest in the scope of this field, there is relatively little application of ICT in teaching, learning and management practices especially in primary and secondary schools (Njathi, 2010).

The question that needs needed be answered was what could should be the nature and form of educational infrastructure, human and organizational aspects to be considered and implemented in order to embrace ICT application and adoption in schools in Ruiru District. School managers, teachers, administrative staff and students need to embrace the fact that ICT is an integral part of teaching and learning process (Karon, 2000).

Application of ICT in school management is essential since it is recognized that senior managers in schools have a major impact upon classroom and curriculum implementation practices. ICT within schools is permeating aspects of school practices that would impact upon all staff and students. The real significance of ICT for primary and secondary educational management verified especially in developing countries and more so in rural areas. Educational management indicates that attitudes towards ICT are shifting significantly towards impacting upon school management in relation to the importance of communication and management systems and models for education (Keegan and Wheeler 2008). The application of ICT in management practices in Ruiru is a problem because so far very few schools if not none have tried to apply ICT. This study investigated the application of ICT in public secondary schools.

1.2 Statement of the Problem

Messages arising from the general management and management of change appear to be relevant and pertinent within the educational systems and ICT applications in public secondary schools administration points towards some caution that needs to be taken with regard to certain areas – in particular personnel, financial and strategic aspects. This study looked for evidence which pointed the recurring factors that underpinned the effective use of ICT to support and enhance school management, for example, school culture, leadership skills, training and monitoring. The permeation of application of ICT for educational purposes means that for all those who manage, ICT is likely to have an impact

on the achievement of institutional objectives. From the point of view of those who manage in educational institutions this implies that there will be implications in all types of management; strategic management, implementation management at school policy level, curriculum management, classroom management, site management, financial management and personnel management. This study therefore sought to establish application of Information and Communication Technology in school management practices in public secondary schools in Ruiru District in Kenya.

1.3 Purpose of the Study

The purpose of this study was to establish how school management practices could be enhanced through application of ICT. It also aimed at establishing the impediments of adoption of ICT in public secondary schools in Ruiru District in Kenya.

1.4 Objectives of the Study

The objectives of this study were to:

- i. Assess the existing ICT components and infrastructure in public secondary schools in Ruiru District.
- ii. Assess application of ICT in management of student and staff human resources.
- iii. Investigate the use of ICT in financial and physical resources management.

- iv. Establish the constraints faced in adoption and implementation of ICT in public secondary school management in Ruiru District.

1.5 Research Questions

The study aimed at answering the following questions:-

- i. What ICT hardware and software were applied in public secondary schools in Ruiru District?
- ii. How was ICT applied to manage students' records, human and physical resources in public secondary schools in Ruiru District?
- iii. How is ICT applied to manage school finances in public secondary schools in Ruiru District?
- iv. What constraints were encountered in application of ICT in public secondary schools in Ruiru District?

1.6 Significance of the Study

The study will enhance educational managers in educational institutions in appreciating the feasibility and expansion of application of ICT in management practices and broaden the effectiveness and efficiency of the schools. This will lead to viable plans on how the institution's objectives of promoting knowledge acquisition could be promoted and thus promoting human capital and reduce wastage. The study will also lead to an understanding of the status of ICT which would lead to devising viable ways of improving its status in schools in Kenya. In addition, the study will also show a reflection of the costs required to setup

ICT infrastructure. Finally, the study will contribute to the existing knowledge on application of ICT in management. It will also act as future reference source for stakeholders in education.

1.7 Assumptions of the Study

Values that are shared by people in a group and that tend to persist over time (organizational culture) which represents the behavioral patterns or style of an organization that employees are automatically encouraged to follow by their fellow employees was assumed that it would not affect adoption of change and implementation of ICT in public secondary schools in Ruiru District. It was also assumed that the respondent's feedback and assessment parameters during data collection i.e. (very good, good, average, below average, poor) would give uniform results.

1.8 Limitations of the Study

The study was carried out in just a small proportion of Kenyans public secondary schools. The subjects of the study were also few compared to the total number of teacher, provincials, students and bursars in the public secondary schools in Kenya. For these reasons, the findings of the study may not be generalizable to the entire country.

1.9 Delimitations of the Study

This study was delimited to one district that is Ruiru district in central province, Kenya. The study limited itself to verifying the status of application of ICT in management practices in public secondary schools in Ruiru District in Kenya. The study did not investigate application of ICT in other institution's activities apart from management. The study did not examine application of ICT in primary schools, tertiary institutions levels and business sector.

1.10 Theoretical Framework

The study was theoretically based on the Systems Theory. The underlying assumption in Systems Theory is that all organizations are like living organisms, constantly moving, changing, and interacting, and a change in any one element affects the organization as a whole. Systems theory has a long history in the realm of human knowledge. Some scholars trace the development of systems theory back to Aristotle. Most scholars attribute the idea of holism, central to systems thinking, to the German philosopher Hegel who stated that the whole was greater than the sum of its part. This idea that systems consist of a number of interrelated and interconnected parts, that once put together, make the behavior of the whole different and distinct than the behavior of its individual parts. Management control systems consist of all organization structures, processes and subsystems designed to elicit behavior that achieves the strategic objectives of an organization at the highest level of performance with the least amount of unintended consequences and risk to the organization. The key ideas

in this definition are as follows. Control is about achieving strategic objectives. The objectives must be achieved at a superior level of performance while minimizing any chance of unintended consequences. Structure refers to the formal task, authority and responsibility assignments in an organization. Processes are the activities through which control is accomplished. Subsystems support the structures and processes by providing the right incentives to shape behavior (Göran, 1994).

Using systems theory as a framework means that we view management control systems much like biological organisms that exist in a constant interaction with their environment. If an organization is an open system in constant interaction with its environment, then it follows that the environment will be very important in determining and explaining its behavior and controlling its fortunes. The implication is that a study of management control system must begin by understanding and characterizing an organization's environment. Organizational environments can be benign (few threats) or uncertain and dynamic (rapid change). Effective management control systems must meet the needs of their environment. This is embedded in the definition of Management Control System when it was stated that the purpose of control is to achieve strategic objectives and to avoid unintended consequences (Göran, 1994).

The concept of interrelated subsystems suggests that management control systems should be viewed as comprising of many interrelated components. Some of these may be structural components such as information, authority

delegation, and so on. Others may be behavioral or cultural factors such as motivating behavior or building the right values. These systems are interrelated which means that we must design each one recognizing its impact on the other components. For example, we must consider how information will impact human behavior and vice versa. This means that the challenge for the designer of a management control system is to bring together an organization's structural components and mesh it together with its behavioral and cultural components, so all three work together as a singular whole (Göran, 1994).

The concept of input-transformation-output links the management control system to the environment. Organizations obtain inputs from their environment, transform them into outputs, and then send the outputs back into the environment. In order to design a good management control system, it is imperative that we have a proper understanding of where in the environment to find the right inputs, what kind of transformation perform, and what output to produce.

Differences in management control systems will reflect different input-transformation-output differences. For example, manufacturing organizations that use a mass manufacturing process will have different types of control systems than organizations that use lean manufacturing methods. Understanding the input-transformation-output process helps to determine the special design parameters of a management control system for that organization.

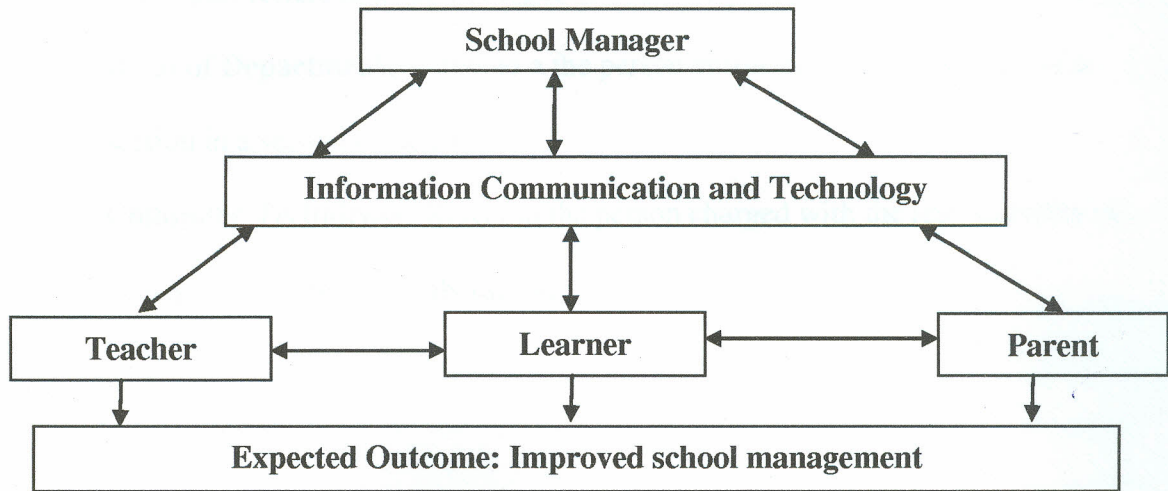
The notion of feedback is a very useful in designing management control systems. In a number of situations, an organization is faced with a choice of choosing whether to design feedback or feedforward systems. Budgetary controls typically use negative feedback. Economic and market forecasting systems use feedforward information. In general feedforward controls are better but they are expensive. Feedback systems are less efficient but also less costly to design and implement. The concept of homeostasis in the area of management control means that the system is not looking for a steady equilibrium. Rather it is seeking an improved state. Continuous improvement rather than maintenance of status quo becomes a key issue in designing control systems (Bailey, 2003).

Control systems must continually scan their environment and improve their operations in order to maximize their chances of long run survival. The usefulness of concept of equifinality for management control is that it keeps the designer from looking for a one best way to do things. It recognizes that many different designs for a management control system can lead to the same end result. The concept of equifinality sensitizes a designer to look for solutions anywhere in the system and introduce change where it will be most likely to be effective in attaining the goals of the organization. For example, the productivity of a worker is affected not simply by how a task is designed; it is also affected by social environment in which he or she works. Increase in worker productivity, therefore, can be accomplished by redesigning the task or by redesigning the social system within which the worker is operating. In line with

this study the researcher considers application of ICT in management in public secondary schools as based on systems theory of management (Bailey, 2003).

1.11 Conceptual Framework

Figure 1.1 Conceptual Model for Interaction Within the School Community



Source: Researcher (2012)

In this conceptual framework (Figure 1.1), the school manager is the independent variable because he or she determines the kind of ICT components and designs that will be used in his or her school, while the information communication and technology is the dependent variable. The conceptual model shows the various interactions between the different school members. It shows that communication between any two members or group of members is two way. This is the essence of communication in daily life in the school system whose objectives achievement is likely to be made more efficient by application of ICT in management practices in public secondary schools.

