

**AN INVESTIGATION INTO THE EXTENT OF THE USE OF ICT IN  
EDUCATION MANAGEMENT IN PUBLIC SECONDARY  
SCHOOLS IN NAIVASHA DISTRICT, KENYA**

**BY**

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## DECLARATION

This project is my original work and has not been submitted for an award of any degree or study program in any of the Universities

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## **DEDICATION**

This research project is dedicated to the Almighty God for giving me life, power, knowledge, wisdom and understanding to write it.

Secondly, I dedicate it to my dear wife Mrs. Alice Ngugi and my children Grace, Simon and Joy for their support and encouragement during the writing of this project.

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## **ABSTRACT**

The purpose of this study was to investigate the extent of the use of ICT in education management in public secondary schools in Naivasha District. The study was guided by the following specific objectives: to establish the status of the use of ICT in the management of public secondary schools in Naivasha District, to assess head teachers' preparedness for the use of ICT in the management of public secondary schools in Naivasha District, to establish the use ICT in the management of different task areas in public secondary schools in Naivasha District and to make recommendations on the ways of improving the management of public secondary schools by using ICT. The population for the study were public secondary schools in Naivasha district. The district had a total of 37 schools out of which 20 were sampled for the study. The study targeted the principals, secretaries and the school Bursars. A total of 60 respondents were sampled for the study (this constituted 20 principals, 20 secretaries and 20 bursars). Descriptive survey design was used for the study. Stratified sampling method was used to categorize the schools into National, Provincial and District schools from which the study samples were drawn from each category. Purposive sampling was used to sample the respondents for the study. The study used questionnaires and interview schedules as instruments for the study. Questionnaires were used to collect the data from the sampled principals while interview schedules were used to collect the data from the secretaries and the school Bursars. The instruments were piloted in two schools which were not included in the actual study to test their reliability and validity. Data was analyzed by the use of SPSS. Descriptive statistics such as, frequencies and percentages were used to describe the data. The analyzed data were presented in form of tables, pie-charts and bar-graphs where applicable. The study found that 72% of the respondents indicated that they used computers to carry out administrative duties. The computers were used in the following ways: management of students' records, typing letters, memos and examinations, analysis and preparation of data and for communication. Regarding the computer literacy of the principals, the study found that 61% of the respondents were computer literate and that they invested in ICT resources as indicated by 8% of the respondents. The study finally found that ICT was used in different areas of management in schools such as curriculum instructional management as indicated by 67% of the respondents, student management

67%, financial management 61%, personnel management 50% and material resources management as indicated by 44%. The study concluded that even though some of the secondary schools in Naivasha district were prepared, others were not prepared as they did not have ICT resources required for the management of the schools. The study recommended that the government through the ministry of education should layout ICT infrastructure in schools to facilitate the use of ICT in the managements of schools and that head teachers should be trained on the use of ICT in the management of schools. The study recommended that another study be done on the challenges facing the use of ICT in teaching and learning in secondary schools in other districts.

## **ABBREVIATION AND ACRONYM**

<b>BOGs</b>	Boards of Governors
<b>Dot Force</b>	Digital Opportunity Task Force
<b>DEBs</b>	District Education Boards
<b>DEO</b>	District Education Officer
<b>GeSCI</b>	Global e-schools and communities initiative
<b>ICT</b>	Information and Communication Technologies
<b>ICI</b>	Information and Communication Infrastructure
<b>IT</b>	Information Technology
<b>ITAA</b>	Information Technology Association of America
<b>ILO</b>	International Labour Organization
<b>MIS</b>	Management Information Systems
<b>NOF</b>	New Opportunities Funded
<b>PDE</b>	Provincial Director of Education
<b>PTTO</b>	Provincial Technical Training Officer
<b>PTAs</b>	Parents-Teachers Associations
<b>SMCs</b>	School Management Committees
<b>SAGAs</b>	Semi Autonomous Government Agencies

## **CHAPTER ONE**

### **INTRODUCTION**

#### **1.1 Background of the study**

For decades now, fast changes have been taking place in all facets of human life. We have been living through a period of revolutionary change induced by what is commonly called the information and communication (ICT) revolution. This term refers to the economic, social and political transformations currently being driven by a cluster of technologies centered on the electronic computer and the Internet. Information and Communication Technologies (ICTs) are defined as a diverse set of technological tools and resources used to communicate and to create, disseminate, store, and manage information. These technologies include computers, the Internet, broadcasting technologies (radio and television) and telephony (UNDP, 2000). ICTs consist of the hardware, software, networks, and media for collection, storage, processing, transmission and presentation of information (voice, data, text, images), as well as related services. ICTs can be divided into two components, Information and Communication Infrastructure (ICI) which refers to physical telecommunications systems and networks (cellular, broadcast, cable, satellite, postal) and the services that utilize them (Internet, voice, mail, radio, and television) and Information Technology (IT) that refers to the hardware and software of information collection, storage, processing, and presentation. (World Bank, 2002)

The study of technology implementation in organizations and institutions started around the 1950s. The rapid evolution of technology has necessitated a change of approach to

corporate technology management (Applegate, McFarlan and McKenney, 1999). Wiseman (1985) identified three areas in terms of objectives for information system use: to improve institutional efficiency by automating information processing, to improve management effectiveness by satisfying information needs and to improve competitiveness by affecting the business strategy. Laudon and Laudon (1998) in their studies indicated four types of institutional change enabled by ICT namely: automation, rationalization, reengineering and paradigm shift. Automation refers to the application of ICT to assist employees in performing their jobs more efficiently and to speed up the performance of existing tasks. Rationalization of procedures is the streamlining of standard operating procedures, eliminating bottlenecks so that automation makes the procedures more efficient. These two models of change in general take an engineering approach, emphasizing the processes of designing, planning, constructing and controlling. On the other hand, reengineering refers to the radical redesign of institutional processes used to produce services or products with the goal of reducing significantly the costs of operation; and paradigm shift is a more radical form of reengineering which involves the radical reconceptualization of the nature of the institution. Obviously, each model of change carries different rewards as well as risks. It is believed that the reengineering approach is a valuable way of rethinking the nature of school leadership and management to meet the challenges of the twenty-first century (Davis, 1996).

Exploratory research has shown that implementation of ICT in schools is perceived by principals to be complex and fraught with difficulties (Schiller, 1997). Principals identified concerns about access to and maintenance of appropriate hardware and software, apprehension about personal computer use, providing appropriate staff

development programs, and coping with strategic planning processes required to integrate ICT into teaching, learning and school management practices.

Management is a very important function in any institution and therefore must be done effectively and efficiently. To achieve effectiveness in the management of schools, the use of ICT has to be incorporated as it helps in the passage of information from one department to another and also the coordination of institutional functions. According to Okumbe (2001), the principal is charged with the task of managing curriculum and instruction, staff personnel, student personnel, school plant, finances and school community relations. Thus the principals are charged with the responsibility of carefully planning and utilizing the available resources in the school to achieve the institutional goals. Adapting from a framework developed for information system management in organizations, Telem (1996) presented a framework for school management information system implementation, which included five components namely: technical, structural, psychosocial, goals and values, and managerial. This five component framework clearly indicates that the change involved in ICT implementation in schools is a complex process and needs special attention even when the change involved is related to management and does not involve teaching and learning in schools.

### **1.1.1 Importance of ICT in the Management of Schools**

The increasing use of technology in all aspects of society makes confident, creative and productive use of ICT an essential skill for life. According to Harrison (2002), ICT capability encompasses not only the mastery of technical skills and techniques, but also the understanding to apply these skills purposefully, safely and responsibly in learning, everyday life and employment. ICT capability is fundamental to participation and engagement in modern society. ICT can be used to find, develop, analyse and present

information, as well as to model situations and solve problems. ICT enables rapid access to ideas and experiences from a wide range of people, communities and cultures, and allows students to collaborate and exchange information on a wide scale. It acts as a powerful force for change in society and citizens should have an understanding of the social, ethical, legal and economic implications of its use, including how to use ICT safely and responsibly. Increased capability in the use of ICT supports initiative and independent learning as students are able to make informed judgments about when and where to use ICT to enhance their learning and the quality of their work. There is an increasing use of information communications and technology (ICT) in schools both as a management tool and as a classroom resource. Appropriate use of ICT in schools can transform the teaching, learning and management processes in schools (Harrison, 2002).

Education is a prerequisite for achieving several development goals. Research has shown that education is positively associated with a wide variety of human welfare issues that are seen as development goals. Appropriate use of ICT could enhance many aspects of life in developing countries from health to education to economic growth. According to Annan (2001), education is one area where ICT deployment and improved access to information promises to deliver tangible benefits, it can facilitate a pedagogical shift entailing an educational interaction between teachers and learners; if used correctly, it can encourage and support a meaningful two-way informational flow between teachers and learners, moving away from the old method of teaching where knowledge is simply transferred from teacher to student without any space for critical analysis on the part of the learner. Using ICT in education to produce ICT-literate students and a versatile, adaptable workforce is also consistent with the human capital theory of education. Hawkins (2002) stated that workers must learn how to learn and quickly acquire new skills. Augmenting the skills of the workforce in this way has the potential to benefit the

economy at large and also improve the individual student's earning and employment potential.

In specific terms, there are several ways in which ICT can contribute to solving education problems in Developing Countries; some of the most pertinent of these problems include:

**Shortage of qualified teachers:** Global e-schools and communities initiative (GeSCI, 2004) estimated that as many as 25% of teachers in sub-Saharan Africa are not adequately qualified; ICTs can therefore accelerate teacher training. Report by Unwin (2004) concluded that ICT in education has most potential in pre- and in-service teacher training.

**Low learning achievement:** Introducing ICTs can help to counter some of the negative factors endemic in many schools in Developing Countries, such as high pupil: teacher ratios, shortage of basic instructional materials and poor physical infrastructure. Research on the Digital Education Enhancement Project in the Eastern Cape of South Africa found that ICTs had a positive impact on pupil achievement and classroom practice (Leach, 2003).

**High drop-out rates:** ICT can be used to make the school curriculum more interesting. Studies have verified that children enjoy learning using technology (Hepp et al. 2004). This motivation may deter children from dropping out of school; Gomez and Martinez (2001) described how using the internet in education programmes for street children in Colombia enticed a higher than usual number back to learning.

**Lack of opportunities in remote areas:** Distance learning can help to overcome the problems associated with geographical isolation and is invaluable for students in remote areas. Distance learning educational software also benefits from economies of scale increasing cost efficiencies. Recruiting teachers for the more remote regions is often difficult in Developing Countries; ICT serves to counteract physical distance as teachers can maintain contact with family and friends through telephone and e-mail.

**Lack of study material and resources:** Study and teaching materials are very sparse in many schools in Developing Countries; ICTs can play a significant role in providing teachers and students with access to educational content and up to date resources.

The issues arising from the preceding paragraphs lead toward the conclusion that education is one of the most important elements for achieving development success. However, ICT in turn can contribute towards enhancing education. This relationship was summarized by Kofi Annan (United Nations, 2003) when he asserted that:

*“While education unlocks the door to development, increasingly it is information technologies that can unlock the door to education”*

The Government of Kenya sees education as the natural platform for equipping the nation with ICT skills in order to create dynamic and sustainable economic growth (Kenya Government, 2004). Apart from the traditional use of ICTs in education “as a vehicle for improving existing school curricula and school management processes” (Makau, 1990), the Kenya Government holds that the use of ICT in education and training institutions will play a major role in disseminating skills to the wider society and thus create positive impacts in the economy (Kenya Government, 2004).

