SELECTED SOCIO-TECHNICAL ISSUES INFLUENCING EFFECTIVE USE OF ICT IN THE MANAGEMENT OF PUBLIC SECONDARY SCHOOLS IN UASIN GISHU COUNTY, KENYA

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DECLARATION AND APPROVAL

Declaration

This Thesis is my original work and has not been presented for the conferment of a degree or for the award of a Diploma in this or any other University.

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DEDICATION

I would like to dedicate this thesis to my family members, Pauline, Joyline, Faith, Victor and Vincent who have been very supportive during my time of study.

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First of all, I would like to thank the Almighty God for giving the strength and health to carry out this demanding and challenging task when all seemed impossible.I am greatly indebted to my supervisors Dr. Joshua Manduku, Dr. Hellen Sang and Dr.Alfred Bett in this thesis and family members for their financial and moral support.

ABSTRACT

There is an increasing interest, attention and investment being put into the use of ICT in education worldwide. The Ministry of Education Science and Technology in Kenya has developed an Information Communication Technology (ICT) strategy which outlines how ICT will be adopted and utilized to improve access, quality and equity in the delivery of education services in Kenya. With the introduction of computer-based technology in schools, major changes should be observed in the way education is managed, but there is still minimal evidence on the impact of these technologies in public secondary schools." The general objective of the study was to analyze selected socio-technical issues influencing effective management of public secondary schools in Uasin-Gishu County in Kenya. Specifically, the study sought: to find out how administrators' attitude toward ICT affects effective management of public secondary schools; to determine how the frequency of use of ICT affect the effective management of public secondary schools; to establish how administrators' access to ICT facilities affect the effective management of public secondary schools; and to find out how administrators' ICT technical competencies affects the effective management of public secondary schools in Uasin-Gishu County. The study was based on Open Systems Theory and The Technology Acceptance Model (TAM). The researcher adopted the correlational and descriptive research design. The population for the study was 166 public secondary schools in Uasin-Gishu County. The sample size used was 61 principals, 61 school bursars, 61 school secretaries and 6 Sub-County Directors. Stratified random sampling method was used to select the respondents. Primary data was collected using structured questionnaire measured on likert type interval scales of 1-5. Reliability of the research instrument was tested against Cronbach's alpha coefficient where an overall reliability score of 0.814 was achieved while validity was gauged using panel of experts, ensuring that the indicators of each variable were within the same construct and operationalizing the instrument as per the variables. Descriptive statistics comprised means and standard deviations were used to analyze the data while hypotheses were tested using multivariate linear regression model to generate relevant statistics. The findings indicated that administrators' attitude on ICT has a significant positiverelationship ($R = 0.637$, $\beta_1 = 0.637$, $R^2=0.405, p<0.05$) with effective management of schools indicating that a positive change in administrators' attitude leads to adequate improvement on management of schools. ICT frequency of use and effective school management were also found to have a significant positive relationship ($R =0.549$, $\beta1 = 0.449$, $R^2=0.302$, $p<0.05$) demonstrating that whenever school administrators' frequently employ ICT facilities in their management functions there was a significant improvement on effective management of schools.Based on the study findings, there was also a significant positive relationship between access to ICT facilities and effective management of schools ($R =0.383$, $\beta_1 = 0.287$, $R^2=0.147, p<0.05$) which demonstrated that those administrators' who have access to ICT facilities tend to manage their schools better. Lastly, the study established a significant positive relationship between administrator's ICT technical competencies and effective school management ($R =0.588$, $\beta_1 = 0.506$, $R^2=0.346, p<0.05$). Implying that administrators' skill set are necessary in leveraging on ICT facilities to realize success in management of schools. On the basis of these findings, it was concluded that the Ministry of education should: ensure that the administrators develop a favourable attitude; frequent use of ICTs in school management is encouraged; resources are allocated for the acquisition of ICT facilities and administrators given training on how to utilize ICTs their schools to enable them achieve effective management. The study may be useful to stakeholders in the education sector in providing information on the state of ICT in public secondary schools in Kenya.

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LIST OF ABBREVIATIONS AND ACRONYMS

AKF Aga Khan Foundation

BBC British Broadcasting Cooperation

BOM Board of Management

CBT Computer Based Teaching

CEPAK Computers in Education Project in Kenya

EMIS Educational Management Information System

FPE Free Primary Education

GeSci Global e-School and Communities Initiative

GoK Government of Kenya

HOD Head of Department

ICT Information and Communication Technology

KICD Kenya Institute of Curriculum Development

KESSP Kenya Education Sector Support Programme

KNEC Kenya National Examination Council

MOE Ministry of Education

MOEST Ministry of Education, Science and Technology

MoEVT Ministry of Education and Vocational Training

MS Microsoft

NACOSTI National Commission for Science Technology and Innovation

NEPAD New Partnership for Africa Development

ODC Open and Distance Learning

SMART Specific, Measurable, achievable, Realistic, Time bound

SPSS Statistical Package for the Social Sciences

SSTC Sold Subject To Contract

UN United Nations

UNESCO United Nations Educational, Scientific and Cultural Organization

DEFINITION OF TERMS

Attitudes Refer to a settled way of thinking, feeling or about something, such as ICT use (Cherry, 2022). In this study it refers to the school administrators' feelings about ICT use in school management.

Influence Refers to the act or power of producing an effect without apparent exertion of force or direct exercise of command (Merriam Webster Dictionary).In this study it refers to that effect that socio-technical issues on ICT use in the management of secondary schools

ICT Refers to is the infrastructure and components that enable modern computing (Pratt, 2020). In this study, it is set of technological tools and resources used by school administrators to transmit, share or exchange information for school management purpose.

ICT Infrastructure Refers to gadgets and resources supporting ICT use (Pratt, 2020). In this study it refers to technological tools and resources used by school administrators used for school management.

ICT competencies Refers to the ICT literacy skills(Gerona & Bautista, 2022). In this study, this these are school administrators' ICT skills.

ICT literacy Refers to ones' ability to use digital technology, communication tools(Ivanković, et al., 2013). In this study it is the administrators' ability to use ICT tools.

School Administrators Refers to a person designated by the governing body of a school as ultimately responsible for the ordinary operations of a school (Law Insider, 2022). the heads of school, deputy heads, school bursars and heads of department in secondary schools."

Socio-technical issues Refers to thefactors that may impact the integration of ICT in Schools for example software, hardware and users (Tay, Lim &Lim, 2013). This study adopts the same definition.

CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter entails the background of the study, the problem statement, and purpose of the study, objectives, research hypothesis, significance and justification of the study, scope of the study, limitation of the study and assumptions of the study. Generally, chapter one gives a synopsis what the research is all about.

1.2 Background of the Study

Information and Communication Technology (ICT) in educational management is used to overcome the barriers of distance and time and significantly improves the accessibility of information and knowledge (Gavua, Okyere-dankwa & Offei, 2018). Rapid growth in the global economy and technological advancement has pressurized the education institutions to use ICT not only for teaching and learning but also for managing school operations. Since ICT has become an essential part of everyday life, its integration in education is inevitable and cannot be avoided. However, it is important to note that Schools are open systems that interact with their environment, and the effective use and integration of technology is directly associated with the role of various socio-technical factors that may impact the integration of ICT in schools (Tay, Lim & Lim, 2013).

In the current day and age, the expectation is on schools to be somewhat digitally versed, meaning to use technology to support instructional practices but also other activities necessary for a school to function (such as communication and documentation) (Dexter, 2018).

This expectation puts the principal in a position where she or he is (also) viewed as a technology leader. The global pandemic has acted as a catalyst, increasing the pressure to integrate ICT (Iivari et al., 2020; Scully et al., 2021), thereby also increasing the challenges of school leaders to ensure a competent use of ICT but also to effectively lead and manage schools during a time of crisis (Harris and Jones, 2020; McLeod and Dulsky, 2021; Weiner et al., 2021). It is still unclear whether changes made in "crisis-mode" during the pandemic will last.

Today, all schools are already equipped with computers and connected to the Internet, and 93.2% operate their own wireless network or information system (Wichova, 2020). The ICILS international comparison of computer and information literacy states that Czech schools (Fraillon, Ainley, Schulz, Friedman, and Duckworth (2018). Even though primary teachers are generally positive about ICT and its ability to support their administrative and management duties, the findings point to low levels of use of ICT for administration and management."

Globally, the use of ICT innovation in school management can be dated back to the 1960s when the computerization of schools gained momentum (Mimbi & Bankole, 2016). Anderson, Potočnik and Zhou (2014) stipulated that secondary schools should embrace ICT use in school management. For example, In Malaysia, the University Science Malaysia (2009) "brought to light that successful diffusion of ICT was due to perceived administrative and technical support on the use of technology. In Spain, familiarity with computers and years of experience with ICT correlate positively with levels of institutional management (Selwood, Fung & Mahony, 2003).

Palagolla and Wickramarachchi (2019) in a study in the North Central Province (NCP) of Sri Lanka how a very low use of ICT among schools in the territory due to poor ICT infrastructure, leadership support, school planning, and ICT competency. Although different actions have been taken to promote effective ICT usage among secondary schools of Sri Lanka, ICT is under-utilized in secondary schools of the territory.

In African countries, initially, the use of ICT in management of schools was low compared to other fields such as business and engineering, however, in recent times, school managers have embraced ICT in the education sector" (Mwadulo & Odoyo, 2020). Farrell and Isaacs (2008) observe that Rwanda is among few African countries to have embraced ICT policy more specially in the management of schools (Farrell & Klemperer, 2007). In South Africa many educational institutions have embraced ICT in management of their operations (Hennessy, Harrison & Wamakote, 2010).

Studies in Nigeria such as Jegede, Dibu-Ojerinde and Ilori (2007) and Mohammad, 2012) revealed that one of the challenges impeding the use of ICT for school management was the school administrators' attitude towards ICT. There are isolated cases where individuals are technophobia or just develop a dislike towards ICT. This will make them not to acquire literacy skills or better still work negatively towards equipping the schools with requisite skills.

Even though the importance of using ICT in school management, studies worldwide show that to date some principals still have a negative attitude towards the utilization of ICT for school management.

Examples of such studies include Takach, Ayoub and Kibbi (2018) among the Lebanese public secondary schools, Papaioannou and Charalambous (2011) among the Cyprus primary school principals' and Bahrain, Abdul Razzak (2013) among Arab Countries. However, these studies did not explore how this negative attitude affected effective use of ICT in the management of public secondary schools. Effectiveness in the use of ICT in school management can be influenced by the frequency of use of ICT as shown in several studies. Afshari, Bakari, Luan, Afshari, Fooi and Samah (2012) indicated that frequency of use entails communicating with staff, and members of the wider school, initiating and sustaining collaborative activities with colleagues within and outside their school were the areas of greatest use, while financial matters, maintaining administrative records about students, using a program to analyze information for solving problems, and using technology to support levels of professional collaboration."

Another important aspect is whether principals and other school administrators have access to ICT hardware. In a study in Malaysia, Hoque, Razak, and Zahora (2012), observed that at least, 95% schools have photocopy machines and scanners while the multimedia projector is available in 85% schools. This means that administrators had access to ICT hardware. However, this was not the case with developing countries in Africa. For instance, Jeilani (2020) in Mogadishu, Somali found that there is low availability of information and communication technology such as computers, and communication equipment. However, the studies did not demonstrate how the varied levels affect effective use of ICT in school management.

Markauskaite (2005) did a study in Nairobi, Kenya which revealed that many school principals have low levels of competencies for effective use of ICT in school leadership.

School principals not only need formal training, but also sustained and ongoing support from their colleagues to help them learn how best to integrate technology into their administrative duties (Amara, 2006). ICT administration and management applications are currently common in schools because of their capacity to facilitate administration from data storage to information management and decision-making activities (Ghavifekr, Afshari, Siraj & Sereg, 2013)."

In Kenya, the proficiency of principals to use ICT for school management is wanting. Most of school principals are not equipped with ICT literacy skills such as word processing, spreadsheets, e-mail and Internet skills and this limits their ability to use ICT for school management (Ogachi (2014). In majority of instances, school management using ICT involves monitoring the school activities, controlling school finance and stores, human resource management and correspondence with stakeholders (Pernia, 2008). School principals, require ICT literacy to enhance their ability to use ICT applications effectively.

In a study by Ngavana, Mutua and Koech (2018), the emphasis was on frequency of use of ICT equipment, and Singh and Muniandi (2012) looked at frequency of use of ICT applications for management. The conclusion in these studies was that frequency of ICT use can influence effective use in ICT management.

Principals and other school administrators need requisite technical competencies for effective school management (Polizzi, 2011).

Several studies however, show that majority of school administrators do not have adequate technical competencies for ICT utilization in school management. For instance, studies by Obiekwe and Obadigie (2019) and Ogachi (2014) in Nigeria and Chepkonga (2015) in Kenya show that school administrators lack essential skills required "for use of ICT in school management, and this raises questions with regards effective use of ICT in school management.

Like many other countries in the world, Kenya developed National ICT policy in 2006, giving priority to ICT. The ICTs in Education Sessional Paper one (MoE, 2012), explains that ICT can be leveraged to support and improve school management (MoE, 2012). In regard to educational institutions adoption of ICT the mandate was to improve school management. In the quest for integrating ICT in education,four various policy documents spelt out the ICT policy in schools, namely; e-Government Strategy, National ICT Policy and Sessional Paper No. 1 of 2005" (MOE, 2006).ICT policy in this study was taken as a theoretical variable that the researcher used to explain a connection between Socio-Technical issues and the management of public secondary schools in Uasin-Gishu County in Kenya. A sound policy in place would ensure that the issues bedeviling the ICT usage in secondary schools in Uasing-Gishu County would be addressed adequately enabling schools to adopt technologies that are relevant to their business processes.