1.12 Definitions of Significant Terms

The following terms will be taken to mean as described.

School manager: Refers to a person involved in the day to day running of the school.

Learner: Refers to a secondary school student.

Principal: Refers to a head of a public secondary school.

Head of Department: Refers to a the person entrusted with the running of a section in a secondary school

Computer Technician: Refers to the person charged with the responsibility of managing the computer laboratory.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction

This chapter deals with the review of related literature under the following subheadings: the rationale of the use of ICT in schools, reporting systems, monitoring and students tracking systems, parental alert system, general management and the management of change, educational management, timetabling, communication, learning environment, related studies and other resources. A brief summary of the literature review is given at the end of the chapter.

2.1 The Rationale for ICT in Schools

It is necessary to develop a thorough rationale before beginning to use computers in schools and classrooms. There is little or no point in providing computers in schools unless such a rationale has been completed. With the increasing availability of computer hardware it is important that teachers do not become engrossed in the machine but focus rather on their primary role as educators. Teachers need to extend their imaginations with the awareness that as developments in computer technology occur they will be able to achieve more of their goals (Photos and Kyriacos 2011)

Since the 1960's the computer has been heralded, by some, as the solution to many problems in education. Many early computer scientists saw the possibility of the computer replacing teachers in schools. However these pictures of

students sitting behind computer terminals for much of the day have largely not occurred in mainstream schools and most would not like this to be realized (Collins, 1989). There are three main rationales for ICT in schools: one concerns the organizational productivity of the school, and the other two focus on the needs of students: technological literacy and support for their learning. The need for ICT competent teachers stems from the need for ICT competent students and for ICT-rich learning environments that enhance students' learning across the curriculum. Apart from in a few exceptional schools, in the 20th century computers had only a minimal impact on what happens in classrooms (Becker and Kim, 2000). There has been much debate over the reasons for this discrepancy between the potential and what is realized. The computer is one of a range of technologies now available to teachers and students. In past decades technologies such as radio, television and overhead projectors similarly had little lasting impact on the experiences of students and teachers in schools. In these cases a large amount of money was spent on these resources which some would argue would have been better spent on other resources. It is important that scarce resources to support learning in schools are not wasted and therefore care needs to be taken in choosing to use computers to support learning.

Historically, technology has been developed to solve problems, improve living standards and to increase productivity. Therefore, it is reasonable that we should expect educational technology to be developed with similar objectives. Within the educational context these objectives become to increase productivity and to

fundamentally solve problems in teaching/learning programmes. If these could be achieved, then ICT could be seen to have a positive impact in education (Becker and Kim, 2000).

2.2 Reporting Systems

Any business use of ICT can be adapted to fit the particular requirements and needs of an educational establishment, all that is required is the vision and willingness to see what is available within the commercial world and take on board any ideas that would enhance productivity of students, teachers, and administrative staff. Computerizing the reporting system of a school is of great benefit to schools as it saves time for both teaching and administrative staff and it means that reports can be generated automatically and to a common format. Standardization of documentation and the availability to have it accessible from any computer and that the information is searchable means that it is very easy to facilitate the sharing of information. A reporting system also means technology can be used for the communication with students and parents and ensure that “criteria are communicated to students in a standardized way” (Lavigne, 1996). This is a step in the right direction to achieve quality assurance within the school system and move away from paperwork with the ideal of achieving a “paperless” office system removing some of the administrative burden from the teacher. It also means that quality wise a standard can be enforced and adhered to and changed easily with any changes being communicated quickly and efficiently to staff.

2.3 Monitoring and Tracking Systems

Monitoring student progress is one vital aspect of a teacher's professional role, and also is an important factor for schools to be effective, "the most effective schools are those that have strong leadership, a climate of high expectations, an orderly atmosphere and constant monitoring of student progress" (Johnson, 2000). Software monitoring systems are an easy way to monitor student performance automatically and give teaching staff early identification of underachievement. While this does not replace the function of the teacher it can act in tandem and supplement the teacher's function in ensuring that no student is overlooked and no student is left behind, as sometimes some teachers have a lot of students to monitor. Monitoring and tracking systems can provide a kind of failsafe although the data does need to be entered into the system periodically to ensure it works well.

Lavigne (Ibid) intimates that monitoring systems can, not only be used for monitoring results as they occur, they can also be used to predict grades that can be used to identify pupils requiring additional support and give the school Period-by-period registration, reporting and progress and behavioral tracking. Software and ICT also makes information about criteria more readily accessible than a handout that can be easily lost or misplaced which for reporting and monitoring purposes means a simplification of the process into a standardized, automatic and efficient process.

2.4 Parental Alert

Parental alert software enables a school to communicate quickly and cheaply with parents which means improved communication with them, reducing unauthorized absence rates with a further benefit of cutting administration costs. ICT provides tools that can assist school staff in the important task of managing pupil absences and enables schools to send parents automatically generated phone calls, short text messages (SMS), and emails. It means that if a child is missing from school, parents can be notified within a short period of the absence being recorded, thus keeping parents up to date if there are any problems with their children and “promoting a mutually supportive relationship between parents and school personnel” (Johnson, *Ibid*).

Use of parental alert software means that overall attendance will improve and the number of unauthorized absences will be significantly reduced. That first-day contact sends a clear message to pupils and parents that absence is a matter of concern and will be followed up. The final benefit of using parental control software is that office and guidance time can be used to better effect. The empowerment of technology utilized in these examples facilitates better communication and frees up time for staff to use their limited resources to better effect.

Passey *et al* (1997) identified a range of management implications of using ICT resources in schools and in homes. Of particular note was the outcome that parents would be likely to use ICT more in the future for communication with

schools, and that this would require managing, just as any other area of important relationship needs to be managed between homes and schools.

2.5 General Management and the Management of Change

Karen (2011) undertook a major series of early studies into industrial change. His studies focused upon aspects of change within large multinational organizations, which mirror educational systems in some respects. He identified at an early stage how existing attitudes could shape internal change, and how interest groups needed to be managed. Above all, perhaps, his concept of 'the mobilization of support' was central, and is as pertinent now as it was then.

Peters (1989) looked at implications of change for managers, and, as a consequence, the impacts that managers should consider when change is a necessity or a desirable action. He was concerned with the concept of the potential for rapid innovation within companies, and the need to consider failure as a reasonable and useful element within the entire realm of processes of change. Morgan (1986) looked at the ways in which organizations can be managed, and the implications that this has for a developing, continuing or changing practice. His work looked at the industrial and commercial fields, and showed that there was a need for those managing change to consider the overall approaches that can be undertaken at an organizational level. Browning (1990) offered what might be considered a realistic viewpoint on commercial change. He argued that change for individuals was not easy, and that change for groups or organizations was even more difficult. However, he argued further that the

need for change was certain, and that therefore the control of change must be a major consideration for all organizations. He argued that those who had some control over processes of change would be more successful than those who did not.

Carnall (1990) identified an important series of effects on working practices that individuals move through when they experience change. He noted that individuals go through a series of five stages: shock, denial, testing, owning, and implementing. He showed that effectiveness can be affected by change, and that some lowering of effectiveness should be anticipated at the early stages before the positive outcomes of change from later stages emerge. He showed that the stages individuals work through need to be managed from both an individual and a group point of view. Mevarech, (1997) also showed this effect in an educational context, and argued that the lowering of effectiveness at early stages could halt the emergence of higher level outcomes at later stages.

2.6 Educational Management

Fullan, (1992, 1993) and Fullan and Hargreaves (1992) were concerned with identifying reasonableness in terms of change, and indicating the need for all those within an educational system to take on board the meaning of uncertainty and features of change if change itself is to be accepted and implemented. Their studies pointed to the need for positive support to bring about change; however, the fact that ICT brings about future needs where support has to be identified by implication can clearly be a difficult aspect for organizations and groups to

address at certain times. His concept of 'the learning organization' is central to this concern – 'the capacity to live in a state of continuous imbalance'.

Davies (1991) identified the need for school managers to consider a range of attitudes - threat, anxiety, inadequacy, and antagonism as major negative effects. However, she did not from her studies look at the needs and implications for managing positive attitudes in change situations – it can be just as hard to manage enthusiasm, commitment and endeavor when resources and access to those resources are limited, for example. Studies by (Scrimshaw, 1997; Passey et al., 2000; Somekh et al., 2001) have pointed to the fact that ICT implementation in schools is happening over short time intervals. However, the fact that technological change can happen more rapidly than an integration of ICT into practice means that the development of uses of ICT into practice need to be managed all the more.

2.7 Timetabling

Timetabling is perhaps one of the most important planning exercises in the school calendar and can be a nightmare of organization with many resources such as teachers and classrooms to allocate to classes without any mistakes. Putting a timetable together is a practical expression of the curricular philosophy of the school and it sets, maintains and regulates teaching and learning time whilst at the same time ensuring that there is a delivery of quality education for all students.

There is a wide range of specialist software to assist in the production of the school timetable, greatly speeding up the process and ensuring that duplication and mistakes are avoided. Although putting together a timetable for an entire school only occurs once a year, it is of vital importance to manage resources effectively and software and ICT will greatly help facilitate this important and time consuming task.

2.8 Communications

There are many benefits for school communication derived from an ICT system, “communicating performance criteria through technology is advantageous for teachers in that the time spent developing computer materials, tutorials, or programs is a long-term investment.”(Lavigne, 1996) ICT also enhances communications within school as it is easy to use and it enables all staff, parents, and students to keep informed. ICT also supports management and administrative procedures with an electronic document management system which means there is less paperwork and all files are stored in a central area and not lost; and they can be accessed from anywhere.

There are many considerations when implementing an ICT system in a school. The primary consideration is that of cost effectiveness. Systems are expensive to install and maintain; the initial outlay on the infrastructure required is quite high, the licenses for the software; the cost of maintaining the systems and upgrading them as required; all need to be carefully evaluated. Additional staffing will be required or contracts with an external company to manage the planning,

implementation, and evaluation of the system and keep the ICT system functioning as once people make the transition to using ICT they can become overly reliant upon it and cannot function so well if it is not available for some reason.

Teacher training is required to use ICT for the best results which can sometimes be difficult for some teacher to embrace as technology is relentlessly changing all the time and those who use ICT will be constantly updating their skills to keep up to date with the latest innovations. Another problem is that systems do not always deliver what was promised or anticipated or alternatively can generate a lot of data some of which might not be always welcome if it provides negative feedback or simply provides such a vast array of information that it is not possible of the principal or other administrators to evaluate it. The use of ICT within a school needs to be carefully evaluated so that it can be integrated to where is most useful and appropriate so that the greatest benefit can be achieved.

