PERCEPTIONS OF SCHOOL MANAGERS ON ROLE OF INFORMATION AND COMMUNICATION TECHNOLOGY IN EDUCATIONAL MANAGEMENT IN PUBLIC SECONDARY SCHOOLS IN KAKAMEGA COUNTY, KENYA

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DECLARATION AND RECOMMENDATION

Declaration

I hereby declare that this thesis is my original work and has not been presented for an award of a degree or diploma in this or any other university.

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Recommendation

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DEDICATION

To my beloved wife Alice Were, children Daisy, Allan, Eugene and Alvin and my parents Selina Choti and my late father Roman Musambai.

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ABSTRACT

Kenya is among those countries that have adopted the use of Information and Communication Technologies (ICTs) as a vehicle for educational change and improvement. Use of ICTs is known for transforming the quality of management of educational institutions worldwide. The government has encouraged investment in ICTs through the provision of grants to selected secondary schools to acquire computers. Secondary schools in Kakamega County have been beneficiaries of these grants. However, information on how these ICTs were used in educational management in schools remains unclear. The purpose of this study was to investigate the perceptions of school managers on role of ICTs in Educational Management in public secondary schools in Kakamega County. The study was guided by Rodgers Diffusion and Innovation Theory. Descriptive survey research design was used for the study. The study population comprised of 360 Heads of Departments, 45 Principals and 45 Directors of Studies from 45 public secondary schools that had benefited from ICTs grant. Using Stratified, purposive and simple random sampling techniques, a representative sample of 161 respondents comprising of 23 Principals, 23 Directors of Studies and 115 Heads of Departments (HODs) was selected to participate in the study. Three questionnaires, one for each category of respondents were used to collect data. Validity of the instruments was determined through expert judgment. Cronbach Alpha was used to estimate the reliability of the instruments. From the pilot, HODs, DOS and principals instruments had a coefficient Alpha of 0.889, 0.904 and 0.952 respectively. These were greater than recommended value of 0.70 which is acceptable for research purposes in Social Science research thereby making these research instruments reliable. Data was analysed using Statistical Package for Social Sciences (SPSS) version 20. Results showed that schools that received grants had a variety of ICT facilities such as desktop and laptop computers, printers, LCD projectors and internet facilities. The study further showed that these facilities were inadequate. However, over 60% of these schools had acquired additional facilities from their own resources to meet their needs. These facilities were used mainly in instructional management such as the analysis of examination results, preparing of students mark sheets, generating report cards and revision materials. Besides, ICT was also used in financial and general administrative management though on a lesser extent. It was found that majority of respondents had no formal academic training in the use of ICT but had gained literacy through experience outside the formal learning. All respondents had received short in-service training to equip them with skills on ICT use. The use of ICT in educational management had made the school management more efficient therefore beneficial in educational management. The study recommends that the government to incorporates ICT training in teacher training colleges and increase time duration for in service training to enhance their integration capacity in school management as it was inadequate which is reason for inadequate use of computers in schools. Stakeholders should also put more effort towards improving and equipping schools with ICT facilities. These findings are useful to school managers, Ministry of Education and other stakeholders in education who are interested in promoting ICT use in school management.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

BOM	Board of Management
CATs	Continuous Assessment Tests
CFSK	Computers for Schools
DOS	Director of Studies
EFA	Education for all
HOD	Head of Department
ICT	Information Communication Technology
KESSP	Kenya Education Sector Support Programme
KICD	Kenya Institute of Curriculum Development
KICTANET	Kenya ICT Policy Action Network
KIF	Kenya ICT Federation
KNEC	Kenya National Examination Council
MIS	Management Information Systems
MOE	Ministry of Education
MOEST	Ministry of Education Sciences and Technology
NACOSTI	National Commission of Science, Technology and Innovations
NGO	Non-Governmental Organizations
PTA	Parents Teachers Association
SAGA	Semi-Autonomous Government Agencies
SPSS	Statistical Package for Social Sciences
TCO	Total Cost Ownership
TSC	Teachers Service Commission
UK	United Kingdom
USA	United States of America

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The world continues to rely greatly on technology because of the ever increasing changes brought about by demand for work to be done. Change is inevitable in any growth-oriented industry, and education sector is no exception (Unachukwu & Nwankwo, 2012). The rapid growth in the field of education has made governance in schools a very complex task. This however could be made simpler through the use of the latest technology for communication known as Information and Communication Technology (ICT) (Menjo & Boit, 2010).

Information and Communication Technologies (ICTs) are technologies which facilitate communication resulting in the processing and transmission of information electronically, which is more efficient than traditional modes of handling information. These ICTs include technologies and methods for storing, managing and processing as well as communicating information (Unachukwu & Nwankwo, 2012). Adebayo and Adesope (2007) describe ICT as a scientific, technological, and engineering and management technologies used in the handling, processing of information and applications related to computers. Omondi (2010) observed that today, the computer is one of these technologies that most people use in their everyday lives. ICTs could enhance the flow of information in a school in order to improve management decision making. To accomplish many of the school administrative and managerial tasks today, the use of ICTs has been advocated (Oloo, 2009). It has been argued that they are essential tools in almost every field of human endeavour because of their capabilities such as capturing, processing, storing and displaying information besides increasing productivity and competitiveness through information provision (Salerno, 2009). Preston and Cox (2000)

argue that the importance of ICT is widely recognised both in schools and at home. While agreeing with this, Zhao and Frank (2003) add that ICT has contributed greatly to educational management in schools worldwide due to its role in the effectiveness, efficiency and quality service delivery in schools.

ICTs have revolutionized the way people work today and are now transforming educational systems (Watson,1998). Application of ICTs in education has gained a great momentum globally. In the USA and Canada, the use of Information and Communication Technologies accounts for 85 percent of its use in schools management (Braak, 2006).Computers infiltrated into the American schools in the late 1970's and early 1980's as a result of calls for educational reforms based on understanding that education needed to resolve a previous unknown deficiency called " Computer Literacy". However, more importantly, computers were perceived in the U.S.A to have the potential to revolutionalise school management as well as teaching and learning just as they revolutionalised many other aspects of modern life in the country (Omondi, 2010). In addition, introduction of ICT into schools brought great expectations for educational improvement (Tubin, 2011). Oppenheimer (2004), in Tubin, (2011) observes that in 1990's alone the U.S.A spent 90 billion dollars on ICT in schools. This is because Information and Communication Technology is widely touted as not only being the backbone of modern school management, but an important catalyst for effective management and resource utilization (Pelgrum, 2001).

African countries are slowly integrating Information and communication technologies in the schools (Omondi, 2010). For example, the Ethiopian government provided 500 senior secondary schools with television broadcasting equipment as a way of enhancing the schools ICT infrastructure. In South Africa, the government has mandated schools to create computer media and resource centres so that teachers can use InformationandCommunication Technologies in managing school tasks (Van derwal& Pienaan,1996). In Botswana ICTs have changed management approachesas a principal in an office could multi-task and receive information from all corners of the school within a very short time (Batne, 2002). On the other hand, Tanzania has only a few private

secondary schools around urban settings, especially in Dar es Salaam, that have access to ICTs.

Administrative and managerial operations in educational institutions rely heavily on information management for decision making (Makhanu & Kamper, 2012). Unachukwu and Nwankwo (2012) argue that schools require information to manage three main components namely students', staff and general administration. ICT has tremendous potential to revolutionize the way information and knowledge is managed and communicated (Unachukwu & Nwankwo, 2012).

The potential of ICT to enhance human capabilities and revolutionize the management of organizations was first realized in the business world and in the military (Menjo &Boit, 2010). Importance of ICT contribution is also felt and recognized in the work place all over the world (Outa, Etta & Aligula, 2006). ICT therefore, has become a vital enabling tool that can no longer be ignored in the management of schools because quality and effectiveness of leadership make the difference between the success and failure of a school (Musungu & Nasongo, 2008).

Managing students' and teachers' affairs require reliable, timely and user friendly data (Maki, 2008). ICT facilitates the keeping and managing of school records both for students and teachers. Student records include continuous assessment tests (CATs) marksheets, examination results analysis, fees, school attendance and disciplinary records as well as students' bio-data. Teachers use ICTs administratively for record keeping, reporting students' achievement, communicating with students, colleagues, parents among others. They also use ICT for lesson preparation. Maintaining data on staff and schools' physical infrastructure such as number of classrooms and their capacities as well as financial records are important in order to help school administrators to streamline operations, monitor performance and improve use of physical and human resources (Salerno,2009).

Use of ICT in curriculum implementation enables teachers to find ready-made learning resources from the internet, create their own learning materials and engage students in the use of technologies for their indivindualized learning (Omondi, 2010). Additionally, computers are used in searching and evaluating information, carrying out experiments and simulations. Other aspects as allocation of teachers' workloads, timetabling and efficient curriculum routine checks are operational ICT benefits in schools. Besides, ICT is crucial in the preparations and processing of examinations together with report cards. ICTs use assists and enables principals in keeping inventory records and undertaking of financial transactions (Menjo & Boit, 2010). These include donations and fees collection, and their utilization. This assists schools in effective and efficient financial management through structured approach that assists in decision making. Historically, the system of governance is based on sound record keeping so that irrespective of the executive head, the records forms the basis for governance, control and decision making (Ahmad, 2013)

Integrating ICT in educational management facilitates quick communication and ensures the running of schools is more efficient, modern and reduces bureaucratic burden (Makhanu & Kamper , 2012). More than other technologies, computers related technologies have the potential to support and promote communication among schools, parents, central decision makers and businesses, thus fostering accountability, public support, and connectivity with the market place.

While ICT can do a lot in school administration and management, available data suggest that the majority of developing countries in sub-Saharan Africa are lagging behind in the information revolution despite tremendous progress in the field (Zhao& Frank, 2008). Not surprisingly, the quest for adoption of ICT in educational management has been problematic and would require fundamental policy interventions, availability of ICTs in schools and clinical supervision until take off is guaranteed (Makhanu & Kamper, 2012)

Secondary schools in Kenya are increasingly becoming complex multidimensional organizations with lots of human, financial and physical resources. Management of such an array of resources is bound to overwhelm the abilities of today's principals if they are

not aided in the performance of their duties by technology. These developments therefore dictate that schools modernize their tools of conducting business to enhance management and leadership effectiveness (Menjo & Boit, 2010).

Kenya is one of the African countries that have put considerable emphasis on ICTs in education to address the concerns of efficiency, effectiveness and quality service delivery (Kukali, 2010). The government of Kenya has made progress towards transformation of all educational institutions in the country to be ICT compliant as attested by the interest shown on ICT in the number of government policy documents (Republic of Kenya 2001, 2005). In 2005, the ministry of education developed a Kenya Education Sector Support Programme (KESSP) that highlighted ICT as one of the priority areas in educational management aimed at mainstreaming ICTs in school management (MOE, 2005). In 2006, Kenya developed an ICT policy aimed at improving the livelihood of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services (MOEST, 2005).

The KESSP considers ICT as one of the priority investment programme and catered for financial resources for ICT which gave rise to ICT grant in schools. Indeed the last two decades have witnessed a lot of effort by the government of Kenya towards the realization of transforming all educational institutions in the country to be ICT compliant. The government is currently in the process of supplying free laptops for standard one pupils in schools across the country. This laptop project is among the many government initiatives to integrate ICT in schools for curriculum delivery and in management. To make the project succeed, the government intends to digitize school curriculum, train teachers and provide the laptops. Wanjala (2013) in her research on teachers' perceptions on the use of ICT in management observes that the government through the ministry of education had made great initiatives towards developing ICT infrastructure in secondary schools by providing grants for computer laboratories and provision of ICT facilities.

Secondary schools in Kakamega County have been acquiring computers through purchase or donations since the 1990s. This has been enhanced by the government of

Kenya through the economic stimulus program which was a pilot programme that targeted 45 schools in the County in 2011. The secondary schools were each given a grant of Kshs. 877,500 to purchase ICT equipment (MOEST, 2012). The grant was to assist schools to buy ICTs in order to improve schools' managerial efficiency and effectiveness thereby achieve their set goals, which had not been a priority in Kenyan schools (Menjo & Boit, 2010). In view of these efforts by the government of Kenya to embrace ICT in education, this study therefore seeks to investigate what ICT tools are available in secondary schools in Kakamega County and how they are used in educational management.

Although ICT has contributed greatly to educational management in schools worldwide as observed by Zhao and Frank (2008), there is limited use of ICTs in school management in Kenya (Menjo & Boit 2010). This is attributed to a myriad of challenges facing many schools with regard to adoption of ICTs in educational management. This has resulted to a slow rate of adoption of technology despite its promise and potential for use in educational management in schools (Makhanu & Kamper, 2012).

What is of most concern is that ICT literacy among school managers is also very low, especially those that live in the rural or remote parts of Kenya (Menjo & Boit, 2010). Despite the investment by the government on ICTs for schools, there is very little information on availability, adoption and use of ICT in educational management of schools in Kakamega county and how these affects the management of public secondary schools in the area.

1.2 Statement of the Problem

The adoption and use of ICTs in educational management in developing countries remains elusive despite a decade of large scale investment in ICTs. Kenya Vision 2030, which is intended to make Kenya a middle level economy by lowering cost of doing business, improving quality of services provided, improving security and providing Kenyans with a friendly working environment, has placed ICT in schools at the centre of

achieving the vision. The Ministry of education has made remarkable initiatives towards this end by providing ICT equipment to five selected public secondary schools in every constituency in the country. Kakamega County benefited by having 45 selected public secondary schools from its nine constituencies receiving a grant of Kshs. 877,500 for each school to purchase ICT equipment in the year 2011 as a pilot project that would later be rolled out to all secondary schools in Kenya. These ICT facilities were intended to be used both for teaching / learning and in educational management in these counties. While the benefits of ICT in school management cannot be disputed, there is limited data on the use of these ICTs to facilitate school management in Kakamega County. This study was intended to provide information to fill this gap.

1.3 Purpose of the Study

The purpose of this study was to establish perceptions of school managers on role of the information and communication technology in educational management in public schools in Kakamega County, Kenya.

1.4 The Objectives of the Study

The objectives of this study were to:

i) Establish the availability of ICTs in public secondary schools in Kakamega County for educational management.

ii) Establish perceptions on teachers ICT literacy levels in public secondary schools in Kakamega County.

iii) Determine the perceptions on the role played by ICTs in educational management in public secondary schools in Kakamega County

iv) Assess teachers perceptions on the role of ICTs in educational management in public secondary schools in Kakamega County

v) Investigate the perceptions on challenges facing ICT implementation in educational management in public secondary schools in Kakamega County.

1.5 Research Questions

The study sought to answer the following questions:

i) What ICT facilities were available in public secondary schools in Kakamega County for educational management ?

ii) What were the perceptions on ICT literacy levels among teachers in public secondary schools in Kakamega County?

iii) What were the perceived roles of ICTs in educational management in public secondary schools in Kakamega County?

iv) What were the perceptions of school managers on the role of ICTs in the educational management in public secondary schools in Kakamega County?

v) What were the perceived challenges in ICT implementation in educational management in public secondary schools in Kakamega County?

1.6 Significance of the Study

Although this research was conducted among the 45 public secondary schools in Kakamega county that have benefited from ICT grants, the outcome of this research would provide new insights that would enable Ministry of Education to engage in more effective measures of ICT policy implementation which may include prioritizing and equipping managers with knowledge and skills necessary for successful ICT implementation. The findings of the research are likely to assist the Ministry to identify and consequently address some of the challenges that inhibit effective implementation of ICT in educational management. Additionally, the findings of the study may inform the

Ministry of education of the need to provide more ICT grants for the purchase of more ICT facilities.

The findings may also provide public secondary schools' administrators with information that would assist them lead the way for ICT implementation in educational management. This in turn would raise ICT profile in educational management in schools.

The study would help the future researchers to make references to this work with the aim of building more knowledge in the field of ICT and education management. The study may further provoke scholars in the field of education to carry out more research on ICTs in schools or stimulate debate and search for solutions to challenges affecting ICTs policy implementation in public secondary schools in Kenya.

1.7 Scope of the Study

This study was limited to public secondary schools in Kakamega County sampled from public secondary schools that received grants to purchase ICT facilities which at the time of this study were 45 schools in total. This study was confined to principals, directors of studies and heads of departments, all totalling to 450. Directors of Studies and Heads of Departments were involved in the study because they deal with curriculum management and academic affairs of students hence they would be in apposition to provide objective opinion on availability and use of ICTs in schools. The study was conducted in 23 public secondary schools selected from the 45 public secondary schools that benefited from ICT grants in the County using, questionnaires. The study specifically sought to establish the availability and use of ICTs and their perceived influence on Educational Management in Secondary Schools in Kakamega County.

1.8 Assumptions of the Study

For the study to elicit the required responses, the following assumptions were made:

i) The respondents that were involved in the study were honest in providing the needed information on ICT use for educational management.

ii) There are some educational management tasks in public secondary schools that require the use of ICT

iii) Most school managers were trained and are ICT literate.

iv) The ICTs are already an integrated part of sampled school data processing at all levels

1.9 Limitations

The study was limited to public secondary schools in Kakamega County that had received the grant to purchase ICT facilities and so only the views of the principals, directors of studies and HODs from these schools were considered in this study. The views of other stakeholders including teachers were not considered, even though their views could compliment or even contradict the views that were received from the respondents.

Further, the use of questionnaires as in this study is known to have limitations as to the accuracy of the information that may be obtained from the cross-section of the respondents (Mugenda & Mugenda, 2003). Thus only a few schools were studied. The findings of this research were therefore only generalizable to schools with similar characteristics and educational setup. This limitation was addressed by choosing a sample size that is highly representative.

1.10 Operational Definition of Terms

The following terms have the following meaning as used in this study:

Adoption : Is the decision to accept and start using ICTs as an administrative tool in Educational management in our schools.

Computer competency level : Refers to the skills and knowledge of using computers , acquired through training or self- teaching.

Diffusion: Is the process by which an innovation is communicated through certain Channels over time among the members of a social system.

Educational Management: Is the process of planning, organizing, directing and controlling the activities of an institution by utilizing human and material resources so as to effectively and efficiently accomplish managerial functions such as teaching office work and research.

ICT Access : Opportunity available for use of appropriate ICT hardware and software.

ICT Integration : Is the incorporation of technological resources and technology- based practices into the daily routine, work and management of organizations such as schools.

Information Communication Technology: Includes hardware, processes and systems that are used for storing, managing, communicating and sharing information by electronic means such as television, video, DVD, telephone, computers, network hardware and software, video conferencing, Email and Internet.

Infrastructure: Refers to facilities used to provide one or more information technology Services and they include; computer laboratory, air conditioner, solar panels,

Panels, uninterrupted power supply, electricity.

Public Secondary Schools: The educational Institutions that provide Secondary Schools Education to students and they are government funded.

School Managers: Schools leaders involved in planning, organizing, directing and controlling various school activities by utilizing human and material resources to accomplish and achieve set goals. They include Heads of Departments, Directors of studies and principals or Heads of schools.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviewed literature related to the research problem. This enabled the researcher to establish what others have already done and identify gaps to be filled leading to the creation of new knowledge in the field of study. This chapter reviewed related literature covering such factors as contribution of ICT to educational management and availability of information communication technology resources in Kenyan secondary schools, use of information and communication technology in management of schools, challenges facing successful ICT implementation in public secondary schools and various initiatives towards ICT integration in secondary schools in Kenya. The chapter ends with theoretical and conceptual framework that guided the study.