## **1.2 Statement of the Problem**

The way we live, work and intermingle have changed and will continue to change considerably with the expansion of ICT and the surfacing of knowledge societies. Our educational systems must be equal to the task and should respond consequently, not only in endowing students with ICT skills, but also in ensuring effective and efficient management of the institutions. The use of ICT in education is being nurtured well in both developed and developing countries. As the availability and use of ICT continues to expand, educational institutions needs to incorporate its use in the management and administrative functions.

Kenya promulgated National ICT policy in education in 2006. This has made a lot of changes in the education sector in Kenya. In the recent past, there has been changes in the school management which has been evidenced by the introduction of online registration for national examinations and the way records are kept in schools. This is an indication that the introduction of ICT in education in Kenya is geared towards ensuring that the management of schools is taken to another level where records can be easily kept and ensuring that communication between the stakeholders in the school is made easy. Although many secondary schools introduced computers in great numbers starting early 1990's, there is limited data on their use to facilitate school administration. To fill the knowledge gap existing, this study was aimed at establishing the extent of the use of ICT in the management of public secondary schools in Naivasha district.

## **1.3 Purpose of the Study**

The purpose of this study was to establish the extent of the use of ICT in the management of public secondary schools in Naivasha District.

#### **1.4 Objectives of the Study**

The study was guided by the following specific objectives:

1. To establish the status of the use of ICT in the management of public secondary schools in Naivasha District.
2. To assess head teachers' preparedness for the use of ICT in the management of public secondary schools in Naivasha District.
3. To establish the use of ICT in the management of different task areas in public secondary schools in Naivasha District.
4. To establish the strategies for improving the management of public secondary schools by using ICT

#### **1.5 Research Questions**

The study was guided by the following research questions.

1. What is the status of the use of ICT in the management of public secondary schools in Naivasha District?
2. What is the level the level of preparedness of the head teachers in terms of training and availability of resources in embracing use of ICT in the management of public Secondary schools in Naivasha District?
3. How is ICT used in the management of different task areas in secondary schools in Naivasha District?
4. What strategies can be employed for the improvement of the use of ICT in the management of public secondary schools in Naivasha District?

### **1.6 The scope of the Study**

The study was carried out in public secondary schools in Naivasha District. The study targeted principals, bursars and secretaries of the sampled schools.

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

The study will be of importance to the management of secondary schools. By highlighting on the areas of the use of ICT in the management of schools, the management will get to know where ICT can be applied to improve the management of schools.

The study will also inform the already promulgated policies in education. By highlighting on the extent to which ICT has been used in the management of schools, policy makers can review their policies to ensure effective use of ICT in the management of schools.

### **1.8 Assumptions of the study**

The study assumed that the public secondary schools in Naivasha district use ICT in their management. It is therefore upon this assumption that this study was aimed at establishing the status of the use of ICT in the management of schools within the District.

### **1.9 Limitations of the Study**

According to Orodho (2004) a limitation is an aspect of the study that the researcher knows may adversely affect the results or generalizability of the study, but over which he/she has no direct control over. One of the limitations of the study was that it was only carried out in the public secondary schools in Naivasha. This left out the private institutions; hence the findings of the study may not be generalized to the status of the use

of ICT in the management of all secondary schools in Kenya. Thus by carrying out the study in public schools, the findings of the study was only subject to public secondary schools in the District.

#### **1.10 Delimitations of the study.**

The study was delimited to selected public secondary schools in Naivasha District. Out of the 37 public secondary schools in Naivasha district, the study was carried out in 20 schools. This helped the researcher to conserve on the time to be spent on the data collection and the finances to be used.

#### **1.11 Theoretical framework**

##### **Classical Organizational Theory**

This study adopted the use of classical organization theory. In this category of management theory are the works of Max Weber's bureaucratic theory and Henri Fayol's administrative theory.

##### **Bureaucratic Theory**

Weber (1947) postulated that western civilization was shifting from value oriented thinking, affective action (action derived from emotions), and traditional action (action derived from past precedent) to technocratic thinking. He believed that civilization was changing to seek technically optimal results at the expense of emotional or humanistic content.

According to Gerth and Wright (1974), Weber developed a set of principles for an "ideal" bureaucracy as follows: Fixed and official jurisdictional areas, a firmly ordered hierarchy

of super and subordination, management based on written records, thorough and expert training, official activity taking priority over other activities and that management of a given organization follows stable, knowable rules. The bureaucracy was envisioned as a large machine for attaining its goals in the most efficient manner possible.

However, Weber was cautious of bureaucracy when he observed that the more fully realized, the more bureaucracy “depersonalizes” itself - that is, the more completely it succeeds in achieving the exclusion of love, hatred, and every purely personal, especially irrational and incalculable, feeling from execution of official tasks. Hence, Weber predicted a completely impersonal organization with little human level interaction between its members. This theory was therefore used to explain how the use of ICT has changed the management of schools which was the interest of the researcher.

### **Administrative Theory**

Henri Fayol’s administrative theory mainly focuses on the personal duties of management at a much more granular level. In other words, his work is more directed at the management layer. Fayol believed that management had five principle roles: to forecast and plan, to organize, to command, to co-ordinate, and to control. Forecasting and planning was the act of anticipating the future and acting accordingly. Organization was the development of the institution’s resources, both material and human. Commanding was keeping the institution’s actions and processes running. Co-ordination was the alignment and harmonization of the group’s efforts. Finally, control meant that the above activities were performed in accordance with appropriate rules and procedures.

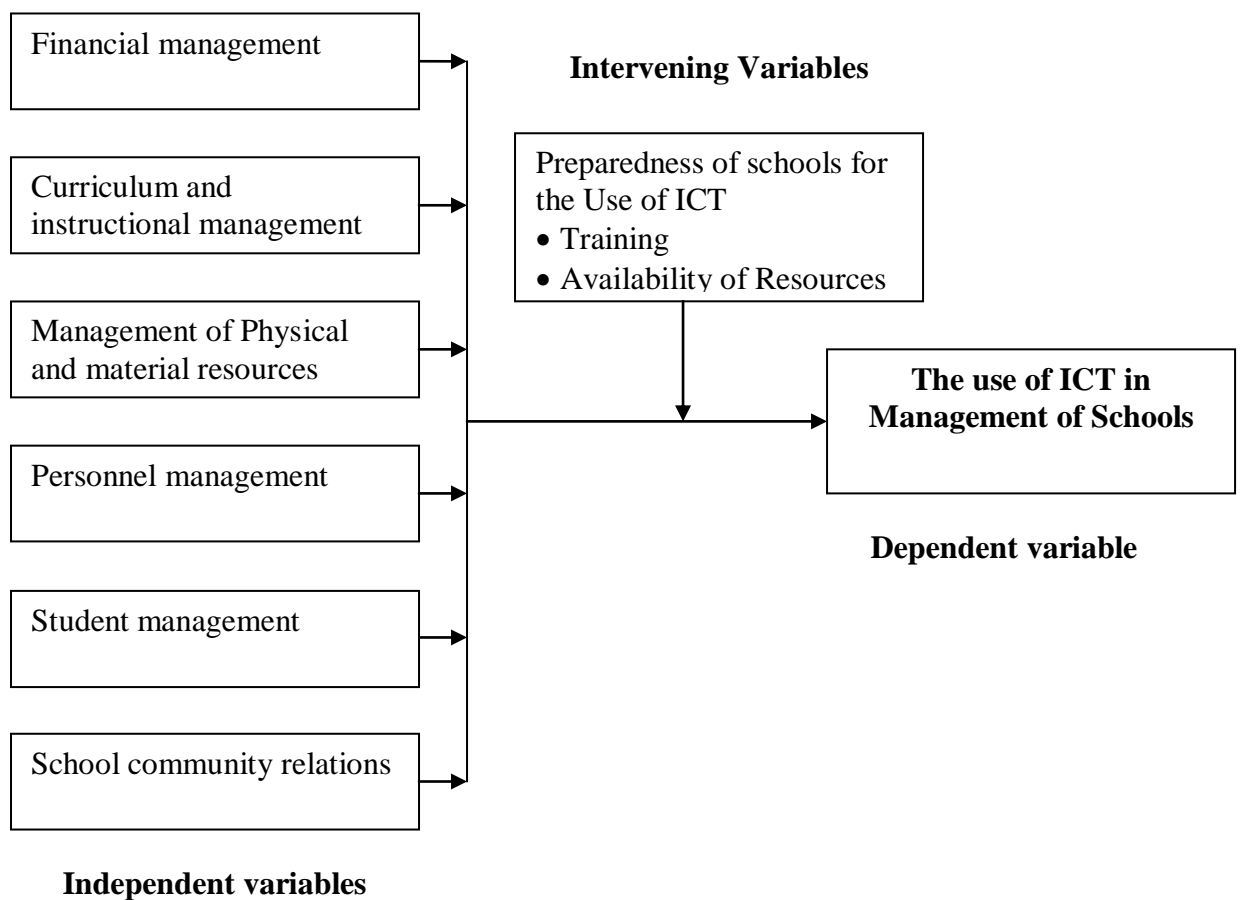
Fayol (1937) developed fourteen principles of administration to go along with management's five primary roles. These principles are: specialization/division of labor, authority with responsibility, discipline, unity of command, unity of direction, subordination of individual interest to the general interest, remuneration of staff, centralization, scalar chain/line of authority, order, equity, stability of tenure, initiative, and esprit de corps. Fayol clearly believed personal effort and team dynamics were part of an "ideal" organization. Fayol's five principle roles (Plan, Organize, Command, Co-ordinate, and Control) of management are still actively practiced today. The concept of giving appropriate authority with responsibility is also widely commented on and is well practiced. Unfortunately, his principles of "unity of command" and "unity of direction" are consistently violated in "matrix management", the structure of choice for many of today's companies.

This study adopted Fayol's administrative theory to explain the role of the school principals in the management of schools. This was because, according to Fayol, management has five principle roles: to forecast and plan, to organize, to command, to co-ordinate, and to control. This was used to explain the use of ICT in achieving these administrative roles. Focusing on the co-ordination, ICT is used by the management to coordinate different activities in the school and school community relations. On the other hand, ICT is used in the control and management of records and resources in schools e.g management physical and material resources, personnel management, student management and in curriculum and instructional management.

### **1.12 Conceptual framework of the Study**

The conceptual framework below presents the relationship between the independent and dependent variables of the study. In the framework, the independent variables were the

task areas where ICT is used in the management of schools i.e financial management, curriculum and instructional management, management of physical and material resources, personnel management, student management and community relations. The dependent variable was the use of ICT in the management of schools. The intervening variable for the study was the preparedness of the schools for the use of ICT e.g in terms of training and availability of resources.



**Figure 1.1 Conceptual Framework**

From the conceptual framework presented above, the independent variables reflect the areas in which ICT is used in the management of the schools. Technology has been adopted in the management of finances and students records where just by a mere click of

the students registration number, all the details of the students including the performance, fee balance class and any other information relevant to the student will be known. This is also applicable to the management of resources in the schools where records are kept regarding the use of different material resources in schools. The use of resources such as emails and telephone lines help in establishing community relationships with the schools where parents can be updated on the progress of their students in school. The use of these resources in ensuring effective management of the schools is determined by the training on the use of the resources and the availability of ICT resources in schools. Establishing the use of ICT in different task areas in schools management will therefore help to evaluate the extent to which ICT has been used in the management of schools.