1.3 Statement of the Problem

The use of ICT in school management helps enhance effectiveness in three main areas of administration, that is, student administration, staff administration, and general administration. ICT assists in enhancing timeliness, accuracy, completeness and quality of school management.

To achieve this, school administrators need to embrace the adoption of ICT for use in school management in order to register required management effectiveness. On the other hand, the government should ensure that a policy to address the socio-technical issues be in place to help address them and enable schools adopt technologies that will help them achieve their objectives. Schools' ought to have relevant ICT hardware and software and related ICT skills for effective management of various business processes in schools. Nevertheless, past studies in Kenya indicate that "secondary school principals' lack proficiency in database, spread sheet, presentation/multimedia software, the internet and information seeking which are requisite for school management. The Kenyan government has made deliberate attempts to encourage the use of ICT to revolutionize the management of schools, which is evident through the introduction of National Education Management Information System (NEMIS) putting in place an ICT policy and creation of institutional websites. When principals are not competent in computer use, they may not integrate ICT into their instructional and administrative tasks. When school administrators do not embrace ICT in their work, then they will experience challenges with respect to organization of information, computation and processing of paper work, organization communication, planning, monitoring, and management of instruction. In view of the above, there was limited research on socio technical issues influencing effective use of ICT in the management of public secondary schools, in Kenya, and in Uasin Gishu County, hence theneed for the study so as to shed some light on ICT use by principals in secondary schools.

1.4 General Objective

The general objective of the study was to analyze socio-technical issues influencing effective use of ICT in the management of public secondary schools in Uasin-Gishu County, Kenya.

1.5 Specific Objectives

The study specificallysought to: -

i. Examine school administrators' attitude towards ICT influence effective management of public secondary schools in Uasin-Gishu County.
ii. Determine ICT frequency of use influence effective management of public secondary schools in Uasin-Gishu County.
iii. Establish school administrators' access to ICT facilities influence effective management of public secondary schools in Uasin-GishuCounty.
iv. Investigate school administrators' ICT technical competencies influence effective management of public secondary schools in Uasin-Gishu County.

1.6 Hypotheses of the Study

The following hypotheses guided the study

H_{01}: There is no significant influence of school administrators' attitude towards ICT on effective management of public secondary schools in Uasin-Gishu County

H_{02}: There is no significant influence of frequency of use of ICT on effective management of public secondary schools in Uasin-Gishu County.

H_{03}: There is no significant influence of school administrators' access to ICT facilities on effective management of public secondary schools in Uasin-Gishu County

H_{04}: There is no significant influence of school administrators' ICT technical competencies on effective management of public secondary schools in Uasin-Gishu County.

1.7 Justification of the Study

The use of ICT in school management has been found useful across the globe. ICT use in management is associated with benefits such as timeliness, accuracy, completeness and quality of reports, however, the uptake of ICT by principals, bursars, teachers and departmental heads in secondary schools in Kenya is wanting. School managers/administrators who have not adopted ICT have been experiencing a lot of challenges in going about complex tasks such as planning, controlling and directing of school functions. They have in most cases lost data because of the manual ways of managing data and experience a lot of delays retrieving a given file record due to the manual way of storing them. The school bursars have been reporting varying students' financial statements and this have been affecting financial reporting of the school due to lack of proper students' financial records. This is to say ICT is an essential ingredient in the management of schools, and thus secondary school need to fully adopted it for use in management so that they remain relevant thus the need for this study.

1.8 Significance of the Study

Key stakeholders in the education sector may benefit from the study findings since it provided useful information by pointing out the available ICT resources, school administrators' competencies in ICT use and initiatives being taken by schools to integrate ICT in management.

The Ministry of Education may also utilize the findings for strengthening and / or initiating and formulating policies to offer professional development programmes to both pre-service and in-service principals. The policies currently in place may need to be improved on the basis of the research findings.

The findings may also be utilized by researchers and academicians as reference materials in guiding future research studies. The principals may utilize the study findings to appreciate the value of having requisite ICT competencies in relation to effective school management. The students may be able to appreciate how ICT use can be utilized in managing various aspects of student matters. They may also appreciate how ICT can contribute towards safety, adequacy and relevance of teaching and learning materials.

1.9 Scope of the Study

The "study focused on selected secondary schools in Uasin-Gishu County. The study utilized responses from secondary school principals and administrators. The confine of the study was on the relationship between principals' attitude toward ICT and effective school management, relationship between frequency of use of ICT and effective school management, relationship between principals' access to ICT hardware and software, and effective school management, and relationship between principals' technical competencies and effective school management in selected secondary schools in Uasin Gishu County. The study was carried out in the period between July 2021 and October 2021.

1.10 Limitations of the Study

The study was limited to public secondary schools in, Uasin-Gishu County which is an urban setting hence the findings may not be generalized to other areas not studied.

To counter this, the research highlighted this limitation and suggestions for further studies to be conducted in areas not represented in this study.

The researcher relied heavily on questionnaires as the instruments of data collection and it is likely that some respondents may not have answered the questions honestly.

To counter this limitation, the researcher adopted the triangulation approach whereby other data collection tools such as interview schedules and observation checklists were used.

1.11 Assumptions of the Study

The study had the following assumptions:

i. School managers" / administrators' attitude towards ICT varies from school to school and this should explain the need for carrying out the study in all the selected schools. As such the methodologies proposed were sufficient to capture attitudinal aspects of these principals.

ii. School managers / administrators have a record on how frequently they use ICT in school management in their secondary schools, and thus was able to provide such information.

iii. The study assumes that school managers / administrators understand the essence of access to ICT hardware and software and thus were able to provide information on access to ICT and associated influence on school management effectiveness.

iv. The study assumes that school managers / administrators are already utilizing ICT in financial management and procurement management and therefore seeks to establish the contribution this has on effective school management.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This "chapter reviews the related literature, under the following subheadings: ICT use in management of public secondary schools; principals' attitude toward ICT and effective utilization of ICT in management of public secondary schools; frequency of use of ICT and the effective utilization of ICT in management of public secondary schools; principals' access to ICT hardware and software affect the effective utilization of ICT in management of public secondary schools; and principals technical competencies and effective utilization of ICT in management of public secondary schools. The chapter also covers the theoretical framework and conceptual framework.

2.2 Management of Public Secondary Schools

The term 'management' is often used in relation to an organizational hierarchy, with those occupying higher (management) positions in the hierarchy having more power and responsibility than those lower down the (management) hierarchy. This view of management has its roots in Weberian bureaucracy (Bendix, 1977), and Lumby (2017) has recently drawn attention to these origins in this journal. From a Weberian bureaucratic perspective, those in lowly positions in the management hierarchy are monitored and controlled by those with higher standing, in the interests of organizational efficiency. When viewed from that standpoint it is easy to see why educational management may be viewed negatively. It has connotations of control and the dominance of those deemed to be of lower standing in the hierarchy with a focus on efficiency at the expense of institutional aims and purposes.

Thus, when staff systems in schools are viewed this way, teachers would be controlled and dominated by those at higher levels, such as the head teacher/principal who is deemed to have status and privilege.

Shaturaev and Gulnora (2020) concluded that educational management entails carrying out the responsibility for the proper functioning of a system in an educational institution in which others participate. Carrying a responsibility of this kind is a state of mind and does not necessitate actions, though it typically and frequently does. Educational management in practice entails delegation, which involves being assigned, accepting and carrying the responsibility for the proper functioning of a system in which others participate in an educational institution, and implies an organizational hierarchy.

According to Hawkins and James, (2017), an effective management system entails the participation, contribution and involvement of other individuals. In the staff system in a school, these individuals would be members of the teaching staff and ancillary staff. Educational institutions are no exception to the idea of delegation; it enables them to function properly. Thus, using a secondary school in England as an example, the school governing board delegates the responsibility for the day-to-day functioning of the school to the head teacher/ principal (HT/P). Aspects of that responsibility are then delegated to others, such as the responsibility for the school's curriculum provision to the deputy HT/P, and the responsibility for the school's finance and premises systems to the school business manager.

Olaso and Baja (2019) in a study in the in the Division of Lipa City,

Philippines observed that school administrators have an array of responsibilities.

From school maintenance, to staff development, to producing quality graduates, to linking with stakeholders; the busy-ness of schooling requires that its administrators pay attention to an array of activities that is historically unprecedented. In the Philippines, school principals are now under constant pressure to provide an account of all school policies and practices to anyone and everyone: government, the Department of Education, faculty and staff, parents, students, community groups and the like. The school heads should see to it that all teachers will be properly guided in the performance of their duties. At the same time, they should also see to it that the educational objectives of the school concerning its students will likewise be satisfactorily met. With these two scenarios, the nation have their eyes on the public education institutions. The growing expectation of the community and the various stakeholders call for an authority in the school level that can firmly hold the rein that would lead the horse in the right track. The use of ICT in management of the school is one sure way of ensuring effectiveness in school management.

Marete, *et al.* (2020) conducted an assessment of the school's communication practices and its influence on students' unrest management in public secondary school in Meru County of Kenya. The study used mixed method of research. The conclusion of the study was schools' ineffective communication practices of top-down communication practices, poor listening skills, poor language skills, lack of timely feedback on student issues and lack of suggestion systems lead to development of conflict leading to student unrest. In addition, the student councils handled many responsibilities in punishing student's resulting in conflicts and students' unrest. The findings from the study by Marete, *et al.* (2020) show that management of public schools was not effective.

2.3 ICT use in Management of Public Secondary Schools

Information and Communication Technology (ICT) is an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software. They are often spoken of in particular context like ICT in education (Noor-ul-Amin, 2013). Information and Communication Technology in education encompasses the utilization of ICT in carrying out management functions of (Sweeney, 2012). ICT applications in the field of education are regarded as an effective facilitator to creating, accessing, storing, manipulating and transmitting or share various forms of information, such as audio, visual and word formats. This is made possible by the proactive environment presented by ICT (Kawade & Kulkarni, 2012).

According to Sharma and Jain (2018), schools have adopted an e-governance and automated school administration programme for schools, by building capacity for the implementation and deploy school management information system. A school wide local area network enables automation of a variety of processes, such as library automation, maintenance of records student tracking, office automation, resource planning, with the help of ICT infrastructure efficiency is increased, with this help a great amount of cost and time is saved. Thus, SIMS serves as a great tool to amalgam all the stakeholders viz schools, management, teachers, students etc. by creating a community in which these stakeholders participate. Many School Management softwares have been developed such as moodle, ATutor, webcaster, Quick School, Skool Manager, Literom, etc. These softwares provide various features to support different functions of the school. These softwares act as complete solution software. These softwares enable to cover all the dimensions and functions of the school and provide a systematic approach to its working.

Sharma and Jain further explain that ICT helps the school administration in decision making, policy making and controlling. Management software like Moodle is a Course-ware Management System (CMS). It is also known as Learning Management System (LMS). It is a free open-source web application designed to help educators create effective environment. Similarly, School Manager is a product from Stellar. ERP school software helps institutions to get the wide range detailed and summarized in administrative, academic nature, management, accounting and maintenance of school in different forms required at different level. EIMS- Educational Institute Management System is java-based software. The software is the best software for colleges, institutes, management colleges and medical colleges with plug-ins like SMS, IVRS, GPRS and dynamic web portal.

As explained by Sharma and Jain (2018), managing of school activities is the newer application of computer software. The software aspect of Information Technology mainly comprises of management information system and decision support system. With respect to management function, information technology can be defined as the use of hardware and software for efficient management of information for social, economic and cultural upliftment. The education management information system is a way of providing accurate and timely information to educational managers for planning, decision-making, monitoring and other managerial functions. Figure 2.1 shows the ICT framework as applied in educational institutions.

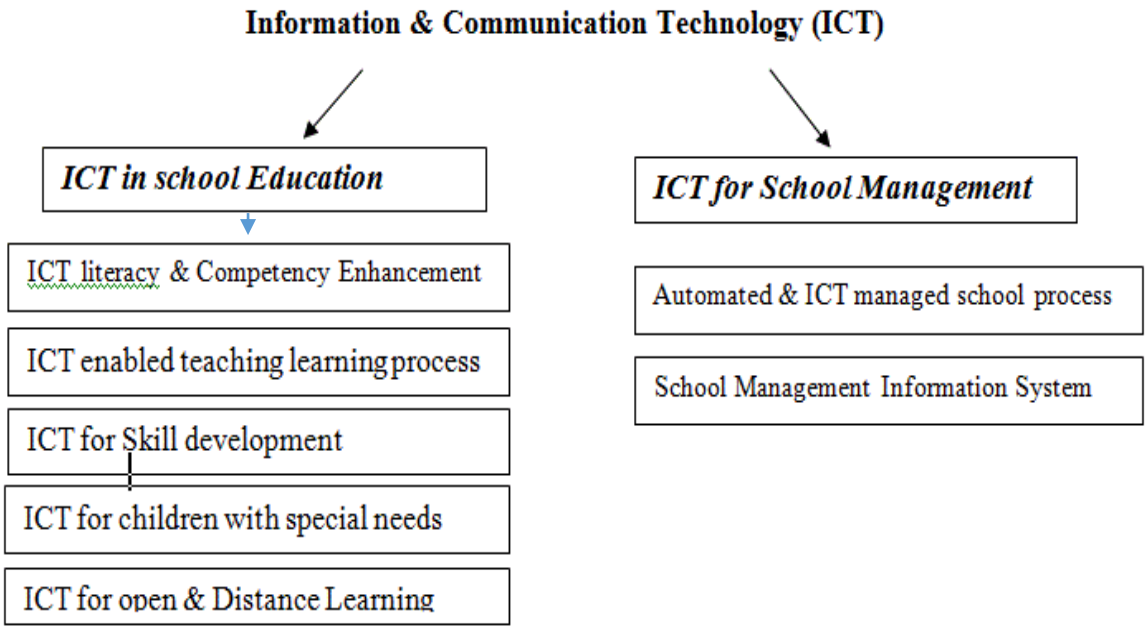

Figure 2. 1: ICT Framework

Source: Sharma and Jain (2018)

According to Maurya (2013), Student Information Management System is configurable and can be configured to meet most individual school's needs. Student Information Management System server easily just the same as if you were sitting in the school office. However, the speed limitation is up to both client's and server's Internet speed. Shown in Figure 2.1 is a model of Software's of Student Information Management System by Maurya (2013).