2.2 ICT and Educational Management in Schools

ICTs have become powerful tools worldwide, touching almost every part of our lives, organizations and homes due to the rapid development of emerging technologies such as computing devices and the internet (MOE, 2012). As a result many governments have invested heavily in ICT for schools (Wanjala, 2013). Wanjala further argues that educational systems globally are under pressure to use ICTs to improve the quality of school management and administration. The researcher adds that, for example United Kingdom spent about £2.5 billion yearly on educational ICT. The United States current educational ICT policies emphasize the use of technology for efficient resource allocation and enhancement of a school principal's daily administrative operations (Omondi, 2010). Similarly, the educational ICT policy of Malaysia emphasizes the use of ICT in educational management via office automation (MOE Malaysia, 2003). A study by Abdul and Zohora (2012) in Mue (2013) on areas of ICT utilization in educational management in Malaysian schools found that the country had ICT policy but unknown to the teachers.

ICT facilities were available in majority of schools and teachers had high level of skills in using computers but interestingly their expertise and skills were not integrated with educational management.

In African countries, ICT has not picked up well due to inadequate access to affordable ICTs as a result of poor ICT infrastructure, the weak policy and regulatory framework and human resource deficiencies in these countries (Nchunge, 2013). Nchunge adds that African countries have in the recent years made some efforts to facilitate the ICT infrastructure roll-out in schools. However, Africa still remains the continent with the least capability in ICT and other related facilities (NEPAD,2002). In Kenya, significant initiatives and achievements have been made through the undersea Fibre Optic Cable and other initiatives (Nchunge, 2013). Wanjala (2013) adds that the Ministry of Education in recognition of the several challenges in delivery of education services to achieve improved access, equity and quality, needed to have an effective Educational Management information system (EMIS) infrastructure to support processing, use, sharing and dissemination of available data and information at all levels. This data collection infrastructure begins with the capacity of head teachers to collect uniform data from regular administrative records for effective planning and decision- making.

In Kenya, under Vision 2030 and Medium Term Plan (MTP), the aim of the government is to ensure 20,000 computers are provided to schools as a flagship project in the education sector in addition to the current efforts by the Ministry to channel more resources towards providing adequate ICT infrastructure (Wanjala, 2013). The purpose of the government initiatives to provide schools with computers is in recognition of the fact that public secondary schools in Kenya have become increasingly complex multi-dimensional organizations with lots of human, financial and physical resources (Menjo & Boit, 2010). Makewa, Meremo and Role (2013) argue that school management is a key determinant factor for the realisation of the desired educational out comes hence use of ICT in management is seen as critical by all stakeholders. Administrative and managerial operations in schools in the 21st century are going electronic and this is only possible

where ICT is integrated in management (Kukali, 2010). For principals to function efficiently and effectively in managing these schools, they must rise to the challenge of using ICT in the management of schools (Makhanu & Kamper, 2012).

ICTs are tools known to modernize the way schools conduct their business and enhance effectiveness of management and leadership as they make management and office work easier (Kukali, 2010). Maki (2008) stipulates that ICT plays a vital role in supporting powerful, efficient management and administration in education sector. Cheryl (2005) conducted a study on ICT use in management of physical facilities in South Africa. It was found that ICT was used in online procurement, advertisement of the schools goods and other activities. The study further found that school managers could monitor the ratio of various resources and how they were being used in the school. It was also possible for them to know from the comfort of their offices whether there were adequate chairs, tables and teaching and learning resources in school or not. Hence without the use of technology, it would be difficult for school managers to monitor physical resources in their schools today.

A study by Grey (2000) on ICT and finance application in management in United Kingdom revealed that institutions have software packages to help produce statutory accounts and reports for management, as well as to help with the day- to- day control of their finances. The software has modules to manage payroll and debt factoring facilities. It was also established that spread sheets were widely used to help manage cash flow. Use of ICT in finances enhances transparency which prevents school managers from misusing financial resources that are available in the school and thus channelling them to their appropriate purposes.

Mue (2006) argues that ICT has efficient and safer ways of carrying out financial transactions over a short period of time. School managers can adopt the use of ICT in paying of their staff members salaries or making orders for school supply. It enables them to keep records of all transactions done and gauging themselves on the basis of amount spent and the amount received.

Study by Razae, Elan and Sharbatoghlie (2009) entitled "Continuous Auditing" reveals that ICT enables the principal to get proper records and keep such records as for purchases, budgets, grants, cash flow, audit and other financial transactions carried out in a school hitherto kept in hard copies. They add that ICT has enabled school managers and accountants to process all transactions on-line via the system called e-accounting (Electronic accounting). Grey (2000) on the other hand observes that ICT has enabled schools to do electronic banking in Kenya. This has developed and advanced to Mpesa banking which allows school managers to check their bank accounts records on line in real time, saving time and ensuring that payments have been made correctly. However, the extent to which ICT has been used to facilitate financial management in Kenyan public secondary schools remains unclear.

From the studies, there are a lot of systems available, designed for the purpose of contributing towards improved school management (Fullan, 1982). Some of these are reporting systems, parental alert softwares, timetabling, human resource management and development systems and accounting modules (MOE, 2011; Ndhine, Njoroge & Ogwel (2011). However, a baseline survey report by Oloo (2009) on ICT use in secondary schools in selected parts of Kenya indicated that use of computers in management in secondary schools was not adequate as it was only used for examination purposes and clerical office duties. Makhanu and Kamper (2012) share this view by arguing that more than half of the principals of secondary schools were not computer literate.

Menjo and Boit (2012) in their study on challenges of using ICTs, argued that although many secondary schools introduced computers in great numbers starting in the early 1990s, there is limited data on how they were being used to facilitate schools management. They cited limited computer hardware dedicated to school management and inadequate ICT literacy among teachers. These researchers found that ICTs were mainly used for clerical activities and to a lesser extent in processing of examinations.

From the reviewed literatures, it is evident that majority of countries worldwide emphasize on the use of ICT in educational management. Various policies and regulatory

frameworks have been formulated to make ICT integration seamless in education systems. However, there exists some weaknesses especially in developing countries like Kenya which makes it unattainable. According to Oloo (2009), ICTs in secondary schools are mainly used for instructional management such examination and administrative duties such as clerical duties as compared in the USA where Grey (2000) indicated that use of ICT has been extended to financial management of student accounts. ICT was being used for administrative functions as well as instructional tool in most of public schools (Konstantina, 2013).

2.3 ICTs and Management of Secondary Schools in Kenya

Any modern institution of higher learning is critically dependent for its smooth operation on the new innovations in ICTs (Wango, 2009). The Ministry of Education through Kenya Education Sector Support Programme (KESSP) in 2005 targeted mainstreaming ICTs into management of Kenyan schools. Accordingly, in 2006, Kenya developed an ICT Policy which aimed at improving the livelihood of Kenyans by ensuring the availability of accessible, efficient, reliable and affordable ICT services (MOEST, 2005; Kwanya, 2009). The policy, among other issues, aimed at integrating ICT use in educational management through growth and development of e-learning curriculum in education to enhance the country's ICT skills. This was in response to National ICT policy objectives which included among others, to ensure that ICT played a key role as an empowerment tool, addressing gaps relating to gender, youth, people with special needs, rural and urban and disadvantaged groups and as a literacy tool for the potential users. Through this policy the Kenya government committed itself to ensuring that ICT services are available throughout the country and to support the widest access to such services while keeping them affordable and maintaining quality standards.

Implementing ICT in education also fits well within the broad e-government policy, which aims at mainstreaming ICT in all government operations and other service delivery areas as schools. Oyier, Odundo, Khavugwi and Wangai (2015) argue that ICT has become a basic tool in modern school management and that it has contributed immensely

to efficient management. Makhanu and Kamper (2012) observe that ICT in Kenyan secondary schools is being used to communicate, create, organize, disseminate, store, retrieve and manage information which has made education managers to be more efficient and accountable. Application of ICT in management of schools has led to far reaching developments in managerial systems and especially on managing tasks in schools (Makhanu & Kamper 2012).

A study by Oloo (2009) indicated that there was use of ICTs in secondary schools and colleges surveyed. Use in school management accounted for only 27.93 percent and examination processing at 19.70 percent. This indicates a very low and dismal use of computers in schools.

It should be noted that if ICT facilities like word processors, electronic databases, e-mail and Management Information Systems (MIS) are put in place, they can result in more efficient communication and other managerial operations of a school. However ICT application depends on the existence of ICT infrastructure, people's skill and knowledge and also for the case of secondary schools, availability of ICT tools such as a computer connected to internet at every department and in each office.

The emergency of ICT in educational management has enhanced communication among stakeholders. It has made school managers, staff, students and parents to exchange information and ideas with a lot of ease and instantly (Oyier et al., 2015). They add that this is witnessed in a number of schools having WhatsApp communication device, websites, mass SMS software and emails. They further argue that this flow of information has allowed schools and stakeholders in remote areas and communities to become integrated into global networks making knowledge and culture accessible to everyone.

Many schools have purchased and or sought assistance from well-wishers including Non-Governmental Organizations to acquire computers. In Malaysia, Simini (2013) identified these additional hardware and software that have been acquired besides the

Government's grants while in Nigeria, Oluyemisi (2015) observed that schools sought for funding from friends and well-wishers to purchase Television sets and reporting subsystems. However, no study has been carried out in Kakamega County to ascertain the availability of facilities acquired through economic stimulus package and the additional facilities that were acquired after the grant.

2.4Application of ICTs in schools in Kenya

Alexander (2012) in Oyier et al (2015) in his study on the use of ICT in educational management classified ICT tasks in three groups:- administrative, financial and instructional management.

2.4.1. ICT and Administrative Management in Schools

Oyier et al (2015) argue that ICT in administrative management involves harnessing technology for better planning, setting standards, effecting change and monitoring results of the core functions of secondary schools. Menjo and Boit (2012) while agreeing with this assertion maintained that ICT use in educational management in Kenya schools is largely in administrative management that involves maintenance of records, communication and development management.

A study by Mue (2006) and Wanjala (2013) on use of ICT in management of secondary schools point to the fact that utilization of ICT has changed the way schools are managed by allowing information to be created, transferred, stored, retrieved and processed by all who work or interact within and outside the school. They argue that this has improved efficiency in day- to day school operational activities especially in managing information about students, staff and resources. Makewa, Role and Nyamboga (2011) observe that this efficiency in keeping records in schools has enhanced overall students' records management by making them more accessible when needed to many people especially parents. For instance in some schools, parents get termly results before students arrive home after closure of schools.

A study by Etudor- Eyo, Ante and Ema (2011) on how ICT was used in communication in secondary schools in Nigeria showed that it greatly enhanced communication among different stakeholders. ICT tools make communication faster, convenient and more effective (Kwanya, 2009). With the data bank of parents systematically arranged for each class, parents can be notified of their children's absence from school through ICT systems. The systems can generate automatic phone calls, text messages and emails, thus keeping parents updated if there are problems with their children. The principal can also remind parents of a particular class or all parents of a meeting in school by dispatching bulk instant short text messages to all parents just by clicking' send' on the computer and all parents will receive messages including statements on fees balances where applicable on their mobile phones. Notifications can be send to teachers, school workers and even board members and other school clients or stakeholders at a moment's notice of any important event in school. Web sites can also be used to communicate important information to external stakeholders about the school (MOE, 2012).Applications of electronic systems ensure school management that has less paperwork and all files are stored in a central database and can be accessed from anywhere (Wanjala, 2013). This frees the principals and teachers from performing repeated work and allows them to focus on other important tasks of teaching and counseling (Merireng, 2013).

Makhanu and Kamper (2012) add that ICT automation of admission process ranges from enquiry by students, applying for admission through electronic media, registration and enrolment on line has made work easier and improved management initiatives to adequately handle both students and stakeholders related issues.

Concerning staff management, Mue (2006) asserted that ICT has enabled allocation of work, attendance, leave management and performance appraisals, to easily carried out thereby raising efficiency in tasks distribution, data collection and management in secondary schools. Processing voluminous records of workers is done in a quick, meticulous and impeccable manner as opposed to earlier when they were kept as hard copies(Oguta, Egesa & Musiega (2014).

From the literature, it is evident that ICT is beneficial in administrative management in schools. However, some studies have failed to identify the benefits of using ICT in school management. Only Makewa, Role and Nyamboga (2011) have indicated that students records were more accessible when needed by parents, while others such as Mue (2006) and Wanjala (2013) have failed to indicate how ICT usage benefited administrative functions in schools. Makhanu and Kamper (2012) indicated that ICT automate student admission process through electronic media and online enrolment. They further indicated this integration requires large initial capital outlay to fully automate the process. As majority of secondary schools are public, this initial capital outlay is a limiting factor.

2.4.2 ICT and Financial Management in Schools

Use of ICT is school management provides a wonderful potential for increasing school accountability, transparency and monitoring by various stakeholders (Mue, 2006). Mue argues that ICT can help solve the problem of centralisation and decentralisation by making relevant revenue and expenditure data easily available at all school levels. She adds that it can also be used to facilitate budget analysis and school programming and thus improving a timeliness of the school budget information.

Adoption and use of ICT in educational management in schools has become an indispensable tool in all areas including financial management. Ngugi (2012) agrees with this position by arguing that ICT is valuable in storing and analysing school financial management data such as budgetary allocation, expenditure, student's fees payment and general accounting.

ICT tools are also now available for assisting schools in effective and efficient financial management through structured approach to target setting, reviewing, auditing, and monitoring. They can assist with quality assurance issues and ensure that procedure put into place is adhered to by all (Wanjala, 2013). They also enable managers to be updated on summaries of financial controls, expenditure in order to make fast decisions. This system enables control and audit of financial records, at a glance. Management

information systems provide parameters on class size, teacher / pupil ratios, records on available and functional infrastructure and students' enrolment. Information communication technologies minimize wastage of time as electronic record system improves performance as well as preventing serious data losses in management matters.

Makhanu and Kamper (2012) are in agreement that managers in Kenyan schools have benefitted immensely from the use of ICT in planning and controlling use of funds in schools which has greatly improved discipline in resource management. Principals need ICT basic skills to reap the full benefit of what has been started in school in relation to ICT. Use of ICT in financial management should be encouraged as it has improved school financial information management systems through availing data to parents, students, government officials and other stakeholders like donors. For instance, parents though far from school can easily be updated about the status of fees payment for their children (Wanjala, 2013). Previous studies have concentrated on how ICT has been used in financial management in schools. Non of the studies has been undertaken to find out how ICT is beneficial in educational management in Kakamega County which this study sought to fill.

2.4.3 ICT and Instructional Management

Oyier et al (2015) observe that instructional management aims at improving teaching and learning processes through a deliberate emphasis on ways and means of instilling excellence in quality of instruction. To achieve quality instructional management, Menjo and Boit (2012) recommend use of ICT in management instructional systems. Makhanu and Kamper (2012) observe that instructional process has rapidly been changing educational facilities such as the blackboards are being replaced by smart board, books and notebooks with flash disks and memory cards, overhead projectors with LCD data projectors and text-based assignments with presentations and slide shows. These researchers further argue that ICT in schools is rapidly diminishing workload of keeping daily records of students, in analysing students' attendance and in marking students' scripts and recording results. Schools can maintain different type of students' records

including personal data such as their backgrounds, schools attended, age, KCPE marks, and hobbies. Other records include performance in CATs and examinations; conduct in school, fees payment and other school financial records. Records are not limited to students only. There are teachers, other school workers and record pertaining to the school itself. They include data on staff, schools' physical infrastructure such as number of classrooms, their capacities, etc (Richardson, 2008). These records are important in helping principals streamline managerial operations and make decisions geared towards achieving organizational goals. All these records can easily be managed through the help and application of ICT than manual (Wanjala, 2013).

Makewa et al (2011) agrees that further to that ICT is handy in updating schemes of work yearly without repeating the writing as was done earlier, thereby making work easier for teachers and managers. Oyier et al (2015) argue that instructional management involves guiding and influencing students towards desirable behaviour to achieve educational goals.

ICT can be used in the automation of management processes such as timetabling and administration of examinations in a school. Timetabling is perhaps one of the most important planning exercises in a school calendar that can be a nightmare to many. This is because it deals with organization and allocation of measurable time to subjects, teachers and classes. This is crucial to maintaining and regulating teaching and learning time while at the same time, ensuring that there is delivery of quality education to all students (Mue, 2006).

Computerizing schools reporting systems is a big contribution of ICT to schools (Oloo, 2009). Oloo in his baseline survey report observes that reporting system is part of management system in a school. Many schools are using computers to prepare and generate report cards for students (Oloo, 2009). This saves time for both teaching and administrative staff. It enables students' report cards to be generated automatically using a common format (Mue, 2006). Besides, preparation of class lists, keeping and accessing students' records are conveniently made easier by the use of ICTs (Menjo & Boit, 2010).

According to Lai and Pratt (2008) the most obvious role of ICT use for teachers was not the change of teaching philosophy or pedagogy, as one might think, but the improved efficiency of management and administration of teaching, accessing resources for preparing teaching materials and presenting lessons. This would results to achieving high skills that is required to organize the instruction in the classroom effectively. However, the reviewed studies such as Oyier et al (2015) did not reveal the achievement of ICT in Instructional management in relation to school timetable, examination administration and student academic progress reports. By carrying out this study, this gap was filled as the study was able to bring out the benefit of ICT usage in relation to timetabling for examinations and lessons, student progress reports and exams preparations.

2.5 Challenges to ICT implementation in Secondary Schools in Kenya

School operations and strategic focus can greatly be enhanced by a well-focused application of Information and Communication Technologies (ICTs) to support improvement in management effectiveness. While the benefits of ICTs in schools cannot be disputed, there are several challenges that affect or slow down successful ICT integration in educational management. Several studies have identified many challenges affecting ICT integration (Pelyrum, 2003; Farrel, 2007; Kukali, 2010; Wanjala, 2013 & Oyier, 2015). These studies have identified challenges such as ICT infrastructure, qualified human personnel, the attitude of teachers towards innovations, the role of school leadership in incorporating technology into the curriculum, technical administrative support and funding among others. These challenges are discussed in detail hereunder.

2.5.1 Communication Technology Infrastructure

Infrastructure is a fundamental pre-requisite for ICT implementation in schools (Gichoya, 2005). ICT infrastructure refers to landline and cellular telephones, wireless technologies, computers, and the internet, computer software and hardware, as well as older communication technologies such as radio (Outa, Etta & Aligula, 2006).They continue to

argue that ICT includes all hardware, software and services that relate to information processing, handling and communication. Thus ICT involves a wide array of technologies used in varied extents for gathering, storing, retrieving, processing, analyzing and transmitting information (Kwanya, 2009).

The international ratio of computers to students is 1:5, while in Kenya, the ratio is approximately 1:150 (Kukali, 2010; Dawson & Rakes 2003). This ratio is even wider in disadvantaged regions and areas (Wanjala, 2013). Kukali (2010) further observes that most secondary schools lack the basic ICT infrastructure. This is worse in primary schools which seem to attract less attention. Although the government has introduced the laptop project in primary schools, these are for instructional rather than management purposes. Ndhine, et al (2010) observes that while most secondary schools have some computer equipment, only a fraction of these schools are equipped with basic ICT infrastructure and software that can be used in school management. The Education Management Information System (EMIS) survey 2003/2004 cited in MOE (2006) reported that over 70 percent of secondary and many more primary schools required telephone connections. Indeed many parts of Kenya cannot easily get internet services because of the poor telephone networks (Wanjala, 2013). She adds that about 90% of secondary schools need to establish standard Local Area Networks (LANs)in order to improve sharing of information and learning resources through the internet. This indicates that ICT infrastructure in Kenyan schools is insufficient. Kwanya, (2009) equally observes that Kenya suffers from low levels of ICT readiness due to underdevelopment of ICT infrastructure.