According to Koerner (1999) implementing ICT in schools is a hard task and many criteria need to be considered including a primary priority to describe the educational specifications for the system in terms of its components, applications, and entry reporting formats before anything else can be done. Questions need to be posed as to the current situation as to whether the school is "just beginning," or just "doing some word processing, but it's uninspired," or

"We are using computers extensively for administration" (Davis, Bagozzi, & Warshaw, 1989). A frank and accurate assessment as to the current state of play in the school needs to be formulated prior to moving to planning what is needed and how it can be put in place.

School-related planning and identification and setting of goals with timeframes are the next stage which needs to be in consultation with the teachers and relate directly to the needs of the schools; its students; and its staff. As the planning process draws to a close, the school needs to plan for the effective and equitable use of computing resources in the school or where and how the resources will be deployed. They need to budget for buying new software and depreciation of the hardware. Lastly there is a need to create a long-term plan for future developments.

There needs to be a change in the paradigm of thinking of the teaching staff as "everyone involved must accept and understand that successful technology development implies changes in teaching and learning. Handy, (1993) intimates that there must be formulation of a consistent policy with specific goals, though not everyone embraces change which means it needs to be handled in a cooperative fashion with the possibility of input and ideas from all who will subsequently use it.

Once there is acceptance by the staff in principle, there is a need for the development and testing of such a system and a training program on the

implementation and use of new systems so that it can actually be used which will require not just funding, but also an investment in time to learn how to use the ICT provided effectively. Equipment must be reliable and the software must be curriculum-appropriate, reliable, and must meet the students' needs. Teachers must also receive ongoing professional development and support.

2.9 Learning Environments

Learning environments in schools typically involve one or more adult teachers connected with a number of students, usually in well defined physical settings. These people interact and form a variety of relationships, creating what Comer, (2000) calls "a system of interrelated factors that jointly affect learning in interaction with (but separately from) relevant individual and cultural differences". This is what Rockmann (1997) term as the "relationship dimension" in learning environments at school. The learning environment has a physical as well as a relationship dimension. Physically it may be in a room, full of particular furniture and equipment.

Curriculum materials such as books and videotapes may also be present. The curriculum also has a place in the relationship dimension of the environment in that the students and teacher(s) are focused on certain processes and content in the curriculum and have a relationship with that curriculum and the methodologies that are associated with conveying the curriculum. Students and teachers may have very different relationships with different components of the

curriculum. The place of computers in learning for the majority of children is most likely to occur in the classroom and, for an increasing number, at home (Hunt, 1997). Most experts in the field of education computing would characterize computers as interactive and thus admit them a place within the relationship structures of the classroom learning environment, not just the physical environment.

2.10 ICT and Sustainability

Bush, Glatter, Goodey, and Riches (1980) look at ICT and sustainability in terms of training and capacity building. Checkland (1981) mentions the importance of involving local communities which surround projects and recognizing the demands and needs of the people who are expected to be future users of ICTs. Stoll & Menou (2002) say information technologies change and evolve. ICT access that evolves with new technologies would contribute to sustainable improvement in education, social welfare and environment. Despite the attempts of research on ICT O'Farrell, & Norrish (1999) there are few substitutive critical appraisals or evaluations dealing with rural ICT access and its impact on sustainable development. This is itself an important finding to reflect that more has yet not been done on rural ICT capacities. Over the past several years a great deal of attention and financial support has been focused on ICT access for rural areas. While there is a general belief that such investments contribute to positive development results, concrete evidence to support these expenditures is sparse.

2.11 ICT and Application

In spite of the abundance of information, which addresses the importance of ICT policy and regulation and the multitude of technologies being developed to overcome rural access, there is little documentation of how rural communities are using ICT application to improve people's lives and increase the information and technology goals between rural and urban inhabitants throughout the world.

The best evidence of ICT applicable being utilized by rural communities is found in recent literature which identifies the concepts that need to be considered when planning new initiatives (Fusch, 1998). The literature recognizes that the process of developing relevant ICT applications should be concluded in conjunction with the selection and implementation of the infrastructure to ensure that they do meet the needs of the intended users. Ultimately these applications should have the objective of assisting the development of local communities. Stoll & Menou (2002) emphasizes that all ICT initiatives must engage with the intermediary agencies serving rural communities with all aspects of development assistance in devising strategy and action. When these intermediary organizations are used as contact points for the introduction and utilization of ICTs such as computer, video and internet in rural areas, the impacts of these technologies are more likely to be felt by rural people.

Some of the main conclusions that can be drawn from the information found on use of ICT application in rural African and the impact that the technology has on

rural communities include: “The importance of participatory approaches to ICT applications. In order for any project with the introduction of new technologies to succeed the participation of the community in the design, implementation and evaluation of the project is crucial” (Stoll & Menou, 2002). Due to the relatively high costs of implementing ICTs in rural areas few local organizations or entities can afford to proceed with such initiatives alone. In order to make rural ICT access a reality, a combination of different partners who share similar project objectives need to work together to share their collective resources, experiences and knowledge to cover greater ICT opportunities. Involvement and achieving the support of local politicians who support and understand the potential of the technology is vital to the spread and success of ICTs (Robinson, 1988). Identification of local champions in order to facilitate the introduction of ICT as smoothly and quickly as possible is paramount.

2.12 Training

As the utilization of technology will depend heavily on the understanding of that particular technology, the sustainability of the ICTs and their effective application will depend on a large-scale training of both the people who provide and maintain ICT services and people who use them. Therefore continuous training is critically important (Gómez & Martínez, 2001)

2.13 Appropriate Technology

In order for the proposed technologies to be easily understood and implemented the applicants should be appropriate to the context of the region/institution where it is to be utilized. At the same time ICT should be as user friendly as possible. Communities need to be comfortable with the technology and what it can achieve. The information collected and disseminated through the use of ICTs should be available to or constructed by participants in a format that is comprehensive and meaningful. Collecting the information and reorganizing it in a way that it can be easily understood and be meaningful to the rural community will make it possible that ICTs will be seen as a means to an end (the general development of the rural community) and not as an end in itself.

2.14 ICT and Educational Data Management

Successful management of education has always depended on having the necessary information available. Information is principal for good management. It determines the knowledge base from which critical decisions are made and provides current as well as projected scenarios, of the system for which decisions are made. Management and learning decisions can be much more effective, credible and resistant to challenges if they are based on reliable and relevant information like decisions on staffing can be based upon the information collected and analyzed on staff ratios. Similarly the leadership team can use assessment data to inform decisions they make about curriculum

planning and target setting. The effective processing and storage of data will be made possible by application of ICT.

A survey from Empirica (2006) indicates that only 7.9% of the primary school teachers use computers in class in more than 50% of their lessons, whereas more than 35% of primary school teachers use computers in class in less than 10% of their lessons. Moreover, a study that was conducted among primary school teachers in 2004 revealed that 53% of the teachers hold negative attitudes towards computer technology integration in their classroom practices (Eteokleous, 2008). It can therefore be inferred that ICT integration in primary school in Cyprus cannot be considered as successful yet. This was also the case of Ruiru District.

Policy makers, in the centralized educational system of Cyprus, focused their efforts mainly on equipping the schools with more technological resources and providing in service training sessions to all the teachers. On the other hand, they paid little attention to the principals' role in achieving the innovation. But, according to Anderson and Dexter (2005), a "school's technology efforts are seriously threatened unless key administrators become active technology leaders in a school" (p. 74). Moreover, Pelgrum (1993) examined the impact of the attitudes of school principals and teachers and concluded that "there is a clear association between the attitudes of school principals and the emphasis on computer integrated learning within the school" (p. 209).

Photos and Kyriacos (2011) in a study on Principals' Attitudes towards ICT and Their Perceptions about the Factors that Facilitate or Inhibit ICT Integration in Primary Schools of Cyprus found out that regarding principals in-service training on ICT, the majority of them received training for using ICT for personal purposes (78.6%) and for using ICT in the teaching and learning process (63.4%). A very interesting finding is that a higher percentage of them (82.4%) had never attended in-service training on ICT for administrative and managerial purposes. Finally, it can be argued that the principals cannot be considered as computer savvy, since only an average of three out of ten principals have been learning or working with computers for more than 10 years. Nevertheless, it should be noted that more years of 355 Principals' Attitudes towards ICT experience with ICT does not necessarily mean that a particular principal has a higher level of expertise in ICT. Regarding the schools' background information, 65.6% had computer in the principal's office; 84.7% had a computer in the staff room; and 60.3% had a computer lab.

2.10 Summary

The review of literature gives a view of how, if well implemented, the use of ICT in schools can bring a positive impact in as far as management is concerned. Accepting the use of ICT is in many ways inevitable in schools as it has been inevitable in all areas of business. Careful planning, implementation and training along with clearly identified goals are a basic requirement along with the desire to carry through with a well defined plan and the acceptance that

there will be problems, it will be expensive, but the long term benefits of taking on board the ICT aspects that are relevant to a school will increase teacher and student productivity and lead to more teaching time and more effective learning. The research main interest was to investigate the use of ICT in school management in Ruiru District.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter focuses on the methodology that will be used in the study. In the subsequent sections detailed descriptions of research design, locale, study population, the development of research instruments and their administration and the methods that will be used in the analysis and presentation of data are discussed.

3.2 Research Design

The study adopted a descriptive research design both qualitative and quantitative data were used to answer the research questions on the use of ICT in school management in public secondary schools in Ruiru District.

Descriptive research design is a scientific method which involves observing and describing the behavior of a subject without influencing it in any way. According to Orodho (2004) descriptive survey designs are used in preliminary and exploratory studies. Descriptive surveys are used to ascertain the nature of a phenomenon from a relatively large number of cases. According to Best and Kahn (1998), descriptive research is concerned with conditions that are in existence, opinions that are held, processes that are going on, effects that are evident and trends that are developed. It is primarily concerned with the present, although it often considers the past events and their influences as they relate to

current conditions. According to Travers (1978) this kind of design is concerned with gathering facts and obtaining pertinent precise information concerning the current status of a phenomenon and whenever possible, making conclusion from the facts discovered.

3.3 Locale of the Study

In Ruiru District, only three public secondary schools had been equipped with computers and none of the schools is connected to the internet and this necessitated research to investigate the reasons why there is low application of ICT in those schools. Ruiru secondary schools were also selected because of their accessibility and the researcher's familiarity with the area, and hence, data collection could not be hindered by the participants' hostility due to suspicion. Wamahu and Karugu (1995), point out that sometimes being familiar with the research locale helps in gaining acceptance. A researcher is expected to work with either a familiar or an unfamiliar group but should be aware of how to handle participants carefully.