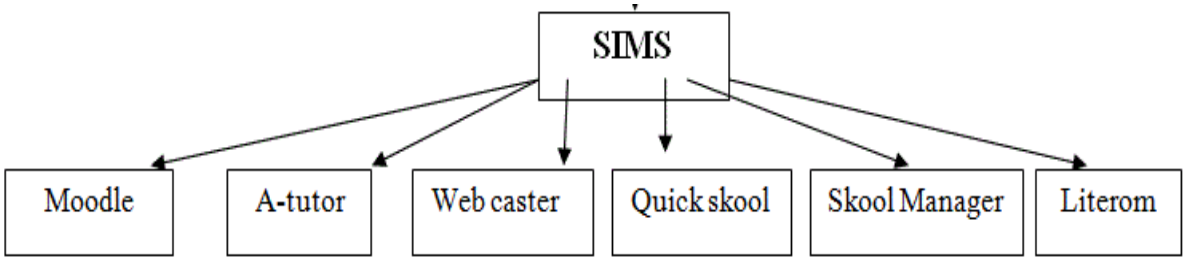

Figure 2. 2: Software's of Student Information Management System

Source: Maurya (2013)

Student Information Management System shown in Figure 2.1 is a large database system which can be used for managing school's day to day business. SIMS was the first MIS for schools. It was developed by Philip Neal, a teacher at Lea Manor High School, from 1982 to 1983. Bedfordshire County Council (L. Manor's local education authority) then further developed the product, which began being used by other schools in 1984. In 1988, a commercial company, SIMS Ltd, was founded to further develop SIMS. SIMS Ltd was acquired by Capita Group in 1994.

By using management software in schools one can easily manage academic and administrative functions of school. Thus Student Information Management System makes the working of an institution very systematic and less error prone. The whole working of an institute becomes so smooth which have been very cumbersome and lengthy otherwise. In Student Information Management System storage of data become very systematic and the accessibility of information is very easy. Student Information Management System makes the life easier for all the stakeholders viz, school Management, Office Staff, School Teachers, Parents, Students. In Student Information Management System, All the stakeholders are well informed about the day-to-day activities of the schools.

Student Information Management System helps in information management, in a very short time. It helps stakeholders to know the information of current year and passed year perfectly and vividly. It also reduces the cost of collecting the information.

Akramov and Muzaffar (2021) from an Uzbekistan perspective observed that a focused system of management procedures and processes, as well as a scientific description of management operations, including the formulation of management choices to meet the general and specialized goals of the company, are regarded to be the most basic forms of management technology. There is no question that the distinctive traits of the social and economic environment have an impact on education management. This explains the critical role that ICT plays in the management of secondary schools.

Antonio and Lorenzo (2019) observed that the use of ICT in the management of education within the sector of services could improve management functions in schools like communication, ability to exchange data, teamwork, customer relations, visibility of services, competitive advantage, and others, that is why Love and Irani stressed that management within the sector of services should use ICT because it provides many benefits

In a school context, ICT applications can be utilized for various functions including enhancing the teaching-learning process and the overall school administration purposes. School administrators utilize ICT to ease their mundane administrative task areas. School administrators use ICT in the registration of students, preparing school reports, announcements and letters for meetings, as well as staff and teachers' employment. ICT is also employed in giving in-house training or presentations to

teachers. Preparation of schemes of work, teaching plans and timetables also come forth as the functions that necessitate administrators to use ICT applications. Finally, schools' administrators utilize ICT application in handling financial work, keeping records, collecting data, processing documents and maintaining communication across the school and with the external environment alike (Mwalongo, 2011).

Okon *et al.* (2015) investigated the relationship between information and communication technology (ICT) utilization and principals' administrative effectiveness in public secondary schools in Akwa Ibom State, Nigeria. Two hypotheses were formulated to guide the study. Ex-post facto research design was adopted for the research. A sample of two hundred and fifty-five (255) principals was drawn from eighty-five (85) public secondary schools through purposive sampling technique. Two self-structured questionnaires titled "Information and Communication Technology Utilization Questionnaire (ICTUQ)" and "Principals' Administrative Effectiveness Questionnaire (PAEQ)" were used for data collection. The results of the analysis revealed a significant relationship between ICT usage in the communication process and record keeping, and principals' administrative effectiveness.

ICT in education improves teaching, learning, and administrative processes to qualify students for the modern-day era (Zhao, Pugh, Sheldon, & Byers, 2012). Efforts have been made to incorporate technology into education since the late 20th Century. For instance, low cost software, such as Logo, first became available in the 1980s (Papert, 1980). According to the World Bank, [ICTs] consist of hardware, software, networks and media for collection, storage, processing, transmission, and presentation of information (including voice, data, text and images).

Information Communication Technology (ICT) plays an important role in enhancing the quality of education. Administration and management applications of ICT are currently popular in schools due to its capabilities in facilitating administration activities from data storage to knowledge management and decision making."

Plomp, Anderson, Law & Quale (2009), in his contribution in the World Communication "and Information Report 1999-2000 states, that information and communication technologies (ICT) are diverse set of technological tools and resources used to communicate, and to create, disseminate, store, and manage information. For the purpose of this study, ICT covers a range of technologies, including computers, communication devices, and audio and video components (Powell & Rødseth, 2013). ICT also includes software, such as Excel Spreadsheet, Word processing, Image Creation, Data Show, Email, and Web tools; all help to improve the teaching approaches and content quality. Consequently, ICT is considered as a tool for transforming the education system, which has profound implications for change.

ICT has been promoted as a way of making education more effective. Computers designed specifically for education, such as the BBC Computer Literacy Project (Salkeld, 1982). Recently, researchers have shown that ICT supports and promotes teaching and learning activities (Keenan & Rovcanin, 2013). Importantly, ICT offers new ways of teaching and learning that are underpinned by constructivist theories of learning and constitute a shift from a teacher-centered pedagogy in its worst form characterized by memorization and rote learning to one that is learner-centered (Tinio, 2013). Thus, ICT is perceived as a valuable education tool. However, the role of the teacher or facilitator is also critical and cannot be ignored.

Osborne and Hennessy (2003) emphasize the role of the teacher; state that a significant role is played by the teacher as they create the conditions for effective ICT use. Therefore, ICT is considered a tool that creates and causes change in the practices and behaviours of both teachers and students. While some people view the use of ICT in education in negative ways (Trucano, 2008), ICT is perceived as a positive influence by many in the global education field. Further, ICT has potential advantages which assist the world to develop, to decrease the technological gap between the developed and emerging countries, and to reduce poverty, as well as to facilitate communication and knowledge sharing (The World Bank, 2008).

In education, ICT is seen as a valuable tool to enhance student engagement and to transform conventional teaching and learning methods (Strigel, Ariunaa, & Enkhjargal, 2012). According to Punie, Zinnbauer and Cabrera (2013), ICT helps to motivate students by initiating new methods of teaching. For example, ICT can help students with special educational needs, simulate a range of scientific phenomena, develop problem-solving capabilities, develop research skills, and interpret and organize information. For example, students can learn about chemical reactions through multimedia images and animations (Mumtaz, 2010).

ICT makes use of a combination of information and communication methods and, as a result, helps students to learn faster. The strength of ICT is that it makes use of text, images, motion and, sometimes, sound, to engage the learner and transform traditional teaching approaches (Selinger, 2010). Moreover, through networking, ICT uses information repeatedly, while also increasing the learner's chance to participate in real world events (Baumgartner, Denz, Oberhauser, & Hoffmann, 2011).

For these reasons, ICT offers great advantages for students, and teachers; it also facilitates management processes, such as meetings and training sessions (World Bank, 2014).” The use of ICT positively increases the school administrators’ efficiency (Alharbi, 2012; World Bank, 2008; Tinio, 2003). In order to reap the benefits of ICT, it is essential for school principals and administrators to “be technologically literate. Thus, they need to be able to use computers, the Internet, websites, networking and software programs. While ICT is about enhancing the quality of administrative processes, it also provides a forum for communicating and interacting socially, thinking critically, and building a lifelong learning culture (Lee, 2012). Nevertheless, ICT implementation in schools requires much effort for successful integration. Embedding ICT requires both behavioural and practical amendments which can be challenging for educators. While past research presented here appears to concentrate on the importance of ICT in school management,” the neglected aspect is the ICT competencies of the user and how these relates to effective school management in selected public secondary schools. Though we appreciate the fact that much effort is required on the part of school managers, little is said about their attitude and its relationship with effective school management.

A “change agent is a person whose role includes the responsibility of initiating and facilitating change or a professional whose major function is the advocacy of innovations into practice (Fullan & Hargreaves, 2016). Effective implementation of an innovation is dependent to a considerable degree upon the active intervention of key personnel in change agent roles; their roles are crucial because school improvement programmes require time and effort for effective change (Miles, Saxl & Lieberman, 2000).

Wango (2009) indicates that there is a considerable increase in knowledge and innovations which have had an impact on education. Wango (2009) elaborates that education policy makers will have to combine the knowledge of individual schools with an understanding of administrative and managerial factors and skills so as to influence the process of change."

Tan (2016) examined the technology usage in school management in Elazig. The purpose of the study was to determine the opinions of teachers on the use of technology in school management. According to the teachers, use of technology provides support for order, management planning, project development and decision-making process. Even though the study demonstrated that ICT was useful in school management, the study did look at whether the principals had requisite ICT competencies and how these competencies if possessed contributed to effective school management.

According to Ukpoma (2020) who conducted the study in Nigeria, ICT applications in education may be utilized for efficient teaching and learning processes, to attain quality education and the general development of pupils, or for administrative procedures by teachers, staff, and management teams.. Over the years, educational program design has seen numerous modifications, "moving from a talking head" approach to more interactive and dynamic program that links students to the program around teaching technique, making them proactive. However, the intended educational results (goals and objectives) must first be made known to decision-makers and planners in the field of education (administrators). The selection of technologies to be deployed and their use modalities should be based on these general aims. Each technology has different potentials depending on how and for what it will be employed.

There are at least five degrees of technology usage in education, according to Haddad and Draxler (2017): Drill and practice sessions, teamwork, and presentation demonstration

According to Wango (2009), computers integrated in secondary school management have legible and presentable work. For example, class lists, schemes of work and classroom tests; allows more copies to be made available. For example, making report cards and newsletters; Documents can easily be redrafted to improve structure, expression and accuracy using the cut and paste facility; Massive amounts of data concerning students, workers, examination results, schemes of work, photographs of school functions and letters can be easily stored on a computer; A simple programme can do a large amount of work like typing, editing a document, accounting, analysis of examination results and grouping students by type of class or hostel; This is the fastest form of communication worldwide where the school community can access information ranging from culture, history, and definition of terms. Information and communication technology (ICT) play a vital role in supporting strong school leadership and efficient management and administration in education sector. It is specified that technology can be used right from student administration to various resource administration in an education institution (Maki, 2008). The various ways of introducing technology in education institution administration are the following (Salerno, 2009): Sending e-mail notices to staff, rather than printing and distributing them; Submission of lesson plans through e-mail; Foster technology growth by asking parents to write e-mail addresses on medical forms; Insist that all teachers create a class Web page; Attend technology conferences to see what other schools are doing, what other teachers are doing to integrate technology, and what principals are doing to encourage the use of technology in their schools and classrooms;

All day-to-day activities of the institution and Staff administration. However, the application of Salerno's suggestions in the management of secondary schools in Kenya, and Nakuru specifically is a subject that needs to be explored further. The lingering question that remains unanswered is whether school principals have these ICT abilities and if so, how these ICT competencies help them become effective school managers.

The current study focused that focused on the use of ICT school management by school administrators, and with regard the review captured that ICT is important for administration. The process of managing a company, office, or organization (such as a school) is referred to as administration. These involve making choices, managing operations, and organizing staff, workers, or other individuals to focus efforts on accomplishing a single goal or set of objectives. This is despite the fact that educational Administration is a field of study in the field of education that looks at the administrative theory and practice of education in general, educational institutions, and teachers in particular (Wikipedia, 2012). Nevertheless, a lot of nations, including Nigeria, have developed ICT plans and policies for their educational systems with management and administration. For this reason, the federal government has announced intentions to create a new national information, communication, and technology policy (ICT). This information was provided in Abuja at the Africa-Cooperation Information Technology for Digital Economy by Umar Danbatta, the Executive Vice Chairman of the Nigeria Commission (NCC) (Guardian 2nd July, 2018).

School administration and management can use various software applications in their work. The enormous data generated in the course of managing schools can be efficiently and effectively handled by use of spreadsheets and database applications.

A case in point is the Education Management Information System (EMIS). Information can easily be collected, stored, processed, analysed, and disseminated by such a system" (Ministry of Education, 2012).

Tay *et al* (2013) describes and analyses the conditions that support the seamless integration of information communication technology (ICT) into school management. The researcher points out the importance of two factors: technological infrastructures and human (school managers)' beliefs and practices. However, Tay's argument relate to primary school and thus, leaves the gap as to whether these factors can apply in the context of secondary schools.