Whereas computers acquired by schools on their own did not present serious problems, a number of shortcomings were however, noted with donated computers. Donated computers especially by NGOs could not run on the latest software, such as windows 2000 because of incompatibility. This limited the number of school management tasks that could be performed by the hardware and confining them mostly toward processing (Manduku, Kosgei & Sang, 2012).

Wanjala (2013) in her study on teachers perceptions on the use of ICT in administration observed that lack of relevant infrastructure discouraged teachers from using ICTs in management as it becomes cumbersome and time consuming to make them available. The researcher adds that teachers' confidence to employ ICTs is directly affected by personal inaccessibility to the facilities. Thus, lack of basic communication and electronic infrastructure remains one of the bottlenecks for governments in Africa (Kukali, 2010; Omondi, 2010). Sessional Paper No. 1 of 2005 (Government of Kenya, 2005) and Farrell (2007) report that inadequate institutional and national infrastructure, lack of internet access and affordability of the same, limited rural electrification and frequent power disruptions are major setbacks in the implementation of ICT in rural institutions in Kenya. The failure of telecommunication infrastructure to permeate into rural and economically poor areas and the costly technology are major challenges limiting active telephone, email and internet usage. Besides, most secondary schools equipped with computers are for administrative purposes hence inaccessible for teachers and students use (Kasalu, 2010; Omondi, 2010 & Kukali, 2010).

2.5.2 Human Resource Capacity

Mue (2013) argues that teachers are a key resource in the implementation and success of any programme. Recent studies have shown that successful implementation of educational technologies depends largely on teachers who eventually determine how they are used in the school (Merireng , 2013 & Mue, 2013). Further, teachers' knowledge, ICTs and competency, matters as they are the key to successful integration (Zhao & Frank, 2003). ICT literacy for teachers and administrators should be hinged on policy (Samuel & Zaitun, 2007).

Research by Wanjala (2013) on teachers' perceptions on the use of ICT in the administration of public secondary schools in Kimilili District, Bungoma County indicate that many teachers in Kenya lacked the knowledge and skills to use computers and were not enthusiastic about their use in educational management. The Kenya government through Sessional Paper No 1 of 2005 admits that successful ICT use

depends and relies on sufficient and competent human resource (MOEST, 2005). This is shared again in sessional paper No. 14 of 2012 with emphasis on teacher preparation for ICT integration take off in schools. Merireng (2013) maintains that schools should have ICT technicians to assist both teachers and administration if ICT implementation has to take root in schools. This is because schools in Kenya have a big shortage of trained teachers, ICT teachers included (Kukali, 2010). When it comes to practically applying ICT, many teachers may not know how to deal with it and sometimes are reluctant to accept new technologies in educational management (Nyaga, 2014). Nyaga further argues that whereas results indicate that ICT has penetrated many sectors including banking, transportation, communication and medical services, the Kenyan educational system seems to lag behind. She emphasizes that other sectors are promoting ICT training to encourage integration. Proper training of teachers and administrators is arguably the single most critical element to successful introduction and use of ICTs in education (Wango, 2009). The principal needs necessary ICT competence to raise the profile of ICT in a school and lead other teachers in its use. With the existing shortage of ICT literate teachers it is not clear how this resource is used in schools for educational management.

2.5.3. Teachers' Attitudes on ICT use

Studies on successful use and implementation of technology indicate that this depends largely on teachers' attitude towards the technology (Bullock, 2004 & Nyaga, 2014). A positive attitude is widely recognized as a necessary condition for effective use of information technology in schools (Wango, 2009). Bullock (2004) argues that teachers' attitude is a major enabling factor in the adoption of technology. Similarly, Kersaint, Horton, Stohl and Garafalo (2003) found that teachers who had a positive attitude towards technology felt more comfortable using it and usually incorporated it into their managerial and administrative duties. Infact, Woodrow (1992) asserts that any successful technological innovation in educational practice requires the development of a positive user attitude towards new technology.

The development of teachers' positive attitude towards ICT is a key factor not only in enhancing computer usage but also reducing teachers' resistance to its use (Watson, 1998). Chrisensen (1998) argues that teachers' attitudes towards computers affect not only their own computer experience, but also the experience of the students they teach. In fact, it has been suggested that attitude toward computers affects teachers use of computer in school (Kluever, Lam, Hoffman, Green, & Swearinges, 1991). Positive attitude often encourages less technologically capable teachers to learn the skills necessary for the implementation of technology – based activities in their work. Changing an individual's behaviour is possible once attitudes have been identified (Zimbardo, et al, 1997). Zimbardo and his associate suggest that individual's skills are made up of three components: Affective, cognitive and psychomotor behaviour. The affective component represents an individual's emotional response or liking of a person or an object. The cognitive components consist of a person factual knowledge about a person or object. Even though it is not possible to predict the behaviour of a single individual, we are able to predict that people will change their behaviour if their attitude can be changed.

One of the major factors affecting people's attitudes towards technology is technology itself (Rodgers, 1995). He identified five main attributes of technology that affect its acceptance and subsequent adoption. These are: relative advantage, compatibility and complexity, ability to observe, and to try-outs. Thus, a new technology will be increasingly diffused if potential adopters perceive that the innovation has an advantage over previous innovations; is compatible with existing practices; it is not complex to understand and use; it shows observable results and can be experimented on a limited basis before adoption. This theory is relevant to this study and the Kenyan situation in that it gives us the frame -work as to why some teachers adopt and use ICT in educational management while others do not. It gives us factors that increase or impede the use of ICT in management such as availability of facilities, training and technical support. Teachers need to be sensitized about the new technology before adopting it for use in management. The theory further explains that some teachers are slow in taking up the

new technology until they see others have benefited from it before accepting it and therefore a lot of support including training is crucial in changing negative attitude towards adopting technology.

Studies have indicated that teachers' attitudes towards computer technology are related to their computer competence (Kukali 2010; Kiptalam& Rodrigues, 2010; Unachukwu & Nwankwo, 2012). In his study of correlation between teachers' attitudes and acceptance of technology, Nyaga (2014) maintained that, although many teachers believe computers are an important component of their administrative and managerial duties, their lack of knowledge and experience lead to lack of confidence to introduce them into their work.

A baseline survey by Oloo, (2009) reported that there was low use of ICTs in school management in Kenya. Its use in management on a lesser extent was witnessed in examination processing and office clerical work. Osodo, Indoshi, and Ongati (2010) associate low use of computers in educational management in secondary schools to lack of knowledge and experience, fear of technology, unwillingness for role change, lack of exposure of the teachers and unavailability of requisite hardware and software components in schools.

2.5.4 Leadership and ICT Technical Support in Schools

The role of school principals is often considered in terms of the set of expectations mediated by human agenda (Visscher, 1988). A baseline survey on ICT capacities and capabilities in secondary schools in Kenya by Ndhine, et al (2010) reported least support of teachers by school principals in organizing ICT in-service courses. It was further reported that implementing ICT into schools is the responsibility of school principals who should ensure that their students are served through effective ICT infrastructure and ensure staff professional development.

Although teachers are most important change agents at the educational work floor, what is perhaps more important in the early stages of adopting innovation is the role played by school leadership in promoting change (Unachukwu & Nwankwo, 2012). These

researchers however, argue that principals have a major impact upon ICT user practices and the ways in which changes are introduced. School principals can embed ICT within planning, management and administration very easily.

Teachers depend on school leadership and technology professional developers to address their needs and concerns (Yidana, 2007). Mutuma (2011) identified administrative support as one of the key factors in ICT implementation and integration in educational management. Putting ICT tools in schools alone is not enough to get teachers' attention to use technology for managing school curriculum, organizing their own academic work and managing students' affairs (Wango, 2009; Kukali, 2010). ICTs use in schools has complexities that require technical support that need to be mediated by the principal. These include assistance in troubleshooting and rectifying of malfunctioning devices (Kukali, 2010). In view of these, this author adds that computer laboratories need well staffed technical support personnel to assist teachers and school administrators while using ICTs.

Menjo and Boit (2010) observe that in Kenya, principals of secondary schools have not campaigned strongly for and helped expose teachers and even themselves to ICT use for management in schools. Where computers are in use, emphasis has been on a few applications such as office clerical work, generation of report cards and examination storage (Ndhine, et al, 2010). This is because the principals lack knowledge, experience and drive to use ICT in educational management (Osodo, et al 2010).

Pelyrum (2003) supports the view that teachers and administrators play a crucial role in the adoption and implementation of ICT. There is a need for more support, training and access to these technologies (Richardson, 2008). Kukali (2010) argued that some schools did not have computer technicians at all or those employed were incompetent. Technical support is required for the purpose of administrative management of ICT equipment, maintenance, repair, software updates and backups to facilitate use of ICTs in schools (Unachukwu & Nwankwo, 2012)

2.5.5 Financial Constraints

Resources in the developing world are scarce so that they have been spent mostly on basic supplies such as food, housing and roads (Nyaga, 2014). The author further argues that investing in ICT in education is therefore regarded as a long term issue. This means adopting ICT in education system is not apriority considering other more urgent issues like poverty eradication in many African countries. There is a vicious cycle of scarcity of funds and underdevelopment. Since technology is expensive, this may explain its slow adoption and use in Kenya (Kasalu, 2010). Michieka (2003) argues that since resources are limited most schools have inadequate facilities.

To maintain and support a computer after purchase, about 30 -50% of the initial investment of computer hardware and software annually is required. However, most schools only budget for purchase costs. Maintaining out-dated computers is even more expensive than buying a new one. Apart from purchase costs, there is also Total Cost Ownership (TCO) which includes hardware and software acquisition, installation and configuration, internet connectivity, maintenance, support, refitting, establishment of computer laboratories and replacement costs (Kukali, 2010). Other costs such as training teachers, hiring technical personnel are also required (Oloo, 2009). Thus a lot of funds are required if ICT implementation in schools has to be realized.

Kukali (2010) argues that the success of ICT policy implementation heavily relies on availability of resources, lack of which becomes a serious setback. A baseline survey report for ICT in secondary schools in Kenya by Oloo (2009) reveals that there were inadequate computers in schools. Besides, majority of schools had out-dated computers and did not have ICT technicians to service the computers. The researcher argued that the main cause of this was financial constrains which were rated at 71.4% in all the schools that participated in the survey. Oloo adds that most schools acknowledged that they did not have adequate funding to purchase ICT equipment and would only consider buying them for simple administrative purposes such as clerical work. Even with supply of

computers and other ICT equipment, adequate use of these facilities requires funds which are inadequate in many institutions of learning (Kasalu, 2010).

Various studies have identified challenges on the ICT implementation in secondary schools as revealed in this literature review. However, there were limited infrastructural challenges associated with educational management as most of the literature focused on teaching and learning as indicated by Kukali, (2010) Dawson and Rakes (2003) and Wanjala (2013). Further, human resource capacity challenges focused on training and the resultant inadequacies of knowledge and skill in the use of computers only. However, in the educational management, various facilities such as internet facilities, router, LCD projectors and photocopy also pose serious challenge in educational management. It was also noted that public schools suffer from financial constraints as they depend largely on parents and government for funds that are needed for infrastructure acquisition and maintenance, technical support and training. However, the studies failed to indicate how these challenges affected the implementation of ICT in the educational management. Therefore, this study identified how challenges affected the implementation of ICT in the educational management in public secondary schools in Kakemaga County.

2.6 Partnerships and Collaborations

Creating partnerships and collaborations to provide ICT infrastructure is the surest way for ICT integration in schools (Omondi, 2010). The introduction and use of ICT in secondary schools is expensive. Private universities and NGOs are usually timely partners in implementation and sustainability of ICT facilities. For example, the MOE in South Korea in partnership with Intel provided training for majority of the 400,000 teachers, principals and professors as per the country's ICT master plan (Intel, 2005).

Another partnership with the World Bank facilitated higher education reforms, human resource development, rural infrastructure and basic education in Cambodia. The notable product of the project was training of 526 teacher trainers out of 676 and lecturers in all teacher training colleges on ICT use. Besides, 1000 primary and secondary teachers

benefited from ICT infrastructure provision in Cambodia. Currently Cambodia competes favourably with other developing countries in terms of ICT access and usage in schools (Kukali, 2010).

In Kenya, the Ministry of Education, Science and Technology (MOEST) (2003) reported that the government, stakeholders and development partners in a joint effort agreed to ensure all schools had access to new, and affordable computers. Some of the many initiatives available to the government are to encourage local industry sponsorship, fundraising and community initiatives for ICT funding for schools (Kukali, 2010). Partnerships with religious organizations, donor agencies, Non- Governmental Organizations (NGOs) and individuals can make a big change in ICT facilities provision and implementation strategy (MOE, 2008).

Farrell (2007) observes that Semi- Autonomous Government Agencies (SAGA) of the MOE such as Kenya Institute of Curriculum Development (KICD), play a key role in ICT implementation in education and in secondary schools in particular. In addition to such government entities, institutions in both private sector and civil society have increasingly become influential in ICT matters. These include Network Initiatives for Computer in Education which is a consortium of NGO's with interest in ICT in education, individual NGOs, such as Computer for schools Kenya (CFSK), Telecommunications Service Provider Organisations of Kenya (TESPOK), Kenya ICT Federation (KIF) and Kenya ICT Policy Action Network (KICTANET) which is a civil society organization that is a loose network of donors and NGOs (Outa, Etta & Aligula, 2006).

TESPOK represents interests of telecommunication providers in Kenya and has lobbied the government regarding Internet exchange points. KIF, on the other hand is the umbrella body that brings together all private sector organizations with interest in ICT (Outa, et al, 2006). Odera (2002) noted that through such partnerships, UNESCO provided computers to some national schools, trained teachers and principals at in-service level in 1997.Other organizations interested in ICT in Kenya include Kificom computers,

Microsoft, Safaricom, Computer Aid UK, Equity and Kenya Commercial Banks. These have been in the fore front in supplying schools with computers and user training in primary schools in the North Rift (Kukali 2010).

2.7 Theoretical Framework

This study was guided by Rodgers Diffusion and Innovation Theory. Rodgers (2003) defined technology as a design for instrumental action that reduces the uncertainty in the cause – effect relationships involved in achieving a desired outcome. He adds that technology consists of two parts; hardware and software. Hardware embodies the technology in the form of material or physical object while software is the information. Since software as a technological innovation has a low level of observability, its rate of adoption is quite low. However, he continues to argue that adoption is a decision of full use of an innovation as the best course of action available. Rejection is a decision not to accept innovation.

He defines diffusion as the process in which an innovation is communicated through certain channels over time among members of a social system. He identified four key components of diffusion as innovation, communication channels, time, and social system. These components determine and explain the process of change to individuals (teachers and principals in this respect), decision makers or whole organization. In schools, teachers and principals are the key agents of change in educational management (Pelyrum, 2003).

Rodgers (1995) described an innovation as an idea, practice or object that is perceived as new by an individual or other unit of adoption. He focused on technological innovation in particular. Technology reduces uncertainty in so far as it helps to solve a perceived problem. However, it may create uncertainty when little is known about its consequences (Omondi, 2010). This theory postulates that potential adopters of a technology or innovation evaluate it based on their perceptions on the five characteristics of: relative

advantage, compatibility, complexity, observability and triability. The theory holds that an innovation will be increasingly diffused if potential adopters perceive that it has an advantage over the previous innovations; is compatible with existing practices; is not complex to understand and use; shows observable results and lastly, can be experimented with on a limited basis before adoption (Rodgers 1995).

Many researchers have noted that diffusion of technology such as ICTs in educational management largely depends on teachers' and principals' attitudes, expertise, and knowledge to evaluate its use in schools. Besides, there is also a general inadequacy of software resources that incorporate ICT use (Oloo, 2009; Kukali, 2010; Omondi, 2010). However, there is a common misconception that access to technology on its own motivates teachers to apply it in management. Availability does not necessarily translate into use (Unachukwu & Nwankwo, 2012).

Nevertheless, studies by Harrison and Rainer (1992) found that participants with negative attitudes towards the computer were likely to be less skilled in computer use and were therefore less likely to accept and adopt the technology than those with positive attitudes. This theoretical perspective is significant in this study as it underscores the importance of the decision of whether to adopt and use or reject a technology. Teachers and principals with adequate knowledge are likely to make decisions which enhance adoption and use while those computer illiterate are likely to reject the innovation. Likewise, teachers and principals in schools with adequate infrastructure are likely to adopt an innovation. Finally, if the Ministry of Education has a workable policy which makes computer use in educational management compulsory, then secondary school principals and teachers are likely to adopt the technology. Availability and access of ICT should be accompanied by adequate training and orientation. ICT availability and access on its own is not sufficient for successful integration of ICT in schools.

2.8 Conceptual Framework

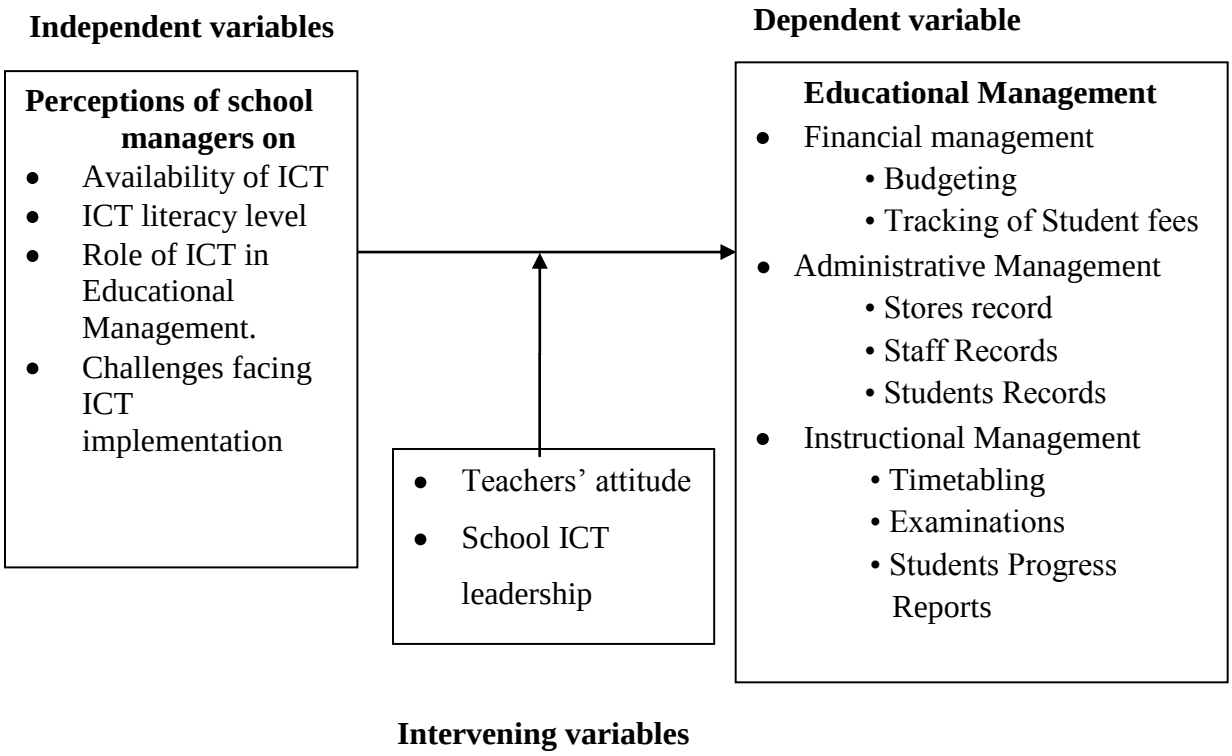

Figure 1 A model relating independent, intervening and dependent variables.