### **1.13 Operational Definition of Terms**

**Computer** is a device that accepts information (in the form of digitalized data) and manipulates it for some result based on a program or sequence of instructions on how the data is to be processed. Complex computers also include the means for storing data (including the program, which is also a form of data) for some necessary duration.

**Computer literacy** – Refers to individual knowledge and ability to use computers and related technology efficiently.

**Education** is an experience that has a formative effect on the mind, character or physical ability of an individual.

**Information technology (IT)** - As defined by the Information Technology Association of America (ITAA) is "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware.

**Innovation-** Refers to a new way of doing something. It may refer to incremental and emergent or radical and revolutionary changes in thinking, products, processes, or organizations

**Learning** -Is acquiring new knowledge, behaviors, skills, values, preferences or understanding, and may involve synthesizing different types of information

**Training** – Is the process of bringing a person to an agreed standard of proficiency by practice and instruction.

**Information Systems** -

Any written, electronic, or graphical method of communicating information.

**Management** – Is an act, manner, or practice of managing, handling, supervision, or control of a business or institution.

**Planning:** Implies a capacity to foresee a pathway to solve the problem

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter presents related literature on management of schools in Kenya, preparedness for the use of ICT, the use of ICT in the management of schools and challenges to the use of ICT in education management. The chapter ends with a summary of the literature review.

#### **2.2 Management of schools in Kenya**

Great expectations for educational improvement accompanied the introduction of ICT into schools (Pelgrum and Anderson, 1999). It is believed that ICT is the vehicle that will assist schools in completing the transition from the industrial to the information Era (Kozma, 2003). Even though the expectations from ICT have only been partly realized, some schools present meaningful outcomes along with structural changes (Plomp et al., 2003; Kozma, 2003). This study was therefore aimed at investigating the extent of the use of ICT in the management of secondary schools.

Currently, the increasing competition has led many organizations to search for more effective management strategies. Many of the organizations have turned to information and communication technologies (ICT) as a way to cope with turbulent environments. According to Laudon & Laudon, (2000), information technology refers to interrelated components working together to collect, process, store, and disseminate information to support decision making, coordination, control, analyses, and visualization in an organization. The adoption and use of IT has been considered to have a lot of effect on

the productivity and performance of different organizations. Very strong evidence comes from OECD (2005) and EU studies (Goldrige and Clayton, 2004) which demonstrate that ICT investments have a clearly positive effect. OECD research showed that in the first part of the 1990s ICT contributed 0.2-0.5 per cent to the annual GDP growth rates (typically around 2.0 per cent annually), while in the second part of the 1990s this increase reached 0.3-0.9 per cent. The biggest effects were found in the USA, followed by Australia, Finland and Canada (Colecchia and Schreyer, 2002). Another OECD (2005) research on productivity showed that in the 1995-2003 period, ICT capital investments made a larger contribution to the increase in productivity than all other non-ICT capital investments together. (Sessional paper No. 1 of 2005 on a policy framework for education, training and research).

### **2.2.1 Principals as School Managers**

The world of the manager is complicated and confusing. The manager plans, organizes, motivates, directs and controls. A manager adds foresight, order, purpose, integration of effort and effectiveness to the contributions of others (Strong, 1965). The multiple roles of a manager are described by Kivimaki-Kuitunen (2000) as follows. First, assuring the commitment and motivation of personnel to the agreed upon goals is one of the most important challenges for a supervisory manager and a premise for success. Additionally the manager recruits, familiarizes, agrees on goals, makes networks, acquires, discards and decodes information, communicates, follows, encourages, demands, takes care of the atmosphere of the organization and listens to problems. It has been claimed that executive work is not that of the organization, but the specialized work of maintaining the organization in operation.

Hepp et. al. (2004) divided manager's roles into: interpersonal roles, informational roles and decisional roles. In the interpersonal role a manager can be a figurehead. Because of their formal authority, the manager is a symbol, obliged to perform a number of duties. The manager can also be a leader who defines the atmosphere in which the organization works.

According to Hepp et al. (2004), leadership involves interpersonal relationships between the leader and the led. The leader's role is clearly among the most significant of all roles, and has received far more attention than any other. The liaison role of the manager deals with the significant web of relationships that the manager maintains with numerous individuals and groups outside the organization that he/she heads. Informational roles are related to the receiving and transmitting of information. The manager as a monitor is continually seeking, and being bombarded with, information that enables them to understand what is taking place in their organization and its environment. The manager's special access to information allows playing the important role of a disseminator, sending external information into their organization and internal information from one subordinate to another. While the disseminator role looks into the organization, in the spokesman's role the manager transmits information out to his organization's environment. The manager is often called upon to speak on behalf of the organization (Hepp et al., 2004).

The third category of managerial roles is the decisional roles. These roles involve the manager in the strategy-making process in the organization. Resource allocation is the heart of the organization's strategy-making system. The manager must oversee the system by which organizational resources are allocated. The manager's final role is that of a

participant in negotiation activities. From time to time, the organization finds itself in major, non-routine negotiations with other organizations or individuals. It is frequently the manager who leads the contingent from his/her organization. The use of ICT in school management is therefore vital. According to Passey (1999), the permeation of uses of ICT for educational purposes means that for all those who manage, ICT is likely to have an impact now or in the very near future. From the point of view of those who manage in educational situations, this will mean that there will be implications for those who are involved in all types of management, whether it be strategic management, implementation management at a policy or school level, those who are responsible for curriculum management, classroom management, site management, financial management, or personnel management. This width of involvement means that potential shifts in practice arising from the involvement of ICT (Passey, 1999). This study is therefore aimed at establishing the status of the use of ICT in the management of secondary schools in Naivasha District.

### **2.3 Preparedness for the use of ICT by the School Managers**

The importance of information and communications technologies (ICTs) as powerful tools for socio-economic development is now widely acknowledged not only among large corporations but in institutions of learning as well. However, for ICT to be effectively deployed as engines of economic development existing IT skills gap both in developed and developing countries must be addressed. The Digital Opportunity Task Force (DOT FORCE, 2002) emphasize human resources development through systematic training and education as critical if countries have to reap digital dividends. Additionally, pervasive use of ICT in the economy depends on well-trained human resources for developing relevant applications, supporting and maintaining systems. Moreover, investment in

human capital, research and development is becoming increasingly recognized as a critical factor in preparing citizens to participate in the digital age.

The International Labour Organization (ILO, 2001) states that countries with the right mix of skills stand a better chance of becoming important locations in global markets. However, for maximum gains to emerge, the development of essential ICT skills is necessary because without such skills, the technologies can neither be maintained nor adapted to local use. The promotion of education and literacy in general and digital literacy in particular, remains a major challenge facing most countries especially those in the developing world. ILO (2001) observes that adoption of ICT in organizations creates two types of skill needs. The first is related to the variety of foundation skills such as the ability to communicate, analyze and solve problems. The other skills relate to technical component which extends beyond the ICT sector to the economy as a whole.

In the school context, teachers are reluctant to use ICTs, especially computers and the Internet. Hannafin and Savenye (1993), identify some of the reasons for this reluctance: poor software design, skepticism about the effectiveness of computers in improving learning outcomes, lack of administrative support, increased time and effort needed to learn the technology and how to use it for teaching, and the fear of losing their authority in the classroom as it becomes more learner-centered. These are all issues that must be addressed by both pre-service teacher education and in-service teacher professional development programs if schools and other educational institutions are to fully exploit the potential of computers and the Internet as educational tools.

A large scale study by SchoolNet in which 69 secondary schools responded found that only 46 per cent of the sampled schools had computers, with availability of Internet and facsimile rare in these schools (Kenya SchoolNet, 2003). The findings also indicated that email was yet to be recognized as a tool for collaboration among students and teachers, and only one school had a website while another two reported having networked all their computers to the Internet. It went on to affirm that in these schools, access to the Internet was severely limited and when available was only for administrative use. The study found that almost 40% of schools had less than 10 computers, and therefore inadequate for teaching and learning.

The OECD studies make a clear distinction between increased student use of ICT because it is available in the school and major changes in work practices. The OECD study concludes that both infrastructure and teacher competencies are required for successful implementation of ICT in a school (Venezky and Davis, 2002). For work practices to change significantly in association with ICT, teachers have to be much more comfortable with using ICT than most are. Even if teachers are familiar with ICT, additional technical support is needed to make ICT a tool for curricular change and changes in the teaching-learning process.

Henry Becker's (1994) analysis of the responses of more than a thousand teachers to the 1989 International Association for the Evaluation of Educational Achievement survey, found that low levels of computer use by teachers were the result mainly of low levels of computer literacy, that in turn results from a lack of resources supporting teacher use of technology. Further, Becker's study suggests that Teachers using computers more effectively were more likely to work in schools offering high levels of teacher

development on computers and having technology coordinators available to assist teachers with ongoing problems (Maldonado, 2000).

#### **2.4 The use of ICT in the management of Schools**

In educational administration, computers have been used in timetabling, personnel management, financial control and examination administration. Schemelzer (2001) noted that technology can help administrators to deal with some of the challenges they face but only if they have a vision and know how to harness it and make it part of the fabric that supports the teaching and learning process in schools. The use of computers has also helped school administrators to plan and allocate human resource and physical resources more effectively. Mablinger (1996) explained how the ability connects computers through networks helps principals to work together and share information and thus promoting school-community relationship. For ICT integration programs to be effective and sustainable, administrators themselves must be competent in the use of the technology, and they must have a broad understanding of the technical, curricular, administrative, financial, and social dimensions of ICT use in education.

ICT plays a key role in the management of complex information flow and integration of such information towards effective policy formulation and planning towards the utmost maximization of human capital and potential in the school environment. Thus, it involves the development of effective and integrated tools as well as training modules to enable their application through effective teacher training (Mac-Ikemenjima, 2005). ICT is used in the following areas of management:

### **2.4.1 Educational management**

Management of educational institutions are faced with many challenges. Fresh approaches are needed to address persistent problems of the past and provide students with an education appropriate to the needs of a modern, information-based global economy. Now, after more than two decades of unfulfilled promises to revolutionize education, computer and communication technologies are finally able to offer opportunities to significantly improve teaching and learning and the management of schools. In educational administration, computers have been used in timetabling, personnel management, financial control and examination administration (Wolff, 1998).

Instructional management strategies are employed to assist educators with planning and assessing what they will teach in their respective classroom or discipline. Lesson plans, grade books, attendance tracking, unit tests, progress reports, and report cards are instructional management strategies required of teachers and monitored by each school principal. The current process is primarily paper-based and, as a result, labor-intensive and error-prone. These teaching and assessment strategies are difficult for teachers to maintain and for principals to review. Request for new courses may be developed at the school level and implemented on a pilot basis for further review and approval. The introduction of information technology in schools has made enormous improvement and efficiency in the way they are managed. According to Osin (1998), computers have been used in the management of data which has made it easier for teachers and administrators to maintain accurate records to improve school and classroom management. As education systems seek to decentralize services, financial support, management and responsibilities, it becomes increasingly important for schools to build the capacity to maintain financial

and personnel records. Using computers has increased accuracy and accountability hence reducing the time and costs involved in entering data; these has made it possible to quickly retrieve and analyze information for decision making (Osin, 1998).