Etudor-Eyo (2012) investigated the "use of ICT and communication effectiveness among secondary school administrators in Akwa Ibom State, Nigeria. The study obtained data from 396 secondary school administrators through the Administrators' Use of ICT Questionnaire (AUIQ) and Administrators' Communication Questionnaire (ACQ). The findings were that the extent of administrators' use of ICT and the extent of administrators' effectiveness in communication are high; there is a significant positive relationship between administrators' use of ICT and administrators' effectiveness in communication; the effectiveness of secondary school administrators in communication is significantly predicted by the use of ICT." This study therefore provides the opportunity to transform the management practices in schools.

Afshari et al. (2012) assert that school principals should possess the fundamental ICT abilities necessary for their everyday management and administrative tasks.

When using computer technology for administrative and management tasks, principals serve as role models. As a transformational leader, principals encourage innovation and open-mindedness while facilitating conditions and events that foster a favorable atmosphere for technology adoption (Singh & Muniandi, 2012). Principals also assist teachers in integrating computers into teaching and learning (Afsheri et al., 2012). The usage of information and communication has altered your excellent job in some way. Email has enhanced and amplified interactions and expectations inside the management information system, which has regularized, enforced, and disclosed those consistencies that need to be rectified.

Ngugi (2012) investigated the extent of the use of ICT in education management in public secondary schools in Naivasha District. The study targeted the principals, secretaries and the school Bursars. A total of 60 respondents were sampled for the study (this constituted 20 principals, 20 secretaries and 20 bursars). Descriptive survey design was used for the study. The study established that ICT resources such as computers, telephone lines and internet are used in the managements of secondary schools. ICT is used in different areas of management in schools such as curriculum instructional management, student management, financial management, personnel management and material resources management. ICT has played an important role in improving data collection in educational systems. It has also made these data more widely available to school personnel, parents, and the public at large through central administration Web sites and in some countries through direct access to central or district databases by school personnel.

2.3.1 School Administrators' Attitude toward ICT and Effective Management of Public secondary schools

Antonio and Lorenzo (2019) studied Ilocano administrators' adoption and use of ICT in the management of public secondary schools in the Province of Ilocos Norte, Philippines. The findings indicate that the respondents had a very high degree of social influence when using ICT, a high level of ICT knowledge preparation, and an average level of ICT competence. Administrators in schools have favorable views and convictions about using ICT. They accept and apply ICT at a very high rate in carrying out their management duties. In terms of managerial abilities, they are quite effective. They use ICT leadership and integrate it into both instructional and human management as part of their ICT management practices. Tests of correlation revealed a substantial relationship between the administrators' acceptance and use of ICT and their preparation for knowledge, competence, and social influence in the field as well as their views and opinions about its usage. Their level of ICT acceptance and use, as well as their attitudes about ICT use, are substantially correlated with their managerial effectiveness. The greatest predictor that has a major impact on ICT acceptance and utilization in school administration is the administrators' attitude toward using these technologies.

Swain (2021) investigated school administrators' prospective towards use of ICT for effective school management. A total of 90 secondary school administrators in Cuttack, Odisha were chosen at random to make up the study's sample. Chi-square analysis was used to gather and analyze the responses to a prepared questionnaire. Chi-square analysis was used to gather and analyze the responses to a prepared questionnaire.

The results showed that school administrators have a good outlook on the use of ICT tools in efficient school administration by resolving the issue of sluggish or delayed correspondence in schools and attaining efficient planning and management of educational activities. The findings led to suggestions for the government to provide ICT tools for schools and students in an acceptable manner.

Dogan (2018) conducted an examination of the technology leadership self-efficacy perceptions of educational managers in terms of the self-efficacy perceptions of information technologies in the Malatya Province, of Turkey. This study was descriptive research. The study group of the study consisted of 210 school principals and assistant principals working in the Malatya Provincial Center. Data were collected by using Self-efficacy perception scale ($\alpha = 0.97$) and Technology Supervisor Technology Leadership Self-efficacy Scale ($\alpha = 0.97$). The results show that school administrators have a high level of self-efficacy perceptions of technological leadership. These perceptions do not differ according to the school level, age groups and in-service training. There is a significant positive correlation between technological leadership and IT self-efficacy perceptions.

Achuonye and Nwiyi (2022) studied the roles of school administrators and teachers on record keeping in Secondary Schools in Nigeria. The study established that some school-heads lack the knowledge of the usefulness of properly kept school records. Therefore, they do not pay more attention to records keeping Ignorance of ICT, poor facilities, and poor attitude towards record keeping are some of the setbacks identified.

Kukali *et al.* (2018) conducted a study in Bungoma County, Kenya e factors influencing principals' leadership for ICT integration in PSSM.

This study adopted Hasan (1998) Activity Theory which states that whole work activity is broken into three parts namely subject, tool and object. Descriptive survey research design was employed. Data collection instruments were Interview Schedule, Questionnaire, Observation Checklist and Document Analysis Guide. The study revealed that finance and administrative support, and attitude as factors influencing principals' leadership for ICT integration in PSSM.

Hashim, Ahmad and Abdullah, (2010) observed that in Malaysian schools "individuals' attitudes toward ICT have been recognized as an important factor for the success of technology integration in education. Principals who have positive attitudes toward technology are very helpful and supportive in introducing these new technologies into the school. For example, they encourage their colleagues to have ICT training, equip the school with sufficient computers and ensure that staff has access to relevant technology. Attitudes consist of three elements: affect, cognition, and behavior. The affective element refers to the individual's emotional feelings or liking of a person or an object. The cognitive element refers to the person's knowledge about a person or an object. However, the study was conducted in different geographical context from Kenya.

Takach, Ayoub and Kibbi (2018) investigated attitudes towards ICT, and level of ICT use of the Lebanese public secondary schools attending a training program at the Lebanese University, Faculty of Education. The training program, in which 204 principals from all over Lebanon participated, lasted for three months. At the end of the program, they filled a survey questionnaire and only 192 filled-in the questionnaire. School principals agreed that they benefit greatly from the ICT course; it helped them in improving their computer skills relevant to their administrative work.

Findings also suggest that there is a no significant correlation between the use of ICT and school principal gender and age, the good equipment of schools is irrelevant with the school geographical location (urban/rural city).The study was conducted in a different geographical location and relied solely on the questionnaire and thus, was not advantaged with use of other research tools like interview schedules and checklist.

Papaioannou and Charalambous (2011) explored the Cyprus primary school principals' attitudes towards Information and Communication Technologies (ICT) as well as their perceptions about the factors that facilitate or inhibit ICT integration in primary schools in Cyprus. Using the formula of Krecjie and Morgan (1970) it was estimated that a sample of 180 principals would be representative for the purpose of this study. Questionnaires were sent to 250 principals (in order to account for non-response) using a stratified random sampling approach. The strata of this study were the urban and rural school principals in all educational districts. According to the findings of the research, primary school principals in Cyprus hold positive attitudes towards ICT. Nevertheless, it should be noted that even though principals appear very enthusiastic about ICT, believe that ICT can improve productivity, and exhibit low levels of computer anxiety and avoidance of ICT, at the same time they are not computer savvy." However, the focus of Papaioannou and Charalambous was in primary schools and not in secondary schools as is the case in this study.

In "Lebanon, Ghamrawi (2013) investigated the relationship between the leadership styles exhibited by 651 Lebanese public-school principals and their attitudes and the level of use of technology for educational purposes in their schools.

Moreover, one teacher from each participant public school completed a questionnaire pertaining to the level of use of technology in the school. The study has shown that though the principals of these schools bear positive attitudes towards computers; they did not consider them as important tools for the enhancement of teaching and learning. They valued computers as tools for the facilitation of the management of information in their schools and for administrative purposes. The study also revealed the existence of positive correlation between the autocratic leadership style of school principals and their negative attitudes towards the use of ICT for educational purposes. In addition, the results of the study accentuate another positive correlation existing between principals' attitudes towards the use of ICT for educational purposes and the level of its use by their teachers in schools.

Bahrain, Abdul Razzak (2013) reported that the status and conditions of the implementation of ICT in Bahraini public secondary schools is poor; she found that the schools are in need of technology plans that focus, in addition to individuals and their attitudes towards ICT integration, to also promote a school culture, which encourages exploration of new teaching, learning, and management techniques. The school leaders, however, need training on the important role they can play in leading and managing ICT integration in schools, since they are expected to positively influence everyone and everything else in the direction of more and better technology integration.

Amenyedzi *et al.* (2011) cited by Yalley and Chapman (2022) surveyed the use of computers and the internet as supplementary sources of educational material in senior high schools in Tema Metropolis. Heads of school's response to computers for educational management showed that some administrators still believed that the use of ICT is limited to the classroom.

From the study, heads of two selected schools contended that computers in education are only relevant to teaching ICT courses. Because of this perception, monitoring students' performance by the heads of schools was undertaken mainly through written assessment cards. These limitation compromised the efficacy of ICT in ensuring effective school management.

Oluyemisi (2015) in Nigeria investigated administrators' perspective towards using ICT for effective school management. The sample used for the study consisted of 120 administrative staff randomly selected from different secondary schools in Ilesa Local Government area in Osun State. Data was collected using questionnaires. The results indicated that school administrators have a positive perspective towards the use of ICT tools in effective school management by solving the problem of poor communication in schools and achieving effective planning.

Pelser and Ngwenya (2018) in their study in Bulawayo, Zambia moted that in order to ensure the success of information and communication technology's full implementation in organisations, it is critical that the users possess the requisite competencies, have the right attitudes towards ICT utilisation, and accept the use of ICT as necessary for organisational effectiveness and efficiency. These attributes were accessed among a sample of 220 secondary school administrators consisting of school heads, deputy school heads and heads of departments by using a questionnaire as an instrument of data collection for a quantitative research design study. An overall 94 per cent response rate was achieved in this study.

The results indicated that public schools' administrators possessed moderate ICT competencies; their attitudes towards the utilisation of ICT were indifferent, leading to low levels of acceptance of ICT utilisation among the education institutions in Bulawayo.

Ogachi (2015) studied the factors influencing principals' integration of information communication technology in administration of public secondary schools in Isinya Sub-County, Kenya. However, simple random sampling was utilized to select a sample of 10 public secondary schools to participate in the study while the other two secondary schools were reserved for pilot study. From the sampled 10 public secondary schools in Isinya Sub County, 10 principals, 10 deputy principals and 10 senior teachers were considered for the study. A self-designed questionnaire was utilized to collect data from the respondents between the month of May and June 2015. The study established that principals' attitude towards ICT affected effective utilization of ICT in secondary schools. The attitudes of the principals towards the use of ICT have a fundamental impact on the principals' integration of ICT in administrative undertakings. Principals with a positive attitude towards the use of ICT will be primed to utilize ICT in their administrative endeavors since they comprehend and appreciate the benefits of employing ICT. Conversely, principals with a negative attitude towards the use of ICT, perhaps due to their previous experience with ICT, will be hesitant to integrate ICT in their administrative roles because of their pessimistic perspective towards ICT use.

According to Kavagi (2010), studies show that among educational administrators, the positive attitude towards use of computers is strongest when the role of computers in school management is made clear. The attitude of school administrators towards ICT determines the speed, spread and depth of computer usage in education.

School administrators also perceive the introduction of computers as boosting the institution's image and prestige as a modern school. Kavagi notes that, many people fear computers. This fear can be overcome through direct interaction with the computer in day-to-day activities. Studies show that most of the fear stems from the perception that computer is a science subject. It is natural for people to prefer longstanding practices to innovations. There is the issue of stereotyping where school administrators see the computer as another typewriter hence its use is likened to turning the boss into the school secretary.

Njathi, Ngaruiya and Maithya (2018) studied the relationship that existed between principals' perception towards computer application and the actual computer use by principals in public secondary schools in Kiambu County, Kenya. The study adopted descriptive survey research design. The study sample comprised of 205 principals which translated to 67% of the target population. Simple random and purposive sampling techniques were used in the selection of the respondents. A questionnaire was used for data collection. The study found out that principal's attitude towards use of computers influenced the use of computers among school principals." However, the study only focused on one type of IT, the computers and thus did not explore other forms of IT, such as phone applications, tablets and other gadgets that can be utilized in school management.

Muchiri (2014) "identifies the lack of enthusiasm towards ICT integration among principals as the main cause of low use of information and communication technology. Another factor that influences the utilization of computers in school administration is the attitude towards the use.

The researcher found that individual principals' attitudes toward computer use was an important factor for the success of technology integration in secondary schools.

Muthomi, Mbugua & Githua (2013) in their study on reactions of schools' Headteachers toward computer use in teaching and learning in secondary schools in Tharaka-Nithi County in Kenya found out that all the head teachers who participated in the study believed that it was very important for them to learn how to use computers." Majority of the principals agreed that computers usually saved time. The school managers believed that they were better principals with computer technology. majority of school principals valued the use of computers in learning. However, the researchers did not find out if this positive attitude of using computers made them more effective in their work.

Kimani, *et al.* (2022) investigated the management of public day secondary schools through infusion of information and communication technology in Githunguri Constituency, Kiambu County, Kenya. The study used descriptive research design. The study sample was 270 participants derived from the 22 public day secondary schools through stratified techniques. The study's main findings were inadequate awareness by principals on the need for use of ICT integration in management, inadequate ICT resources and related infrastructure and lack of technical support for heads of departments as well as low resource mobilization by board of management influenced ICT integration in public secondary schools to a great extent. The main conclusion of the study is poor attitude towards ICT integration and inadequate resources and lack of technical support were the main hurdles towards ICT integration in school.

2.3.2 Frequency of Use of ICT and Effective Management of Public Secondary Schools

Wiyono *et al.* (2021) explore communication techniques based on the information and communication technology (ICT) used in the implementation of instructional supervision to determine their effect on the teacher's learning process in Blitar City, Indonesia. Using a random sampling technique, the study included a sample of 60 teachers. A rating scale, checklist, and open-ended questionnaire were all employed in the data gathering process. The findings showed that Indonesian educational institutions were more successful when particular ICT-based communication approaches were used often. These methods included Skype, Zoom, Google Meet, WhatsApp, and Google Forms. Email, video, and audio recording techniques are used after this. ICT usage is still a rarity. Except when employing cellphones and TVs, there is a substantial correlation between the use of ICT in instructional monitoring and the effectiveness of the teacher's teaching-learning process. ICT techniques are most commonly used for synchronous communication, followed by use for sharing information, and recording activities.