3.4 Target Population

A target population is the larger group to which one hopes to generalize or apply his findings, (Fraenkel and Wallen, 2006). In this study the target population was 14 public secondary schools in Ruiru District and the subjects of the study were 14 principals/ deputy principals, 56 Heads of Departments, 146 teachers

and 2589 students. Additionally, accounts clerks, bursars and computer technicians of the secondary schools were also included in the study.

3.5 Sampling Procedure and Sample Size

Respondents for this study comprised of all the principals, teachers and students in the fourteen public secondary schools in Ruiru district. Given that the number of targeted schools was small, that is less than thirty the researcher took all the fourteen public secondary schools in Ruiru as the sample. Simple random sampling was applied to select five teachers from each school, forty Heads of Department and 560 students. Data was collected from all the principals, accounts clerks, bursars and computer technicians. Sampling is the procedure of selecting individuals for a study while a sample refers to any group on which information is obtained (Fraenkel and Wallen, 2006).

Table 3.1 Target Population and the Study Sample

Respondents Category	Target Population (N)	Sample (n)	%	Sampling Techniques
Principals	14	14	100	Purposive
Deputy principal	14	14	100	Purposive
HODs	56	40	71.43	Purposive
Teachers	146	70	47.95	Simple random
Computer technicians	14	14	100	Purposive
Bursar	14	14	100	Purposive
Accounts Clerk	14	14	100	Purposive
Students	2589	560	21.63	Simple random

SOURCE: DEO's Office Ruiru (2012)

3.6 Research Instruments

Research begins with either a question or questions. Based on the nature of questions asked, the researcher decides on the best method or methods to use to answer the questions, (Merriam, 1988) and (Yin, 1989). For the purpose of this study primary data were collected using questionnaires, interview schedules and an observation schedule. This was because the only way of strengthening a research is through triangulation as stated by (Patton, 1990). The instruments were developed by the researcher and used to complement each other and bridge the gap that could have been left if only one of them was used. The questionnaire as a research instrument was used by the researcher to collect the data from the respondents mainly from teachers and students. A questionnaire is a vital tool for collecting data especially from a large group of people. The interview schedule was used to complement the questionnaire to collect data that would probably be left out in the questionnaire.

The researcher obtained data by examining documents that exist at the secondary schools in Ruiru District. The following documents were considered important for the study:-

- Records showing the number of computers in the schools
- How they were used if available.
- Whether the computers are networked or not.
- Data indicating the qualifications of school staff in relation to Information Technology.
- The secondary schools' types of data that need to be put into records.

- How computers and other IT is used in the schools.
- How data is recorded in the computers, if this is done.
- Data indicating how ICT is used in the management of information in Ruiru District secondary schools.
- What other ICT gadgets are used in school management.

3.7 Piloting

Piloting was mainly done to verify whether the items generated by the researcher were valid and reliable. Piloting helps in ascertaining the validity of research instruments, (Bell, 1993). The researcher administered research instruments in two randomly selected secondary schools in the neighbouring Thika West District. Thika West District had similar characteristics with those of ruiru district. In these pilot schools, the school heads, 4 teachers per school, accounts clerks and 16 students, 4 from each form in the pilot schools were used to pilot the instruments. The pilot study findings enabled the investigator to make adjustments based on observation made and assess the time taken by the respondents to fill the questionnaires.

The pilot study also helped in determining the reliability of the research instruments. The technique of test-retest was used to check reliability. The questionnaires were administered twice at different times in close succession. Then the results were compared using the Pearson's Rank Correlation between the two sets of scores. Responses from the pilot study were used to modify the research instruments in wording and format where necessary. A reliability

coefficient of 0.8 was obtained and guaranteed that the instruments had high-test reliability hence reliable. Piloting also ensured that the research items were valid before proceeding with the actual research.

3.8 Data Collection Procedure

After obtaining a research permit from the Ministry of Education office and the DEO's office Ruiru, the researcher proceeded to the field to collect data. In the first visit the researcher visited the secondary schools to seek permission from the administration, create rapport and set dates and time when the respondents would fill the questionnaires and also take the interview.

In the second visit, the researcher issued the questionnaires to the respondents for the purpose of data collection. The respondents were given enough time to respond to the items in the questionnaire and thereafter give the filled instruments back to the researcher. The questionnaires were collected soonest to curb the possibility of the respondents discussing amongst themselves.

3.9 Data Analysis

Data was analyzed both qualitatively and quantitatively. Qualitative data was obtained from open-ended items in the questionnaires and interview schedule. As advised by (Juma and Ngome, 1998), coding categories was developed as a way of organizing the qualitative data collected according to particular research questions. Through the use of Statistical Package for Social Sciences (SPSS)

computer programme, data were analyzed using descriptive statistics such as percentage, means and frequencies.

Quantitative data collected was tabulated and analyzed using frequencies. Gay, (1996) observes that the use of tabular layout enables any desired figures to be located more quickly and would make comparisons between different categories to be made more easily. Finally the researcher gave suggestions and recommendations for further research based on the findings.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter presents the data analysis and findings based on research questions. The purpose of this study was to establish how school management practices could be enhanced through application of ICT. It also aimed at establishing the impediments of adoption of ICT in public secondary schools in Ruiru District in Kenya. Questionnaires, interview schedules and an observation schedule were used in data collection. Descriptive statistics mainly averages were used. Frequency tables and graphs were used to enhance data presentation. The study aimed at answering the following questions:-

- i. What ICT hardware and software were applied in public secondary schools in Ruiru District?
- ii. How was ICT applied to manage students' records, human and physical resources in public secondary schools in Ruiru District?
- iii. How is ICT applied to manage school finances in public secondary schools in Ruiru District?
- iv. What constraints were encountered in application of ICT in public secondary schools in Ruiru District?

The findings of the study will be presented under the following sub theme which formed the objectives of the study; Demographic information of the respondents, ICT components and infrastructure in public secondary, application of ICT in management of students and human resources, use of ICT in financial

and physical resources management and the constraints faced in adoption and implementation of ICT in public secondary school management in Ruiru district.

4.2 Demographic Information about the Respondents

This section presents demographic description of the respondents, so as to provide a logical background for the study findings as reported in this chapter.

Five key groups of respondents were involved in the study, namely: Principals/ Deputy Principals, Heads of Departments, computer Teachers, Bursars/ Accounts Clerk and students. The respondents' demographic information will be presented in terms of their gender, academic qualification and levels of computer literacy where applicable.

4.2.1 Gender of Respondents

A total of 574 respondents participated in the study out of whom 272 (47%) were males while 302 (53%) were females. Their distribution was as shown in Table 4.1.

Table 4.1 Distribution of Respondents by Gender

Gender	MALE		FEMALE	
	NO	%	NO	%
Principals/ Deputy principal	6	43	8	57
HODs	11	27	29	73
Teachers	7	10	63	90
Computer technicians	0	0	0	0
Bursar/ Accounts Clerk	3	22	11	78
Students	269	48	291	52
Total	272	47	302	53

Table 4.1 shows that out of all the principals/deputy principals who took part in the study, 8 (57%) were female compared to 6(43%) of their male counterparts. A vast majority of the teachers who were interviewed were found to be female 63 (90.0%) compared to 7 (10.0%) of their male counterparts. Majority of the bursars/account clerks who were interviewed 11 (78%) were female compared to 3(22%) of their male counterpart. Twenty nine (72.7%) Heads of Departments who were interviewed were females compared to 11 (27.3%) of their male counterpart. Slightly more than half of the students who were interviewed (54.4%) were female while 48.6% were their male counterpart. The same information is presented in Figure 4.1 for clarity.

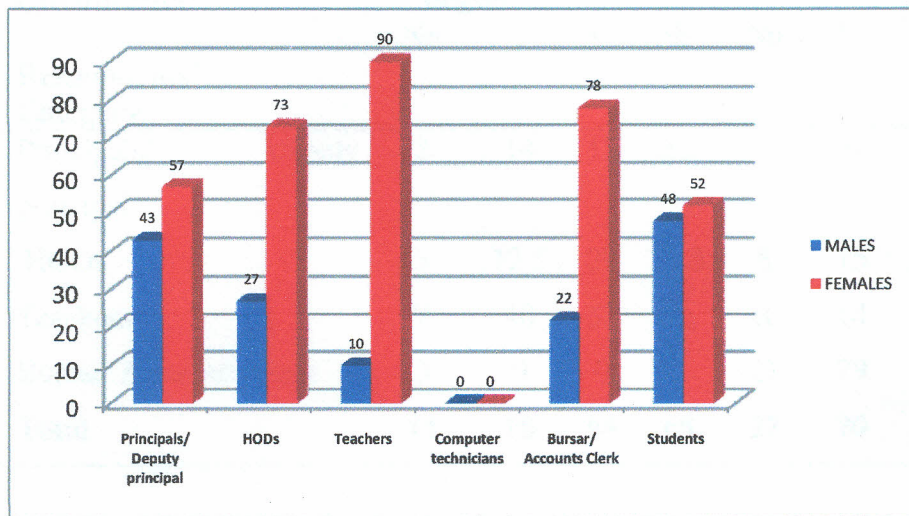


Figure 4.1 Distributions of Respondents by Gender

The total number of males 272 (47%) and the total of females 302 (53%) who participated in the study shows that was gender parity in the sampling. However for the case of teachers, the gender difference was very high (90% female against 10% male) more teachers. A significant observation made was that none

of the schools visited had a computer technician and thus they all relied on the computer studies teachers who were available for any technical service. This meant that schools lacked very important human resource in so far as ICT adoption was concerned.

4.2.2 Academic Qualifications of the Respondents

Academic qualifications were sought from Principals/ Deputy Principal HODs Teachers and Bursar/ Accounts Clerks. The responses were as presented in Table 4.2.

Table 4.2 Academic Qualifications of the Respondents

Qualification	Masters degree	Degree		Diploma		Certificate		
		No	%	No	%	No	%	
Respondents' Category								
Principals/ Deputy principal	2	14	12	86	0	0	0	0
HODs	5	12.5	29	72.5	6	15	0	0
Teachers	7	10	53	76	10	14	0	0
Bursar/ Accounts Clerk	0	0	0	0	11	79	3	21
Total	14	10	94	68	27	20	3	2

According to Table 4.2, majority of the principals/deputy principals 12(86%) had degrees as their academic qualifications. Five (12.5%) of the HODs had masters degrees. Bursars /accounts clerks had either diploma of certificates. These qualifications showed that the respondents had the relevant qualifications for them to carry out their duties.

4.2.3 Respondents' Work Experience

The duration that the respondents had worked in terms of years was as given in Table 4.3.