The conceptual framework illustrates the interaction between variables of the study which were grouped into three categories namely: independent, intervening and dependent variables that guided this study as shown in Figure 1. The study intended to establish perceptions of school managers on availability of ICTs in schools, ICT literacy levels of teachers, ICT role in educational management and challenges facing ICT implementation (Independent variables) and how they impacted on educational management in terms of financial, administrative and instructional management (dependent variables). These two sets of factors were treated as the main independent and dependent variables respectively. The study also considered other variables such as teachers' attitude and school ICT leadership which may impact or confound the effect of independent variable on the dependent variable, magnifying the effect. The three sets of

variables are interrelated in that they have an effect on the use and role of ICT in educational management. The intervening variables in this case were controlled by including various questions in the questionnaire.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology and procedures that were followed in conducting the study. It includes the study design, location, population, sampling procedures and sample size, research instruments, validity and reliability of research instruments, data collection and analysis procedures.

3.2 The Research Design

This study adopted the descriptive survey research design. Sekran (2007) observed that descriptive survey research is intended to produce statistical information about aspects of education that interest policy makers and educators. It is a method of collecting information by administering a questionnaire to a sample of individuals. Descriptive surveys are designed to obtain information about the current status of a phenomenon or to answer questions like where, what, how, why, when, and who. The survey research design is a self- report study which requires the collection of quantifiable information from a sample of subjects (Mugenda & Mugenda, 1999). The survey design was used to collect views, perceptions and opinions on availability, use and role of ICTs in Educational management. Descriptive survey research design was suitable in this case to help in describing the factors as respondents were asked questions about the availability use and role of ICTs in educational management in selected public secondary schools in Kakamega County.

3.3 Location of the Study

The research was conducted in Kakamega County, Kenya. The county lies between latitude 0° 17' 3.19" N and longitude 34° 45' 8.24" E. Kakamega County borders other counties such as Vihiga to the North, Uasin Gishu to the East, Bungoma to the South and

Busia to the West. The area is rich agriculturally with maize and sugarcane being the main crops. It has two sugarcane factories, the West Kenya and Butali Sugar factories.

3.4 Target Population

Target population consisted of all 45 principals, 45 directors of studies and 360 Heads of departments totalling to 450 individuals from the 45 public secondary schools that had benefited from government ICT grants in Kakamega County. Out of 45 public secondary schools, there were 2 national schools, 14 public county secondary schools and 29 sub-county secondary schools. Kakamega County was chosen for this study because it is the second biggest county in Kenya after Nairobi with many secondary schools that have benefited from government ICT grants. This means that there was a substantial government investment in ICT in secondary schools in Kakamega County, yet there was inadequate information on ICT facilities such as desktop and laptop computers, printers, LCD projectors, scanners, photocopy machines, television sets and fax machines that were available and how they were being used to justify the investment. It was therefore considered appropriate to study the availability, use and perceptions of school managers on role of ICT in educational management in secondary schools in the county. The target population was as summarized on Table 1

Table 1

Target Population

Types of schools	**No of schools**	**Principals**	**Directors of studies**	**Heads of departments**	**Total**
National Schools	2	2	2	16	20
County schools	14	14	14	112	140
District schools	29	29	29	232	290
Total	**45**	**45**	**45**	**360**	**450**

Source: County Director of Education office, Kakamega, 2012

3.4.1 Sampling Procedures and Sample Size

Sampling is the process of selecting a number of individuals for study in such a way that the individuals selected represent a large group (Mugenda & Mugenda, 1999; Kombo & Tromp, 2006). Scholars such as Kathuri and Pals (1993), Mugenda and Mugenda (1999) and Best and Kahn (2003) argue that the sample should be sufficiently large to get accurate findings from a reasonably representative sample that is manageable. Wiersma (1995) further argues that a researcher can pick any percentage as high as over 50% if the target population is small because the size of the sample influences the outcome of a statistical test. This study used 51% of all the 45 schools that benefited from ICT grants as sampling frame in line with observation by Wiersma (1995). This gave 23 schools, which was more than half of all the schools. The researcher used all the principals and directors of studies of schools selected. Major departments in all schools are five that include Languages, Humanities, Sciences, Careers and Games. The researcher used the 5 major departments per school to take care of schools of different categories.

This study employed stratified random sampling, purposive sampling and simple random sampling techniques to select the sample. Stratified sampling technique was used to select the schools to ensure that all the three categories were represented. Stratified sampling technique identifies homogenous sub-groups sharing similar characteristics in the population and their proportions and select from each sub-group to form a sample (Oso & Onen, 2011). It aims at proportionate representation to account for the difference in characteristics. In this regard, schools that received ICTs were not homogenous as some are national, county and district schools. These school categories were also different in numbers within the county. Proportionate stratified sampling therefore ensured that each stratum (sub-group) was represented in the sample in a proportion equivalent to its size in the population. Purposive sampling was used to select all principals and directors of studies in the 23 schools.

Simple random sampling was used to select members within each stratum so that each member has an equal chance of being selected (Best & Kahn, 2003).

The sample included 23 principals, 23 directors of studies and 115 Heads of Departments, all totalling to a sample size of 161 respondents. Table 2 gives a summary of the schools and respondents sampled from the target population.

Table 2

Sample size

School category	No. of schools	Principals	Directors of Studies	Heads of Departments	Sample size (by strata)
National	1	1	1	5	7
County	7	7	7	35	49
District	15	15	15	75	105
Total	**23**	**23**	**23**	**115**	**161**

3.5 Instrumentation

The main instrument for data collection was the questionnaire. The researcher administered three questionnaires: one for the principals, Directors of Studies and for Heads of Departments which comprised both closed and open-ended items.

3.5.1 Questionnaire for the Principal

The Principals' questionnaire had twenty items. The questionnaire was divided into four sections and each section addressed specific objectives of the study. Section A had 2 questions, Question 1 and 2 related to availability of ICT facilities in school and competence level of the principal in the use of ICT. Section B dealt with questions seeking to obtain information on preparedness of teachers for ICT use. Section C dealt with questions on how ICTs were used and challenges encountered in the effort to use them while section D dealt with perceptions regarding the impact of ICT use on

educational management in public secondary schools. Both open and closed ended questions were used.

3.5.2 Questionnaire for Directors of Studies

The questionnaire for directors of studies had fourteen items. The questionnaire was divided into four sections where each section addressed specific objectives of the study. Section A addressed questions 1 and 2 related to availability of ICT facilities in schools and competence level of teachers. Section B addressed questions seeking to obtain information and insights from the directors of studies on their preparedness in the use of ICTs in managing school curriculum tasks. Section C had questions on challenges encountered. Section D gathered information about teachers' perceptions regarding the impact of ICTs use in school management in public secondary schools in the county. Both open and closed ended questions were used. There were questions that presented a series of statements where the respondents were required to indicate the extent to which they agreed or disagreed with the ideas expressed on a five point Likert scale.

3.5.3. Questionnaire for Heads of Department

The Heads of Departments questionnaire had eighteen items. The questionnaire was divided into four sections where each section addressed specific objectives of the study. Section A addressed questions 1 and 2 related to availability of ICT facilities in schools and competence level of teachers. Section B addressed questions seeking to obtain information and insights from secondary school teachers on their preparedness in the use of ICTs in educational management. Section C had questions on how ICTs are used for school administration and management and challenges encountered. Section D gathered information about teachers' perceptions regarding the impact of ICTs use on school administration and management in public secondary schools in Kenya. Both open and closed ended questions were used. There were questions that presented a series of statements where the respondents were required to indicate the extent to which they agreed or disagreed with the ideas expressed on a five point Likert scale.

3.5.4 Validity of the Instruments

Validity refers to the truthfulness of findings or how well the research instruments measure what the researcher intended to measure (Walonick, 2004). The type of validity considered was face validity and content validity. Face validity refers to the researcher's subjective assessment of the presentation and relevance of the measuring instrument as to whether the items in the instrument appear to be relevant, reasonable and unambiguous and clear (Oluwatayo, 2012).

Content validity refers to the form of validity that ensures the elements of the main issue to be covered in a research are both a fair representation of the wider issue under investigation and that the elements chosen for the research sample are addressed in depth and breath (Gohen, Manion& Morrison, 2008).

To determine both face and content validity, these instruments were validated by experts and supervisors from the department of Curriculum, Instruction and Educational Management, Egerton University. The instruments were further piloted in two schools in Bungoma East Sub County. The area has similar characteristics as the area of study, their comments were incorporated to improve the quality of the instruments.

3.5.5 Reliability of the Instruments

Reliability means ability of the research instruments to attain the same findings if the study were done all over again (Kombo & Tromp, 2006). According to Kathuri and Pals (1993) reliability refers to consistency that an instrument demonstrates when applied repeatedly under similar conditions. To ensure reliability, the research instruments were piloted in two similar schools identified in the nearby Bungoma East Sub- county using split-half method. This requires one administration of the test. According to Mugenda and Mugenda (1999) this approach has the advantage of eliminating chance error that occurs when tests are administered under different test conditions. The items in the questionnaire were split into two equivalent halves: even numbers and odd numbers. All the even numbers in the pilot study were scored and computed separately and same for

odd numbers. Scores from the even and odd numbers as categorized was correlated using Spearman- Brown Prophecy formula shown below:-

$$r' = \frac{2r}{1 + r}$$

Where r' is the corrected reliability coefficient

r is the reliability coefficient from the original calculation.

The researcher then randomly divided one percent of the sample population in two groups and administers even numbers to one group and odd numbers to the other group. The results of the two groups were then correlated using Cronbach's Coefficient Alpha. The test was deemed reliable if the scores on the two halves had a high positive association. An individual scoring high on one halve would tend to score high on the other halve. From the three questionnaires, HODs had a coefficient alpha of 0.889, DOS 0.904 while for the principals had 0.952. These alpha coefficients were acceptable as Nachmias and Nachmias (1996) argue that a coefficient alpha of 0.70 and above is acceptable in line with the principle that an increased length of the test tends to increase reliability

3.6 Data Collection Procedures

Before conducting the actual field work, a research permit was obtained from the National Commission for Science, Technology and Innovation (NACOSTI) through the Graduate School, Egerton University. Once the research permit was granted, the researcher visited the County Director of Education (Kakamega County) to seek for clearance to visit schools in the county for purposes of carrying out the research. The County Commissioner was notified of the intended research for purposes of information. The researcher visited the sub county education offices to notify the sub county director of education about the research that was to be carried out in some of the schools in the sub county and seek for any assistance that was required

The researcher contacted the subjects for introduction and explained the purpose of involving them as respondents in the study. Respondents were assured of anonymity and confidentiality of information they would provide to enable them voluntarily make informed decisions (Mugenda & Mugenda, 1999; Orodho, 2005). Questionnaires were issued by the researcher and two research assistants. The principals, DOSs and HODs were given their questionnaire to fill after which the questionnaires were then collected later by the researcher and the research assistants.

3.7 Data Analysis

Data analysis is an examination of data collected in a survey or an experiment, in which deductions and inferences are made by extracting important variables of the study and detecting anomalies (Kombo & Tromb, 2006). Here the collected raw data was edited to ensure that all items were correctly completed and that there were no inconsistencies. Data cleaning and coding was done. Data was entered into the computer for analysis. The analysis was aided by a computer programme – the Statistical Package for Social Sciences (SPSS) version 20. Researcher used descriptive statistics that included frequency and percentages to summarize and organize data, and to establish the availability and use of ICT facilities in public secondary schools. The data was presented in form of Tables.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the findings of the study which are discussed under key sub sections in line with the research objectives. It contains the results that were generated from the data analysis, together with the interpretation and discussion of the same. Descriptive statistics in form of frequencies and percentages have been used to summarise the results. The objectives of the study were to:

- Establish the availability of ICTs in public secondary schools in Kakamega County for educational management,
- Establish perceptions on teachers' ICT literacy levels in public secondary schools in Kakamega County,
- Determine the perceptions on the role played by ICTs in educational management in public secondary schools in Kakamega County,
- Assess teachers perceptions on role of ICTs in educational management in public secondary schools in Kakamega County,
- Investigate the perceptions on challenges facing ICT implementation in educational management in public secondary schools in Kakamega County.

4.2 Demographic data

The study had 129 respondents of whom 22 were school principals, 23 were directors of studies while 84 were heads of departments as summarized on Table 3.

Table 3

Demographic data

N = 129	f	%
Principals	22	17.1
Directors of Studies	23	17.8
HODs	84	65.1
Total	**129**	**100**

Table 3 indicates that the majority (65%) of the respondents involved in the study were Heads of departments. This was attributed to the fact that among managers in a school, Heads of departments were more in number. Twenty Two (22) principals out of the 23 participated in the study. Directors of Studies (DOS) were 23 in number equivalent to the number of schools selected for the study.

All these categories of respondents were selected for the study because they were the senior members of schools management. They were involved in the day to day school activities which included directing, planning, supervising and managing the various functions of the secondary schools (Makewa, Meremo, Role & Role, 2013). The position of DOS and HODs are administrative and play a complementary role to the principal. A Director of Studies is essentially a manager within the school management structure (Musitwa & Mukite, 2011). DOS together with HODs supervise academic and professional programs, manage and coordinate departmental activities including recording of work done, maintaining text books and equipment inventories, working out departmental needs and priorities as well as maintenance of learners‘ performance records in a department. This is in addition to controlling of financial, human and physical resources in their departments. All these tasks require the use of ICTs in order for them to be carried out more effectively.

4.3 Questionnaire Return Rate

Indicating questionnaire return rate is important as it reflects the depth of data collection. One hundred and sixty one (161) questionnaires were issued to the respondents. The response rate was as shown on Table 4:

Table 4

Questionnaire Return Rate

Respondents	Questionnaire Issued	f	%
Principals	23	22	95.65
DOS	23	23	100
HODs	115	84	73
Total	**161**	**129**	**80.1**

The results on Table 4 show that out of one hundred and sixty one (161) questionnaires issued to respondents, one hundred and twenty nine (129) were properly filled and returned. This was 80.1% of all the questionnaires. The remaining thirty two which amounted to 19.9% of the questionnaires were either partially filled or not returned at all and were therefore discarded during analysis. Mugenda (2003) and Draugalis (2008) argue that return rate of 50% and above is satisfactory for data analysis. Therefore a return of 80.1% was considered satisfactory and acceptable for this study.

4.4Availability of ICTs in Public Secondary Schools in Kakamega County

The first objective of the study was to investigate the availability of ICT facilities in public secondary schools in Kakamega County. The respondents were required to indicate the different ICT equipment available in their schools. To fully address this, respondents were to identify ICT facilities provided in their schools by the government; those sourced by schools themselves and their location for ease access by users. The results on ICT facilities provided by the government were as shown on Table 5:

Table 5

ICT Facilities Provided by the Government

N = 129	Principals		DOS		HODs	
Equipment	**f**	**%**	**f**	**%**	**f**	**%**
Desktops computers	11	100	11	100	11	100
Laptop Computers	1	100	1	100	1	100
Printers	1	100	1	100	1	100
Internet facilities	1	100	1	100	1	100
LCD projection systems	1	100	1	100	1	100

Source: Field data 2014

Table 5, shows that all the principals, Directors of Studies and Heads of Departments indicated that their schools had desktop computers, laptop computers, printers, LCD projection systems and internet facilities. These facilities were provided by Ministry of Education through Economic Stimulus Program in the year 2011 to be used in educational management and to facilitate teaching (MOE,2011). The government provided 11 computers, 1 laptop, 1 printer, 1 LCD projection system and internet facility system for each of the schools in the sample. All the schools had to have either a computer room or an ICT laboratory as a condition for safe keeping of the ICT facilities (MOE, 2011). Ayere (2011) observes that availability of appropriate ICT room or laboratory is a basic requirement in order to house the computers facilities.

Provision of ICT facilities to schools was an effort by the Government towards modernization of educational management in schools (MOE, 2011). ICT application in management was considered as an effective enabler to create access, store, transmit and manipulate different information in audio and visual form, due to the capability of ICT in providing proactive environment (Kawade & Kulkarni, 2012). Accordingly, these would make schools to start operating differently, far from the traditional ways. Citing their experience in Indian secondary schools, Gupta, Dasgupta and Gupta (2008) argue that

ICT improves organizational performance in terms of efficiency, effectiveness and coordination. Before the provision of ICT, school administration used to suffer from compartmentalization and fragmentation because educational service delivery was organized based on the needs of the administrators. However, with the availability and use of ICT, it is possible to provide better services for the benefit of all schools clients (Ayere, 2011).

Respondents were further asked if their schools had acquired additional ICT facilities besides those provided by the Ministry of Education. The results were as shown on Table 6:

Table 6

Other ICT facilities

N = 129	**Principals**		**DOS**		**HODs**	
Equipment	**f**	**%**	**f**	**%**	**f**	%
Desktop computers	17	77	16	70	65	77
Laptop computers	15	68	14	61	51	61
Printers	16	73	17	74	63	75
LCD Projectors	9	41	9	39	30	36
Scanners	12	55	13	57	40	48
Photocopy Machines	20	91	21	91	80	95
Television sets	18	82	19	83	58	69
Fax Machines	5	23	7	30	11	13.1

Table 6 shows that all schools had acquired additional ICT equipment. Majority of respondents indicated that they had purchased photocopy machines for their schools. On average, 92% of all the respondents indicated that their schools had acquired photocopy machines. Seventy eight percent (73%) of the respondents had television sets in their schools. From these findings, many schools had acquired more additional ICT facilities as seen from responses received on this item. However, the only facility that was found

to be in limited use in many schools was fax machine (22%). This facility has declined in use due to availability of the use of e-mail as a result of internet connectivity.

Availability of these resources in schools is very important because, since the last decade, ICT resources have become indispensable tools in educational management as they are used to support effective management of schools (Ngwu, 2013). Availability of appropriate computer facilities and related infrastructure enhances use of ICT in administrative engagement (Makewa, et al, 2013). Lots of ICT application tools such as printers, scanners, photocopy machines and computers make management processes easier, faster and cheaper (Kawade, 2012). Computers were used to store various information resources that make it easier for the principal to administer teachers, pupils, other staff and procurement services like list of suppliers and stock control. LCD projectors are widely used by administrators for handling meetings, in house training for teachers and staff, video conferencing and presentation purposes (Mwalongo, 2011). Photocopying machines are an asset in educational management as they are used to produce bulk copies for examinations, various circulars for parents and minutes of various meetings in the school. Copies that require mass production are made easily using this facility (Mwalongo, 2011; Ngwu, 2013). Ngwu (2013) further argues that availability of ICT resources plays a major role in provision and fostering of quality and effective management in educational institutions. This is because it provides an opportunity for managers to transform their managerial and administrative practices.

Ouya and Mweseli (2015) argue that equipment which was provided by the Ministry of Education was not enough and in some cases it was only supplementary. Therefore, through fundraising with the aid of partnership with the community, the public and corporate sector, some schools had acquired additional ICT resources to increase availability. Gichoya (2005) argues that ICT infrastructure is a fundamental pre-requisite for ICT implementation in schools. Makoa (2004) agrees with this observation by arguing that the success of ICT integration in educational management heavily relies on

availability of these resources. The Government provision of a limited number of these facilities was a first step towards ICT implementation in schools.