Ukpoma (2020) investigated the use of ICT applications for secondary schools administration. Administration application of ICT is currently becoming popular in secondary schools due to its capabilities in facilitating administration activities, from data storage to knowledge management and decision making. This paper takes a cursory look at the different literature regarding the meaning of ICT, types of application and their uses for effective administrative activities in schools. The study reveals the tendency for administrator to improvise and increase the utilization of ICT in their daily administrative task, to make their task more efficient and effective.

It was recommended that school administrators should develop the knowledge and practice of ICT by ensuring that their subordinate under go in- service training from time to time, so as to enhance their performance.

Ifeyinwa (2020) investigated the extent of principal's deployment of ICT skills in managing secondary school for sustainable development n in Anambra State, Nigeria. Two research questions and one null hypothesis guided the study. Descriptive survey research design was adopted for the study. The population of the study comprised all the 261 principals and 5,827 teachers in the 261 secondary schools in Anambra state. A sample of 60 principals and 360 teachers were randomly selected for the study. The instrument used for data collection was a self-developed questionnaire. The findings of the study revealed that principals do not deploy ICT skills in managing secondary schools which might be because of some challenges they encounter in trying to deploy ICT skills in school management. Based on the findings, some recommendations were made which include that, the government should be organizing periodic training and workshops on ICT usage for principals to attain the 21st century computer proficiency for effective and efficient management of schools and that government should release adequate fund for the procurement and management of ICT facilities and equipment for secondary schools. Low frequency in the use of ICT by administrators, therefore interfered with, its efficacy in school management.

Chukwu (2020) examined the utilization of information communications technology (ICT) in the management of primary education in Enugu State, Nigeria. Three research questions and three null hypotheses guided the study.

The research questions were answered using mean and grand mean scores, while the hypotheses were tested using t-test statistic at .05 level of significance and 286 degrees of freedom. Descriptive survey research design was adopted for the study using a 20-item researcher developed questionnaire (UICTMQ). The sample size was 318 respondents. The findings reveal that ICT is utilized to a little extent in record keeping in primary schools in Enugu State. In addition, ICT is utilized to a little extent in teaching and learning as well as ensuring security in primary schools in Enugu state. Recommendations including; making ICT a compulsory component of primary school curriculum and providing functional ICT equipment in all the primary schools in Enugu State amongst others were put forward.

Afshari,*et al.*(2010) studied the "extent to which Iranian secondary school principals used computers and secondly to explore the relationship between a number of variables related to the use of information and communications technology (ICT). The word processing was the most frequently utilized software among the principals and they used it to create documents and slides. The findings also revealed that that within the area of administrative uses, communicating with staff, and members of the wider school, initiating and sustaining collaborative activities with colleagues within and outside their school were the areas of greatest use, while financial matters, maintaining administrative records about students, using a program to analyze information for solving problems, using technology to support levels of professional collaboration, and using technology to engage new kinds of professional development were the least used areas. Therefore, the early assumption that the introduction of computers into schools for administrative purposes would spread to their use for instructional purposes was not supported by the data.

Kimosop and Chemwei (2016) examined the frequency of use of ICT equipment by secondary school heads and teachers in Nandi and Uasin Gishu counties, Kenya. The study employed a descriptive survey research design. A total of 63 schools with functional ICTs were purposively selected and, in each school, one class teacher, 2 subject teachers and 2 heads of department were selected using stratified random sampling to give a total of 315 teachers. All head teachers from each of the 63 schools were selected through purposive sampling. From the study findings, the most utilised ICTs in schools were the printer, photocopier and computer while the curriculum management activity that highly utilised the use of ICT was the preparation of and the analysis of exams. This implies that ICTs in schools were mostly used as gadgets for typing and producing exam materials. Little seems to have been done in the utilisation of ICTs for curriculum delivery and the management of data that could be utilised for informing decision making.

Lipesa (2018) studied the effectiveness of ICT integration in enabling the e-leadership of public secondary schools in Busia County, Kenya. A cross-sectional survey design was adopted. Systematic random sampling technique of 14 public secondary schools was employed, while the school leaders, including 14 principals, 42 teachers and 14 support staff were sampled using Stratified Random Sampling. Questionnaires was employed in gathering quantitative data. The study established that there was a marked difference between the ways in which support staff and teachers were integrating ICT in their administrative roles, integrating ICT in the leadership of public secondary schools was deemed to improve access to a motivating learning and teaching environment that provides a good interface between theory and practice, as well as improve efficiency.

The administrative staff integrate ICT in handling financial work, keeping records, maintaining communication, and collecting data among other functions. Use of ICT has the potential of improving efficiency and effectiveness when handling such administrative responsibilities as shown by Afshari *et al.* (2012) in their study entitled: Transformational Leadership Role of Principals in Implementing Informational and Communication Technologies in Schools. Resultant documents like balance sheets, inventory records, stock taking reports, audit reports, valuation reports among others can also be easily kept and be retrieved for future reference by use of ICT tools and applications.

In a study by Singh and Muniandi (2012) on factors affecting school administrators' choices in adopting ICT tools in school-the case of Malaysian Schools, the principal, as an instructional leader, facilitates teachers' integration of computers in teaching and learning process in school. Principals may apply PowerPoint presentations to give in-house training in a more interesting way. This has the potential of making teachers have a more favourable attitude towards such instruction as noted by Chen (2012) in a study of incorporating multimedia technology in PowerPoint on demand. ICT applications can be used to prepare and make school announcements, reports, letters of meetings with parents, student registration, and teacher and staff employment. In addition, ICT is useful in decision making, storage of information, and online interaction.

Juma *et al*., 2016) found that frequency in the use of Institutional management systems databases help to avoid the redundancy or duplication of data thereby enhancing data coordination with departments. Manual handling of huge data is very difficult and causes delayed information collection and compilation.

This affects decision-making process for quality education, but with the use of ICT, well-organized and analyzed data is readily available to foster effective and quick decision-making.

Biegon (2017) examined the extent of ICT integration in school management and the perceptions of teachers on its usefulness in Westlands, Nairobi. It focused also on the level of foundation skills and training of school managers on ICT usage for management. The samples size was 42 teachers, 114 teachers and 10 principals from the 10 schools. The study found that ICT was not extensively used in management of the schools. The study further established that secondary schools in Westlands mostly concentrated on using ICT in teaching and learning and not management. This shows that there is still a lot to be done on the integration of ICT in school management. The study concluded that ICT was not highly upheld in public secondary school management. The study further concluded that the principals had not been keen in implementing use of ICT in management and this has slowed down the process. The study concluded that ICT was not highly upheld in public secondary school management. The study further concluded that the principals had not been keen in implementing use of ICT in management and this has slowed down the process.

Mutisya (2017) studied the extent to which Information and Communication Technology has been integrated in the management of public secondary schools in Kitui County, Kenya. This study used sample size table as proposed by Krejcie and Morgan (1970) and Peter (2005) whereby 58 principals, 58 senior teachers and 266 assistant teachers from schools that have functional ICT infrastructure were selected. All 16 Sub-county Directors of Education and one County Director of Education were selected for the study.

The study found that among those who used ICT, majority of the principals" used ICT for managing internal exams to a great extent. On internet use the study established that; majority of principals used internet for school management less frequently. In fact, some of the principals had no active emails. It was also noted that some of the principals and senior teachers respectively had never used internet. This study therefore will help the school administrators to integrate necessary technology to improve the management of the schools.

Bariu (2020) investigated the state of ICT infrastructure in teaching and learning in Kenyan secondary schools. The study adopted a descriptive survey research design. Questionnaires, interviews and observation schedules were used to collect data from the respondents. Descriptive statistics in form of frequencies and percentages were used to analyze data. The study established that most schools have low investment in ICT infrastructure due to high costs of computer hardware, software and related accessories. The use of ICT infrastructure has necessitated the need for development of new skills and competencies among teachers, school heads and learners.

The extent of ICT implementation and use in the administration of school records in Kajiado County, Kenya. Descriptive survey design was used. The sample size for this study was 18 principals,366 teachers, 8 ICT teachers, 183 students, 2 Sub- County Directors of Education and 1 County Director of Education. This study used questionnaires administered to Principals, teachers and ICT coordinators, observation schedules and interview schedule administered to the students, Sub- County Directors of Education and the County Director of Education as tools for data collection. All the respondents were seven principals of public secondary schools.

The findings showed that use and implementation ICT in school administration in Kajiado County was very low. The study concluded that most schools in Kajiado County had not embraced ICT in various areas of administration. This affected the use of ICT for effective school management. Therefore, the study recommends that proper technology should be put in place by purchasing of the required ICT facilities in schools to enhance management of schools using the current technology. However, the study was conducted in a different geographical location.

2.3.3 School Administrators' Access to ICT Facilities and Effective Management of Public Secondary Schools

Turgut and Aslan (2021) investigated the factors affecting Information and Communication Technologies (ICT) integration in learning environments in Turkey. To conduct in-depth analysis and analyze qualitative research findings on this topic, the meta-synthesis approach is applied. 60 papers out of 907 potential studies that were acquired from the databases Web of Science, Education Resource Information Center (ERIC), and Turkish Academic Network and Information Center (ULAKBIM) and met inclusion and exclusion criteria are included in this study. Analysis has shown that there are five elements that influence ICT integration into learning settings in Turkey: students, instructional materials, infrastructure, management, and instructors. When taking all of these factors into account, it has been discovered that a few stand out, including: teachers' ICT and pedagogy proficiency; students' ICT proficiency; a lack of technical resources and support; a lack of instructional materials; administrators' attitudes toward the schools; and the caliber and availability of ICT in-service training. However, the study was conducted in a different location from the current study.

Hoque, Razak, and Zahora (2012), studied the "areas of ICT utilization among teachers and principals of Malaysian schools. The study findings show that most of the schools do not have ICT policy at the school level though the facilities and equipment of ICT are available in most Malaysian schools. Likewise, 95% schools have photocopy machines and scanners while the multimedia projector is available in 85% schools. Besides, 72% schools are equipped with a video camera, overhead projector and laptop. However, it is interesting that their expertise and skills are not integrated with educational management.

Hasin and Nasir (2021) investigated the concerns related to information technology that students and instructors in rural secondary schools must deal with, as well as a general review of how information and communication technology (ICT) is used in Malaysian teaching and learning. There were 49 responses in all, including 28 instructors and 21 pupils from nine secondary schools in a rural part of Kelantan. Despite the lack of resources and skills, the results showed that most respondents had a good opinion of using ICT. Thus, the professors emphasized the necessity for pertinent ICT training. Before a new policy is brought to the kids, recommendations are also considered to help the authorities plan and prepare the proper facilities and equipment for the schools, as well as necessary training for teachers and facilitators.

Abubakar (2016) in a study in schools in Nigeria found that the unstable power supply is another factor preventing effective administration of ICT facilities in Nigerian secondary schools. Many schools do not use ICT facilities today in there because of the poor power supply. The viable usage of ICT in teaching relies heavily upon the accessibility of these gadgets to the instructors and the teacher's competencies in using them (Ajayi, 2008).

Research has shown that the schools in northern Nigeria lack functional ICT facilities thus, hamper the teachers' ability to use them. Other issues include inadequate teacher competency, irregular power supply, insecurity, and lack of fund

Ghavifekr, Razak, Ghani, Ran, Meixi & Tengyue (2013) established that ICT can be used to make radical changes in the links between home and school. A survey was carried out in 115 schools selected for their involvement in innovative work of this kind. In these schools a range of technologies are being trialed and implemented, including on-line access to the school intranet from home, pupils' use of laptops between home and school, and remote teaching and communication via video conferencing. ICT-based links between home and school are contributing to changes in the patterns of administrative work in schools. In several of the case study schools, teachers and parents either have, or soon will have, access to information and pupil records via the intranet."The findings of the study stated that there is inadequate ICT facilities and low level of ICT usage this can lead to low administrative effectiveness.

In his analysis, Al-Maliki (2013) found that in order to support the predicted increase in ICT, ICT infrastructure required appropriate trained staff. Additionally, educational institutions required to integrate ICT into their curricula, create markets for additional investments in the sector, and increase public awareness. The study also demonstrated the role that the Saudi government has played in fostering and developing the IT environment by building a solid ICT infrastructure that will facilitate and enhance the efficiency and effectiveness of business operations across the board, including those of both public and private organizations. As a result, the government developed a number of rules for ICT development, focusing on creating a solid ICT infrastructure among other things.

Almaiah *et al.* (2020) explored Exploring the critical challenges and factors influencing the E-learning system usage during COVID-19 pandemic in Saudi Arabian and Jordanian institutes. The study established that the lack of financial support, change management issues, and technical issues associated with management systems were the key challenges faced by Saudi Arabian and Jordanian institutes. Similarly in a study by Dhawan (2020) on the management of online learning in the time of COVID-19 crisis established that the key barriers to integrating ICT in education were the unequal distribution of ICT infrastructure, quality of education, digital divide, lack of well-defined policies and standards, and technology cost.

According to the Association of African Universities (2014), the low utilization of ICT in Africa is attributable, partly to the high cost of bandwidth, inadequate expertise in ICT, and the related costs of soft and hardware. The issue of the inability to obtain appropriate software licenses is raised. The cost of software is high due to the exchange rate, which draws administrators away from buying original products to the use of cracked versions, preventing users from accessing the product services. In addition, internet bandwidth is highly costively, unstable, and mostly inaccessible to users. The persistent creates discomfort, stress, and waste of resources making users of technological resources have a change of minds for the manual alternatives.