Table 4.3 Respondents' Work Experience

Experience	0-5 years		6-10 years		11-15 years		16-20 years		21-25 years		26 years and above	
	NO	%	NO	%	NO	%	NO	%	NO	%	NO	%
Respondents' category												
Principals/ Deputy principal	0	0	2	14	2	14	6	44	2	14	2	14
HODs	0	0	21	53	7	17.5	5	12	7	17.5	0	0
Teachers	11	15.7	21	30	8	11	20	29	10	14.3	0	0
Bursar/ Accounts Clerk	8	57	5	35.7	1	7.3	0	0	0	0	0	0
Total	19	14	49	35.5	18	13	31	22	19	14	2	1.5

According to Table 4.3, slightly less than half of the principals/deputy principals 6(44%) said that they had taught for 16-20 years. This accounted for the majority of the principals /deputy principals. Those who had taught for 6-10 years, 21-25 years and over 25 years constituted to 14% each.

The study revealed that majority of the bursars/account clerks (57%) had worked for between 0-5 years, 35.7% had a job experience of 6-10 years whereas 1(7.3%)had worked for 11-15 years. The study further revealed that 11 (15.7%) of teachers had been teaching for five years and below, 30.0% for 11-15

years, 26.7% for 16-20 years while 6.7 % for 6-10 years and over 20 years apiece. Most teachers were found to have been teaching for a longer period. The study revealed that half of the Heads of Departments had taught for 16-20 years, 18.2% for 11-15 years and another 18.2% for over 25 years. 13.6% had taught for 6-10 years. None of the heads of the departments had taught for less than 6 years. These showed that the participants had the relevant experience in their areas of operation and they were therefore in a good position to explain matters relating to the adoption of ICT in the management practices.

4.2.4 Teachers' Work Load per Week

Teachers' work load was given by the number of lessons that a teachers attended in a week. The work load of the teachers who participated in the study was as shown in Table 4.4.

Table 4.4: Teachers' work load per week

Mean	23.03
Mode	22
Standard deviation	4.723
Minimum	13
Maximum	30

The statistics in the Table 4.4 shows that the mean work load for teachers per week was 23.03 lessons with a standard deviation of 4.723. The teachers with the highest number of lessons per week had 30 while that with the least had 13. Most teachers had 22 lessons in a week. These work loads were within the Teachers Service Commission (TSC) ranges and were manageable.

4.2.5. Level of Computer Literacy

It was observed that all the bursars/account clerks had certificates as their highest level of computer literacy. Majority of the Heads of the Departments said that they had certificate as the highest level of computer literacy, 18.2% said that they didn't have any computer knowledge, 13.6% reported that they had degree in computer whereas 4.5% of them said that they had a diploma in computer applications. This was an indication that most of the Heads of Departments had some knowledge in computer.

Half of the teachers who were interviewed reported that their highest level of computer literacy was a certificate, 23.3% said that they didn't have any computer knowledge, 13.3% had diplomas in computer applications whereas another 13.3% were degree holders in computer. It was found that majority of the students (88.6%) didn't have any computer knowledge. This was probably due to the fact that computer studies were not taught in their schools. Only 25.7% of the students reported that computer classes were taught in their schools. Only a very small proportion (11.4%) of them said that they had certificates in computer applications.

Responding to the item on whether the computer literate lots in the schools were of any benefit to the schools in the adoption of ICT, most (86%) of the principals/deputy principals reported that they did.

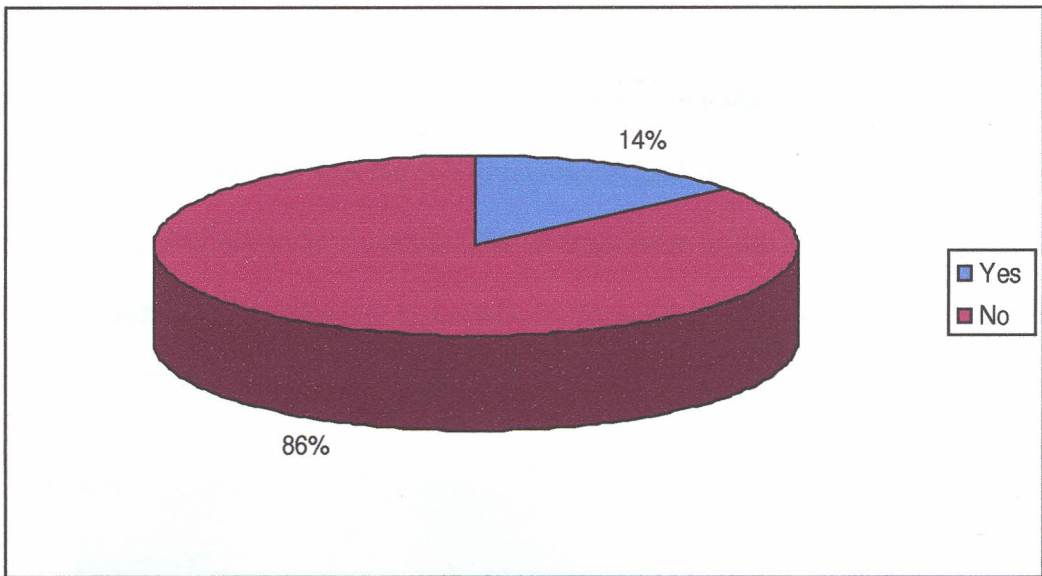


Figure 4.2: Assistance of Schools by the Computer Literate Personnel

The study revealed that majority of other personnel who were computer literate assist in the schools while 14% of them did not. On further probing the following were sighted as the ways in which the computer literate lots assisted the schools:

- Exam Analysis
- Management school records
- Typing of their notes
- Use of ICT in lesson presentations
- Maintaining financial records
- Online KCSE registration

These were important areas where application of ICT was very vital.

4.3 ICT Components and Infrastructure in Public Secondary Schools

The study sought to establish the ICT components and infrastructure that were available in public secondary schools. The findings were as follows:

4.3.1 Availability of Computer Laboratories/Rooms in Schools

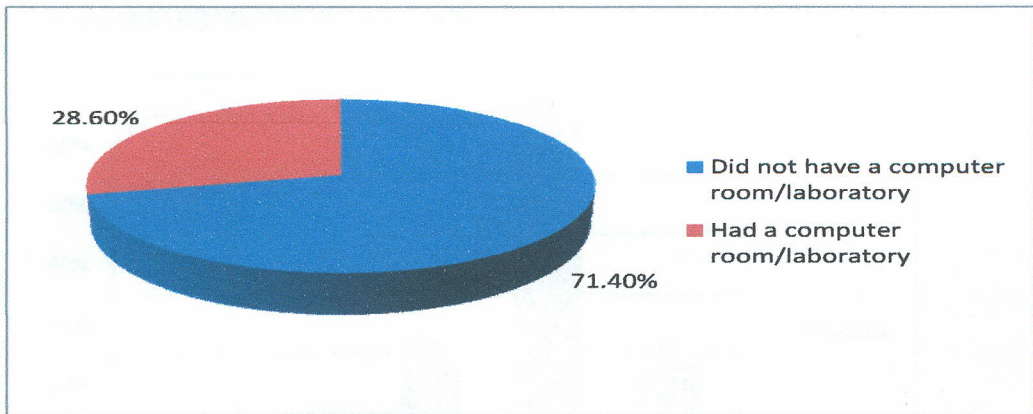


Figure 4.3: Availability of Computer Rooms Laboratories in Schools

Responding to the item on whether they had or did not have computer laboratories/rooms in their schools majority of the principals/deputy principals said they don't have. Only a small proportion, 4 (28.6%) said that they had computer laboratories/rooms in their schools. However two principals/deputy principals of those that reported that they had computer laboratories/rooms also added that theirs were not adequately/properly equipped. Without adequate and well equipped ICT rooms/laboratories it would be very difficult for schools to encourage the stakeholders to adopt the use of ICT.

4.3.2 Levels of ICT Infrastructure in Educational Institutions

When asked to describe the level of ICT infrastructure in secondary schools, most (60%) principals/deputy principals indicated poor while 20% indicated average and very poor respectively. No respondent indicated very good and good respectively as indicated in Figure 4.4.

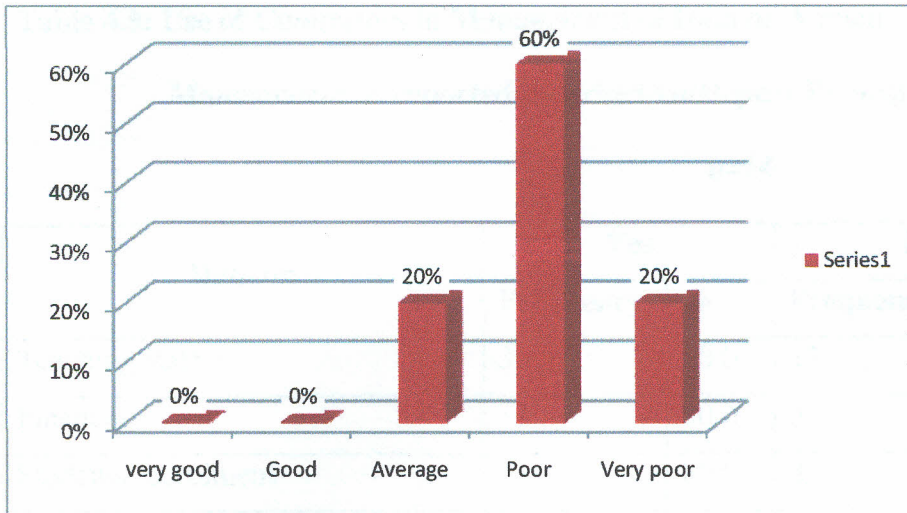


Figure 4.4: Ratings of Levels of ICT Infrastructure in Schools

When the infrastructure is poor as was reported as majority (60%) of the principals/deputy no meaningful utilization of the ICT can be realized. It is therefore very important that the ICT infrastructure in all schools is improved for proper and efficient adoption of ICT in management of public secondary schools.

4.4 Use of ICT in Management of Data on Various Aspects of Management

4.4.1 General Use of ICT in Management

Respondents were provided with various management areas where the use ICT would be very important. They were required to indicate whether ICT was applied in the specified areas within their respective schools. Their responses were as presented in Table 4.5.

Table 4.5: Use of Computers in Management of Data on Various Aspects of Management as reported by Principal/Deputy Principals

n=14

Data on	Yes		No	
	Frequency	%	Frequency	%
Teaching staff	3	20.0	11	80.0
Finances	11	80.0	3	20.0
Students' enrolment	11	80.0	3	20.0
Subordinate staff	8	60.0	6	40.0
Physical resources	0	0	14	100.0
Timetabling	11	80.0	3	20.0
Students progress	11	80	3	20.0
School programmes	8	60.0	6	40.0

Table 4.5 shows whether principals/deputy principals used computers in the management of data/information on the stated areas of management. A significant observation made from the table was that none of the principal/deputy principals said that they used computers in the management of data on physical resources. However majority (80.0%) of them reported that

they were using computers in timetabling as well as management of finances and storing of records/data on students enrolments and academic progress.