According to World Bank (1999), computers have also made it possible for teachers to maintain accurate student records, track and analyze performance and use the resulting information to make decisions about how to individualize instruction. Burdensome and tedious record keeping takes time away from more important tasks and inhibits teachers from maintaining records. Simplifying the process by the use of computers has encouraged teachers to keep better records and, more important, making use of the resulting information. Before changing the way teachers and schools manage classroom and school records, it is important to evaluate the school's information system and the staff's perceptions of its current information management system (World Bank, 1999).

Day et al. (2000) concluded that, "Research findings from diverse countries and different school contexts have revealed the powerful impact of leadership processes related to school effectiveness and improvement. Essentially, schools that are effective and have the capacity to improve are led by principals who make a significant and measurable contribution to the effectiveness of their staff. Research on school leaders in Denmark, Scotland, England and Australia by MacBeath (1998) identified a number of characteristics of effective leaders including "Good leaders are in the thick of things, working alongside their colleagues", "respecting teachers' autonomy, protecting them from extraneous demands", and "look ahead, anticipate change and prepare people for it so that it doesn't surprise or disempower them." Durland and Teddlie (1996) posit a 'Centrality-Cohesiveness Model of Differentially Effective Schools'. Differentially

effective schools can be distinguished by the cohesiveness of the staff and the centrality of the leadership within the school. ‘Well-webbed’ structures and ‘central’ leadership were found to be more effective than those based on cliques, or ‘stringy’ structures and a perceived lack of leadership.

Yee (1998) proposed five information technology leadership types from a study of school principals in New Zealand, namely, technology entrepreneur, technology caretaker, technology trainer, technology modeler, and technology learner. Organizational challenges, opportunities, responsibilities, and leadership strategies must be considered well before ICT implementation in schools, and principals are leaders of change, supporters of teacher development, and modelers of ICT use (Yee, 1998). Yee (2000) further defined eight types of ICT leadership namely: equitable providing, learning-focused envisioning, adventurous learning, patient teaching, protective enabling, constant monitoring, entrepreneurial networking, and careful challenging. The important role of school leaders in educational innovations has been well documented; Leithwood et al. (1999) summarized the latest leadership theories in education into six different approaches: instructional, transformational, moral, participative, managerial, and contingent. However, it is evident that power and influence are central in leadership (James and Connolly, 2000; Yukl, 2002).

#### **2.4.2 The use of ICT in Data Management**

There is evidence of radical beneficial changes in planning and sharing materials and recording assessments and examples of ICT-led assessments where electronic collection of samples of pupil’s work is used to validate and moderate baseline assessment (Venezky and Cassandra, 2002). The underlying reasons may lie in the condition of the

project itself: High levels investment in ICT including the incorporation of management information systems, which have fostered collaborative approaches. IT is the evidence of the use of ICT in formalizing co-operative planning via the sharing of curriculum plans and the analysis of students' data. Teachers keep records of students' work electronically which has led to clearer target settings and to improvements in reporting to parents (Venezky and Cassandra, 2002).

Bilateral assistance agencies and international banks placed emphasis in the 1980s and 1990s on using ICT to collect educational data and to improve the administration of educational systems in developing countries, particularly through decentralizing educational offices to regions, states, municipalities and states themselves (OECD, 2001). As in developed countries, such ICT systems have been used mainly for collecting enrollment data, student attendance, basic information on teachers, and basic information on schools. In other words, ICT mainly helps administrators get a better idea of the size of the educational system, student dropout and repetition, and the number of students per teacher. In some sense, this can be characterized as measuring the efficiency of the educational system and as a first step in improved resource allocation. Educational administrators need to have basic information on student and teacher flows, probably also of school supplies, and how much the system is spending on various inputs, in order to make the most basic resource allocation decisions. Undoubtedly, ICT has played an important role in improving data collection in educational systems. It has also made these data more widely available to school personnel, parents, and the public at large through central administration Web sites and in some countries through direct access to central or district databases by school personnel (OECD, 2001).

These rudimentary data collection functions are expanded in some countries and regions by more sophisticated quality control data, namely student evaluation data. Currently, Kenyan government has incorporated the use of ICT where National examination results of individual students are made available on the Web site. Other countries like France make available the results of the examination, school by school, on the Ministry's Web site. These results are presented in adjusted form, corrected for the socioeconomic background of the students in each school (Carnoy, 2002). Until 1996, these results were only available to schools; now they are also posted on the Web. States such as Texas and North Carolina are pioneers in using testing in grades 3-8 and a high school exit test to monitor individual school success or failure with students from different ethnic groups. Now many states use similar state standards and testing to monitor schools (Carnoy, 2002)

ICT is crucial to these national and state accountability systems, both in collecting/processing the data and disseminating the results. In all these systems, however, the centralized administration uses ICT to regulate the system from above. According to Carnoy and Susanna (2002), ICT collects information from and distributes information to the different departments in schools and uses the information to extract greater effort from the different parts of the system. In many countries, such top-down use of ICT to monitor performance could be extended to collecting and disseminating information on student and teacher absenteeism, student attainment and other variables, all on a school-by-school basis (Carnoy and Susanna, 2002).

Top-down monitoring is a typical use of ICT in business applications. Many would consider this monitoring a form what Derber (1994) calls contingent capitalism an effort

to reduce wages and job security. The education industry is largely public, marked by permanent contracts and wage negotiations that have little to do with measures of productivity. Thus, any effort to measure educational productivity, even of schools, could be considered as moving in the direction of labor control of attempting to take autonomy away from teachers. Such top-down administrative controls are not widely practiced even in developed countries, especially those with more decentralized systems. The single most prevalent form of centralized control is a standardized curriculum and a system of inspection. This system is supply based. It assumes that if the curriculum is fixed and teachers are applying the technology, student will learn at an expected rate. In practice, supply based management leaves an enormous amount of control of the educational process in the hands of individual, unsupervised, un-evaluated teachers (Derber, 1994).

In all the cases mentioned of attempts to augment centralized control with student evaluations, the central administration uses ICT to regulate schools but leaves to schools the choice of method to improve performance. How much of a role does ICT play in helping schools do better, either in improving school attendance, student test scores, or student promotion? In France and Chile, for example, the curriculum is centrally controlled, and student evaluations in 3rd and 6th grade in France and in 4th, 8th, and 10th grade in Chile are all tied directly to the standard curriculum. Similarly, in many U.S. states where students are regularly tested and schools judged on the basis of test scores, individual student test scores are made available to schools (in France, the tests are graded by school personnel at each school). With computer capacity available to schools, it would not be difficult to assess student results against components of the curriculum (Carnoy, 2002).

In states or countries where students are tested in every grade, it would be possible to assess student progress grade-by grade in each school provided that students stayed in a school. Patterns of incorrect answers by students could even be matched to individual teachers, thus helping teachers improve their productivity, at least in terms of test items. There is evidence of teacher resistance to external accountability using student testing as a measure of school productivity (DeBray, Parson and Avila, 2002). However, teacher resistance has not impeded the application of external accountability, and there are some studies that indicate its positive effects on student outcomes, particularly in mathematics (Carnoy and Loeb, 2002).

### **2.4.3 The use of ICT in Communication**

Over the past decade computer and other communication equipment have come to play such a dominant role in the processing of information that it is enormous to imagine any enterprise to function efficiently without them. They are therefore useful tools for data/information input, storage, organization, processing and retrieval.

The use of ICT for communicative purposes continues to evolve in an institutional set up. In business, one of the major changes in work associated with ICT is the shift from more traditional networking within organizations to networking between organizations. Likewise, in schools, one of the most important ways that ICT changes student and teacher work is by creating new networking possibilities directly with other schools or, indirectly, to informational data bases on the World Wide Web. In business, ICT has transformed radically work that requires communication with others, processing information, or creating information. Similarly, ICT can change student and teacher work around teaching and learning. When computers are readily available to students and teachers are also trained to use computers, students can do a major part of their

schoolwork using Web resources, preparing written work on their computers, and consulting special databases and learning software to help with their math. Teachers can also consult databases for lesson plans, can interact with other teachers to share teaching ideas, and can help students become more self-sufficient and creative in their schoolwork (Maldonado, 2001).

In schools in El Paso, Texas, relatively low-income Latino middle school students had improved their writing skills significantly, were much more likely to complete their homework assignments (a major step in raising their overall academic performance), and spent significant amounts of time using Web resources, including special databases developed by Net Schools to help students in their coursework. Teachers in those schools were able to communicate with parents more effectively through the students' laptops, used Net Schools' databases to improve teaching, and used the teacher-student connection through the laptops to improve teacher-student communication. The observations in El Paso were similar to that reported in many schools in the OECD study: improved writing, greater enthusiasm about doing schoolwork, increased use of the Web, and increased use of e-mail. In some cases, teaching also changed because of the intense use of computers in the school (OECD, 2001).

Bayode (1996) has described ICT as the acquisition, processing, storage and dissemination of information by means of computers and other telecommunication equipment. He noted that the processing, storage and retrieval facilities are provided by computers, while telecommunications provide the facilities for the transfer or communication of data or information. Kumar (1994) described how man is faced with constant change and development in the last two decades. According to him, "there had

been very significant development in ICT and which has for ever changed the way information is gathered, processed and disseminated". He noted further that the information explosion and commercialization of information, coupled with the opportunities presented in ICT, have greatly affected the practice of information professionals.

The impact of the introduction of laptop technologies upon management has been reported in series of studies. It was found in one of the studies that parents would be likely to use ICT more in the future for communication with schools and that this would require management just as any other area of important relationship needs to be managed between homes and schools. ICT has made it much easier to share assessment information with parents via school websites or learning platforms. Schools have increased the use of telephone to communicate with parents which enables them to respond to parental enquiries more rapidly. Most recently the implication for management in terms of personnel needs, financial needs, and procurement needs have been studied and reported (Passey et al. 2000). It is becoming clear that as ICT use pervades to greater extents, so the range of roles and responsibilities shifts and the importance of managing finance and procurement becomes all the greater. Series of studies by Visscher, Wild, and Fung (2001) in different countries explored the current features of computerised school information systems, their implementation in a range of schools, the outcomes of this implementation, and implications for the future in terms of further research. Their findings offer perhaps the widest view of ICT and school management from the perspective of Management Information System (MIS). North et al. (2000) looked at the impact that the use of management information systems can have on the abilities of

schools to be managed more effectively. Their study looked at the role of support in bringing about such processes, and their future implications.

#### **2.4.4 The use of ICT in Personnel Management**

It is increasingly clear that ICT is becoming more pervasive within educational systems and more usable in wider circumstances. ICT has been found to have an effect on the abilities and qualities of those who need to be employed by organizations. ICT provides a supportive role for human activities to enhance organizational (or personal) efficiency and effectiveness (Cohen et al., 2002). It therefore helps to execute activities faster, support autonomous decision-making processes, and enable distributive operations in order to achieve higher efficiency (Faber et al., 2002). In a way, the use of ICT makes the processes more transparent to the stakeholders, which in turn, could lead to adoption of better practices to meet the customer service levels and increase in organizational capability to respond to a dynamic environment thereby reducing the cost of operation by as much as 50 per cent over the traditional practices (Gattorna and Berger, 2001).

Important functions of leaders in personnel management are impressing upon employees that they are capable, and empowering them to maximize their human capabilities. This cannot be accomplished with the command-and-control management philosophy. According to Andersen (2001), leaders must generate and sustain trust to gain employees following. Business leaders must develop employees that can identify problems and assist them in finding solutions. Leaders must motivate employees to achieve excellence in everything they do. Leaders also need to be decisive and timely in decision making when dealing with employees. Loyalty that is built among employees will carry through to

customers. For successful business leaders, experience, competency, and a commitment to life-long learning have never been more important (Andersen, 2001).