Okonoko and Eruvwe (2021) investigated utilization of information and communication technology-based information resources in library user education programmes in South-South Nigeria. Descriptive survey research design was adopted for the study. The population of the study comprised 1022 respondents which consist of 62 staff and 960 library users.

The instrument for data collection was questionnaire of a four-point rating scale and observation checklist. The findings revealed that the ICT facilities available are limited for effective utilization of ICT-based information resources in library user education programmes. The study reveals that ICT-based resources listed in the table were utilized to high extent in South-South colleges of education libraries for user education programmes. It also shows that poor funding was the major challenge of utilization of ICT-based resources for user education programmes in colleges of education libraries under study. The study revealed that inadequacy of ICT facilities was impediment to their utilization for effective school management. However, the study was carried out in a different geographical location. Moreover, the focus was in colleges and not secondary schools.

According to Jegede et al. (2020), in a study in Nigeria, Administrators face a number of obstacles when using ICT. These include inadequate funding for ICT programs, inadequate ICT infrastructure facilities, a lack of ICT personnel, unstable power supplies, a high cost of ICT facilities and poor network services, and poorly implemented ICT policies in elementary schools. Following this, the paper made the following recommendations to address these issues: adequate funding for computer education programs; provision of ICT facilities; subsidization of the cost of ICT facilities; implementation of ICT policies on education; capacity building for teachers; and provision of reliable internet and electricity services. However, Jegede et al. (2020) chose not to pursue additional research into how these difficulties influenced school management.

Agu *et al.* (2020) investigated the constraints and strategies for better utilization of ICT in the management of Public Primary Schools in Nsukka Local Government Area of Enugu State, Nigeria. The population comprised 236 headmasters and assistant headmasters from the 118 public primary schools. No sampling was done as the entire population was used for the study. The findings of this study revealed that the school managers of public primary schools in Nsukka LGA identified: non availability of computers, lack of capacity building opportunities for school managers, lack of funds to procure ICT tools, frequent breakdown of ICT tools, as constraints to ICT utilization in the management of schools in the area. They strongly agreed that if there is adequate supply of ICT tools by government and stakeholders, provision of alternative power supply like solar energy, constant ICT training/workshops for headmasters and other members of staff, availability of technicians for the maintenance and repair of damaged ICT tools as strategies that can be adopted for better utilization of ICT resources in the management of public primary schools in Nsukka Local Government Area of Enugu State, Nigeria. However, the study was carried out in primary schools and not in secondary schools.

Abubakar (2016) established in an attempt to provide adequate ICT facilities to secondary schools in Nigeria, the Federal Government ordered a Mobile Internet Unit (MIU) through the Nigerian National Information Technology Development Agency (NITDA). The MIU is a customized vehicle that has been changed over into a portable mobile station and digital web hub. It is comprising of ten workstation computers, all organized and associated with the web. The MIU is additionally outfitted with printers, scanners, and some other multimedia amenities.

Internet service is given by means of VSAT a 1.2 m satellite bowl fixed at the roof of the transport van which was furnished with a little power source to guarantee a customary supply of electric power. The MIU distributes the web service across the different institutions.

Nsama, et al (2020) studied the availability and usage of ICT facilities in secondary schools in Zambia, from the perspective of teachers. Based on two primary study goals, which include examining the availability of ICT infrastructure and how it is used in the selected secondary schools. The information was gathered from Lusaka, the Copperbelt, Eastern, and Luapula provinces in Zambia. Each province had three districts chosen, and three schools were sampled in each district. A survey design was used in the article, and a sample of 360 instructors was chosen. Teachers' responses to a questionnaire were utilized to collect information, which was then analyzed using descriptive and inferential statistics.The null hypotheses about the availability and utilization of ICT facilities were validated using the Mann Whitney U test and the Kruskal Wallis test. The findings indicated that administrators, instructors, and students had limited access to ICT resources, which led to limited use of the resources that were made accessible.

Jeilani (2020) investigated the influence of Information and Communication Technology for administrative purpose by secondary schools in Mogadishu. A sample of 50 administrators were selected from the secondary schools in Mogadishu city. A questionnaire was distributed to collect the needed data for the study. The findings of the study stated that there are inadequate ICT facilities and low level of ICT usage this can lead to low administrative effectiveness.

The study concluded that there is inadequate availability of information and communication technology such as internet access, having email address, electronic media to prepare timetable and class schedule, electronic media to communicate academic details of students and their parents, backup equipment, anti- virus program, electronic examination management/database, fee payment system and equipment of automation attendance.

Ferede, *et al.* (2022) studied the determinants of instructors' educational ICT use in Ethiopian higher education. Twenty-one teachers' comprehensive data were gathered through focus group talks. Using the ATLAS.ti program, the data were thematically evaluated. The outcomes supported the perception that the framework's institutional, individual, and infrastructure-related characteristics are significant in influencing teachers' use of ICT. The study also showed the need to include new criteria—such as management support, course-related factors, student ICT proficiency, and access to ICT infrastructure—to the suggested framework to account for how instructors use ICT in the classroom.

ICT application tools relevant to school administration include internet-based tools, hardware and software applications. Internet based tools bear a direct impact in improving the effectiveness of administration functions of a school. Hardware application tools, such as photocopy machines and computers make administration tasks cheap, fast and easier. Finally, software application tools including Microsoft Office and Educational management Information systems (EMIS) help schools' administrators to manage information in an effective and efficient manner (Huggins, 2007). According to Ukpoma (2020), there are several ICT application tools that have been widely employed in management and education.

Computers, the internet, broadcasting technologies (radio & television), and telephones are all ICT applications that may be used for administrative reasons in education. ICTs, however, encompass much more than simply these instruments; although receiving less emphasis today; earlier technologies like the telephone, radio, and television have a longer and more extensive history as teaching aids. For instance, radio and television have been utilized for open and remote learning for more than forty (40) years, despite the fact that print remains the most affordable, accessible, and hence dominating delivery method in both rich and developing nations. Access to ICT was found to be influential toward school management effectiveness.

Wanjala (2015) studied the perceptions of teachers on the use of Information Communications Technology in the administration of public secondary schools in Kimilili District, Bungoma County, KenyaCross-sectional survey and phenomenology were both employed in the research, which followed a mixed technique approach. The sample, which consisted of twelve public secondary schools chosen through stratified selection, was chosen using both probability and non-probability sampling techniques. There were 160 instructors and 12 head teachers among the responses. Teachers' questionnaires, a head teachers' interview guide, an observation guide, and a guide for document analysis were among the research tools utilized in the study. The study's conclusions showed that while most schools have some basic ICT gear and software, they are completely insufficient for usage in carrying out administrative responsibilities. Even though the teachers were willing to fully embrace ICT in administration, its use in administration was limited to very few administrative tasks due to inadequacy of hardware or absence of relevant software.

Oluoch (2016) studied the strategies of enhancing ICT use in the delivery of management services in public secondary Schools in Siaya County in Kenya. The research design that used was descriptive survey. A total of 43 Educational institutions selected on the criteria of presence of ICT related facilities and indications of ICT use in school management were used in the study. Questionnaires, Interviews and document analysis were used to collect data. The study observed that there was limited access to ICT equipment. The study acknowledged that lack of adequate ICT infrastructure has hampered provision of efficient and affordable ICT services in the country."

Mbatia (2014) investigated the factors influencing school principals' integration of Information Communication Technology in public secondary schools in Githunguri Sub County, Kiambu County, Kenya. It was carried out in 10 public secondary schools; 10 Principals, 10 deputy principals and 40 heads of departments were randomly sampled to participate in this study. The study established that inadequate ICT resources and related infrastructure was one of the main hurdles towards ICT integration in school administration in public secondary schools. Hence, this study will help administrators understand the need for establishing ICT resources and infrastructure to improve management in schools.

2.3.4 School Administrators' ICT Technical Competencies and Effective Management of Public Secondary Schools

Basilaia and Kvavadze (2020) studied transition to online education in schools during a SARS-Cov-2 coronavirus (COVID-19) pandemic in Georgia. The researchers conducted an analysis of the nation's and its population's ability to continue their education at the institutions through distant learning over the internet.

This involved a review of the various platforms that were available and identifies those that were used with government assistance, such as online portals, TV Schools, and Microsoft teams for public schools, as well as alternatives like Zoom, Slack, and Google Meet, as well as the EduPage platform, which can be used for live communication and online education and provides usage examples. According to the study, virtual learning can be successful in schools with a technical environment and support but is not yet appropriate for use in schools with inadequate technology. The study found that due to administrators' technical competencies, there was quick transition to the online form of education went successful and gained experience can be used in the future.According to Casuarina (2020), some of the skills that can be utilized by school administrators in the execution of their management functions include the following as captured in Figure 2.5.

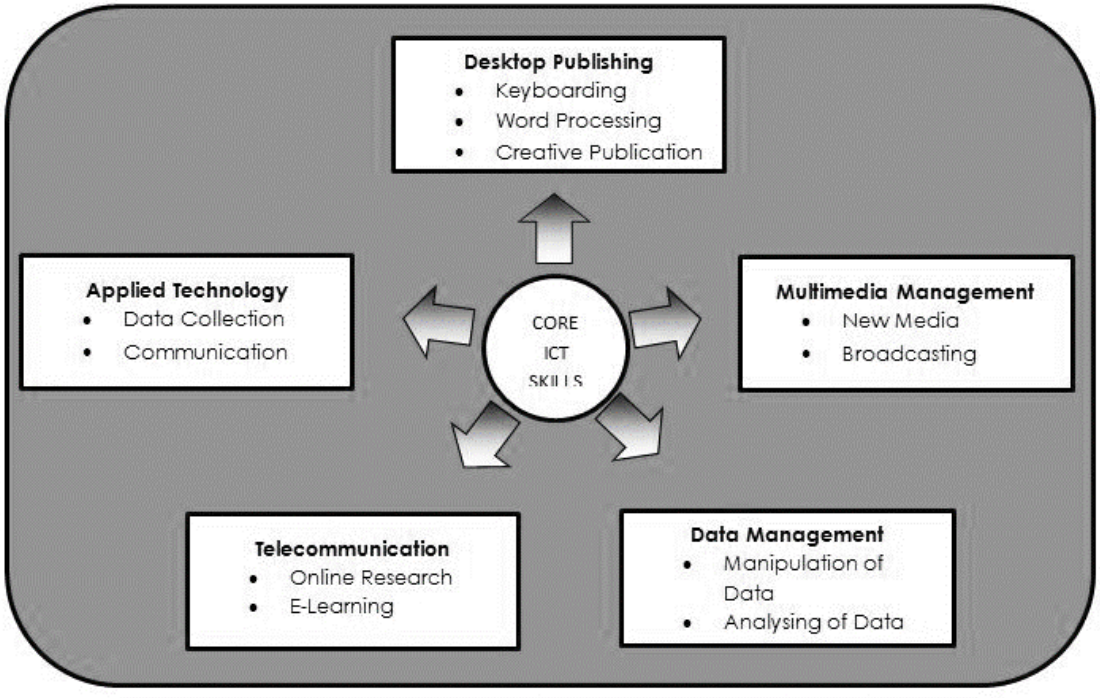

Figure 2. 3: Core ICT Skills needed by School Administrators.

Source: Casuarina (2020)

Tulowitzki, Gerick and Eickelmann (2022) investigated how frequently German school principals use ICT compared to principals in other countries, what distinct clusters of German principals could be identified in terms of ICT usage and how principals viewed ICT in schools and related challenges. A mixed-methods approach was chosen, using quantitative data from both the international comparative large-scale assessment study ICILS 2018 and the explorative qualitative data from Germany. For the international comparison, the school principal data sets of the 12 international participants of the International Computer and Information Literacy Study (ICILS) 2018 were taken into account: Chile, Denmark, Finland, France, Germany, Italy, Kazakhstan, Republic of Korea, Luxembourg, Portugal, Uruguay and the United States. The results indicate that, in general, German school administrators use ICT for leadership and management activities on a similar level as their international colleagues. However, they seem to communicate with education authorities significantly more often than their international colleagues, whereas representative activities (presentations, home page) are rather infrequent. The qualitative data point to significant barriers to fully harnessing the potential of using ICT for leadership, management and school improvement such as lack of competencies and lack of adequate support.

In the Philippines, Gerona and Bautista (2022) investigated the interaction between ICT skills, e-supervision scheme of school heads, and teacher development in distance learning which longed to be a valuable undertaking in the time of pandemic where alternative delivery mode of education is implemented. The ICT skills of school heads have been challenged and brought impact to their administrative and academic roles.

It used a descriptive-correlational design. The study found that school heads had extremely high levels of ICT proficiency and proficiency in usage, extremely high levels of e-supervision scheme proficiency in terms of video conferencing, instant messaging, and office suite, and extremely high levels of teacher development in distance learning. According to correlation, school heads' e-supervision plans and teacher development for remote learning are better the greater their ICT skill levels are in terms of competency and usage. These findings essentially show the significance of maintaining high-level ICT skills, an e-supervision program for school administrators, and teacher development for distant learning.

Asio and Bayucca (2021) analyzed the level of digital competence of school administrators, the readiness of schools, and perceived challenges on the delivery of distance learning in the province of Bulacan, Philippines. The researchers conducted an online survey to collect relevant data for the study using a descriptive research methodology. Using universal sampling, 36 administrators from a school division in the Philippine province of Bulacan participated in the online survey. Before it was ever used, the researchers validated an online research tool they had designed. The researchers tallied and encoded the data after collecting it. Based on the statistical analysis, the study discovered that the administrators' responses to the question of digital competency differed. Schools were still not prepared to launch a distant learning program in terms of their preparation for it. The main issue with the perceived issues is internet connectivity.