4.4.1 Location of ICT Facilities for ease of Access

Principals, Directors of studies and Heads of departments were required to indicate where the ICT facilities were located in their schools for ease of access by users. The results were as shown on Table 7:

Table 7

Location of ICT facilities

Location	Principal		DOS		HOD	
	f	%	f	%	f	%
My Office/ principal's office	6	27	9	39	8	9.5
Computer lab / ICT room	16	71.6	14	61	73	86.9
Library	0	0	0	0	3	3.6
Total	**22**	**100**	**23**	**100**	**84**	**100**

Table 7 shows that majority of the respondents indicated that ICT facilities were located in a central place for easy access. A majority of respondents indicated that ICT facilities were housed in a computer laboratory or ICT room. This means that majority of the teachers' accessed ICT facilities in a central place possibly due to the limited number of computers, printers and photocopy machines since the school could not provide for every user. The location of some facilities in offices (25%) was driven by safety considerations and to minimise misuse hence intended to regulate and monitor their usage (MOE, 2011).

The housing and location of ICTs in specific places such as a laboratory determines their accessibility and use (Matovu, 2009). Computer laboratories give teachers and all other users easy access to the facilities within a set time frame (MOE, 2011). Besides, putting

all ICT equipment in a laboratory has the advantage that there can be a better control and use of equipment in addition to enhancing flexibility of access.

4.4.2 Financiers of Additional ICT Facilities

Principals were required to indicate how the additional ICT facilities were acquired by their schools. The results were as shown on Table 8:

Table 8

Financiers of Acquisition of Additional ICT Facilities

Financiers	**Principals**	
	f	**%**
Board of management	6	27
Computer for Schools Kenya (CFSK)	3	14
Education Partnership Africa	2	9
SMASSE	3	14
No extra facilities	8	36
Total	**22**	**100.00**

Table 8 shows that 36% of schools did not get any additional ICT facilities, hence depended on what was provided by the Ministry of Education. However, 64% of schools received financial support to buy additional ICT facilities from various institutions, the biggest financiers being the schools themselves through the schools' Board of Managements (27%) followed by Computers for Schools, Kenya (14%) and SMASSE (14%).This implied that there was partnership in supplementing government efforts to equip schools with ICT facilities in Kakamega County.

4.4.3 Internet and Email addresses

The respondents were further asked to indicate whether their schools were connected to the internet and whether their schools had email addresses. They were also required to

indicate whether they had their own active personal e-mail address. The results were as shown in Table 9:

Table 9

Email addresses

Internet / Email Address	Principals		DOS		HOD	
	f	%	f	%	f	%
Internet Connectivity	22	100	23	100	84	100
School email address	22	100	23	100	84	100
Personal email address	22	100	23	100	76	90.5

Table 9 shows that all the respondents indicated that their schools had email addresses which were used for official communication with stakeholders. Majority of the respondents (96.8%) indicated that they had personal e-mail addresses besides school e-mail addresses implying that communication had been made easier in schools. ICT tools like e-mail and SMS were important in effecting communication in modern school management. With the use of internet and e-mail addresses, communication with stakeholders and within the school was much easier, efficient and effective (KEMI, 2014).

In many schools, communication had been enhanced by internet services and WhatsApp which is a new and most used mobile chat messenger, giving people a chance to talk to each other through instant messaging system (Adu & Olatundun, 2013). For teachers, principals, school management boards and parents who shared contacts, this had enabled them to share educational and general information among themselves creating abroad based discussion forum on many subjects relating to the school. This was a wonderful communication system in many schools. Adu and Olatundun (2013) observe that WhatsApp has the advantage of enabling sharing of information, questions and answers of what is happening in schools at the comfort of one's bed. They add that one can ask questions in any subject and send it across to all people in the circle through a broadcast. Therefore, WhatsApp can make better communication with the school stakeholders, be it

a motivational message to keep spirits high in the school or important updates about a particular assignment – this tool makes it easy and effortless. Besides, the principal can also communicate with school stakeholders and find solution of a problem in real time (Mwalongo, 2011). This author further argues that the internet is the most dominant enabler towards better, faster and cheaper approach in carrying out administrative and managerial tasks such as information processing, transfer, storage and retrieval. The internet therefore works better when dealing with students' assignments and communication.

Managers in secondary schools need effective and fast communication and access to information as suggested by Wiley (2003) in Makewa et al (2013).The author argues that principals, their Deputies, Directors of Studies and Heads of Departments are professional communicators and therefore need to correspond through e-mail and the internet. This can save time in communicating with parents, teachers, students, other schools, business executives, suppliers and the wider community. This implies that effective managers must possess ICT knowledge. This is important to market the school, to communicate effectively while in school and to carry out school transactions and make educational management easier and efficient.

The findings on this objective show that schools had achieved the first step in capacity building for ICT integration in management by acquiring the basic infrastructure. This included computers, networks and relevant software. This had brought changes in school management and enhanced communication through the use of email and Whatsapp application within and outside the school. Principals were able to communicate very easily, effectively and efficiently with school stakeholders which had enhanced school management.

4.5 Teachers ICT Literacy Level in Public Secondary Schools in Kakamega County

The second objective was to establish ICT literacy levels of teachers in public secondary schools in Kakamega County. In order to investigate this, the respondents were asked

several questions. The first question was on their highest level of attainment in computer literacy. The results were as shown in Table 10

Table10

Highest Level of Computer Literacy

N = 127	**Principals**		**DOS**		**HODs**	
Competence Level	f	%	f	%	f%	
Degree	1	5	3	13	14	16.7
Diploma	2	9	5	22	13	15.5
Certificate	4	18	3	13	22	26.2
Experience	15	68	12	52	35	41.7
Total	**22**	**100**	**23**	**100**	**84**	**100**

Source: Field data

Table 10 shows that majority of the respondents indicated that they had acquired computer literacy through experience. This can be clearly seen from responses from the principals (68%), Directors of Studies (52%) and Heads of Departments (41.7%). These categories of teachers who form top administrators in a school had no formal training in the use of ICTs in educational management. It would appear that majority of the teachers including principals did not receive any ICT training prior to joining the teaching profession. There was need for colleges to make ICT training for teacher trainees mandatory to enable them join schools with the skills.

This finding shows that while different categories of teachers had some basic competence in ICT, is was not fully sufficient for educational management. ICT competence is important in promoting educational reforms and effective educational management as it supports the functionality of the use of ICT and its contribution to the effectiveness in educational management (Zwaneveld & Bastiaens,2007). Kidombo, Gakuo and Kindachu

(2011) argue that successful integration of ICT in education depends on professional training of teachers.

This finding is in agreement with Kukali (2010) who observed that schools in Kenya have a big shortage of trained teachers in ICT. He observed that effective ICT integration in schools hinges on proper training of teachers and administrators. Wango (2009) concurs with this arguing that this training of teachers and administrators is arguably the single most critical element for the successful introduction and use of ICTs in education. Professional ICT development courses for teachers are the only sure way to improve teachers' skills and knowledge (Abuhmaid, 2011).

4.5.1Administrators Training in ICT

The respondents were further asked to indicate if they had attended any training on use of ICTs to manage school work. The responses were as shown in Table 11:

Table 11

Training in ICT

Training attended	**Principal**		**DOS**		**HOD**	
	f	**%**	**f**	**%**	**f**	**%**
Had been trained	15	68	20	87	72	85.7
No Training	7	32	3	13	12	14.3
Total	**22**	**100**	**23**	**100**	**84**	**100**

Table 11 indicates that a majority of schools' top administrators had attended some training. This can be seen from responses from the principals (68%), Directors of studies (87%) and Heads of departments (85.7%). This implies that a majority of the managers could be regarded as having basic ICT literacy skills as a result of this training. This is because it has already been revealed that a big segment of school managers gained competence outside formal training. However, inadequate training of managers in ICT is

responsible for fair ICT application usage among teachers. This is associated with fair level of literacy in ICT knowledge and capability (Mwalongo, 2011).

Respondents were further asked if other teachers in their schools had been trained in the use of ICT in educational management. The responses were as shown in Table 12:

Table 12

Training for other Teachers

Training attended	**Principals**		**DOS**		**HOD**	
	f	**%**	**f**	**%**	**f**	**%**
Had received Training	18	82	18	78	67	79.8
No Training	4	18	5	22	17	20.2
Total	**22**	**100**	**23**	**100**	**84**	**100**

Table 12 shows that other teachers had received ICT training as seen from responses from principals (82%), Directors of Studies (78%) and Heads of Departments (79.8%). These findings show that majority of the teachers (80%) have been trained in ICT and therefore had basic ICT literacy skills. This is one possible reason for relatively fair usage of ICT in schools. However, Makewa et al (2013) wonders that even after in-service training of teachers, it was still a nightmare for them to use ICT in administrative practices. They argue that this situation could be due to inadequate ICT training. Selwood (2005) advocates for more training and time to practice what has been learnt. As argued elsewhere in this study, lack of adequate training reduced teachers' confidence in using ICT in educational management making them reluctant and fearful. This problem would be solved if teachers were trained and given ICT orientation in colleges before joining schools as teachers.

4.5.2 Duration of Training Provided

The respondents were required to state how long they were trained. The results were as shown in Table 13:

Table 13

Duration of Training

	Principals		DOS		HODs	
Training Duration	**f**	**%**	**f**	**%**	**f**	**%**
One week	11	50	13	57	61	72.6
Two weeks	8	36	6	26	16	19
One month and above	3	14	4	17	7	8.3

Table 13 shows that majority of the respondents were trained. However, these results indicate that majority of the respondents were trained for one week as indicated by 50 % of principals, 57% by Directors of studies and 72.6% by Heads of departments. The training may be argued to be very short and insufficient for effective ICT application in educational management. On average, only 13% were trained for one month and above. ICT training needs adequate training so as the trainer are able to grasp the concepts both in theory and practical. However, limited training duration leaves majority of teachers to use it fair level in the educational management.

Dzidonu (2010) argues that many African countries, Kenya included, lack well trained teachers and high levels of teachers' ICT skills and knowledge which are recognised as major obstacles in implementation of ICT in schools. He adds that a lot of time should be committed to training teachers to practise and guide them on how to use ICT in education management and offer them basic skills needed for its implementation. Abuhmaid (2011) observes that short training which seems to be the focus of ICT training by MOE cannot equip respondents with the required skills and competences in ICT usage. Adu and Olatundun (2013) recommend in-service training of between one to three months to

accommodate the acquisition of both theoretical and practical skills. They argued that foundation of ICT skills or "computer literacy" which includes introduction to computers, key boarding, file management, word processing, spreadsheets, e-mail and internet use, requires sufficient time to learn each item and practise it for better understanding. Teaching all these in a week would not provide adequate hands-on practical skills. Mingaine (2013) agrees with this assertion and adds that while foundational skills are important, they are not the end goal but provide a base on which to build further knowledge and skills in the use of ICTs. Menjo and Boit (2010) argue that lack of adequate training in ICT for teachers' accounts for low ICT use in educational management. Successful implementation of educational technology depends largely on trained teachers in ICT (Zhao & Frank 2003). Samuel and Zaituni (2007) and Kukali (2010) agreed that a proper policy should be put into place for implementation of meaningful training to facilitate ICT application in educational management. They add that continuous training and monitoring is vital to a successful ICT implementation. Kisirkoi (2015) argues that there is need for an organized teacher training on ICT integration and sustained regular in-service to equip them with necessary skills and knowledge for use in educational management

4.5.3Training Provider

The respondents were further asked to indicate who provided the training they attended. The results were as shown in Table 14:

Table 14

Training Provider

	Principals		DOS		HOD	
Training provider	**f**	**%**	**f**	**%**	**f**	**%**
MOE	16	73	14	61	52	61.9
School Management	7	32	7	30	31	36.9
NGOs	3	14	2	9	1	1

From Table 14, majority of the respondents indicated that MOE facilitated their training. This is clearly shown by the responses of principals (73%), Directors of Studies

(61%) and Heads of Departments (61.9%). These findings indicated that while teachers in public secondary schools were trained in ICT, much of the training in ICT (65.3%) was done by the Ministry of Education. However school management in a good number of schools (33%) supplemented the Ministry's training of teachers in ICT in Kakamega County.

Training of teachers is key to ICT integration in educational management (Ayere, 2011). This is because teachers are key to the success of any school programme and therefore need to be versatile and conversant with the latest technology (Adu & Olatundun, 2013). These authors add that teachers are the custodians of knowledge dissemination therefore adequate and constant training programme for them to promote their sense of professionalism is necessary. Saitoti (2007) observed that increasing computer literacy in Kenya's secondary schools is a prerequisite for improving ICT use in the education system. Makewa et al (2013) wonders that many years later, there are teachers who see ICT use in management as important but find it difficult to apply it in practice. Therefore training of teachers and administrators need to be intensified to provide them with knowledge and skills in ICT and refresh them with the latest technology (Adu & Olatundun, 2013).

4.5.4 Principals Level of Expertise and ICT Usage

The final question on this objective required the respondents to rate on a 5 point Likert scale their rating on their competence in the use of ICT in educational management. The school principals' responses were as indicated on Table 15:

Table 15

Principal Level of Expertise and ICT usage

Expertise	SA		A		N		D		SD	
	f	%	f	%	f	%	f	%	f	%
Low	7	32	9	41	0	0	3	14	3	14
Fair	13	59	9	41	2	9	10	45	4	14
Good	3	14	4	18	2	9	10	46	6	27
Very good	2	9	2	9	1	5	11	50	9	40
Excellent	0	0	1	5	1	4.8	11	52.3	8	38.1

Principal's ICT level of expertise is likely to influence ICT adoption in educational management. However, majority of principals have fair level of expertise. As shown on Table 15, majority of the principals (73%) indicated that they had low expertise in using ICT in management. However, all the principals indicated that they were able to carry out basic functions and word processing applications which they classified as only fair. Only 32% of the respondents viewed themselves as being good as they were able to use word processing applications, spread sheets and presentation software, while 18% of the respondents viewed themselves as very good as they were able to use internet and internet resources besides word processing applications, spreadsheets and presentation software.

These findings are in agreement with Prestride (2012) who found teachers to be most skilled and competent in word processing compared to other applications. This is true for Kakamega County as majority of principals (61.9) indicated that they were not good in

ICT. To use ICT in management one should be competent by having necessary knowledge and skills in ICT use (Unachukwu & Nwankwo, 2012). The findings of this study indicated that majority of principals; Heads of Departments and Directors of Studies did not possess the prerequisite skills and competence to use the ICT tools available to them. The findings were in line with Kukali (2010) who found out that school in Kenya lacked trained teachers in ICT, making the usage of ICT tools difficult. The findings are also consistent with Ndhine, et al (2010) who found out that most of the principals were reluctant to organize in-service training for teachers because they themselves were not competent in ICT use arguing that it is for the new generation. This lowered their competence in using ICT tools for educational management (Unachukwu & Nwankwo, 2012). While agreeing with this, Menjo and Boit (2010) observed that principals of secondary schools in Kenya have not campaigned strongly enough for the need to expose teachers and even themselves to ICT use for management in schools. The principals have only used ICT on little administrative work such as clerical work, generation of report cards for students and examination preparation and storage (Kisirkoi, 2015). This means that use of ICT in management in the majority of secondary schools in Kakamega County is not fully exploited and therefore still problematic.

It is clear that majority of the principals(73.4%) were not good in ICT use in educational management. These findings presents a setback because for teachers to use ICT in management, a substantial support by principals leading by example is critical (Kisirkoi, 2015) Kidombo, Gakuo and Kindachu (2011) agree that integration of ICT in educational management in schools in Kenya depended on schools' leadership, professional training of the teachers, school principals level of ICT skills and presence of an enabling school ICT policy. While promotion on ICT use in schools is on the shoulders of the principal, this study shows that their competence was only fair, not adequate. Matovu (2013) argues that principals should be super trainers and should lead the way for others to follow. He adds that as instructional leaders, principals facilitate teachers integration of computers in schools. If they are competent in ICT, principals can facilitate conditions and events that create a positive environment for technology adoption (Afshari et al, 2012). Therefore

principals' personal competence in ICT is key to enabling staff members to develop skills and knowledge in ICT (Yee, 2000).

4.6 Use of ICTs in Educational Management in Public Secondary Schools in Kakamega County

The third objective of the study was to determine how ICTs were used in educational management in public secondary schools in Kakamega County. The principals were required to indicate the tasks in their schools that were carried out using ICT. The results were as shown on Table 16:

Table 16

Education task that use ICT

Education task that use ICT	SA	A	N	D	SD
Generating timetables	20.1	22	14.3	25	18.6
Analysis of school examination results	61.9	38.1	0	0	0
Keeping students records	8.1	12	32.6	28.4	18.9
Tracking students' academic performance	21.3	30.1	9.5	29	10.1
Preparing of students mark sheets	60.9	39.1	0	0	0
Preparing of students report cards	59.1	40.1	0	0	0
Mass communication with parents	9.5	38.1	9.5	33.3	9.5
Word processing (clerical work)	6.7	93.3	0	0	0
Keeping inventory records	8.1	9.5	11.0	52.4	19
Budgeting and maintaining financial records	9.5	13.6	15.0	19	42.9
Students registration	42.9	28.6	9.5	19	0
Maintain staff records	9.5	27.6	14.3	34	14.5
Monitoring teachers' class attendance	9.5	14.3	9.5	38.1	28.6

Table 16 shows that all the schools relied solely on ICT in carrying out the following functions: analysis of school examinations results, preparing of students mark sheets,

preparing of students report cards and clerical work. There was also greater use of ICT in carrying out students' registration (71.5%). With high usage of ICT in examination processing, the reports are produced in shortest time possible, similar layout with good presentation such as charts and graphs. For timetable generation, the use of ICT has enabled production of timetables at departmental level and teacher level which makes it easier for departmental heads to monitors class attendance of the teachers. The clerical work which prior to ICT was done by typewriter was considered rather cumbersome and untidy. However, ICT has enabled networking of typed work amongst various departments and well as producing neat and presentable work in shortest time possible.

These findings in Kakamega County agree with that of Makewa et al (2013) who found that principals and teachers only used ICT in examination processing such as setting, typing, recording and analyzing marks, processing results and preparing report cards. They add that administrators did not apply ICT as much in the remaining other areas namely: personnel, financial, general management and supervision of instruction. This implies low and unfilled promise of ICT in educational management (Lee, 2000). This is in agreement with Oloo (2009) findings that ICT use in secondary schools is yet to pick up fully. It means ICT use in educational management is not yet fully-fledged even with the provision of the relevant infrastructure by the Government. This is because training of teachers was inadequate as discussed in this study. This means that a lot of tasks in educational management are still done manually therefore not benefitting from the innovative nature and enriching skills of ICT (Adu & Olatundun, 2013).

4.6.1 Teachers 'use of ICT facilities

The Directors of Studies and Heads of Departments were required to indicate which tasks teachers used ICT facilities to perform in their schools. The results were as shown on Table 17:

Table 17

Teachers use of ICT facilities

Tasks	**DOS**		**HOD**	
Response	**f**	**%**	**f**	**%**
Generating timetables	5	22	10	12
Analysis of examinations results	23	100	78	92.9
Tracking students' academic performance	9	39	32	38
Keeping student records	8	35	25	30
Preparing of students mark sheets	23	100	80	95.2
Preparing of students report cards	23	100	84	100
Mass communication with parents	7	30	21	25

Table 17 shows that majority of the teachers in the schools used ICT in carrying out the following functions: to prepare report cards (100%), analysis of examinations results (96.4%) and preparing of students mark sheets (96.2%).It is clear that the computer was used by the vast majority of the teachers in the schools on management tasks related to students' evaluation.