#### **2.4.5 The use of ICT in the Management of Organizational Resources**

The perceived effect of ICT adoption on resources management has been found to be positive. Among the impacts are: improved ability to identify training needs and improved efficiency of financial/accounting control, improved reliability of accounting and financial reports, improved work flow and increased ability for timely product/services delivery. In a study done by Olukunle (2008) on the perceived effect of information and communication technology (ICT) adoption in Botswana organizations, he found that ICT application improved records keeping as well as information security, confidentiality, and retrieval. It also necessitated organizational restructuring, and brought flexibility and adaptability in organizational activities. While ICT adoption was not seen as increasing employee redundancy, it was perceived as increasing the total wage bill of the organization as well as reducing the inventory of both finished goods and input materials. As such, respondents perceived ICT adoption as beneficial to the quality of information and cost control.

#### **2.4.6 The use of ICT in improving Productivity**

Certainly, good school administrators do use data to improve student performance, but there is very little evidence that ICT is widely used even in countries where schools have ample computer hardware and software to use available information in this way. Even more at the central administration level, educational administrators at the department level are unlikely to use ICT for managing educational output or quality. Nevertheless,

under pressure from state-based external accountability demands, some schools are using specially prepared software packages that allow teachers and the school to measure student gains on tests and compare test items missed by individuals and the sum of individuals in a classroom against the required curriculum. Thus, for the first time, some schools in states such as California are helping teachers by using ICT to track systematically how much students are learning (OECD, 2001)..

The OECD carried out 107 case studies of schools using ICT in 22 OECD countries. The objective of the study was to study the organizational changes wrought by ICT in schools in various countries. Although the studies were focused on the organization of teaching and learning, not administrative changes, it is remarkable that little mention is made in any of the cases of using ICT to monitor teacher application of curriculum through analyzing test results. One of the claims made in some of the studies was that the use of ICT helped shift performance monitoring to students themselves. As students used interactive modes of instruction, the software provided performance evaluation (OECD, 2001).

### **2.5 Challenges to the use of ICT in Education Management**

A major use of ICT in business decision-making is gathering data on various aspects of business performance and on the basis of those data, assessing how performance can be improved. In education, data on student performance is readily available in many schools and these data can be related to curricular content to assess whether required or tested curriculum is being applied. However, many educators have claimed that measuring learning through achievement tests essentially pushes schools to teach the tests, and is detrimental to a broader, more valid conception of learning (McNeil, 2000).

Constructivist approaches to education argue that understanding arises as learners through prolonged engagement relate new ideas and explanations to their own prior beliefs (OECD, 2001). Standardized testing, many argue, fails to measure this understanding; hence, analysis of test data would lead to incorrect educational decisions, often pushing teachers who might be providing understanding of the material to focus on teaching test items.

The other side of this coin is that ICT used for student-centered teaching, in which student engagement, hence greater understanding of the material, may require new kinds of assessment tools. In its recent publication, *Learning to Change: ICT in Schools*, the OECD discusses work by Voogt and Odenthal (1999), who proposed a series of emergent practices associated with the integration of ICT in education, which imply and invite radical change. They see an emphasis on skill development and on cross-disciplinary activity more in keeping with real life, developed and accredited through formative and summative student assessment by a variety of means, including portfolios. Students will themselves accept more responsibility for their own learning and its assessment, developing expertise in the process (OECD, 2001). The OECD study further concludes that the potential of ICT will not be realized as long as assessment is primarily in terms of student achievement in single subjects, by means of conventional written tests (OECD, 2001). Yet, this does not explain why ICT has not been more extensively used in translating traditional assessment procedures into more systematic educational improvement. It would seem logical to harness the information processing power of today's desktops to monitor student progress on curriculum-based assessments.

In those countries and states that implement accountability systems, schools and districts are usually responsible for finding the means to improve student performance, yet have little or no capacity to do so. In some OECD countries, where there is a tradition of educational research, or collecting extensive data on education, and making these data available to researchers, there is considerable analysis of educational productivity. In the past decade, Chilean researchers, assisted by the Ministry of Education, have also begun doing extensive analysis of Chilean educational data on a regular basis using the power of ICT. Yet, even in these countries, ICT as a management tool has not reached into local school districts and schools. From this analysis, the most obvious policies inside education that could stimulate more use of ICT in educational management would be widespread training of secondary school and university students in using ICT-based management tools and preparing high school students and education majors in college in rudimentary statistical analysis. By making such training part and parcel of a general educational preparation, the younger generation of teachers and educational administrators would be highly trainable in using data to assess their students' and their own work (OECD, 2001).

The following analysis aims to present the perceived barriers to the use of ICT which were highlighted in the reviewed studies and examine their causes and effects. The barriers are broadly divided into three categories: teacher-level barriers, i.e. those related to teachers' attitudes and approach to ICT, school-level barriers, i.e. those related to the institutional context and system-level barriers, i.e. those related to the wider educational framework.

The factors that impede the successful implementation of ICT include:

### **Teacher-level barriers**

Teachers' poor ICT competence, low motivation and lack of confidence in using new technologies in teaching are significant determinants of their levels of engagement in ICT.

**Lack of motivation and confidence in using ICT:** Their limited ICT knowledge, makes teachers anxious about using ICT in the classroom and thus do not feel confident to embrace new pedagogical practices. Becta (2004) survey on the perceived barriers to the uptake of ICT by teachers also refers to the 'teachers' fear of admitting to their pupils their limited ICT knowledge.

**Inappropriate teacher training:** Unsuitable teacher training programmes fail to engage teachers in using ICT both during their lessons and also in the preparation of lessons beforehand. The most commonly mentioned cause of this is that training courses focus mainly on the development of ICT skills and not on the Pedagogical aspects of ICT. It is interesting to observe that although some teachers have good ICT skills in terms of their own personal use, they are unable to transfer these skills to using ICT in classroom (Becta, 2004). Developing the skills to engage effectively with the technology and creating structures to enhance ICT use is as important as investing in ICT infrastructure. Therefore effective training is crucial if teachers are to implement ICT in an effective way in their teaching. On the contrary, when training is inadequate or inappropriate, teachers are not sufficiently prepared, and perhaps not sufficiently confident, to make full use of technology in the classroom.

Dawes (2001) found the major barriers to the use of ICT are: the availability of the technology, support and training, Leadership and time. More attention has been given to the availability of the technology in terms of quantity, type and reliability of computers,

access arrangements and location of equipment. Computer access for teaching purposes is clearly important as this relates not just to sufficiency of computers but also to the location of equipment and access arrangements (Hepp et al., 2004). Computer reliability is also important, referred to by Global Campaign for Education (2004) as the most commonly cited ‘significant problem’ in the adoption of technology. The need for more training in ICT use has received recent attention having been neglected as a focus for Government intervention for a period between the early 1980s and mid 1990s. There is recognition that training needs to have a carefully planned structure and a focus on ‘training outcomes’ (Plomp et al., 2003), and now, particularly in the light of the New Opportunities Funded (NOF) training (Global Campaign for Education (2004)) and associated initiatives the emphasis is now firmly on the nature of training required and the effectiveness of different training strategies and models (Tubin et al., 2003).

It is also recognized that for teachers to start using ICT, they need various modes of support e.g. technical (Kozma, 2003); administration (Hoffman, 1996); the support of senior staff for practical needs such as time or resources, or recognition of new practices (Fullan, 1992); and that of peers for collaboration (Dawes, 2001). Issues around the need for time have featured regularly over the years; it has been found that these issues are increasing as pressures on teachers continue to grow on training (Leach, 2003). Without undermining the requirement for additional ‘time’, time management is also a factor in this climate of new initiatives (Dawes, 2001).

### **School level barriers**

Limited access to ICT (due to lack or proper organization of ICT resources), poor quality and inadequate and inadequate maintenance of hardware as well as unsuitable educational

software are also defining elements in teachers' levels of ICT.

The lack of high quality hardware and suitable educational software is also considered by the majority of ICT coordinators as an important hindrance to further development of ICT in education. Poorly maintained computers are usually unreliable and likely to cause disruption to even the best planned lessons. Similarly, inappropriate software does not enhance a lesson in any way and rather disengages both teachers and students from the learning process.

**Limited Access to ICT equipment:** The inability of teachers and students to access ICT resources is a result of a number of other factors and not only of the lack of ICT infrastructure. Sometimes a school may have high quality of ICT resources but these are inappropriately organized and thus not optimally used. In some schools for instance, prior booking of the ICT classroom is required, or the internal school network cannot be accessed from outside. As a result teachers and students do not have the opportunity to use ICT at any time according to their needs.

**Absence of ICT mainstreaming into schools' strategies:** Schools face the problem of unsuccessful organizational implementation of ICT because ICT is not seen as a part of the general strategy at school level. Even if some schools have developed ICT strategies, these are not integrated into the school's overall strategies. Yet ICT is no longer a goal itself, an isolated phenomenon requiring a special strategy. Instead, it should be used to support whole school development.

**Individual Attitude towards the use of ICT:** With specific reference to use of ICT in schools, the collective viewpoint, such as whole school's culture and ethos is referenced as influential (Kozma, 2003). The nature of the comments made is in keeping with those

noted when considering change management, though more tightly and specifically focused. There is a view that aspects of individual attitude and belief are the main factors influencing a teacher's use of ICT (Kaino, 2004). A key general point is the need for a teacher to be motivated to use the technology. In a study done by Hepp et al, (2004), they noted that teachers must believe that use of the technology can more effectively meet learning objectives or reach a higher level goal than could otherwise have been achieved and that they must have the confidence, ability and access to necessary resources to apply the technology in their teaching situation.

## **2.6 Summary of the Literature Review**

This chapter presented related literature on the use of ICT in the management of schools. It was found that ICT has played an important role in educational management. It was also found that the use of ICT made it possible for teachers to maintain accurate student records, track and analyze performance and use the resulting information to make decisions about how to individualize instruction. ICT is also used in management the data that are crucial to the management of schools; thus it helps in the administrators to get a better idea of the size of the educational system, student dropout and repetition, and the number of students per teacher. In some sense, this could be characterized as measuring the efficiency of the educational system and as a first step in improved resource allocation. Regarding the use of ICT in communication, it was found that ICT made the dissemination of information easy both within the institution and outside thus making easy the management task. There are other areas in education management where ICT has been used in the management of schools such as the use of ICT on the financial management, resource management, curriculum instruction management and the management of school-community relations which were the focus of this study. To fill

the knowledge gap that exists in literature, this study was therefore aimed at establishing the status of the use of ICT in the management of the schools by assessing the preparedness of schools for the use of ICT in management and identifying the areas of use of ICT in the management of schools.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter describes research design, study population, sampling design and procedure, data collection instrument, data collection procedures and data analysis. It explains various scientific methods to be used in achieving the study objectives.

#### **3.2 Research Design**

Descriptive survey design was used for the study. The main advantage of this type of design is that it enables the researchers to assess the situation within the study area at the time of the study (Kothari, 2003). The researcher therefore used the design to assess the use of ICT in the management of schools in the study area. According to Cooper (1996), a descriptive study is concerned with finding out the who, what, where and how of a phenomenon which is the concern of this study. The study was designed to find out the status of the use of ICT in the management of public secondary schools in Naivasha District.