Noor, Norakmar, and Arumugam (2018) explore the relationship between principals' technology leadership and teachers' self-efficacy in Malaysia. The study also identified the aspects of technological leadership that are indicators of teachers' empowerment and ICT self-efficacy.

The NETS-A and TSES instruments are the two that are utilized. 376 instructors from Malaysia made up the study's sample. Respondents were chosen using a multi-level sampling process, and the study was carried out using a quantitative methodology. A significant positive relationship between technological leadership and teachers' self-efficacy was found through correlation testing. Nevertheless, teachers' self-efficacy is impacted by technological leadership in 24% of cases. Two contributing dimensions are excellence in professional practice and digital citizenship. The study demonstrates the use of ICT in managing human resource for school effectiveness.

Polizzi (2011) in a report on support for ICT Integration by school principals in Palermo, Italy reported that advocacy for ICT integration behaviors by principals depends on both organizational and intra-personal variables. The study found out that their exposure to ICT training courses and their own perceptions of their competence in using ICT influenced their effectiveness in school management.

Stuart and Remus (2009) “explored the association between ICT literacy of school leaders and the intention to integrate ICT. The findings indicated that principals who perceived themselves as technology leaders have high levels of ICT literacy and that they frequently integrate ICT in their administrative and instructional tasks. In fact, competence in operating a computer and utilizing software helps school principals to be effective in as far as ICT integration is concerned. Therefore, principals as technology leaders should be fluent in ICT integration as aspects such as word processing, spread sheets and presentation software.

Wiyono, *et al.* (2021b) investigated the use of online communication media used by school administration staff and their effectiveness in school management in East Java Indonesia. Additionally, it sought to understand how their age and degree of education related to how intensely they used these approaches. A quota random sampling procedure was applied on a total of 56 samples. In this study, questionnaires were utilized to gather data, and descriptive statistics, correlation, and regression were used to analyze the data. The findings indicated that the school administrative employees mostly employed online communication methods when performing volunteer work. They utilized WeChat, BBM, Line, Twitter, and Skype the least, while also using email, Google Drive, Google Forms, websites, Google Spreadsheets, and Zoom. WhatsApp, Google Drive, Email, Google Forms, Google Spreadsheets, Google Documents, Websites, and Zoom were the most efficient school administration tools, while BBM, Line, WeChat, Twitter, and Skype were the least efficient. There was no significant relationship between the education level and age of the school administration staff with the frequency of using online communication techniques.

Pernia (2008) outlines the key competencies that can be expected of individuals who have completed a foundational knowledge course on ICT as follows: Familiarity with hardware like mobile phones, computers, Internet and other ICTs, ability to identify ICTs, appreciation of actual and potential functions of these technologies in everyday life, understanding basic features and uses of ICT (for instance, mobile phones; voice calls and SMS; computers: word processing, spreadsheet, database, information storage; Internet: web browsing, e-mail and instant messaging).

Technical skills training ensures that an individual is proficient in the various applications of ICT, which include searching and accessing information; collecting and organizing data, integrating and interpreting information from multiple sources, assessing validity and reliability of information; and generating new information. Pernia (2008) adds that such technical skills include: -ability to use ICT features and applications of mobile phones, cameras, video recorders and players, voice recorders, music players, multi-media services, word processing, spreadsheets, infrared, presentation software, Bluetooth and internet connectivity; applications for computers include: word processing, spreadsheet, database, information storage; for Internet: web browsing, e-mail, and instant messaging; ability to access and search a website for example, log on to the Internet, use search engines, and refine search using keywords."

In Ghana, Yalley and Chapman (2022) investigated the challenges affecting the use of ICTs in pre-tertiary school administration would provide first-hand information to policymakers. In order to cover 60 public senior high school administrators in the Birim Central Municipality, the study used a descriptive survey methodology and a census survey. A closed-ended questionnaire used for data collection has a (α) of 0.84 Cronbach's alpha value. According to the survey, pre-tertiary school administrators were happy with the accessibility of computers and other hardware equipment but unhappy with the accessibility of software, photocopiers, and the internet for administrative tasks. The use of technological resources in school administration and management was further hindered by institutional hurdles (inadequate facilities to facilitate full integration of ICTs and exclusion of ICT programs from administrators' training on curriculum delivery).

Osiesi, *et al.* (2022) assessed teachers' perception of the provision, use, and maintenance of ICT facilities in Ekiti State Primary school libraries in Nigeria. The research type used in the study was a descriptive survey. All of the public elementary school teachers in Ekiti State made up the study's population. The sample for the study was chosen using a multistage sampling technique. Data gathering involved the use of a questionnaire. Descriptive statistics were used to analyze the data that were obtained (frequency counts and percentages). The supply, use, and upkeep of ICT facilities in primary school libraries in Ekiti State are subpar, according to the findings. The constraints militating against these were lack of/inadequate computer literacy among school librarians and teachers, lack of electricity, poor funding of school libraries by governments, poor funding of school libraries by non-government organisations, lack of internet services in schools, lack of staff training on ICT use, excess workload of school librarians/teachers, and insufficient time for ICT use. However, the study was opinioned by limiting itself to teachers' perceptions instead of administrators' perceptions.

Obiekwe and Obadigie (2019) studied information and communication technology competencies needed by principals for administrative effectiveness in secondary schools in Anambra State in Nigeria. A descriptive survey research design was adopted for the study. The researchers observed that school principals lacked the necessary competencies in ICT to be able to effectively carry out these administrative duties. The findings also revealed that principals of secondary schools in Anambra state need computer operational competency, internet / networking competency and ICT safety competency.

Okoroafor (2010) in a study in Nigeria observes that majority of the principals lacked requisite skills on how to search the internet and get information for school management.

Okoroafor observed that the “Internet provides up-to-date information on a variety of topics on school administration unavailable from other sources. The content of textbook, library and principal’s knowledge is enhanced by this medium. The Internet is a global information system that includes communication capabilities and many high-level applications. The web is one of such applications. The existing connectivity of the internet. According to Okoroafor made it possible for users and servers all over the world to participate in this activity. To participate fully and gain the benefits offered by the Internet and networking, the principals must acquire new set of skills digital literacy.

Ogachi (2014) in a study on factors influencing principals’ integration of information communication technology in administration of public secondary schools in Isinya sub-county, Kenya found that most principals” did not have requisite ICT competencies to use ICT appropriately in carrying out their management functions. The study further revealed that principals’ ICT literacy influenced the likelihood to use ICT in performing their administrative task areas. This is reflected in the fact that it was found that principals who had integrated ICT into their administrative task areas had earlier participated in the ICT training programme.

Rodah (2015) investigated how the degree of ICT literacy among principals, “their gender and age influence the integration of information and communication technology in secondary school management in Makueni Sub-County. Levels of Principals' literacy showed consistency where those who were ICT literate integrated ICT more in performing the different administrative tasks than those who had no experience.

Chepkonga (2015) investigated the relationship of ICT training of principals in ICT integration in management public secondary schools in Nairobi County, Kenya. The findings of the analysis of data revealed that there was a significant relationship between the principals' educational level and ICT integration in management of public secondary schools in Kenya. Technical skills training ensures that an individual is proficient in the various applications of ICT, which include searching and accessing information; collecting and organizing data, integrating and interpreting information from multiple sources, assessing validity and reliability of information; and generating new information."

In a study by Mutisya, Mulwa and Mwania (2017) carried out a study on the influence of principals' related factors on integration of Information Communication Technology in the management of public secondary schools in Kitui County, Kenya. The study revealed that majority of the school principals were not able to integrate ICT in school management effectively, owing to the fact that they lacked requisite ICT competencies. The findings of the study show that majority of the principals integrate ICT in school management less frequently because they lack requisite skills.

Mbatia (2014) shows that the majority of heads of secondary schools in Githunguri Sub-county, Kiambu County, Kenya have little computer literacy in Microsoft word (60 percent), PowerPoint (60 percent) and 60 percent email and internet, and Microsoft excel at 70 percent and therefore cannot effectively enforce ICT incorporation in school management. However, Mbatia's study focused only on computer literacy but did look at the ability of school principals in using other technologies such mobile phones for school management purposes.

Therefore, this study will look at the ability of school principals to use these ICTs for management, and go a step further in establishing how these affects effective school management in secondary schools.

Njathi and Ngaruiya (2018) conducted a study "to establish the relationship that existed between principals' computer application skills and computer use in administration of public secondary schools in Kiambu County. The study adopted descriptive survey research design. The target population for this study was all the 307 principals of public secondary schools in Kiambu County. The study found out that principals' possession of computer skills influenced the use of computers among school principals.

Kasimiri, Sang, Shadrack and Beru (2021) investigated the level of preparedness of secondary school Principals to adopt the National Education Management Information System (NEMIS) in Keiyo North Sub-County, Elgeiyo-Marakwet County in Kenya. The Unified Theory of Acceptance and Use of Technology (UTAUT) and the public choice theory served as the foundation for this explanatory study. In the Keiyo North Sub-County schools, which include boarding and day secondary schools, a target population of 30 secondary school principals and 30 HODs in charge of ICT was used. The institutions were divided into secondary National, Extra-County, County, and Sub-County schools. Close-ended questionnaires were used for the collection of quantitative data, and descriptive and inferential statistics were used for analysis. Results show that acceptance, training, and skills, as well as ICT infrastructure, were sub-variables of the principal's degree of preparation that had a statistically significant beneficial impact on NEMIS adoption in secondary schools. The finding of this study is useful to the Ministry of Education (MOE) in planning purposes.

The constructs of Principal's level of preparedness (acceptance, training and skills and ICT infrastructure) positively and significantly correlated with adoption of NEMIS and as these constructs are enhanced, adoption of NEMIS receives a positive boost.

In a research study done by Mumbua (2009) in Nairobi, it was established that most principals suggested that the MoEST should make it mandatory for all school principals and HODs to be trained in ICT before taking over leadership responsibilities and the government should provide resources for training. The researchers observed that slow uptake of computers in Kenyan schools can be partly attributed to inadequate human resource capacity at all levels."

2.3.5 Information and Communications Technology Policy

According to PISA (2021), specific ICT-related policies and practices could directly influence access to and use of ICT resources. The report shows that there is a relationship between access to and use of ICT resources on one and outcomes such as effectiveness in school management. Such policies include, for example, the existence of specific funding for ICT resources in schools, principals' attitudes towards ICT use as an instructional tool, and guidelines and support for administrators in using ICT for school management. These policies and practices could also be developed as a response to administrators' performance or their attitudes towards ICT. As shown in Figure 2.1, the availability, accessibility and quality of ICT resources partly shape users' practices with ICT. Indeed, the total amount of ICT equipment available per student is likely to affect decisions on whether and how to use ICT resources.

The figure demonstrates that the availability of ICT resources in a country can be assessed by examining various ICT-related country-level indicators. Relevant indicators at the country level include: the availability of ICT infrastructure; the affordability of ICT resources; use of ICT by the population and government; the quality of ICT resources; inequalities in access; and the demand for ICT skills in the labour market. Several dimensions of ICT development or readiness (which refers to the propensity for countries and economies to exploit the opportunities offered by ICT) at the country level are also key indicators.

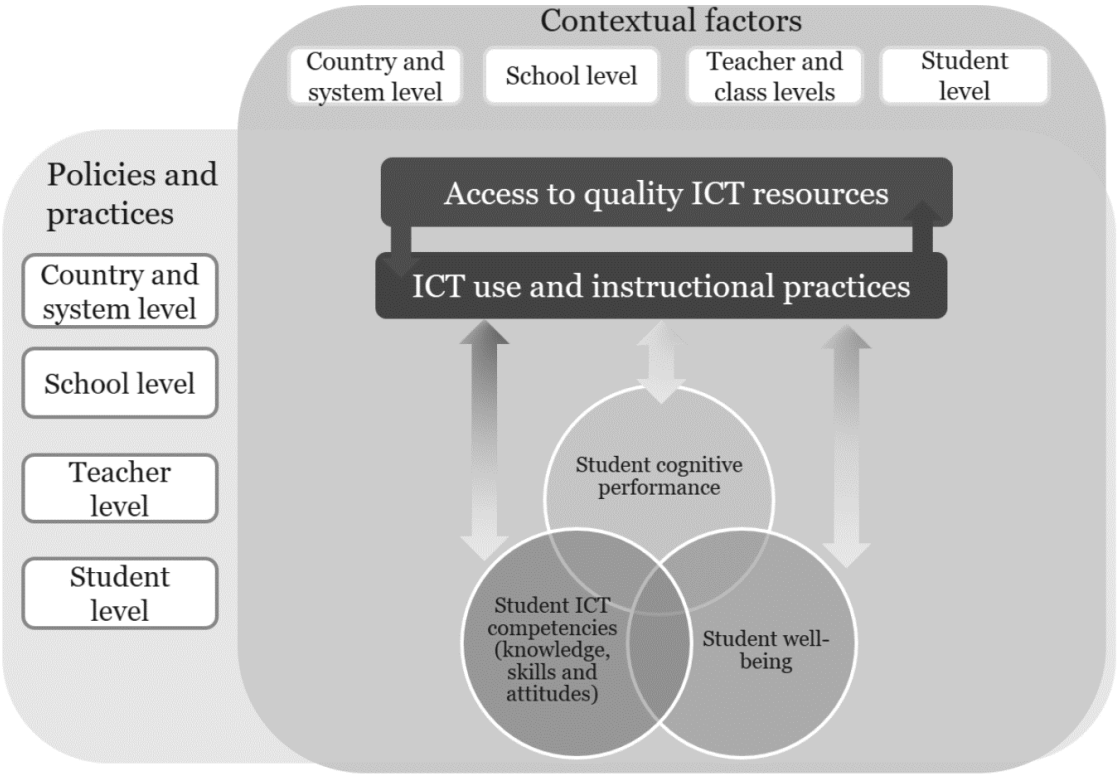

Figure 2. 4: Figure 2.1. PISA 2021 ICT conceptual framework

Source: PISA (2021)

In addition to creating new opportunities for the development of technology-based solutions, the COVID 19 pandemic has also presented an once-in-a-lifetime chance to study the research and application of technology, including information management, work habits, and the design and use of technologies (Sein, 2020). The rapid adoption of telemedicine, telework, and online education in response to the coronavirus danger serves as a reminder of the numerous advantages of digital technology and how it can be utilized to manage and lower the risks associated with the lockdown during the pandemic and even after it has ended (Richter, 2020). It is commonly established that information systems and information technology (IS/IT) are crucial for risk management, clinical decision support, and healthcare (Kohli, & Jones, 2019).