The results further show that ICT use by teachers is still low. This may imply that ICT training for teachers was not effective and adequate. Kisirkoi (2015) argues that enough and effective teacher preparation and training must be put in place and in addition to having sustained regular teacher professional support and visionary instructional leadership for ICT integration in education to succeed. Kombo (2013) argues that despite the Kenya government's effort and willingness to promote ICT use in secondary schools by providing the needed infrastructure, progress on ICT front had fallen short of expectations. Baylor and Ritchie (2002) argue that regardless of the amount of technology and its sophistication, technology will not be used unless teachers have the skills, knowledge and attitudes necessary to infuse it into the education management and curriculum implementation.

While the Government through the Ministry of Education had plans to integrate ICT in educational management by training both administrators and teachers to learn file management, word processing, spread sheets, email and internet skills (MOEST, 2005) Makewa (2011) argued that teachers needed to receive initial in - servicing and then sustained on going training to gain necessary skills and competence. Selwood (2012) agrees with this assertion by observing that there is need to "reform" teacher education so that there is more meaningful training and time to practice what has been learnt in formal training sessions rather than just trying to "re-tool" the teachers. Kisirkoi, (2015) shares experience found in a school she researched on near Ngong town, Kajiado County in Kenya (unnamed) where ICT training was taken seriously by teachers and observes that any new teacher who joined this school joined evening computer literacy classes and after two months the teacher acquired basic computer literacy skills. The teacher then trained students on how to use the computer and the students taught one another after classes on how to work with computers in the computer lab with the supervision of the teacher on duty. Teachers acquired skills on how to post students assignments in the school website. Teachers also learned from one another how to obtain information from the web and customize it for use in their teaching. Kisirkoi adds that when conducting meetings, it is easy to explain concepts when cast on a screen, and no teacher wants to be left behind. The computer made work easier and enjoyable so that those who had higher computer skills and were more innovative and creative in the area helped others. Administrators and teachers in the school were versatile in the use of ICT in management as they used it in generating timetables, analysis of exams and maintenance of school records. The researcher further observes that such back up training which is part of school ICT policy is required in all schools if ICT has to be fully used in educational management.

4.6.2 Frequency of use of ICTs by DOS and HODs

Directors of studies and Heads of departments were asked to indicate their rate of frequency of using ICT in performing tasks at school. The results were as shown in Table 18:

Table 18

Directors of Studies and HOD Frequency of ICT use

Frequency of ICT use	Directors of Studies		HOD	
	f	%	f	%
Everyday	7	30	11	13.1
At least 3 days a week	6	26	25	29.8
At least 1 day a week	6	26	30	36
Never	4	18	18	21.4

From Table 18, respondents who used ICTs up to 3 days per week were 49.5%. However, 50.5% of respondents used ICT only once a week or not at all. This percentage use may be attributed to inadequate skills and knowledge in using ICT in education management. Those who used ICTs once a week and those who never used ICTs are almost the same in terms of percentages. This implies lukewarm use of ICT in schools. Only a half of Directors of Studies and Heads of Departments used computers in educational management.

It is expected that ICT should be used at least daily in educational management especially amongst Heads of Department and Directors of Studies who play vital roles in school operations. However, some of the tasks which are expected to be performed using ICT have been found to be carried out manually due to lack of skills on using the application or unaware of those applications. The usage of this applications by Directors of Studies and Heads of Department would have save them time and relieve the to perform other duties outside educational management.

This implies, as earlier observed by Wims and Lowler (2007) that computers in schools may be an object of study rather than a tool for educational management. Except for analysing exams, printing reports cards, preparing mark sheets and clerical work (MS – Word), there was little integration of ICTs in management. It appears also that many of the schools lacked clear policy or will to integrate ICT in school management. This may be arising from the lack of sufficient training, lack of encouragement from school management or technophobia. This is because where the principals were conversant with ICT they encouraged its use in many areas of education management (Gakuu & Kidombo, 2013). This underscores the importance of leadership in implementing change. This had affected the use of ICT in Kakamega County and as such, the technology was inadequately being used in educational management despite ICT investment in schools by the Government.

From the findings, even though ICT tools in secondary schools are used in generating of teaching and examination timetables as well as examination operations, it has grossly been neglected in other areas like keeping students and teachers' records, inventory management as well as communication using email facilities to education stakeholders. The findings are in agreement with Kidombo et al (2011) who reported that there was low use of ICT in the management of schools in Kenya as a result of poor inadequate training in ICT, unfocused school leadership on ICT use, principals' low level of ICT skills and knowledge and lack of school ICT policy. Unachukwu and Nwankwo (2012) also found out that many principals of secondary schools shy away from the use of computers, some of them arguing that innovation is for the young generation. While many of the respondents blamed training as the reason for the low usage of ICT tools in the educational management of schools, Osodo, Indoshi and Ongati (2010) also associated low use of computers in educational management in secondary schools to lack of knowledge and experience, fear of technology, unwillingness to change, lack of exposure of teachers and unavailability of requisite ICT tools. Therefore there was need for more ICT capacity building and awareness campaign in schools.

4.7 Perceptions of School Managers on role of ICTs in Educational Management in Public Secondary Schools in Kakamega County

The fourth objective of the study investigated the perceptions of schools managers on role of ICTs in educational management in public secondary schools in Kakamega County. Principals, Directors of Studies and Heads of Departments were asked for their views and perceptions on role of ICT in the management of schools in Kakamega County.

4.7.1 Principals perceptions on role of ICT in school management

Principals were required to respond to statements on their perception on role of ICT in the management of secondary schools. The results were as shown in Table 19

Table 19

Principals' perceptions on role of ICT in school management

Statements	SA	A	N	D	SD
ICT does not benefit school management	0	0	2	9.5	88.5
Schools would be better places without computers	0	0	3.2	9.5	87.3
ICT makes school management easier and efficient	81	9.5	9.5	0	0
ICT saves time and effort in school management	52.4	38.1	9.5	0	0
ICT reduces operational inefficiency	44.1	39.6	16.3	0	0

Table 19 reveals that principals viewed role of ICT for educational management as worth while. Evidence shows that principals responded positively to the support provided by ICT in their administration and management responsibilities. All principals agreed that ICT improves the operations in a school related to management. Majority of respondents

indicated that ICT saves time and effort in school management (90.5%) and ICT makes school management easier and efficient (90%).

The findings indicated that ICT had a positive influence on the management of schools as it had made schools better places and improved the quality of services of schools management. Therefore, principals' perceptions of ICT adoption and use were positive. The findings are in agreement with the study of Zaman, Shamin and Clement (2011) which reported that, when used appropriately, ICT can help to strengthen the provision of services thereby raising the quality of schools' management. Further, the findings are consistent with the results of a studies done by Andoh (2012) and Makhanu and Kamper (2012) which concluded that implementation of ICT improved management of schools and that use of ICT tools helped teachers execute their duties effectively. Therefore, use of ICT should be encouraged in school management as it saves time and effort. Efficiency in management is a vital component of success and by proper application of ICT in schools can decrease uncertainties, transactional costs and the time needed to carry out certain procedures (Broder, Calopa & Pihir, 2009).

4.7.2 Dos Perceptions on role of ICT in school management

Directors of Studies' were required to respond to statements on their perceptions on the role of ICT in the management of secondary schools. The results were as shown on Table 20:

Table 20

Dos Perceptions on role ICT in school management

Statement	SA	A	N	D	SD
ICT does not benefit school management	0	0	13.6	54.6	31.8
Schools would be better without computers	0	0	10.6	50	39.4
ICT makes management easier and efficient	59.0	41	0	0	0
ICT saves time and effort in management	51.4	37.6	11	0	0
ICT reduces operational inefficiency	22.7	50	27.3	0	0

From Table 20, all Directors of Studies indicated that ICT made educational management easier and efficient (100%).Respondents further indicated that ICT also saved time and effort (86.4%) in performing school management tasks and greatly reduced operational inefficiency (89%). These responses were positive, indicating that perceptions were positive towards role of ICT. This implied that Directors of Studies appreciated the importance of ICTs in the school management as it had enabled them to become more efficient (Kamper & Makhanu, 2012). Simonson (2008) argues that teachers 'ICT skills, perceptions about role of ICT and attitudes were related to their use of ICT in educational management. While perceptions were positive, the actual use of ICT in schools was low which may be as a result of inadequate training of teachers in ICT as indicated earlier in this study.

4.7.3 Heads of Departments' Perceptions on role of ICT in School Management

Heads of departments were also required to respond to statements on their perception of ICT role in the management of secondary schools. The results were as shown in Table 21:

Table 21

HODs perceptions on role of ICT in school management

Statements	SA	A	N	D	SD
ICT does not benefit school management	0	0	10.8	44	45.2
Schools would be better places without computers	0	0	9.5	15.5	75
ICT makes educational management easier and efficient	61.9	34.4	3.7	0	0
ICT saves time and effort in educational management	69	25	6	0	0
ICT reduces operational inefficiency	53.6	36.9	9.5	0	0

From Table 21, majority of HODs agreed that the use of ICT should be encouraged in schools as it helped HODs to work efficiently thereby making school management easier and efficient (96.3%). They also agreed that ICT saved time and effort in educational management (94%). These results show that teachers believe and have positive perceptions that technology will bring to them advantages but they lack the basic skills of computer usage. These perceptions were in agreement with similar studies by Manduku, Kosgei and Sang (2012) who found that Kenyan teachers held very positive perceptions towards ICT integration in education. From this study, teachers understood the importance of ICT in enhancing quality of educational management and were willing to integrate more technology into their day to day professional tasks in schools. In relation to this, Mingaine (2013) observed that when used appropriately ICT has the capability of raising the quality of services provided in educational management. This argument is consistent with results of a study by Andoh (2012) that concluded that the implementation of ICT improved management of schools. Makhanu and Kamper (2012) also agree that the use of ICT tools helped teachers execute their educational management tasks effectively and efficiently.

The findings from the principals, Heads of departments and Directors of studies indicated that ICT in school management has positive perceptions. In fact all cadre of managers indicated that it is vital to educational management and it made schools better places for both students and teachers. The findings agree with similar results in Jordan where teachers reported highly positive impact on ICT training on their attitude towards ICT use in educational management (Abuhmaid, 2011). The findings are consistent with (Omondi, 2010) who found that use of ICT in educational management for schools made daily administrative operations more efficient . Kukali (2010) also agreed with findings as she stated that ICT modernized school operations and enhanced effectiveness of management and leadership as it made administrative and office work easier. MOE, (2012,2011) and Kwanya (2009) also concurred with these findings by arguing that the use of ICT hastened the speed of communication within and between sections of an organisation and reduced paperwork thereby, freeing principals and teachers from carrying out extraneous duties and concentrate on other important tasks of teaching and counselling.

It is evident from the data provided that responses from the principals, DOS and HODs were positive on the use of ICT applications to support their administration and management responsibilities. However, across all the cadres of these managers, ICT was not adequately being used in schools as expected. It would appear that majority of principals, DOS and HODs in Kakamega County were not yet ready for the use of ICT in educational management. It has been revealed in this study that only few of these managers have the necessary knowledge and skills for fully-fledged ICT usage in their schools. The implication of these findings are that school managers who are not ready to use ICT will be having problems in storing, managing and processing as well as communicating information in this present era when ICT makes things easy for people in educational management (Unachukwu & Nwankwo, 2012).

4.8 Challenges facing ICT Implementation in Educational Management in Public Secondary Schools in Kakamega County

The last objective of the study sought to identify challenges facing successful implementation of ICT in public secondary schools. The results of findings were divided into principals, Directors of studies and Heads of departments.

4.8.1 Challenges facing ICT Implementation in Educational Management according to Principals

Principals were required to state what challenges they faced during the implementation of ICT in educational management. The responses are as shown in Table 22:

Table 22

Challenges facing Principals in the Implementation of ICT in Educational Management

Reasons for not using ICT tools	SA	A	N	D	SD
Inadequate and poor training on ICT use	28.6	57.1	4.8	9.5	0
Lack of technical support	19	61.9	14.3	4.8	0
Negative attitude towards computers in schools	19	28.6	9.5	33.3	9.5
Inadequate computer hardware and software for school management purposes	24.8	42.9	14.3	8.5	9.5
Computers use is cumbersome	9.5	9.5	19	28.6	33.3
Limited and unreliable supply of electricity	0	19	4.8	38.1	38.1
Limited access to the internet	38.4	49.1	6.5	6.2	0

Table 22 shows that majority of the principals indicated that they had difficulties in using ICT in educational management. This is clearly shown by responses of principals over 75%who indicated that they lacked confidence in using ICT tools, lacked technical support (80.9%) while 87.5% viewed limited access to internet as another challenge.

Lack of internet was a financial issue and schools could not afford to provide internet for use by teachers all the time. There was also lack of competence in ICT. This may be attributed to inadequate and poor training of teachers in ICT. This implies that in-service training in ICT was inadequate, ineffective and as a result principals lacked necessary skills and knowledge to use ICT in educational management.

These findings were in agreement with the findings of Lau and Sim (2008) who asserted that the main challenges affecting ICT adoption and use in education were inadequate training of teachers, lack of ICT infrastructure and lack of technical support. Teachers ICT skills and professional development was critical to the implementation of ICT in schools (Mingaine, 2013). This author adds that with proper training on how to implement ICT, teachers can offer crucial advice on how to implement it. Makhanu (2010) and Mingaine, (2013) observed that training of teachers on adoption and use of ICT in most developing countries has not been appropriate as teaching dwells on technical aspects of the technology and very little on the use of the technology in educational management.

Some schools principals (67.7%) indicated that they lacked necessary hardware and software to implement ICT in educational management. Internet connectivity was a challenge with 87.5% approval. Hennessy, (2010) observes that lack of adequate facilities like hardware; software and internet access by teachers in many countries in Africa, Kenya included is a common place.

4.8.2 Challenges facing ICT Implementation in Educational Management according to Directors of Studies

Directors of studies were required to indicate what challenges they faced during the implementation of ICT in educational management. The responses were as shown in Table 23:

Table 23

Challenges facing DOS in the Implementation of ICT in Educational Management

Reasons for not using ICT tools	SA	A	N	D	SD
Inadequate and poor training on ICT use	22.7	50	8	12.3	7.3
Lack of technical support	36.4	40.9	12.6	7.8	2.3
Limited support by school management	13	40.9	3	34.6	9.1
Inadequate computer hardware / software for school management purposes	35	39.5	4.5	11.5	9.5
Computers use is cumbersome	19	24	11	23.5	22.5
Limited and unreliable supply of electricity	4	23.4	5	43.7	24.1
Limited access to internet	40	49	7.5	3.5	0

From Table 23, majority of Directors of studies (89%) indicated that they lacked internet access while 77.3% lacked technical support as a result exhibited lack of confidence in the use of ICT tools. More than 72% of respondents indicated that they and received inadequate and poor training on ICT use and they had inadequate computer hardware and software.

This finding agrees with argument those teachers' ICT skills, access to professional development and necessary computer hardware and software play a significant part in implementation of ICT in schools (Mingaine,2013). He further suggests that teachers' attitudes, beliefs, adequacy and skills influence successful implementation of ICT in schools. Unfortunately, lack of well trained and low level of teachers' ICT skills and knowledge in Sub- Saharan Africa has been recognized as a major obstacle in implementation of ICT in schools (Dzidonu, 2010). This means for efficient implementation of ICT in schools, there should be adequate personnel that have correct skills DOSs included. Where such skills are missing, it would be difficult to fully implement ICT in education management.

4.8.3 Challenges facing ICT Implementation in Educational Management according to Heads of Departments

Heads of departments were also required to indicate what challenges they faced during the implementation of ICT in educational management. The responses are as shown in Table 24:

Table 24

Challenges facing Heads of Departments in the Implementation of ICT in Educational Management

Reasons for not using ICT tools	SA	A	N	D	SD
Inadequate and poor training on ICT use	23.9	58.3	7.1	7.1	3.6
Lack of technical support	38.1	49.3	9	2.3	1.3
Limited support by school management	33	30	9.5	12.5	15
Inadequate computer hardware / software for school management purposes	29.8	40	4.7	10.5	15
Computers use is cumbersome	2.4	3.6	8.8	50.7	34.5
Limited and unreliable supply of electricity	2.4	13.6	8.2	41.3	34.5
Limited access to internet	40.6	50	7	2.4	0

From Table 24, majority of Heads of Departments over (90%) indicated that they lacked internet accessibility, lacked technical support (87.4%) and had received inadequate and poor training on ICT use (82.2%). Other key challenges mentioned were inadequate computer hardware and software (69.8%) and limited support by school management (63%) and as a result exhibited lack of confidence in the use of ICT tools.

It is evident from the findings that lack of adequate computer facilities, inadequate training for teachers and lack of technical support as well as limited support by school management are serious challenges in the use of ICT in educational management. This resulted to low confidence among users as they did not interact with the facilities often.

These findings were in agreement with the findings of Lau and Sim (2008) who found out that the main challenges affecting ICT adoption and use in developing countries, Kenya included, were inadequate training of teachers, lack of ICT infrastructure and lack of technical support. To successfully, implement ICT in schools there should be comprehensive pre-service courses on ICT that equip teachers with required skills (Mingaine, 2013). Unfortunately, Mingaine adds that, many teachers' training institutions teach more about what is ICT rather than teaching how to use it in teaching and learning and in management. He asserts that training in ICT use and technical support to teachers which should emphasize on its application as a tool in management are important for successful ICT implementation in school. Lack of technical support posed serious challenge in the usage of ICT facilities in the management of school as most teachers lacked the required knowledge and skills to use the facilities as required without assistance of a technician. Therefore ICT usage take off was difficult in the absence of technicians to assist as back up to little training received by teachers.

Technical support is vital in maintaining confidence of teachers and principals in the use of ICT software and other equipment (Makhanu, 2010). Lau and Sim (2008) argue that lack of technical support is a key barrier in implementation of ICT in schools and leads to teachers avoiding ICT for fear of messing. It is therefore important that school managers should ensure that teachers have adequate access to technical support. This is essential in order to help teachers utilize fully ICT in education management.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents summary of the study, conclusions based on the findings of the perceptions of school managers on role of ICT in educational management in public secondary schools in Kakamega County and recommendations for further research.

5.2 Summary of major findings

This study investigated the perceptions of school managers on role of information and communication technology in educational management in secondary schools in Kakamega County, Kenya. The objectives of the study sought to examine: The availability of ICTs in public secondary schools in Kakamega County, establish perceptions on teachers' ICT literacy levels, determine perceptions on the role played by ICTs in educational management, assess teachers' perceptions on role of ICTs in educational management and to investigate the perceptions on challenges facing ICT implementation in educational management in public secondary schools in Kakamega County. The results are presented based on the objectives of the study.

5.2.1 Availability of ICTs in schools

With regard to objective one, the study found that the schools whose ICT facilities had been financed through Economic Stimulus Programme had desktop and laptop computers, computer laboratories, printers, the internet facilities and LCD projections systems as indicated by the principals, DOSs and HODs. The study further indicated that more than 60% of schools had acquired additional facilities from their own resources. However, even with these additional facilities, they were still not sufficient to meet the needs of the schools.

5.2.2Teachers ICT literacy level

In relation to the second objective, the study found that majority of respondents had no formal academic training in the use of ICT. The respondents' ICT literacy was gained through experience rather than formal training as indicated by 68%, 52% and 41.7% of the principals, DOS and HODs respectively. This level of expertise was only basic as such they were more comfortable in using word processing applications than other more advanced ICT applications. More than 68% of the respondents had only received short training which lasted for one week only. Classroom teachers had also received the same short training (82%). Most of these training was provided by the Ministry of Education Science and Technology.