#### **3.3 Location of the Study**

This study was carried out in public secondary schools in Naivasha District in Rift Valley province. It is one of the administrative Districts in Nakuru County. The District covers an area of 2837 km<sup>2</sup> and has a population of 277,106 (Nakuru District strategic plan 2005-2010). The major economic activity in the area is agriculture: horticultural farming. The District has 37 public secondary schools. The choice of the District was determined by the introduction of the use of ICT in the management of schools in the District and the

familiarity of the researcher with the study area which made it easy to develop immediate rapport with the respondents making data collection less cumbersome. In support to this, Singleton (1993) states that, the ideal setting is one that is related to the researcher's interest, easily accessible and that which allows the development of immediate rapport.

### **3.4 The Target Population**

A population or universe for a study is any group of individuals or institutions which have one or more characteristics in common that are of interest to the researcher (Cooper 1996). The target population for the study were public secondary schools in Naivasha District. The study targeted the principals, the director of studies, secretaries and the school Bursars. Naivasha District has 37 public secondary schools.

### **3.5 Sampling Technique and Sample size**

Stratified sampling technique was used to group the schools as National, Provincial and District. According to Coopers and Schindler (2001) systematic stratified sampling is whereby the population is first divided into strata; study samples are then drawn from every stratum. By sampling from the strata, the researcher ensured that all the categories of schools in the area of study were represented in the sample size. This was achieved by writing the names of all schools in each stratum on small pieces of paper, folding them and then randomly picking without replacement. A total of twenty schools were sampled for the study. Purposive sampling was used to select the principals, secretaries and the school Bursar. A total of 60 respondents were sampled for the study (i.e from every school, the researcher sampled the principal, secretary and the bursar).

### **3.6 Research Instruments**

In the selection of the instruments to be used in the study, the researcher ensured that the instruments chosen are suitable and appropriate. The researcher considered to use questionnaires due to their characteristic that they can be used to capture large amounts of data while the interview schedules were used to due to their characteristic that they can be used to capture information that would otherwise not be captured using questionnaires.

#### **3.6.1 Questionnaire**

Orodho (2004) defines a questionnaire as an instrument used to gather data, which allows a measurement for or against a particular viewpoint. He emphasizes that a questionnaire has the ability to collect a large amount of information in a reasonably quick space of time. Best and Khan (1993) observe that questionnaires enable the person administering them to explain the purpose of the study and to give meaning of the items that may not be clear. The researcher used questionnaires to collect data from the principals in the sampled schools in Naivasha District. The instrument was chosen because the targeted population were considered learned which minimized the interpretation of the questions for their understanding to capture reliable information. The questionnaires were divided into different sections whereby each section addressed questions to achieve each of the specific objectives of the study.

#### **3.6.2 Interview Schedules**

Yin (2003) states that interview is one of the most important sources of data and defines the interview as a two-way conversation that gives the interviewer the opportunity to participate actively in the interview. The researcher used interview schedules to collect data from secretaries and the school bursars. Kerlinger (1973) observed that more people

are willing to communicate orally than in writing, this therefore provide data more readily in an interview. The interview schedules were structured based on the predetermined questions of the study.

### **3.7 Piloting of Research Instruments**

The instruments of the study were tested in two schools which did not participate in the actual study. The piloting ensured clarity of the final instruments used for the actual data collection. Further more expert opinion from my supervisors and from other professionals well versed in research issues helped to check on the content validity of the instruments. The purpose of this pre-testing was to assist in findings out any weakness that might be contained in the instruments of the study.

#### **3.7.1 Validity**

According to Mugenda and Mugenda (2003), validity is the degree to which results obtained from the analysis of data actually represent the phenomena under study. A valid instrument should accurately measure what it is supposed to measure. After administering the instruments to the selected respondents, the data obtained should be a true reflection of the variables under study. Expert opinion from my supervisor and from other professionals well versed in research issues was used to check on the content validity of the instruments.

### **3.7.2 Reliability**

To test on the reliability of the instruments, the researcher used test re-test method. This method involves administering the instruments to the respondents and after some period of time re-administering the same instruments to see the consistency with which the questions are answered. The researcher administered the instruments to the two schools which were used for piloting and after a period of one week, the instruments were administered again in the same schools. The researcher found that there was consistency in the way the instruments were answered by the respondents thus the instruments were considered reliable.

### **3.8 Data Collection Procedure**

The researcher obtained a letter from the Ministry of Education allowing him to go to the field. He made appointments with principals of the sampled schools to notify and request for permission to carry out the study in their schools and arrange for the dates for data collection. The researcher administered the instruments to the respondents who were given ample time to respond to the questions. This ensured achievement of a good return ratio and help respondents to get a chance to seek clarification on items which proved difficult to answer.

### **3.9 Data analysis**

Primary data from the field was cleaned to eliminate errors made by respondents. Coding was done to translate question responses into specific categories. Coding was expected to organize and reduce research data into manageable summaries. Quantitative data collected was analyzed, presented and interpreted using both descriptive statistics while content analysis techniques was used to analyze qualitative data collected using interview

schedules. Statistical Package for Social Sciences (SPSS) package was used to analyze the quantitative data. Descriptive statistics such as means, standard deviation, frequencies and percentages was used to describe the data. The analyzed data was presented in form of tables, pie-charts and bar-graphs where applicable.

### **3.10 Ethical Consideration**

The researcher had to arrange with the principals to confirm the dates for data collection and get the consent to carry the research in the sampled schools. This was to eliminate the cases of surprising entry into schools without prior visit to clarify on the intention of the visit.

The researcher ensured confidentiality of the information given by the respondents. This was done by using the information without mentioning of the specific names or schools where the data is collected from.

## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATION AND DISCUSSIONS

#### 4.1 Introduction

This chapter presents the findings of the study. The purpose of this study was to establish the extent of the use of ICT in the management of public secondary schools in Naivasha District. Out of the 60 respondents targeted by the study, 54 responded giving a response rate of 90%. The findings of the study presented in the following sections as per the objectives.

#### 4.2 General Information of the Respondents

In this section, the researcher presents information on the respondents' gender, level of education, years of service and type of schools.

##### 4.2.1 Distribution of the Respondents by Gender

The principals were first asked to indicate their gender. The study found that 83% of the respondents were male while 17% were female. From the findings of the study, it can be said that most of the Principals in secondary schools in Naivasha were male. The findings of the study were as presented in Table 4.1.

**Table 4.1: Distribution of the Respondents by Gender**

Response	Frequency	Percentage
Male	15	83
Female	3	17
<b>Total</b>	<b>18</b>	<b>100</b>

#### 4.2.2 Distribution of the Respondents by Level of Education

Principals were asked to indicate their level of education. The study found that 89% of the respondents were bachelors degree holders while 11% were masters degree holders. From the findings of the study, it can be said that the principals serving in Naivasha are qualified for their positions. The findings of the study were as presented in Table 4.2.

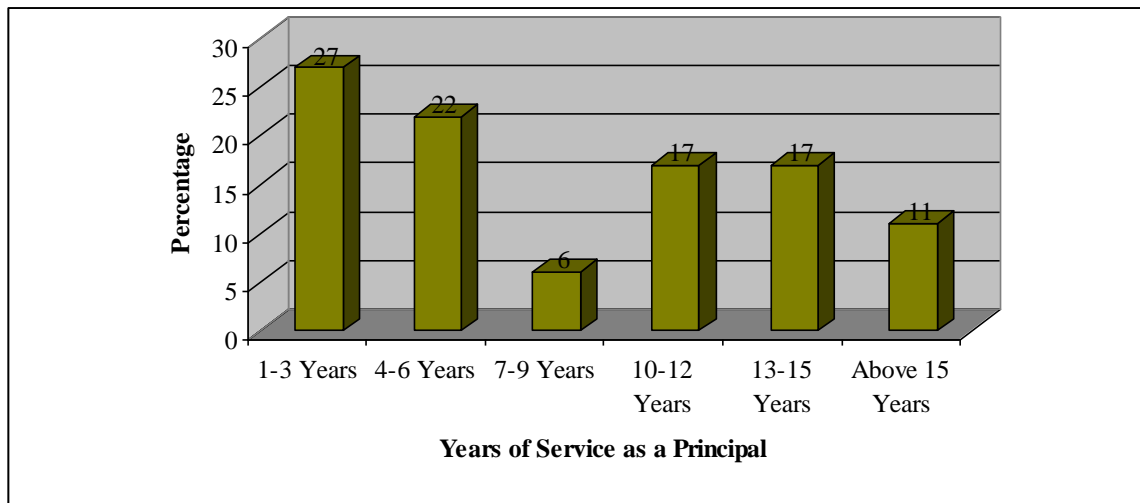
**Table 4.2: Distribution of the Respondents by Level of Education**

<b>Level of Education</b>	<b>Frequency</b>	<b>Percentage</b>
Bachelors Degree	16	89
Masters Degree	2	11
<b>Total</b>	<b>18</b>	<b>100</b>

#### 4.2.3 Distribution of the Respondents by Years of Service

The principals were asked to indicate the period for which they had served as principals. The study found 27% of the respondents had served as principals for a period between 1-3 years, 22% had served for a period between 4-6 years, 17% had served for a period between 10-12 and 13-15 years, 11% had served for a period above 15 years and 6% had served for a period between 7-9 years. The findings of the study were as presented in Figure 4.1. From the findings of the study, the researcher perceived the information given of the use of ICT in the management of schools to be reliable. This was attributed to the fact that most of the principals had served for a long period and were therefore considered to have a lot of information on the use of ICT in the management of schools which was the interest of the study.

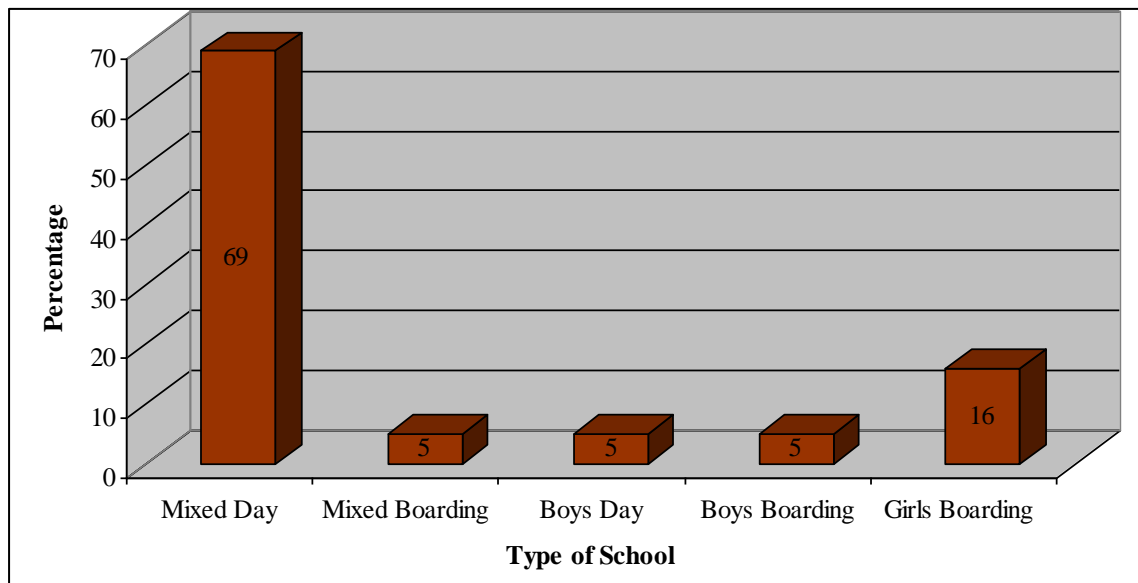
**Figure 4.1: Distribution of the Principals by Years of Service**



#### **4.2.4 Type of school**

The principals were asked to indicate the types of their schools. The study found that 69% of the schools studied were mixed day schools. The study also found that 16% of the schools were girls boarding. The rest of the schools were represented by 5% each including mixed boarding schools, boys' day and boys boarding. From the findings of the study, it can be said that most of the secondary schools in Naivasha district are mixed day schools. The findings of the study were as presented in Figure 4.2.