Responding to the item on how they were storing records /data the principals /deputy principals' responses were as shown in Figure 4.5.

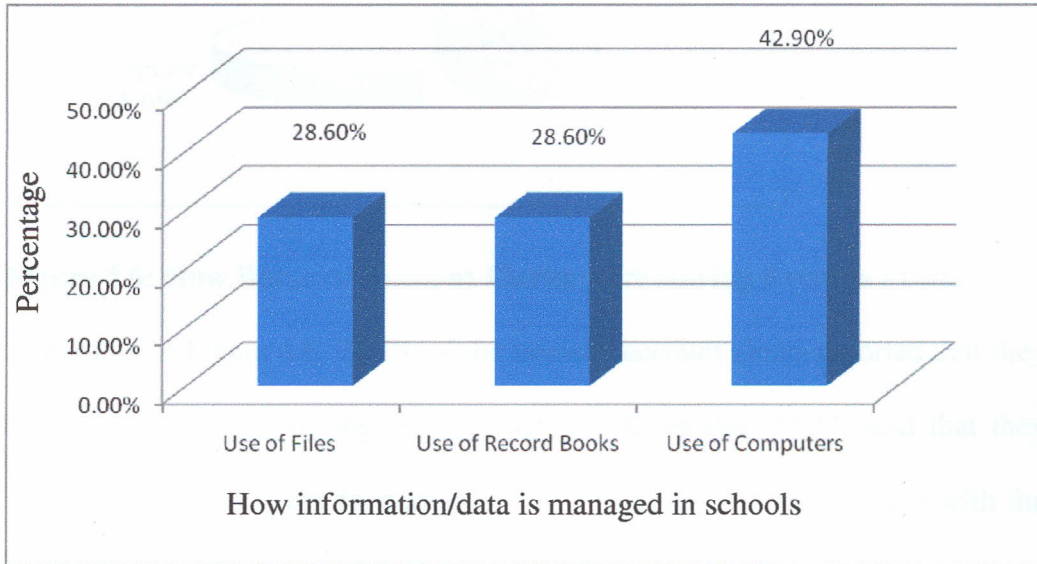


Figure 4.5: How Principals/Deputy Principals Were Storing Records /Data

According to Figure 4.5, 42.9 % of the principals/Deputy principals reported that they were using computers to store information/data in their schools. Those who said that they stored data /information using filling method or record books constituted 28.6% respectively. This indicated the need for more utilization of computers in schools. The use of computers in storing data /records was therefore important.

4.4.2 Management/ Storage of Financial Records /Data

The use of computers in financial management was confirmed by bursars / account clerks. Responding to the questionnaire item on how they were

managing financial data, 55.6% of the bursars / account clerks reported that they were using computers.

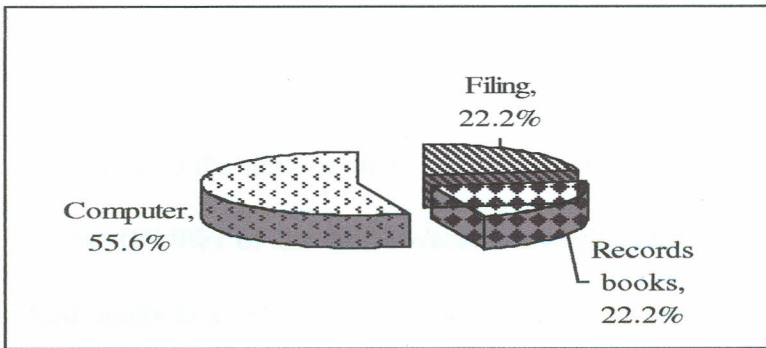


Figure 4.6: How Bursars/ Account Clerks were storing Records / Data

According to Figure 4.6, 22.2% of the bursars/ account clerks reported that they were using files for storing records /data while another 22.2% said that they were using record books to store data. On how comfortable they were with the method of storing records/ data in their departments, the bursars/ account clerks gave their responses as shown in Figure 4.7.

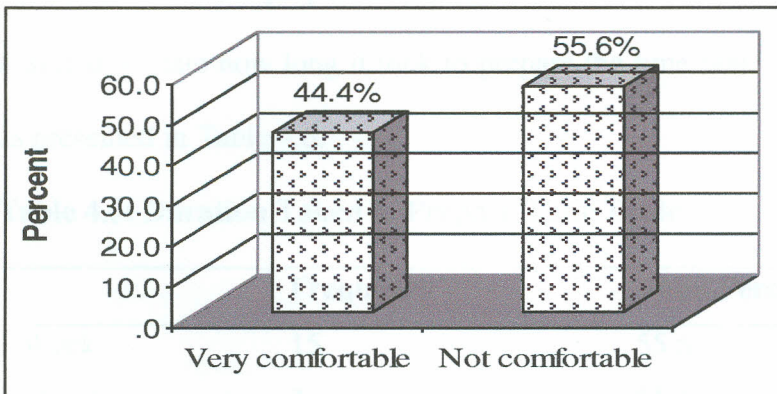


Figure 4.7: Bursars/ Account Clerks views on the Method of Storing Records/ Data they were using

According to Figure 4.7 slightly more than half (55.6%) of the bursars/account clerks reported that they were not comfortable with the method of managing

data in their departments whereas the rest (44.4%) said that they were very comfortable. It was observed that those who reported that they were using computers for data storage were the ones who were comfortable.

Responding to the item on their preferred method of record /data storage, a vast majority (89.9%) of the bursars/account clerks said that they preferred to use record books as an effective method of storing records/ data in their departments compared to 11.1% of those who said that they preferred to use computers. This is a clear indication that there is a need to educate the bursars on the importance of using computers for data management to replace the manual methods for safe and easy retrieval.

4.4.3 Use of ICT in Making School Time Tables

To comment on the preparation of the time table in their schools teachers were required to state how long it took to prepare the time table. The responses were as presented in Table 4.6.

Table 4.6: Duration Taken to Prepare Time Table

	Frequency	Valid Percent
1 Week	15	55.6
1 Month	3	11.1
1 Day	9	33.3
	27	100

Majority of the teachers (55.6%) said that it normally took one week to prepare time table, 33.3% said that it usually took them one day whereas a very small proportion (11.1%) said that the same took one month. With such delays in coming up with school timetables, it meant that schools spent a lot of operating haphazardly without organized daily programmes. This would lead wastage of teaching time. On their levels of satisfaction with the preparation of the time table the following were the teachers' responses.

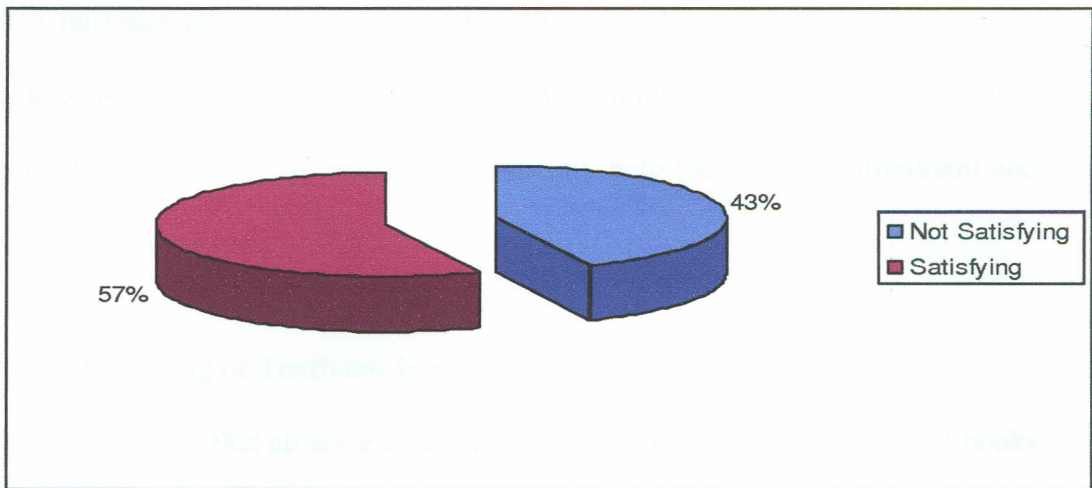


Figure 4.8: Levels of Teachers Satisfaction on the Preparation of the Time Table

Responding to the questionnaire item on how they felt about the duration taken in their schools to have the time table prepared, 57% of the teachers reported that it was satisfying whereas 43% of them said that it was not satisfying. Commenting on the areas of concern about the time tabling teachers reported the following:

- i. Fair distribution of lessons was required.
- ii. The manual preparation of timetable favored those who prepared it and their friends.

- iii. If possible teachers to have equal number of free time
- iv. Should be computerized.
- v. It was not fair in terms of distribution of free morning and afternoons
- vi. The timetable generates a lot of complaints which if not addressed can affect performance.

There is a wide range of specialist software to assist in the production of the school timetable, greatly speeding up the process and ensuring that duplication and mistakes are avoided. Although putting together a timetable for an entire school only occurs once a year, it is of vital importance to manage resources effectively and software and ICT will greatly help facilitate this important and time consuming task.

4.4.4 Recording of Textbook Issued

It was observed that all the teachers interviewed said that they issued text books to the students in their schools. On further probing as to how they issued the text books, their responses were as shown in Figure 4.9.

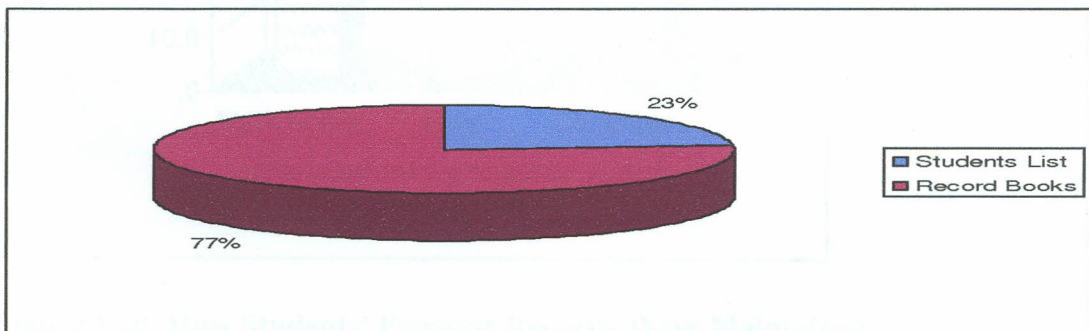


Figure 4.9: How Teachers Put Into Record the Textbooks They Issued

Slightly more than three quarter of the teachers (77%) said that they recorded the textbooks they issued to the students in record books whereas the rest (23%) said that they used students' lists. It was clear that none of the schools that were visited used computers for recording the teaching/learning materials that were issued. This showed how teachers /schools had stuck to the old ways of maintaining records which were at times not very efficient especially when the class lists were misplaced.