5.2.3 Use of ICT in Educational Management

Objective 3 sought to determine the perceptions on the role played by ICTs in educational management. It was found that use of ICT was limited to few tasks in educational management. Majority of ICT use in educational management was in instructional management which included analysis of examinations results, preparation of students marksheets, generation of report cards and general administrative management especially clerical work such as word processing. ICT was used to store and retrieve passed examinations papers, print results, merit lists and make copies of official documents. There was an agreement in all these areas in the schools sampled (100%). Another key use of ICT in educational management was in tracking students' academic performance (51.4%). However, ICT use in financial management was low with responses of principals on keeping of inventory being at 17.6% while budgeting and keeping financial records at only 23%. These were the views of Principals.

The study also found that more than 59% of DOS used ICTs in their work atleast 3 days a week while a low number of HODs did the same at the rate of 42.9%.

5.2.4 Perceptions of school managers on role of ICT in Educational Management

On the fourth objective which sought teachers' perceptions on role of ICT in educational management, it was very clear that school managers and teachers in general were very positive about using ICT. Majority of principals, observed that ICTs was beneficial in educational management by indicating that ICTs reduced operational inefficiency (83.7%), ICTs saved time and effort (90.5%) and ICT made school management easier and more efficient (90.5%) thereby enhancing their job performance. Similarly, DOS and HODs shared the same perceptions with their principals in comparable percentage levels. Despite the high levels of inadequacy of ICT facilities, teachers were generally happy and appreciated ICT in view of the gains such as making work faster and easier.

5.2.5. Challenges facing ICT Implementation in Educational Management

The findings on objective five on challenges of implementing ICT in educational management revealed that notable challenges included limited access to the internet, inadequate and poor training in ICT use, and lack of technical support and inadequate ICT hardware and software for school use. All these challenges were rated as important by more than 67% of all the respondents.

5.3 Conclusions

Based on the findings, the following conclusions were made in relation to research objectives. All sampled schools that had been financed through Economic Stimulus Programme had acquired ICT facilities that included desktop and laptop computers, printer, internet facilities and LCD projection systems. Majority of these schools had acquired additional ICT facilities from their own resources. However, facilities were not enough for all the teachers and therefore had been put in central places for ease of access.

Most respondents had not received adequate training in the use of ICT to be able to use these facilities effectively. The level of ICT training of majority of respondents is far from being satisfactory due to lack of proper exposure during formative training in initial

teachers' training institutions. Most of the respondents had only basic training in ICT gained mainly through outside formal training. The in-service training which was mainly done by MOE and school management was inadequate, as it mainly lasted for one week which was insufficient time for integration of ICT in school management.

Use of ICT in educational management in public secondary schools in Kakamega County was mainly in the analysis of school examination results, preparing of students report cards, preparing of students mark sheets and word processing (clerical work). Directors of Studies mainly used ICT facilities at least 3 days a week while Heads of Departments in sampled schools mainly used ICT one day a week in managing revision programme. Internet facility was least used due to low internet accessibility and lack of bundles. Therefore ICT was not a full time tool in educational management in schools.

Use of ICT was perceived by school managers as beneficial, important and indispensable in educational management as it helped in meeting various needs of school managers in educational management and made their work more organised. Effective use of ICTs in educational management was hampered by a number of challenges. These were inadequate and poor training in ICT use, lack of technical support, inadequate ICT hardware and software and limited access to the internet. This resulted into low levels of confidence in the use of ICT in educational management implementation.

5.4 Recommendations

To improve the quality of educational management in secondary schools the Ministry of Education, Science and Technology should increase investment in training of teachers on how to integrate ICT in educational management.

Since ICTs have positive impact on the educational management in schools, government should extend the same programme to include schools which were previously left out during phase one so that the whole education system in the country benefits from the use of ICT in educational management.

Teachers should be given sufficient training on how to integrate ICT in educational management. Teacher training institutions should align their curriculum to this inorder to provide teachers' trainees with skills and competences required for use of ICT in educational management.

Government and other stakeholders should mobilise resources for equipping school with necessary ICT infrastructure. There should be recognition that considerable managerial improvement could take place while using ICT tools in educational management. Therefore, schools should acquire upto date ICT infrastructure that teachers and administrators could train and learn with.

To foster a positive attitude of teachers on use of ICT in educational management, there should be comprehensive in-service courses. In –service courses should be designed in away that will enable all teachers to acquire ICT skills. Continuing professional development of teachers is central to successful implementation of ICT in schools. Teachers need examples of good practice and leadership from their school leaders (principals) and necessary time for professional development, in order to successfully implement ICT in schools. Therefore use of ICT by principals will have encouraging and commendable results on other teachers who may have a more unwilling attitude towards the technology, providing them a good encouragement to give a trial.

The stakeholders especially the government, sponsors and school management should liaise with manufacturers of software and hardware so as to enable them acquire at wholesale prices. This can be done through government negotiating on the behalf of schools with these companies. Schools could also negotiate with dealers or wholesalers of computers so that teachers can purchase them by paying in instalments. This would enable teachers acquire personal computers to practice with and use for educational management.

5.5 Suggestion for Further Studies

This research elicited and examined the perceptions of school managers on role of information and communication technology in educational management in secondary schools in Kakamega County, Kenya. Further studies to be carried out in the following areas.

i. Similar study may be done in other counties in Kenya to find their experiences on the influence of the use of ICT in educational management.

ii. A study should be done based on the school types such as national schools only or county schools only or district schools only.

iii. A study should be done on whether teacher training colleges had incorporated ICT training in their curriculum to prepare teachers adequately for ICT use in schools.

REFERENCES

Abdul, R. & Zohora, F. (2012). ICT Utilization among School Teachers and Principals in Malaysia: *International Journal of Academic Research in Progressive Education and Development*, 4(2), 2226 – 6348

Abuhmaid, A. (2011) 'ICT training courses for teacher professional development in Jordan', *Turkish Online Journal of Educational Technology* 10(4), 195-210.

Adebayo, E.L. & Adesope, O.M. (2007). Awareness, access and usage of information and communication technologies between females researchers and extension. *International Journal of Education and Development using Information and Communication Technology (IJEDICT),* 3(1), 85-95.

Adu, E.O. & Olatundun, S.A. (2013). The use and management of ICT in schools: Strategies for school leaders. *European Journal of Computer Science and Information's Technology* 1(2), 10 – 16.

Afshari, M., Bakar, K.A., Luan, W.S., Samah, B.A., & Fool, F. S. (2009). Factors affecting teachers' use of Information and Communication Technology. *International Journal ofInstruction,*2 (1), 78-98

Anderson, G. (1990). *Fundamentals of Educational Research. London*:-The Falmer Press.

Andoh, C. (2012). Factors influencing teachers' adoption and integration of information communication technology in schools. *A review of the literature. International Journal of Education and Development using Information and Communication Technology (IJEDICT)* 8 (1), 136 – 155.

Ary, D. & Jacobs (1976). *Introduction to statistics for management.* New Delhi: prentice-Hall of India Private Ltd.

Ayere, M.A. (2009). *A comparison of ICT application Areas in NEPAD pilot schools &Non- NEPAD Schools in Kenya*. Unpublished PhD Thesis, Maseno: Maseno University, Kenya.

Baylor, A., & Ritchie, D. (2002). What factors facilitate teachers skill, teacher morale, perceived student learning in technology-using classroom?. *Computers & Education*, 39 (4), 395-414.

Benzie, H. (1995). *Developing learning technology networks through shared representations of practice.* Source project publication, PUB- OU-55.

Best, J.W. & Kahn, (2003*). Research in Education.* New Delhi: Prentice-Hall of India Private Ltd.

Brodar, K. Calopa, M. & Pihir, I. (2009). Impact of ICT on the structural and contextual Organisational Elements: Case of Varazdin County. *JIOS, 33(2), 45-71*

Bukaliya, R. & Mubika, A. (2011). Teacher competence in ICT : implications for computer educational in Zimbabwean secondary schools, *International Journal of Social Sciences and Education* 1(4), 414- 425

Bullock,S. (2004). *A framework for the pedagogical evaluation of learning* environments. JISC report.

Cheryl, H.W. (2005). *Educational technologists in Higher Education Institutions in South Africa:* Moving beyond random acts of progress. 4(1), 355-361.

Chresense, S. (1998). *INSPIRAL: Investigating petals for information resources and learning*. Final report.

Cohen, L., Manion, L. & Morrison, K. (2008). *Research methods in education* (6thed). London & New York: Routhenge Taylor & Francis Group.

Dawson, C.& Rakes, G.C. (2003).The influence of principal's technology training on the integration of technology into Schools. *J. Res. On Technology in Education*, 3(12), 26-39

Draugalis, J. R., Coons, S. J., & Plaza, C. M. (2008). Best Practices for Survey Research Reports: A Synopsis for Authors and Reviewers. *American Journal of Pharmaceutical Education, 72*(1), 1-51.

Dzidonu (2010). *The Role of ICTs to achieving the MDGs in Education: An analysis of the Case of African countries, Accra Ghana.*

Etudor –Eyo, E., Ante, H.A. & Emah, E.I. (2011). Use of ICT and Communication Effectiveness among Secondary School Administrators. *Journal of Education and Sociology*, 2 (1), 124-132

Farrel, G. (2007*). Survey of ICT in Education in Kenya*. Washington D.C- The World Bank Publication.

Fullan, M. (1982).*The meaning of educational change.* New York : Teachers College Press.

Gakuu, C.M. (2006). *An analysis of the factors and attitudes that influence lecturers' readiness of adopt the use ICT.* PhD Dissertation University of Nairobi, Kenya (Unpublished).

Gichoya, F. (2005). *Information Technology in Educational Management.* London: Chapman and Hall.

Gupta, B., Dasgupta, S., & Gupta, A. (2008). Adoption of ICT in a government publishing in a developing country: Empirical study. *Strategic Information Systems, 17 (7),* 140 – 154.

Hennessy, S. (2010). Developing the use of information and Communication Technology to enhance teaching and learning in East African schools' thinking about ICT and learning: believes and outcomes. *Journal of Teacher Development* 5(12), 729 – 743

Intel (2005). *Three Million teachers' help students learn to develop 21st century skills*. Retrieved on January 2, 2006.

Kasalu, S. (2010). *Application of ICTs in collection development in selected private University libraries in Kenya.* Moi University, Eldoret. (Unpublished)

Kathuri, N.J. & Pals (1993*). Introduction to educational research.* Njoro, Kenya: Education Media Centre Egerton University.

Kavagi, L. (2001). *The Use of Computers in Secondary Schools:* A survey of schools in Western Province. Unpublished Master of Philosophy. Thesis. Moi University.

Kawade, D. (2012).Role of ICT in Education, Management and Administration. *Pioneer Journal,9(1), 281-284*.

Kersaint, Horton, Stohol, & Garofalo (2003). *Rethinking university teaching (Second Edition).*London. Routeledge.

Kidombo, Gakuo & Kindachu. (2011). *Closing the Chasm : Are the Secondary School Teachers in Kenya Using ICT Effectively to Deliver Curriculum Content ?*University of Nairobi School of Continuing and Distance Education.

Kipsoi, E.J., Changach J. K. & Sang, H.C. (2012). Challenges facing adoption of ICT in educational management in schools in Kenya. *Journal of Sociological Research.* 3(1), 212-230

Kiptalam, G.K. & Rodrigues(2010). Internet utilization: a case of Connected Rural and Urban Secondary Schools in Kenya. *International Journal of Computing and ICT Research*, 4(1), 49-63

Kisirkoi, F.K. (2015*). Integration of ICT in education in a secondary school in Kenya: A case study*. Maasai Mara University, Kenya.

Kluever, Lam, Hoffman, Green,& Swearinges (1991). *Learning Objects available from http ://www.newstrols.com*.

Kombo, D. K. & Tromp (2006). *Proposal and Thesis Writing. An introduction*. Nairobi: Paulines Publications Africa.

Kukali, A.N. (2010). *ICT for the physically challenged students. Maseno* University (Unpublished).

Kwanya, T.(2009). *ICT Simplified. A handbook for the communication worker*. Nairobi. Focus Publishers.

Lau, B. & Sim, C. (2008*).*Exploring the extend of ICT adoption among secondary school teachers in Malaysia, *International Journal of Computing and ICT research* 2(2), 19 – 36

Lee, M. (2002). A tale of two cities: Comparing higher education policies and reforms in Hong Kong and Singapore, *Australian Journal of Education, 46*(3), 255–286.

Makewa, L, Role, E & Nyamboga, R. (2011). *International Journal of Education and Development using Information and Communication Technology* (IJEDICT), 2011, 7(2), 4-14.

Makewa, L., Maremo, J., Role, E. & Role (2013). ICT in Secondary school administration in rural Southern Kenya: An educator's eye on its importance and use. *International Journal of Education and Development using Information and Communication Technology*. 9(2), 48-63

Makhanu, E & Kamper. (2012). *Education and general studies* 1(1), 038- 047 (Online). Available at: http://www.heraldjournals.org/hjegs/archive.htm

Maki, C.(2008). Information and Communication Technology for Administration and Management for secondary schools in Cyprus – *Journal of education and development using Information Communication Technology. 5(12), 231-245*

Manduku, J., Kosgey, A.& Sang, H. (2012). *Adoption and use of ICT in enhancing management of public secondary schools : A survey of Kesses Zone Secondaryschool in Wareng District of Uasin Gishu County*, Kenya.

Matovu, M. (2005). *Availability, Accesssibility and use of ICT, in management of students' academic affairs in Makerere university.*

Menjo, D.K & Boit, J.M. (2010). *The challenges of using Information Communication Technology (ICT) in school administration in Kenya.*Moi University. Eldoret.

Merireng, S. (2013). *Effect of computers in management of secondaryschools in Kenya, a case of West Pokot County, Kenya. University of Nairobi, Nairobi.*

Michieka, R.(2003). *Financing of university education for industrial take off*, Chiromo Campus Nairobi.(speech).

Miima, F. (2014). *Integration of Information Communication Technologies in Teaching and Learning of Kiswahili Language in Public Secondary Schools in Kakamega County, Kenya*. Master Thesis. Kenyatta University

Mingaine, L. (2013). Challenges in the Implementation of ICT in Public Secondary Schools in Kenya. *International J. Soc. Sci. & Education*. 4(1), 431-452

MOE, Kenya. (2006) *National Information Communication Technology strategy for Education and training*: Nairobi: MOE.

MOE, Malaysia (2003*). Education Development Plan , 2001- 2010* . Kuala Lumpur:

MOEST (2005).*Information Communication Technologies in Education options paper* Nairobi: Government Printers.

MOEST (2011). *ICT Integration in Schools:* Management Handbook, Nairobi. Government Printers.

MOEST *Session paper No 14 of 2005 on policy framework for Education, training and Research. Meeting the challenges of Education, Training and Research in Kenya in the 21st Century*. Nairobi: - Government Printers.

MOEST *Session paper No 14 of 2012 on Reforming Education and Training sectors in Kenya.* Nairobi:- Government Printers.

MOEST(2003*). School management handbook.* Nairobi – Government Printers.

Mue, J.S. (2014). *Application of Information Communication Technology in school administration in public secondary schools in Langata Division, Nairobi County, Kenya.* Kenyatta University, Nairobi.

Mugenda, M. O &Mugenda (1999*). Research methods-quantitative and qualitative approaches*. Nairobi: Acts Press.

Mukite & Musitwa (2012). *Head of Department academics and Director of Studies Handbook.* Track Academic Solutions. Nairobi

Musungu L.L. & Nasongo, J.W. (2008). *The Headteacher's Instructional role in academic achievement in Secondary Schools in Western Province*. Masinde Muliro University.

Mutuma, L. (2011*). ICT in Education.An Integration Approach. Nairobi*. Rinny Educational and Technical publishers.

Mwalongo, A. (2011). Teachers Perceptions about ICT for teaching, professional development, administration and personal use. *International Journal of Education and Development using Information and Technology*, 7(3), 36- 49.

Nachmias & Nachmias, (1996). *Research Methods in the Social Sciences*.(5th Edition). London.ST. Martin's Press.

Nchunge D.M. (2013). *Factors affecting ICT adoption for educational support activities in secondary schools in Kenya. A survey of Thika District* .Jomo Kenyatta University of Agriculture and Technology, Nairobi.

Ndhine, E.O., Njoroge, H.M. & Ogwell (2011). *ICT Capacities and Capabilities in selected Secondary Schools, Kenya*. Nairobi: National Council for Science and Technology.

NEPAD (2002). *Short- Term Action Infrastructure*; Executive report for New Partnership for African's Development secretariat.

Ngwu, I.O. (2013). Higher education for self-reliance: An imperative for the Nigerian economy. In J.B. Babalola, G.O. Akpa, A.O. Ayeni and S.O. Adedeji (Eds),

Access, Equity and Quality in Higher education. NAEAP publication, Lagos. P.1-8.

Nyaga, N.S. (2014). *Challenges facing effective Information and Communications Technology (ICT) Implementation in selecting public secondary schools in Nakuru North District, Nakuru County.* Kenyatta University, *Kenya.*

Oloo, L.M. (2009). *Baseline Survey Report for ICT in secondary schools in selected parts of Kenya. Developing Partnership for Higher Education*.

Oluwatayo, J.A. (2012). Validity and reliability issues in educational research. *Journal of Educational and Social Research,* 2(20), 42-56.

Omondi, O.P. (2010). *Factors influencing teachers' adoption of computer assisted learning in secondary schools. A case study of Rarieda District, Kenya.* Research Project (Unpublished) University of Nairobi.

Orodho, J.A. (2005). *Elements of education and social science research methods*. Nairobi, Masola Publishers

Oso, W.Y.& Onen, D. (2011). *A general guide to writing a research proposal and report* –A handbook for –beginning researchers. Kisumu.

Osodo, F., Indoshi, F.& Ongati; O (2010). *Attitudes of students and teachers towards use of computer technology in Geography education.* Maseno University.

Ott, L. (1997). *An introduction to Statistical methods and Data Analysis*. Belmont, California, USA: Wadsworth Publishing Company, Inc.

Outa G, Etta F, & Aligula E (2006). *Mainstreaming ICT Research perspectives from Kenya*. Mvule Africa Nairobi, Kenya.

Ouya, E. & Mweseli, J. (2015). *Leadership and effective management in Kenyan schools. (A resourceful management manual for school managers).* Nairobi: Rinny-Educational and Technical publishing Services.

Oyier, R., Odundo, P., Khavugwi, L., & Kahiga, R. (2015). Effects of ICT Integration in Management of Private Secondary Schools in Nairobi County, Kenya: Policy Options and Practices. *World Journal of Education*, 5(6), 24-56

Pelgrum, W.J. (2001). Obstacles to the Integration of ICT in education: results from a worldwide Educational Assessment. *Computers & Education 37 (2001), 163 - 178.*

Pelyrum, L. (2003*). Learning Technology and Groundhog Day. Hypermedia at work: practice and theory in higher education.*

Pestride, S. (2012). The beliefs behind the teacher that influences their ICT practices, Griffith University Brisbane Australia. *Journal of Computer Education* 58(2012) 449 – 458

Prestride, S. (2012) The beliefs behind the teacher that influences their ICT practices, Griffith University Brisbane Australia. Journal of Computer Education 58(2012), 449-458

Razae, Z. Elam, R. & Sharbatoghlie, A. (2009). *Continues Auditing: the Audit of the Future*. Manage. / Auditing J., 16(3), 150 – 158.

Republic of Kenya (2005). *Session Paper No. 1of 2005 on a policy Frame work for Education, Training and Research;* Government Printer, Nairobi Kenya.