**Figure 4.2: Distribution by the type of school**



### **4.3 Status of the use of ICT in the Management of Schools**

In this section, the researcher sought to get information on the availability of computers and whether they are used in carrying out administrative duties in the schools, availability of telephone lines and their use in carrying out administrative duties, the availability of internet and its use in the school management, effect of ICT in the management of schools and on the use of ICT in passing information on administration and management issues.

#### **4.3.1 Availability of Computers in Schools**

The principals were asked to indicate whether they had computers in their schools. The study found that 72% of the respondents indicated that they had computers while only 28% indicated that they did not have computers in their schools. From the findings, it can be said that most of the schools had computers. The findings were as presented as presented in table 4.3.

**Table 4.3: Availability of Computers in Schools**

<b>Availability of Computers</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	13	72
No	5	28
<b>Total</b>	<b>18</b>	<b>100</b>

The principals were further asked to mention the level of adequacy of the available computers. The principals who mentioned that they had computers in their schools explained that even though they had computers in their schools, they were inadequate for carrying out the administrative functions. The inadequacy was reflected in terms of the few numbers of computers available in the schools meaning that the available resources could not support the use of ICT in the management of schools.

#### **4.3.2 Use of Computers in Carrying out Administrative Duties**

The principals were asked to indicate whether they used computers in carrying out administrative duties. The study found that 72% of the principals indicated that they used computers to carry out administrative duties while only 28% did not use computers in carrying out administrative duties in their schools. Schemelzer (2001) noted that technology can help administrators to deal with some of the challenges they face but only if they have a vision and know how to harness it and make it part of the fabric that supports the teaching and learning process in schools. From the findings of the study, it can be said that ICT was used in the management of the schools where the computers were available. This is evidenced by the fact that computers were used to carry out the administrative duties in schools where they were available. Thus the non availability of

computers in the schools was considered to be one of the factors hindering the use of ICT in the management of schools. The findings were as presented in Table 4.4.

**Table 4.4: Use of Computers in Carrying out Administrative Duties**

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	13	72
No	5	28
<b>Total</b>	<b>18</b>	<b>100</b>

Those who indicated that they used the computers to carry out administrative duties were further asked to mention the specific duties they carried out using computers. The following uses were mentioned: management of students' records (100%), typing letters (92%), memos and examinations (85%), analysis and preparation of data and for communication (100%). The findings of the study are in line with Mablinger (1996) explanation on how computer connection through networks helps principals to work together and share information and thus promoting school-community relationship. The findings are presented in Table 4.5.

**Table 4.5 Areas of use of ICT in the Management of Schools**

<b>Areas of use of ICT</b>	<b>Frequency</b>	<b>Percentage</b>
Management of students' records	13	100
Typing letters	12	92
Memos and examinations	11	85
Analysis and preparation of data and for communication	13	100

In an interview with the bursar, they were asked to mention how they use computers to perform their duties. They mentioned that they use computer to prepare financial statements and to enter data on fee payment from the students. They were further asked to mention the ways in which the use of ICT had made it easy for them to perform their duties. The following were their responses: That it had made it easy for them to prepare the budgets (100%), to prepare financial statements (100%), storage of data (94%) and that ICT had enhanced decision making due to easy access of financial statements by the management. The findings are presented in Table 4.6.

**Table 4.6 Use of ICT by Bursars**

<b>Areas of use of ICT</b>	<b>Frequency</b>	<b>Percentage</b>
Preparation of budgets	18	100
Preparation of financial statements	18	100
Storage of financial data	17	94

In an interview with the secretaries, they mentioned that they use ICT resources to: prepare memos (67%), reports (61%), typing letters and staff records (72%), prepare examinations (89%), store data (78%) and to analyze students records (22%). They were further asked to mention the ways in which ICT had made it easy for them to perform their duties. The following were their responses: that ICT had made it easy for them to pass information within the institutions through emails and using telephone lines to make calls, easy retrieval of data and preparation of examination papers. The findings are presented in Table 4.7.

**Table 4.7 Areas of use of ICT by Secretaries**

<b>Areas of use of ICT</b>	<b>Frequency</b>	<b>Percentage</b>
Preparation of memos	12	67
Preparation of reports	11	61
Typing letters and staff records	13	72
Preparing examinations	16	89
Storing data	14	78
Analyzing students data	4	22

### **4.3.3 Availability of Telephone Line in the School**

The principals were asked to indicate whether they had telephone lines in their schools. The study found that 67% of the respondents indicated that they had telephone lines while 33% indicated that they did not have telephone lines in their schools. From the findings of the study, it can be said that even though most of the schools had telephone lines, quite a number of schools did not have the lines. This can be perceived to have an impact on the use of ICT in the management of schools as the use of telephone lines is perceived to be very important in the functioning of schools. The findings were as presented in Table 4.8.

**Table 4.8 Availability of Telephone Line in the School**

<b>Availability of Telephone Lines</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	12	67
No	6	33
<b>Total</b>	<b>18</b>	<b>100</b>

#### 4.3.4 Frequency of the use of Telephone Lines

The principals who mentioned that they had telephone line were further asked to indicate the frequency of the use of the telephone lines in carrying out administrative duties. The study found that 50% of the principals used the line very often. The study also found that 33% indicated that they used the lines often and 17% indicated that they were not using the lines for administrative purposes. From the findings of the study, it can be said that despite the fact that quite a number of schools did not have telephone lines, some of the schools which had the lines did not use them to carry out administrative duties. This can be explained by their poor conditions and the fact that those in the management did not realize the importance of the use of the lines for administrative purposes. The findings were as presented in Table 4.9.

**Table 4.9 Frequency of the use of Telephone Lines**

<b>Frequency of the use of Telephone lines</b>	<b>Frequency</b>	<b>Percentage</b>
Very often	6	50
Oftenly	4	33
Not in Use at all	2	17
<b>Total</b>	<b>12</b>	<b>100</b>

#### 4.3.5 Availability of Internet in the Schools

The principals were asked to indicate whether they had internet connections in their schools or not. The study found that 50% of the principals indicated that they had internet in their schools while the other 50% indicated that they did not have internet connection. The findings are supported by a study done by Kenya SchoolNet (2003) on internet utilization in secondary schools in Kenya, where it was found that access to the Internet

was severely limited and when available was only for administrative use. From the findings of the study, it is evident that the availability of internet in the school was a challenge to the use of ICT in the management of the schools. This is perceived to affect the students even when they are registering for their examination which is currently done online thus hindering effective use of ICT in the management of schools. Internet is also used to pass information through emails. The findings were as presented in Table 4.10.

**Table 4.10 Availability of Internet in the Schools**

<b>Availability of Internet in the Schools</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	9	50
No	9	50
<b>Total</b>	<b>18</b>	<b>100</b>

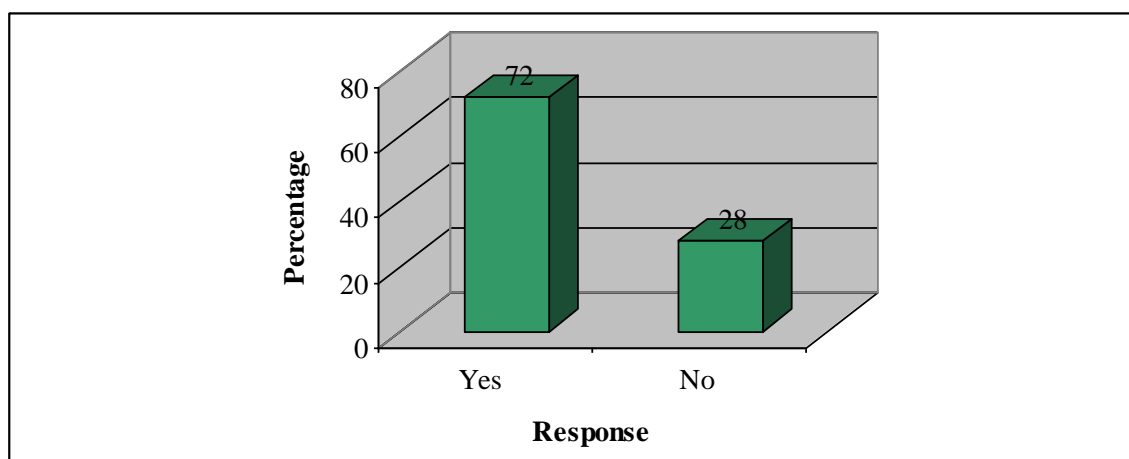
The principals who indicated that they had internet in their schools were asked to mention the ways in which they used the internet in the management of their schools. The following responses were given: to download learning materials (100%) and emailing administrative information to those concerned (100%). This is an indication that ICT are used in the administration and management of schools. It also points out to the importance of the use of ICT in schools thus necessitating its use in the management of secondary schools.

#### **4.3.6 Use of ICT in Passing Information on Administrative and Management Issues**

The principals were asked to indicate whether they use ICT in passing information on administrative and management issues. The study found that 72% of the respondents

agreed that they use ICT to pass information on administrative and management issues while 28% indicated that they did not use ICT for such purposes. Passing information in learning institutions is considered important in the management of schools thus the use of ICT is said to facilitate in the management of the schools which already had the resources. The findings were as presented in Figure 4.3.

**Figure 4.3: Use of ICT in Passing Information on Administrative and Management Issues**



#### **4.4 Head teachers' Preparedness for the use of ICT in the Management of Schools**

In this section, the researcher assessed headteacher's computer literacy, ICT equipment/resources used in the management of resources, investment in ICT, challenges to the use of ICT and the strategies used by the schools to ensure the use of ICT in schools.

##### **4.4.1 Computer Literacy**

The principals were asked to indicate whether they were computer literate. The study found that 61% of the principals indicated that they were computer literate while 39% indicated that they were not computer literate. From the findings of the study, it can be

said that despite the availability of ICT resources, the availability of trained staff is important in ensuring effective use of the resources in the management of schools. According to Becta (2004), developing the skills to engage effectively with the technology and creating structures to enhance ICT use is as important as investing in ICT infrastructure. The findings were as the presented in table 4.11.

**Table 4.11 Computer Literacy among Principals**

<b>Computer Literacy</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	7	39
No	11	61
<b>Total</b>	<b>18</b>	<b>100</b>

Those who indicated that they were computer literate were asked to mention the levels of their computer literacy. The study found that 82% of the respondents indicated that they had basic knowledge for operating computers, 9% indicated that they had knowledge on the use of Microsoft Excel, 9% indicate that they had certificate in computer related courses and another 9% indicated that they had diploma in computer related courses. The findings are presented in Table 4.12.