4.4.5 Maintenance of Records of Students Academic Progress

Responding to the item on how students academic progress records were maintained in their respective schools, teachers' responses were various. Figure 4.10 shows their responses

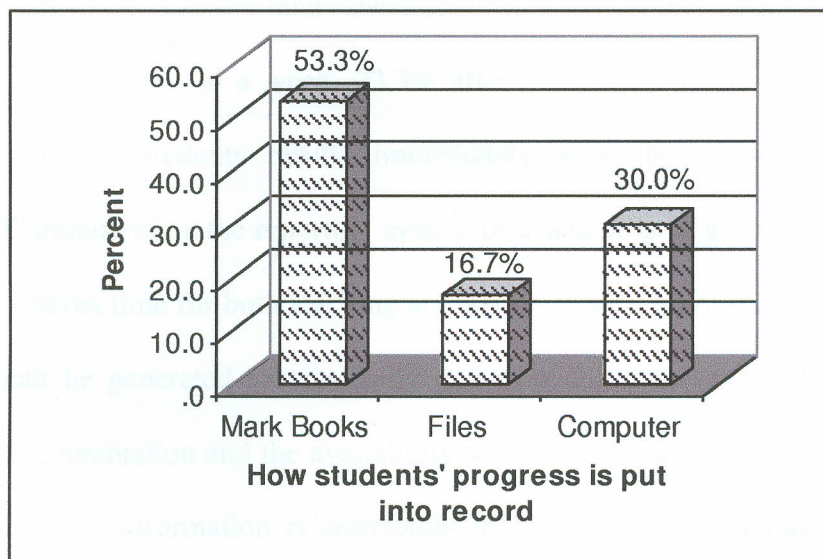


Figure 4.10: How Students' Progress Records Were Maintained

Slightly more than half of the teachers (53.3%) reported that they used mark books to put into record students' progress, 30.0% said that they used computers

while 16.7% said that they used files. This showed low status in the adoption of ICT in such important management area. Teachers were further required to indicate how long it took them to provide examination results to the students. Their responses were as recorded in Figure 4.11.

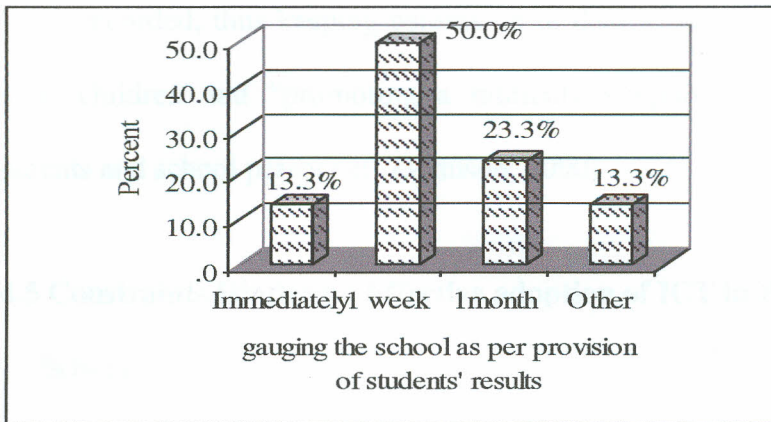


Figure 4.11: Duration Taken for Teachers to Provide Examination Results

Half of the teachers interviewed (50.0%) said that their school provided students results within in a week, 23.3% after one month while 13.3% said that they provided students results immediately after the examinations were done. Computerizing the reporting system of a school is of great benefit to schools as it saves time for both teaching and administrative staff and it means that reports can be generated automatically and to a common format. Standardization of documentation and the availability to have it accessible from any computer and that the information is searchable means that it is very easy to facilitate the sharing of information. A reporting system also means technology can be used for the communication with students and parents and ensure that “criteria are communicated to students in a standardized way” (Lavigne, 1996).

ICT provides tools that can assist school staff in the important task of managing pupil absences and enables schools to send parents automatically generated phone calls, Short Text Messages (SMS), and emails. It means that if a child is missing from school, parents can be notified within a short period of the absence being recorded, thus keeping parents up to date if there are any problems with their children and “promoting a mutually supportive relationship between parents and school personnel” (Johnson, 2000).

4.5 Constraints Hindering Effective adoption of ICT in Public Secondary

School

When the respondents were asked to state the constraints hindering effective adoption of the ICT in management practices in public secondary schools, the responses were as follows:

- a) Inadequate ICT infrastructure.
- b) Limited rural electrification connectivity and frequent power blackouts.
- c) Most secondary school teachers and principals were computer illiterate.
- e) Lack of adequate connectivity and network infrastructure.
- d) Inadequate funds to provide ICT infrastructure.

As Scrimshaw, (1997), Passey et al., (2000) and Somekh et al., (2001) observed ICT adoption in schools was happening over short time intervals. However, the fact that technological change can happen more rapidly than an integration of ICT into practice means that the development of uses of ICT into practice need to be managed all the more.

4.4.5. Efforts to Promote the Adoption of ICTs in Secondary Schools

When asked to state efforts how various stakeholders would assist in promoting adoption of ICT in the management practices the responses were as follows;

- a) Digitization of and distribution of the curriculum by KIE.
- b) Acquisition of Microsoft licenses for schools.
- c) Rural electrification program to connect all schools in the rural areas.
- d) The government to zero-rate tax on importation of computer hardware and software to enable all institutions acquire computers
- f) TSC to offer study leave to teachers pursuing computer studies.
- g) The government to be a visible user of ICTs.

CHAPTER FIVE

SUMMARY OF RESEARCH FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings of the study and conclusions arrived at. It also presents the recommendations derived from the study.

5.2 Summary of Research Findings

The following is a summary of the major research findings of the study:

Public secondary schools in Ruiru district had not employed computer technicians. They therefore relied on the computer studies teachers for technical advice in regard to ICT matters.

ICT components and infrastructure in public secondary schools

- Most schools did not have the relevant ICT infrastructure and where the infrastructure was available, it was inadequate or poor.
- The study further revealed that most schools did not have adequate ICT facilities. This implied that schools could not adopt the use of ICT effectively to enhance their management practices. It is in recognition of this that the ministry of education is working with NGOs to facilitate the acquisition of computers in schools. The government has also zero rated tax on importation of computer hardware and software to enable more institutions to acquire computer facilities. The government is also trying

to develop a program under rural electrification program targeting all schools for electricity connection.

Application of ICT in management of student and staff human resources

- The study also found out that there was minimal utilization of ICT in the management of public secondary schools in Ruiru.

Constraints faced in adoption and implementation of ICT in public secondary school management

- Some of the constraints hindering the adoption of ICT in the management of public secondary schools were identified as inadequate ICT infrastructure, teacher ICT illiteracy, limited rural electrification connectivity and frequent power blackouts and inadequate funds to provide ICT infrastructure.

Use of ICT in financial and physical resources management

- Responding to the item on their preferred method of record /data storage, a vast majority (89.9%) of the bursars/account clerks said that they preferred to use record books as an effective method of storing records/ data in their departments compared to 11.1% of those who said that they preferred to use computers.

5.3 Conclusions

From the foregoing research findings the following conclusions emerged:

Most secondary schools lacked the basic ICT requirement such as electricity, internet connectivity and the basic ICT components such as computers. Without these basic requirements, ICT adoption remained low.

The main challenges facing the adoption of ICT in the management of public secondary schools were principals' ICT illiteracy and limited rural electrification.

There is need for participatory approaches in the adoption of ICT. In order for any project with the introduction of new technologies to succeed the participation of the community in the design, implementation and evaluation of the project is crucial. Due to the relatively high costs of installing ICTs in schools can afford to proceed with such initiatives alone. In order to make ICT access a reality, a combination of different partners who share similar project objectives need to work together to share their collective resources, experiences and knowledge to cover greater ICT opportunities. Involvement and achieving the support of local politicians who support and understand the potential of the technology is vital to the spread and success of ICTs.

5.4 Recommendations

Successful adoption of the use of ICTs in our education system requires clearly laid down strategies and policies. The research therefore recommended the following measures to help achieve full of ICT in the management of public schools:

- i. Effective access and use of ICT requires basic infrastructure like computers, electricity and telephone services. To date a vast majority of schools are found in areas where these amenities are dilapidated or non-existent. This has in turn restricted accessing ICTs to the exclusive privilege of the urban schools. The government should therefore ensure that all secondary and primary schools are connected with electricity under rural electrification programme. The government should also provide funds for purchase of computer accessories under tuition vote-head to all schools through the Free Secondary Education (F.S.E.) program for equity and access to ICTs.
- ii. Training of school principals in ICT applications is necessary for them to embrace the technology and benefit form the latest innovations.
- iii. The use of ICT within a school needs to be carefully evaluated so that it can be integrated to where is most useful and appropriate so that the greatest benefit can be achieved.
- iv. To encourage the use of ICT in schools, computer studies should be made a compulsory subject in secondary level of education. It should

further be compulsory for all secondary schools to use computers as an instructional tool.

5.5 Suggestion for Further Research

Since this research was limited to public secondary schools, a comparative study can be carried out to compare the adoption levels between public and private secondary schools.

A study can also be carried out to compare the levels of application of ICT in Rural schools with that of levels of ICT application in urban secondary schools in Ruiru District.

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APPENDICES

APPENDIX I: INTRODUCTION LETTER

Macharia Nahashon Mbugua

Department of Educational Management,

Policy & Curriculum Studies, Kenyatta University

P.O. Box 43844, Nairobi

Dear Respondent,

I am a postgraduate student from Kenyatta University. I would like to collaborate with you in identifying how ICT application in your school improves data management and make it more efficient. I sincerely request for your support through filling the questionnaire provided to you. The information you will give will assist highly in the above goal, which would be very vital in understanding the role of ICT in promoting efficient data management. The information provided will be treated with a lot of confidentiality.

Your contribution and sincerity will be highly esteemed

Yours truly,

Signed----- Date-----

Macharia Nahashon Mbugua.

APPENDIX 2:

PRINCIPAL /DEPUTY PRINCIPAL QUESTIONNAIRE

Instructions

This is to request you kindly to fill in this questionnaire by responding to all questions items. There is no right or wrong answer so you do not have to discuss or consult with a colleague. You need not to write your name. The information that you will give will be treated with confidence and will not be used for any other purpose other than for this research. Your opinions will be a great importance towards the success of this research.