Richardson, J.W. (2008). ICT in Education Reform in Cambodia: Problems, politics and policies Impacting Implementation. J*ournal of Information Technologies and International Development vol. (4),* 67-82.

Rogers, E.M. (1995). *Diffusion of Innovation (* 4th Ed.)New York: The Free Press.

Rogers, E.M. (1995). *Detailed report on effective resources for e-learning. Effectiveness of resources tools and support services.* New York: Free Press.

Rogers, E.M. (2003). *Diffusion of Innovation (* 5th Ed.) Newyork: Free Press.

Saitoti, G. (2007*). Kenya: Computer literacy vital for secondary schools*, Issue 291 Retrieved from http:// pambazuka.org/en/category/ education/39851

Salerno, C. (2009). Administrator's Role in Technology Integration. Education World.

Samuel, R.J & Zaitun, A.B (2007).Do teachers have adequate ICT Research and the right ICT skills in integrating ICT Tools in the teaching and Learning of English language in Malaysian Schools. *Electronic Journal on Information Systems in developed countries.(* 2007) 29,2 PP 1-15.

Selwood, K. (2012). Introduction: *ICT and Changing Mindsets in Education*. In K. Toure, T.M.S. Tchombe, & T. Karsenti (Eds.), ICT and Changing Mindsets in Education. Bamenda, Cameroon: Langaa; Bamako, Mali: ERNWACA / ROCARE.

Unachukwu, G.O & Nwankwo, C.A (2012). Principals' readiness for the use of ICT in School Administration in Anambra State of Nigeria. *Journal in Organization Psychology and educational studies* 1(2) 114 -120, Nnamdi Azikiwe University; Awka, Nigeria.

Visscher, A.J. ,& Spuck, D.W. (1991). Computer Assisted School Administration and Management: The state of the art in seven nations. *Journal of Research on computing in education*, 24 (1), 146 – 296.

Visscher. A.J. (1988). The computer as an administrative tool. *Journal of Research on computing in education*, 21 (3), 28-35.

Walonick, D.S. (2004*). Survival Statistics*, Inc, 8609 Lyndale Ave. S #2094, Bloomington, MN55420.

Wango, G. (2009). *Schools administration and Management*:- Quality assurance and standards in schools. Nairobi: Jomo Kenyatta Foundation pp 108-109.

Wanjala, A.S. (2013). *Teachers' Perceptions on the use of Information Communication Technology in the administration of public secondary schools in Kimilili District, Bungoma County, Kenya*. Catholic University of Eastern Africa.

Watson, C. (1998). *JISC Usage surveys: Trends in electronic information services*. Final Report.

Wiersma, W. (1995). *Research methods in education: An Introduction.* Boston, U.S.A.

Wims, P., & Lawler, M. (2007). Investing in ICTs in educational institutions in developing countries: An evaluation of their impact in Kenya. *International Journal of Education and Development using ICT* , 3(1), 452-478

Woodro, A. (1992*). Technology and human issues in reusing learning objects.* A Journal of Interactive Media in Education.

Yee, D. (2000). Images of school principals' information and communication technology leadership, *Journal of Information Technology for Teachers Education*, 9(3), 287 – 302.

Yidana, I. (2007).*Faculty perception of Technology integration in the teacher education curriculum. A survey of two Ghananian Universities*. Unpublished PhD Dissertation. Ohio: Ohio University.

Zaman, M., Shamim , R. & Clement K. (2011). *Trends and issues to integrate ICT in teaching learning for the future world of education*, International Journal of Engineering & Technology 11(3), 114 – 119.

Zhao Y. & Frank K.A. (2003). Factors affecting technology use in schools: An ecological perspective. *American Educational Resources*. *Resource J.* 40 (4), 807-840.

Zimbardo M.(1997). *Connecting learning objects to instrumental design theory.* The instructional uses of learning resources.

APPENDIX A: QUESTIONNAIRE FOR THE PRINCIPAL

I am a Master of Education Student at Egerton University in the Department of Curriculum, Instruction and Educational Management. The purpose of this questionnaire is to establish the availability and use of Information and Communication Technologies in Educational Management in Secondary Schools in Kenya. You have been identified as a respondent in the study. Kindly fill in this questionnaire to the best of your knowledge. The information you provide is purposely for academic requirements only and will remain confidential.

SECTION A

Please indicate by a tick (√) in the appropriate box where applicable.

1. Name of school:…….……..
2. What is your highest level of competence in computer literacy

   Degree ( ) Diploma ( ) Certificate ( ) By experience ( ) None ( )
3. Please tick (√) ICT equipment in your school from the following list provided by the government.

i. Desktop Computers	( )		ii	Television	( )
iii. DVDs	( )		iv	LCD projector systems	( )
v. Computer laboratory	( )		vi	Printers	( )
vii Photocopy machine	( )		viii	Fax machine	( )
ix. Laptop Computers	( )		x.	CD player	( )

xi. Internet facilities ( ) xii. Others (Specify)……

4. Where are these ICT facilities located in the school?

ICT Laboratory ( ) ICT Room ( ) Principal's Office ( ) Store ( ) HOD offices ( )

Any other (specify)……..

5. Apart from the government grant to purchase these ICTs , have you received any ICT facilities in your school? Yes ( ) No ( )

6. If yes who donated or provided the facilities?.....

SECTION B

7. Have your teachers received any training to facilitate the use of ICTs in School Management?

   Yes ( ) No ( )

8. (a) If yes, how long were they trained?

   One week ( ) Two weeks ( ) One month ( ) More than one month ( )

9. Who facilitated the training?

   M.O.E. ( ) School Administration ( ) NGO ( ) Any other (Specify)……

SECTION C

10. Which tasks listed below related to educational management do you use ICT to perform in your school? Indicate by showing your level of agreement from the statements below.

    Strongly Agree- SA; Agree- A; Neutral- N; Disagree- D; Strongly Disagree- SD

Statements	SA	A	N	D	SD
Generating timetables					
Analysis of School Examination results					
Keeping Students Records					
Tracking students academic performance					
Preparing of Students mark sheets					

Preparing of students report cards						
Mass communication with parents						
Word processing (clerical work)						
Keeping of inventory records						
Budgeting and processing of finance records						
Students registration						
Maintaining staff records						
Monitoring Teachers class attendance						

11. What is your level of expertise in computer use? Indicate by showing your level of agreement from the statements below

Strongly Agree- SA; Agree- A; Neutral- N; Disagree- D; Strongly Disagree- SD

Level of expertise	SA	A	N	D	SD
Cannot use computer at all (Very low expertise)					
Iam able to operate basic computer functions and word processing application (Fair)					
Iam able to use office applications e.g. word processors, spread sheets, presentation software etc. (Good)					
Iam able to use office applications including use of internet and internet resources.(Very good)					
Iam able to use office applications, internet and use of E-Mail, internet surfing and searching ; development of web pages.(Excellent)					
I try to use computers but I need more training					

(b) If you rarely use ICTs in educational management, what could be your reason?

Indicate by showing your level of agreement with the statement below:-Strongly Agree – SA; Agree- A; Neutral – N; Disagree – D; Strongly Disagree – SD

Reasons for not using ICT tools	**SD**	**D**	**N**	**A**	**SA**
Lack of confidence in the use of ICT tools					
Lack of technical support					
We are unable to start ICT Integration in Educational Management					
Not competent to use computers for Educational Management					
Inadequate computer hardware and software for school Management purposes					
Not prepared enough to take off due to inadequate and poor ICT training					

Computers use is cumbersome					
Limited and unreliable supply of electricity					
Limited access to internet					

12. What is the school's E-mail address?.....
13. What is your personal E- Mail Address?.....
14. Do you have internet access in your school? Yes ( ) No ( )
15. Do you have a technician to assist in use of ICTs in educational Management?
    Yes ( )No( )
16. Does the school have any equipment maintenance and renewal plan?
    Yes ( ) No ( )

SECTION D

17. The following statements refer to your perception on the impact of ICT use in school management. Using the words given below, tick (√)the choices that fit you best.
    Strongly Agree (SA) 5 Agree (A) 4 , Neutral (N) 3, Disagree (D) 2,
    Strongly disagree(SD) 1

Statements	**SD**	**D**	**N**	**A**	**SA**
ICT does not benefit school management					
Schools would be better places without computers					
ICT makes school management easier and efficient					
ICT saves time and effort in school management					
ICT improves overall effectiveness in educational management					
ICT reduces operational inefficiency					

18. What suggestion do you have to help advance technology use in educational management……..……
    ……..……

APPENDIX B: QUESTIONNAIRE FOR DIRECTORS OF STUDIES

I am a Master of Education Student at Egerton University in the Department of Curriculum, Instruction and Educational Management. The purpose of this questionnaire is to establish the availability and use of Information and Communication Technologies in Educational Management in Secondary Schools in Kenya. You have been identified as a respondent in the study. Kindly fill in this questionnaire to the best of your knowledge. The information you provide is purposely for academic requirements only and will remain confidential.

SECTION A

Please indicate by a tick (√) in the appropriate box where applicable.

1. Name of school:……..……..……..
2. What is your highest level of competence in computer literacy
   Degree ( ) Diploma ( ) Certificate ( ) By experience ( ) Nil ( )
3. Please tick (√) ICT equipment in your school from the following list provided by the government.

   i. Desktop Computers ( ) ii Television ( )

   iii. DVDs ( ) iv LCD projector Systems ( )

   v. Computer Laboratory ( ) vi Printers ( )
   vii Photocopy machine ( ) viii Fax machine ( )
   ix Laptop Computers ( ) x CD Player ( )

xi. Internet facilities xii Others (Specify)……..……

4. Apart from the government grant to purchase these ICTs, have you received any ICT facilities in your school? Yes ( ) No ( )

SECTION B

Please tick (√) in the appropriate box where applicable.

5. Have you attended any training course, workshop or seminar on using ICTs to manage your work in school Management? Yes ( ) No ( )
6. If yes, how long were you trained?

   One week ( ) Two weeks ( ) One month ( ) more than one month ( )
7. (a) Who facilitated the training?

   M.O.E. ( ) School Management ( ) NGO ( )

   Any other (Specify)……..……..

   (b) Were other teachers in your school trained? Yes ( ) No ( )
8. (a) Are you accessible to these ICT facilities for use in your school? Yes ( ) No ( )

   (b) If yes, from where do you access them?

   Library ( ) Computer Room ( ) Principal's Office ( ) My Office ( )

   Any other (specify)…….

SECTION C

Indicate by ticking (√) correctly in the appropriate box.

9. (a) Rate the frequency of your ICT use in performing school tasks.

   Rarely ( ) Frequently ( ) Very frequently ( ) Not applicable ( )

   b) Which tasks do teachers use ICT facilities to perform in school related to educational management from the list below? (Tick all that apply).

Tasks	**Tick**
Generating timetables – master timetable, departmental timetables and individual timetables.	
Analysis of examinations results	
Keeping students records	
Tracking and monitoring students academic performance.	
Preparing of students mark sheets.	
Preparing of students report cards.	

Mass communication with parents	

10. How often do you use a computer at school per week (select one item)

    Everyday ( ) Atleast three days ( ) Atleast one day ( ) Never ( )

4. How often do you use the internet at school per week (select one item)

    Everyday ( ) Atleast three days ( ) Atleast one day ( ) Never ( )

5. What do you use the computer at school for? (Tick all that apply)

Using e- mail	
Using search engines e.g Google, yahoo	
Students registration / enrolment	
Internet facility	
Communication of academic details of students to parents	
Generating time table for teaching and examinations	
Storage backup	
Processing and display of result of students	
Preparing and managing examination materials for revision.	

6. If you don't use ICTs, what could be your reason? Indicate by showing your level of agreement with the statement below:-

    Strongly Agree – SA; Agree- A; Neutral – N; Disagree – D; Strongly Disagree – SD

Reasons for not using ICT tools	**SD**	**D**	**N**	**A**	**SA**
Lack of confidence in the use of ICT tools					
Lack of technical support					
We are unable to start ICT Integration in Educational Management					
Not competent to use computers for Educational Management					
Inadequate computer hardware and software for school Management purposes					
Not prepared enough to take off due to inadequate and poor ICT training					
Computers use is cumbersome					
Limited and unreliable supply of electricity					
Limited access to internet					

SECTION D

7. Please choose your level of agreement with the following statements.

Strongly Agree SA; Agree- A; Neutral – N; Disagree – D; Strongly Disagree – SD

Statements	**SD**	**D**	**U**	**A**	**SA**
ICT does not benefit school management					
Schools would be better places without computers					
ICT makes school management easier and efficient					
ICT saves time and effort in school management					
ICT improves overall effectiveness in educational management					
ICT reduces operational inefficiency					

APPENDIX C: QUESTIONNAIRE FOR HEADS OF DEPARTMENT

I am a Master of Education Student at Egerton University in the Department of Curriculum, Instruction and Educational Management. The purpose of this questionnaire is to establish the availability and use of Information and Communication Technologies in Educational Management in Secondary Schools in Kenya. You have been identified as a respondent in the study. Kindly fill in this questionnaire to the best of your knowledge. The information you provide is purposely for academic requirements only and will remain confidential.

SECTION A

Please indicate by a tick (√) in the appropriate box where applicable.

1. Name of school:……..……...…….……..
2. What is your highest level of competence in computer literacy
   Degree ( ) Diploma ( ) Certificate ( ) By experience ( ) Nil ( )
3. Please tick (√) ICT equipment in your school from the following list provided the government.

i. Desktop Computers	( )	ii Television	( )
iii. DVDs	( )	iv LCD projector Systems	( )
v. Computer Laboratory	( )	vi Printers	( )
vii Photocopy machine	( )	viii Fax machine	( )
ix Laptop Computers	( )	x CD Player	( )

xi Internet facilities xii Others (Specify)……

4. (a) Apart from the government grant to purchase these ICTs, have you received any ICT facilities in your school? Yes ( ) No ( )

   (b) If yes, who donated or provided the facilities …….( )

SECTION B

Please tick (√) in the appropriate box where applicable.

5. Have you attended any training course, workshop or seminar on using ICTs to manage your work for Educational Management? Yes ( ) No ( )
6. If yes, how long were you trained?

   One week ( ) Two weeks ( ) One month ( ) more than one month ( )
7. Who facilitated the training?

   M.O.E. ( ) School Management( ) NGO ( )

   Any other (Specify)……..……..
8. Were other teachers in your school trained? Yes ( ) No ( )
9. (a) Are you accessible to these ICT facilities for use in your school? Yes ( ) No ( )

   (b) If yes, from where do you access them?

   Library ( ) Computer Room ( ) Principal's Office ( ) My Office ( )

   Any other (specify)…….

SECTION C

Indicate by ticking (√) correctly in the appropriate box.

10. (a) Do you use these ICT tools to perform your school duties related to education management? Yes ( ) No ( )

    (b) Which tasks do you use ICT facilities to perform in school, related to educational management from the list below? (Tick all that apply).

Tasks	**Tick**
Generating timetables– master timetables, departmental timetable and individual timetables.	
Analysis of examinations results	
Keeping students records	
Tracking and monitoring students academic performance.	
Preparing of students mark sheets.	
Preparing of students report cards.	
Mass communication with parents	

11. (a) Rate the frequency of your ICT use in performing these school tasks.

Rarely ( ) Frequently ( ) Very frequently ( ) Not applicable ( )

(b) Do other teachers in the department use ICT facilities? Yes ( ) No ( )

12. If you don't use ICTs, what could be your reason? Indicate by showing your level of agreement from the statements below.

Strongly Agree SA; Agree- A; Neutral – N; Disagree – D; Strongly Disagree – SD

Reasons for not using ICT tools	**SD**	**D**	**N**	**A**	**SA**
Lack of confidence in the use of ICT tools					
Lack of technical support					
We are unable to start ICT Integration in Educational Management					
Not competent to use computers for Educational Management					
Inadequate computer hardware and software for school Management purposes					
Not prepared enough to take off due to inadequate and poor ICT training					
Computers use is cumbersome					
Limited and unreliable supply of electricity					
Limited access to internet					

13. What is the source of power in your school?

Electricity ( ) Generator ( ) Solar ( ) None ( ) Any other (specify)……

14. Does the school have internet access? Yes ( ) No ( )

15. What is your E- Mail address?.....

16. What is the E- Mail address of your school?.....

SECTION D

17. Please choose your level of agreement with the following statements.

Strongly Agree SA; Agree- A; Neutral – N; Disagree – D; Strongly Disagree – SD

Statements	SD	D	U	A	SA
ICT does not benefit school management					
Schools would be better places without computers					
ICT makes school management easier and efficient					
ICT saves time and effort in school management					
ICT improves overall effectiveness in educational management					
ICT reduces operational inefficiency					

What can you suggests to improve ICTs use in education management in schools?

i. _____

ii. _____

iii. _____

APPENDIX D: SCHOOLS THAT RECEIVED ICT GRANTS

	SCHOOL	TYPE
1.	Bishop Sulumeti Girls	-County
2.	Bukolwe Sec. School	- SubCounty
3.	Bumini Sec. School	-SubCounty
4.	Bushiangala sec.	–County
5.	Butere Girls	- National
6.	Busombi sec.	- SubCounty
7.	Eregi Girls	- County
8.	Eshinutsa Sec.	-SubCounty
9.	Handidi sec	-SubCounty
10.	Itete sec.	-SubCounty
11.	Ikonyero Sec	-SubCounty
12.	Ingotse se	-County
13.	Kakamega High	- National
14.	Kakunga girls	-SubCounty
15.	Kivaywa Sec.	–County
16.	Kimangeti sec.	–SubCounty
17.	Kongoni Sec. Sch.	– Sub County
18.	Lukhokho	–SubCounty
19.	Lumakanda Boys	– County
20.	Lukala sec	-SubCounty
21.	Lunyu sec.	–SubCounty
22.	Lwanda sec.	–SubCounty
23.	Lunza sec.	-SubCounty
24.	Makhokho sec	-County
25.	Matioli sec.	- Sub Count
26.	Mautuma Sec.	–County
27.	Mugai sec	- SubCounty
28.	Milimani sec. Sch.	- SubCounty
29.	Musanda sec. Sch.	- SubCounty
30.	Musingu Boys	- County
31.	Munami Sec. Sch	- SubCounty
32.	Mirere sec.	- SubCounty
33.	Mwihila Boys	- County
34.	Museno sec.	- SubCounty
35.	Musoli Girls	- County
36.	Namulungu sec.	- County
37.	P.A.G Magale	- SubCounty
38.	Samitsi sec.	- SubCounty
39.	Silungai sec.	- SubCounty
40.	Shamusinjiri Sec	- SubCounty
41.	Sidikho sec.	- Sub-County
42.	St. Cecilia sec.	- Sub-County
43.	St.AnnsNzoia	- SubCounty
44.	St Peters Mumias	-County
45.	St. Mary's Mumias	- County

APPENDIX E : LETTER OF INTRODUCTION TO RESPONDENTS

TO,

…….

…….

……

Dear Sir/ Madam,

RE: Filling of the questionnaire

I am a Masters Student at Egerton University, Department of Curriculum Instruction and Education Management currently undertaking Masters Degree in Education Administration and management. You have been identified as an important respondent to this study. Please find the attached questionnaire. This questionnaire is designed to gather information on the availability and use information and communication technologies in secondary schools. All answers are confidential and will only be used in combination with those from other schools as the basis for the recommendation.

This research is being carried out in fulfilment of the requirement for award of the degree of Masters of Education Management of Egerton University.

I will be glad to send to you a summary of the findings of the study. Please return the completed questionnaire at your earliest convenience.

Thanks.

Yours faithfully

ENOCK ANDANJE