**Table 4.12 Level of Computer Literacy by Principals**

<b>Level of Computer literacy</b>	<b>Frequency</b>	<b>Percentage</b>
Basic Knowledge	9	82
Certificate	1	9
Diploma	1	9

#### 4.4.2 Computer Literacy among the Staff

The principals were asked to indicate whether their secretaries, bursars and deputy principals were computer literate. The study found that all the secretaries (100%) in the schools were computer literate. The study also found that 83% of the bursars were computer literate and that 89% of deputy principals were computer literate. This is an indication that the staff in the schools studied were prepared for the use of computers in administration and management of the schools. ILO (2001) observes that adoption of ICT in organizations creates two types of skill needs. The first is related to the variety of foundation skills such as the ability to communicate, analyze and solve problems. The other skills relate to technical component which extends beyond the ICT sector to the economy as a whole. The findings were as presented in Table 4.13.

**Table 4.13 Computer Literacy among the Staff**

Staff	Yes		No	
	Frequency	Percentage	Frequency	Percentage
The school Bursar	15	83	3	17
The school Secretary	18	100	0	0
The deputy principal	12	67	6	33

Asked to mention the levels of computer literacy, they mentioned that they had knowledge on the operation of basic computer packages such as: Microsoft word, Power Point, Excel, Microsoft Office Access, Microsoft Office Publisher and the use of Internet.

#### 4.4.3 Investment in ICT resources

The principals were asked to indicate whether they invest in ICT resources to be used in the management of schools. The study found that 78% of the principals indicated that

they invested in ICT resources while 22% indicated that they did not invest in the ICT resources. This is an indication that schools are determined to ensure the availability of ICT related resources which are required for their effective use in the management of schools. The findings were as per the presentation in the Table 4.14.

**Table 4.14: Investment in ICT Resources**

<b>Investment in ICT resources</b>	<b>Frequency</b>	<b>Percentage</b>
Yes	14	78
No	4	22
<b>Total</b>	<b>18</b>	<b>100</b>

Principals were further asked to indicate some of the ICT resources they had in their schools. The following resources were mentioned: computers, printers, modem, scanners, mobile phones, internet, websites, photocopier machines, radios, projectors and electricity.

Those who indicated that they invest in ICT resources were further asked to describe the extent to which they invested in such resources. The following descriptions were given: that they buy computers, service the available equipments to ensure that they are working, networking computers and creation of school websites. This is an indication that schools make effort to ensure the availability of the required resources for the use of ICT. In an interview with the secretaries on the resources available, the following additional resources were mentioned: Typing stencils, duplicating papers and ink and printing papers.

## **4.5 Use of ICT in the Management of Schools**

In this section, the researcher sought to find information on the areas where ICT is used in the management of schools and the ways in which ICT helped in data management in schools

### **4.5.1 Areas of the Use of ICT in the Management of Schools**

To establish the areas where ICT is used in the management of schools, the principals were asked to indicate whether they used ICT in different areas of management in school. The study found that 67% of the respondents indicated that ICT was used in curriculum instructional management such presentation of notes to students instead of using chalk walls. The study also found that 67% of the principals indicated that they used ICT in student management. They explained that students attendance and fee payment records is made easy as records can easily be accessed for decision making. The study also found that 61% used ICT in Financial management, 50% used ICT in personnel management such as keeping staff records, 44% used ICT in the management of Physical/material resources such as keeping records of the available resources and 33% indicated that they used ICT in the management of school community relations such as passing information to the parents. In support to these findings, Wolff (1998) found that, in educational administration, computers have been used in timetabling, personnel management, financial control and examination administration. According to Osin (1998), computers have been used in the management of data which has made it easier for teachers and administrators to maintain accurate records to improve school and classroom management. From the findings of the study, it can be said that ICT was used in different areas of management in secondary schools in Naivasha district. The findings of the study are as presented in Table 4.15.

**Table 4.15 Areas in which ICT is used in the Management of Schools**

Areas of ICT use in management	Yes		No	
	Frequency	percentage	Frequency	Percentage
Curriculum and instructional management	12	67	6	33
Management of Physical/material resources	8	44	10	56
Personnel management	9	50	9	50
Student management	12	67	6	33
School community relations	6	33	12	67
Financial management	11	61	7	39

The principals were further asked to mention other areas of school management where ICT was used in their schools. The following were their responses: that ICT was used in the preparation of curriculum materials and delivery, preparation of examination, keeping inventories on resources and in passing information within the school and the community. Concerning the use of ICT in preparing examination materials, they explained that ICT resources are use to prepare examination materials such as typing and printing. They respondents further explained that they use spread sheet to keep the school records and computerization of accounting systems which eases the management of school finance. According to Carnoy and Susanna (2002), ICT collects information from and distributes information to the different departments in schools and uses the information to extract greater effort from the different parts of the system.

In an interview with the school bursars, they were asked to mention the benefit of the use of ICT in the management of schools. They mentioned that ICT helped in reducing workload thus promoting efficiency in service delivery, it makes it easy to retrieve data on the financial records and that the use of ICT reduces the use of paper work. According

to Osin (1998), using computers has increased accuracy and accountability hence reducing the time and costs involved in entering data; these has made it possible to quickly retrieve and analyze information for decision making.

#### **4.5.2 Use of ICT in Data Management**

To establish this, the principals were asked to indicate whether they used ICT in the management of different data in the schools. The study found that 78% of the respondents indicated that ICT was used in the management of students' performance in examination, and in dissemination of examination results. According Venezky and Cassandra ( 2002), teachers keep records of students' work electronically which has led to clearer target settings and to improvements in reporting to parents. It was also found that ICT was used in the management of students enrolment data and in passing information as indicated by 67%, management of income and expenditure in the schools as indicated by 56%, passing basic information to teachers as indicated by 50% of the respondents, management of students attendance data as indicated by 22% and in the management of data on supplies in the school as indicated by 11%. According to World Bank (1999), computers have also made it possible for teachers to maintain accurate student records, track and analyze performance and use the resulting information to make decisions about how to individualize instruction. In support to these findings, a study done by OECD (2001) found that, in developed countries, ICT systems have been used mainly for collecting enrollment data, student attendance, basic information on teachers, and basic information on schools. The findings of the study were as presented in Table 4.16.

**Table 4.16 Use of ICT in Data Management**

<b>Data category</b>	<b>Yes</b>		<b>No</b>	
	<b>Frequency</b>	<b>Percentage</b>	<b>Frequency</b>	<b>Percentage</b>
Students' enrolment data	12	67	6	33
Student attendance	4	22	14	78
Basic information on teachers	9	50	9	50
Students performance in examinations	14	78	4	22
Dissemination of examination results	14	78	4	22
Basic information on school	10	56	8	44
Student dropout and repetition	4	22	14	78
School supplies	2	11	16	89
School income and expenditure	10	56	8	44
Communication/passing information	12	67	6	33

#### **4.6 Strategies for the improvement of the use of ICT in the management of public secondary schools**

The following were the suggested strategies for the improvement of the use of ICT in the management of schools:

Resources for the use of ICT should be made available in schools. Resources such as telephone lines should be made available to promote the use of ICT in the management of schools.

Another strategy is to encourage the staff and especially those in the administration to embrace the use of ICT in the management of schools. This will soften the resistance

arising from the staff with regards to embracing change which results from the introduction of technology.

It was also suggested that schools should computerize their accounting systems to improve on financial management. This will reduce the chances of mismanagement of school funds as the records can be checked any time with those responsible for the management of financial resources and any error detected early for correction.

Another strategy was that schools should sponsor training for staff who are directly involved in the management of the schools such as bursars and secretaries to improve on their efficiency on the use of ICT in the management of schools. This would improve their skills for the use of ICT in the management of schools.

It was further suggested that schools should lay down infrastructure for the use of ICT in schools to allow the use of different ICT equipments in the management of schools. Through laying of ICT infrastructure in schools such as internet and electricity and computers, the management of schools can find it easy to adopt the use of ICT in the management of their schools.

It was finally suggested that training on the use of ICT in the management of schools should be incorporated teacher training Colleges and Universities curriculum. This will impart the skills for the use of ICT in the management of schools.

## **CHAPTER FIVE**

### **SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

The purpose of this study was to establish the extent of the use of ICT in the management of public secondary schools in Naivasha District. The study was guided by the following specific objectives: to establish the status of the use of ICT in the management of public secondary schools in Naivasha District, to assess head teachers' preparedness for the use of ICT in the management of public secondary schools in Naivasha District, to establish the use ICT in the management of different task areas in public secondary schools in Naivasha District and to make recommendations on the ways of improving the management of public secondary schools by using ICT.

#### **5.2 Summary of the Findings of the Study**

This section presents the summary of the findings of the study according to the objectives

##### **5.2.1 Status of the use of ICT in the Management of Schools**

On the use of computers in the management of schools, the study found that 72% of the respondents indicated that they used computers to carry out administrative duties. The computers were used in the following ways: management of students' records, typing letters, memos and examinations, analysis and preparation of data and for communication. The study also found that telephone lines were used very often in passing information on administrative and management issues in the schools as indicated by 50% of the respondents. The study finally found that internet connection in the schools was used to pass information in the schools.

### **5.2.2 Head teachers' Preparedness for the use of ICT in the Management of Schools**

Regarding the computer literacy of the principals, the study found that 61% of the respondents were computer literate. The study found that 9% had trained had diploma, another 9% had certificate and 82% had basics in computer operation. The study also found that all the secretaries (100%) were computer literate, 83% of the bursars were computer literate and that 89% of deputy principals were computer literate. In terms of investment in ICT resources, the study found that 78% of the principals indicated that they invested in ICT resources

### **5.2.3 Use of ICT in the Management of Schools**

On the use of ICT in the management of schools, the study found that ICT was used in the management of different task areas in the school. It was found that ICT was used in curriculum instructional management as indicated by 67%, student management as indicated by 67%, financial management as indicated by 61%, personnel management as indicated by 50%, management of material resources as indicated by 44% and in the management of community relations. On data management, the study found that ICT was used in the management of students' performance in examination, and in dissemination of examination results as indicated by 78%, management of students enrolment data as indicated by 67% and in the management of students attendance data as indicated by 22%.

## **5.3 Conclusions**

From the findings of the study, it can be concluded that ICT resources such as computers, telephone lines and internet are used in the managements of secondary schools in Naivasha even though they are inadequate.

It can also be concluded that head teachers were prepared for the use of ICT in management of schools.

The study finally concluded that ICT is used in different areas of management in schools such as curriculum instructional management, student management, financial management, personnel management and material resources management.

#### **5.4 Recommendations**

The study recommended that the government through the ministry of education should lay out ICT infrastructure in schools to facilitate the use of ICT in the managements of schools. Through the laying down of ICT infrastructure such as the internet, the use of ICT in the management of schools will be promoted.

The study also recommended that the government through the ministry of education should train head teachers on the use of ICT in the managements of school and also include ICT training in the teacher training curriculum. This will enhance technical skills in the use of ICT in the management of schools.

The study further recommended that the schools should change from the manual management which entails a lot of paper work and make their management systems to suit the use of ICT such as the establishment of computerized accounting systems. This will enhance efficiency in the use of ICT in the management of schools.

It was finally recommended that in the school management including the principals, Bursars and Secretaries should take computer related courses to get the basic computer operation knowledge. This will enhance the use of ICT in the management of schools.

### **5.5 Recommendations for Further Research**

This study was carried out in public secondary schools in Naivasha district. The study focused on the use of ICT in the management of schools. The researcher therefore recommends that another study be done on the use of ICT in teaching and learning in secondary schools in other districts which were not the concern of this study.

### **5.6 Implication for Further Research**

From the findings of this study, there is a clear indication that there is need for other studies to be done on the use of ICT in the management of schools and the extent to which it has been used in teaching and learning.

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