(Tick appropriately)

Section 1

1. Sex: Male Female (Tick appropriately)

2. Academic Qualifications (Tick appropriately)

Diploma Degree Masters PhD

3. Professional Qualifications

Diploma B.Ed M.Ed

Other (Specify)

4. Teaching Experience - 0-5[] 6-10[] 11-15[] 16-20[] 21-25[] over 25[]

5. Total number of students in your school

6. How do you manage (information) data in the school?

Filing

Record books

Computer

7. Does the school have a computer lab? Yes [] No []

8. If yes is it (Tick the appropriate answer)

Well equipped []

Equipped []

Poorly equipped []

9. Are computers used to facilitate management of the following data in the schools? (Tick appropriately)

DATA TYPE	YES	NO
Teaching staff		
Finances		
Student's enrolment		
Performance		
Demographic		
Subordinate staff		
Physical resources		
Timetabling		
Students progress		
School Programmes		
Others (Specify)		

Section 2

10. How many teachers are in your school: _____

11. What is the number that is computer literate: _____

APPENDIX 3:

COMPUTER TECHNICIANS'/COMPUTER TEACHERS'

QUESTIONNAIRE

Instructions

This is to request you kindly to fill in this questionnaire by responding to all questions items. There is no right or wrong answer so you do not have to discuss or consult with a colleague. You need not to write your name. The information that you will give will be treated with confidence and will not be used for any other purpose other than for this research. Your opinions will be a great importance towards the success of this research.

(Tick appropriately)

1. Sex: Male[] Female[]
2. Level of computer literacy (Tick appropriately)
3. Certificate [] Diploma [] Degree []
4. What is your job experience? (Tick appropriately)
0-5 years [] 6-10 yrs [] over 10 yrs []
5. Please fill in the table below appropriately

Computer Training Level of the Technicians or Teacher	No. of Technicians / Teachers
Elementary (certificate level and below)	
Intermediate (college diploma level)	
Advanced diploma and above	
Other (Specify)	

6. Of these listed in the table below please indicate how it is applied in the institution:

Please fill in the table below appropriately

S/W Application Package	Name of package	Version	Application in the schools
Word-processing			
Spreadsheets			
Databases			
Statistical packages			
E-Mail			
Other(s)			

Key: S/W: Soft ware

7. What method do you use in the management of data?

Filing [] Record books [] Computers [] Other

(Specify)

8. Please explain what categories of information/data you process in the school.

.....

.....

9. Please explain how you store information in the school in the computers specifying the types of software you apply

.....

.....

.....

10. What are the advantages of the network in the school in accessing and processing of information?

11. What level of computer training do you train the students in the school?

(Tick Appropriately)

	Level	Tick
1	Elementary (certificate level and below)	
2	Intermediate (diploma level)	
3	Advanced diploma and above	
4	No training offered to students at all	

APPENDIX 4:

BURSAR/ACCOUNTS CLERKS QUESTIONNAIRE

Instructions

This is to request you kindly to fill in this questionnaire by responding to all questions items. There is no right or wrong answer so you do not have to discuss or consult with a colleague. You need not to write your name. The information that you will give will be treated with confidence and will be used for the purpose of this research. Your opinions will be a great importance towards the success of this research.

1. Sex: Male Female

2. What is your level of computer literacy?

Certificate Diploma Degree None

3. What is your job experience?

0-5 6-10 11-15 16-20 Over 20

4. How do you manage data in your department? Filing Record books Computer

5. What is your expertise in management of data, as per accuracy?

Very accurate accurate Inaccurate

6. How have been your audit reports for the last 3 years?

Very good Good Satisfactory Fair

7. How comfortable are you with the method of managing data in your department?

Very comfortable Not comfortable

8. What would you prefer as an effective method of managing data in your department?

Filing [] Use of record books [] Use of computer []

9. Give a comment on data management in your department.

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

APPENDIX 5:

HEADS OF DEPARTMENTS QUESTIONNAIRE

Instructions

This is to request you kindly to fill in this questionnaire by responding to all questions items. There is no right or wrong answer so you do not have to discuss or consult with a colleague. You need not to write your name. The information that you will give will be treated with confidence and will not be used for any other purpose other than for this research. Your opinions will be a great importance towards the success of this research.

- 1) Sex: Male [] Female []
- 2) What is your level computer literacy?
Certificate [] Diploma [] Degree [] None []
- 3) What is your teaching experience?
0-5 [] 6-10 [] 11-15 [] 16-20 [] Over 25 []
- 4) How many teachers do you have in your department? _____
- 5) What kind of information do you manage in your department? _____
- 6) How do teachers and students get textbooks and teaching materials?
School provides [] students buy Personal copies []
- 7) If school provides how you do keep records?
Filing [] Record books [] Computer []

APPENDIX 6:

TEACHERS' QUESTIONNAIRE

Instructions

This is to request you kindly to fill in this questionnaire by responding to all questions items. This is no right or wrong answer so or wrong answer so you do not have to discuss or consult with a colleague. You need not write your name. The information that you will give will be treated with confidence and will not be used for any other purpose other than for this research. Your opinions will be great importance towards the success of this research.

1) Sex: male [] female []

2) What is your level of computer literacy

Certificate [] Diploma [] Degree [] None []

3) What is your teaching experience in years?

0-5 [] 6-10 [] 11-15 [] 16-20 [] Over 25 []

4) What is your teaching load per week []

5) Who are in the time tabling committee?

6) How is the time tabling:

(a) Satisfying [] (b) Not satisfying []

Any other comment on the time tabling.....

How long does it take to prepare the time table?

1 week []

1 month []

1 day []

7) Do you issue text books and learning materials to your students?

Yes [] No []

8) If you do how do you put into record what you have issued

Record books []: Students list [] Computers []

9) How often are you consulted about the progress of the students?

(1) Often [] (2) Sometimes [] (3) Rarely [] (4) Never []

10) How do you put into record the students' progress?

Mark books [] Files [] Computer []

11) How do teachers get text books and other teaching materials?

School provides [] Teachers buy Personal copies []

12) If the school provides, how do they put into record, what they have issued

Record Books [] Files [] Computer []

13) As a Teacher where can you gauge your school as per provision of the students' results?

Immediately [] 1 week [] 1 month [] other []

APPENDIX 7:

INTERVIEW 5: STUDENTS' QUESTIONNAIRE

Instructions

This is to request you kindly to fill in this questionnaire by responding to all questions items. There is no right or wrong answer so you do not have to discuss or consult with a colleague. You need not write your name. The information that you give will not be used for any other purpose than for this research. Your opinions will be a great importance towards the success of this research.

1. Sex: Male [] Female []
2. What is your level of computer literacy?
Certificate [] Diploma [] None []
3. Besides the core subjects offered in the school, which other subjects are offered. (1) French [] (2) German [] (3) Computer [] (4) None []
4. Are you provided with books and teaching materials (1) Yes [] (2) No []
5. If you are provided with them, how does the school put them into record
(1) Record Books [] (2) Files [] (3) Computer []

Indicate whether the following statements are true or false

6. Fees paid by students are put into record and a receipt issued immediately.
True [] False []
7. A fee statement is issued to students immediately. True [] False []
8. Marks for students are readily available True [] False []
9. Students have an access to the computers at all times True [] False []

APPENDIX 8:

INTERVIEW SCHEDULE FOR PRINCIPALS/ ICT MANAGERS

1. What ICT facilities do you have?
2. How many computers are in the school?
3. What type of network is in the school?
4. In what ways do you use computers in the school?
5. How does use of computers help in managing students data?
6. Do the teachers use computers in any way? If yes which are they?
7. Does use of computers in the school have advantage of saving time?
8. How do you source funds to acquire and maintain the ICT infrastructure in the school e.g. Computers, Internet?
9. Is registration of students conducted online? If yes what are the advantages?
10. What computer courses are taught to the students?
11. What other advantages have you identified of application of computers?
12. How are textbooks accessed in the library?
13. Do you have a library catalogue database? If yes what are its advantages to the manual library catalogue?
14. How do you enter and keep records of books issued to students?
15. How are financial records processed?
16. Can students access their personal information from other places apart from within the school, may be like information about results, fee balances etc?

**APPENDIX 9:
TIME SCHEDULE**

Activity	Oct 2011	Nov 2011	Nov 2011	Dec 2011	Jan 2012	Feb 2012	March 2012	April 2012	May 2012	June 2012	July 2012	Aug 2012	Sept 2012
Writing & typing of research proposal & presentation at the Department													
Submission of proposal to the Graduate School													
Piloting of research instruments													
Data Collection													
Data Analysis													
Report Writing & Submission													

APPENDIX 10:
RESEARCH BUDGET

ITEM		AMOUNT (Ksh)
Proposal Writing	Typing	10,000
	Printing	8,000
	Binding	7,000
	Piloting of research instruments	50,000
Subsistence	Subsistence	30,000
	Transport	20,000
Other Academic resources	Purchase of Text books	65,000
	Internet connection	15,000
Data Collection	Production and distribution of Instruments	25,000
	Telephone/Mobile	15,000
	purchase of a recorder	9,000
Data Analysis & Report Writing	Purchase of a Laptop	65,000
	Typing and Analysis	65,000
	Printing	25,000
	Binding	25,000
	Total	434,000



NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

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when replying please quote
secretary@ncst.go.ke

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

Our Ref:

NCST/RCD/13/012/78

Date:

4th December, 2012

Nahashon Mbugua Macharia
Kenyatta University
P.O.Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application dated **26th November, 2012** for authority to carry out research on ***“Application of information communication and technology in school management practises in public secondary schools in Ruiru District, Kiambu County, Kenya”*** I am pleased to inform you that you have been authorized to undertake research in **Kiambu County** for a period ending **31st December, 2012**.

You are advised to report to **the District Commissioners and the District Education Officers, Kiambu County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

DR M.K. RUGUTT, PhD, HSC.
DEPUTY COUNCIL SECRETARY

Copy to:

The District Commissioners
The District Education Officers
Kiambu County.

Research Permit No. NCST/RCD/13/012/78

Date of issue: 4th December, 2012

Fee received KSH 1,000

IS TO CERTIFY THAT

r/Dr./Mr./Mrs./Miss/Institution

iashon Mbugua Macharia

Address) Kenyatta University

Box 43844-00100, NAIROBI.

been permitted to conduct research in

Location

District

Province

the topic: Application of information communication

technology in schools management practices in

public secondary schools in Ruiru District, Kiambu

county Kenya



Applicant's

Signature

Secretary

National Council for

Science & Technology

for a period ending 31st December, 2012.