Setiawan, *et al,* (2018) studied the degree to which ICT is employed in school management, either as a tool for school administration or as a way to make decisions for the organization. The Junior High School in Sukabumi, Indonesia Municipality is the research site, and the qualitative research technique is applied in this study. The promotion of digital literacy has not been a goal of the schools in Sukabumi. The lack of organization, integration, and application of ICT values as a basis of values for schools' achievement is demonstrated by this. The commitment statement needed to facilitate ICT integration into the school administration system has not been properly established in the quality policy. It is not yet possible to examine the compliance of ICT policies for high-quality schools and its controls. The management system's incorporation of ICT is explicitly highlighted as a way for the school to demonstrate its commitment to upholding ICT standards and fostering ongoing development.

The availability of organizational structures and school rules regarding quality has an impact on how ICT performs as a strategic partner for schools and as instruments to assist daily operations.

Tomczyk, Martins, Eliseo, Silveira, Amato and Stošić (2020) studied ICT and education in Brazil - NGO, local government administration, business and higher education expert perspective.The technique used was qualitative - an expert interview with four experienced respondents. The individuals interviewed represented different areas of professional activity: the academic sector, the implementation of practical activities in schools, pedagogical supervision, and the development of commercial software. The study was conducted in 2019, as part of the expert conference CBIE (Congresso Brasileiro de Informática da Educação – Brazilian Conference on Computers in Education). The results of the analyses reveal that the challenges of implementing ICT in educational processes are similar to those found in the global perspective. According to these experts, Brazil faces similar issues to those found in other countries, namely: the appropriate preparation of teachers in the use of ICT, supplying schools with high-speed and up-to-date hardware and software, encouraging teachers to use ICT, the re-constitution of educational policies, and changes in administering IT resources within schools.

A study by UNESCO (2011) in “different regions of the world, that is, Africa, Arab region, Asia and Latin America revealed a global dimension of the changes that ICT bring to education systems and policies. The study revealed that conditions for the effective use of technology in education vary from country to country.

The report shows that formulating a policy on ICT in education requires taking a set of variables into account such as objectives, the availability of technologies, applications and content, and teacher capacities. These are defined as a combination of competencies, motivation and the characteristics of teachers' working environment. Policies on ICT in education require the complementing of existing educational management information systems (EMIS) by specific data and indicators.

According to the Federal Ministry of Education (2019), in Nigeria, the development of the National Policy on ICT in Education was informed by the need to have a standardized and coordinated deployment of ICT in Education. The policy identifies the critical role of ICT towards the attainment of the National Vision within the context of the Constitution of the Federal Republic of Nigeria, the National Policy on Education, Ministerial Strategic Plan: Education for Change and Sustainable Development Goals (SDGs). The policy explains that ICT can be useful in enhancing the efficiency and effectiveness of educational administration and policy as new technologies can help improve the quality of administration including human resource management, student registration and monitoring of enrollment and achievement. The ICT policy helps ensure that ICT systems for education administration are in place and all necessary common infrastructure for the storage and management of the ensuing data are provided in all educational institutions and establishments.

Ogunode and Jegede (2020) studied the administration of information communication technology (ICT) in Nigerian secondary schools. The article used secondary data and the secondary data were sourced from print materials and online.

Identified inadequate funding of ICT education, inadequate ICT facilities in secondary schools, unstable power supply, High Cost of ICT facilities, poor implementation of Government policies on ICT, poor network service and coverage and poor ICT literacy as the challenges preventing effective administration of ICT in the Nigerian secondary schools. The researcher observed that the Nigerian government finds it difficult to fully implement educational policies designed and formulated for the development of education in the country. There are many educational policies such as ICT policies. The Nigerian government in order to develop the ICT in all the Nigerian educational systems added ICT policy to the National Education policies for education.

The Government of Kenya is keen to utilize ICT and other resources to increase access to education for all Kenyans. In March 2004, GOK funded the design and development of the e-government strategy to provide a common framework and direction across the public secondary schools and all other sectors. The policy is intended to enhance collaboration in the development and implementation of ICT within and among GOK institutions as well as between the business community and the citizens of Kenya. The ICT policy required standards to be developed for hardware, software, and training, which considers the use of refurbished computers in schools.

One of the main policy objectives of the National Information, Communications and Technology (ICT) Policy by Ministry of Information, Communications and Technology, Kenya (2019) is to create the infrastructure conditions for use of always on, high speed, wireless internet across the country.

The policy geared towards providing an enabling infrastructure and frameworks that support the growth of data centers, pervasive instrumentation (Internet of Things), machine learning and local manufacturing whilst fostering a secure, innovation ecosystem."

2.4 Theoretical Framework

This study was supported by the Open Systems Theory and The Technology Acceptance Model (TAM).

2.4.1 Open Systems Theory

The "theory was developed by a biologist Ludwig Von Bertalanffy in 1937 in Chicago. The theory views an organization as an integrated system of interdependent and interrelated structures and functions. In the open systems theory, the school is viewed as an open social-technical system composed of four major inter-dependent subsystems namely; structure, technology, task and people. These subsystems interact with the external environment in such a way that bringing change in one would lead to changes in all the others (Waweru, 2008).

The incorporation of ICT into the day-to-day functions of educational institutions has a marked impact on every aspect of management structure and dynamics. It means the study on ICT introduction in the schools would not have been exhaustive if the social and technical aspects were not considered in their entirety explaining the reason for the adoption of the socio-technical approach in the study based on the open systems theory as espoused by Kast and Rosenzweig (1985).

According to Owen & Valesky (2011), the organization is structured, equipped and staffed appropriately to accomplish its mission.

The organization must have technological resources and people who contribute to the task achievement. The four internal organization factors; task, structure, technology and people are variables that are highly interactive, each tending to shape and mold the others. Significant change in one factor will result in some adaptation on the part of the other factors. A technological change, such as introduction of computers in a high school will require personnel with new technical skills. It may lead to change in the structure as a new department may be created. Technology is usually developed outside the school system. The school may either adapt it smoothly and easily, or it may resist technological changes (Muriko, Njuguna, & Njihia, 2015).

2.4.2 The Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a theoretical model that explicates the manner in which users accept and embrace novel technology and was coined by Fred Davis in 1989. TAM postulates that actual technology usage is shaped by behavioral intent. TAM proposes that perceived usefulness of new technology determines the attitude of a user towards the innovation. On the other hand, perceived ease of use influences the users to utilize technology. Generally, TAM assumes that once perceived usefulness and perceived ease of use interact and the intention to act is developed, an individual is boundlessly able to act. However, this comes out as the major limitation of TAM since in reality individuals face constraints including time, limited ability, as well as organizational and environmental restraints (Davis, Foxall & Pallister, 2002). This brings forth the importance of perceived usefulness and perceived ease of use in integration of ICT into secondary schools.

The concept of perceived usefulness, as presented by TAM, will be conceived to influence not only the attitude of principals towards the use of ICT but also the ICT literacy, which they seek in order to tap on the potential benefits of ICT. On the other hand, perceived ease of use will be conceived to be demonstrated through the availability of both ICT infrastructure and the technical support thereof. By comprehending the manner in which new technology is embraced, it is easy to predict the aforementioned factors will impact the utilization of ICT in administration of schools.

Administration/ management is the process of working with and through people in order to achieve organizational goals. School leaders play a key role in administrative functions which include goal setting, making decisions, building relationships and establishing an effective management structure (Owen & Valesky, 2011; Tranter, 2006). According to Wango (2009), administration is the activity that directs action of staff to work towards meeting the organizational goals. The work of school administrator is to ensure that specific duties are assigned and performed, and there is a continuous feedback to improve on overall school management.

In a study by Miriko (2015), it was established that half of the administrators indicated that they used computers to carry out administrative tasks while the rest stated that they did not. A large number of the administrators stated that they often used computers for timetabling, evaluation of students and storage of information. Some administrators indicated that they sometimes used ICT to carry out administrative tasks like financial transactions, keeping inventory records, tracking curriculum implementation, communicating with various stakeholders and preparation for meetings. Administrators who did not use computers stated that they used manual or paper work to carry out their administrative task).

The use of computers is becoming widespread in education and training. Computers have become an integral part of education institutions. However, the task of undertaking a computerization project in a school is challenging to most administrators as ICT is a relatively new field (Kavagi, 2010). School administrators face a huge task of managing schools in a society that has been transformed by technologies and many feel overwhelmed by the mandate to integrate ICT in schools. School administrators are required to assume leadership responsibilities in areas they are unfamiliar with and for which they have little training. School leaders need to develop new competencies in order to be effective in their new roles as technology leaders in managing the use of ICT in schools (Mutuma, 2005).

One tends to agree with Adams (1985) who states that being computer literate may become as important as being literate in the more traditional sense. Computer literacy means being able to cope comfortably and effectively with computer technology. Levels of computer knowledge include awareness, literacy, application and innovation. Teachers should strive for application level in order to use computers successfully (Siddiqui, 2007). It's important to training administrators and staff designated to work with the new technology. To effectively manage the use of computers, administrators must have basic competencies like being able to choose applications that are appropriate for a given school situation, select the best software and hardware and develop implementation plan for computer application (Ray and Davis, 1991).

According to Crawford (1997), Schools should encourage teachers to develop their ICT skills. It is advisable to reserve some ICT resources for staff only. The staff ICT room should be equipped with the suitable hardware, software and ICT learning resources to train staff on ICT skills.

If teachers can see that what is done can be done more thoroughly and effectively using ICT, then they will spend more time developing their ICT skills. Schools should hire ICT technician to assist teachers in familiarizing with both the theory and applications of computers

Barta, *et al* (1995), observed that introduction of ICT into the traditional school structure have run into difficulties because computers are not fully effectively used. Proper school employee preparation programs are a pre-requisite for ICT successful assimilation. Training activity should take place prior to ICT implementation and subsequently on an on-going basis to familiarize administrative staff with hardware and software changes and recent developments. The greatest challenge facing the Ministry of Education in Chile is the need to in-service teachers, especially in the effective use of new technologies. Several Latin American and Caribbean countries (LAC) are providing professional training in the use of the new technologies (Siddiqui, 2007).

The future direction that computer technology may take needs to be evaluated so that teachers can prepare for an ever-changing technological world (Adams, 1985). Director of Microsoft East and Southern Africa Channel, Eric Odipo states that it's not that there is a shortage of trained IT people coming out of colleges, but that the IT environment changes at such a fast rate that universities are not able to keep up as they lack the latest of this technology. Nearly every six months there is something new coming from Microsoft and computing companies. That's why various organizations involved in ICT are re-training fresh graduates (Daily Nation, July 23, 2012: p1).

Mutuma (2005) notes that, school leaders' command of technology is important because leaders who are computer literate are more aware of their staff member's ICT needs. Learning the basics of word processing, spreadsheets, presentation software, using web page and internet are prerequisite to boost their computer skills. In a study done in Kilungu Division, Makueni District revealed that about 52% of the teachers and principals acquired computer knowledge from friends. Only 16% of the principals had a certificate from a computer college (Mumbua, 2009). In a research study done in Nairobi most principals suggested that the MoEST should make it mandatory for all school principals to be trained in IT before taking over leadership responsibilities and the government should provide resources for training. They also suggested that IT to be included in the teachers training curriculum (Kanyeki, 2006). The slow uptake of computers in Kenyan schools can be partly attributed to inadequate human resource capacity at all levels. Schools need skilled technicians to maintain and repair computer hardware and software and support teachers.

According to Daily Nation (August 31, 2012: pVII), Kenya Education Management Institute (KEMI) has been at the forefront of building the capacity of education administrators/managers on ICT integration under the Economic Stimulus Program. KEMI director Dr. Wanjiru Kariuki has expressed the organizations commitment to bridging the digital divide in the education sector. In its ICT strategy the MOE has outlined a training program for the entire MOE, its agencies and institutional managers in the area of Education Management Information System (EMIS). The teaching staff force of about 240,000 teachers will be trained in ICT literacy and integration (ROK, 2006).

Training is one aspect of people-ware that never ends. Most teachers training programs have not incorporated ICT in their core curricula, hence majority of the teachers are not well equipped with relevant ICT skills (Kavagi, 2010). Training of administrators in application and administrative software programs for school administrative needs should be undertaken by the schools and the universities training teachers (Menjo & Boit, 2005). Kenyatta University (KU) is offering both in-service and pre-service IT courses to train and trainee teachers respectively. It should be possible to develop computer basics and use the most common computer applications to meet the initial training needs of school administrators. In order to stay ahead and become a competitive person, a school leader needs to keep abreast with the latest technology

From the reviewed literature it was clear that principals and teachers in public secondary schools in Kenya were not literate enough to use computers. School administrators also felt overwhelmed by the fast changes occurring in the technology world. That's why there was need to keep on offering in-service courses to school administrators in order to cope with technological changes. Lack of training for administrators in ICT was a major drawback in their ability to utilize the technology. The researcher embarked on ascertaining the level of ICT skills among secondary school administrators and establishing whether schools had put in place mechanisms to help teachers acquire ICT skills to help them cope with the fast-changing ICT world in order to be able to utilize modern technologies in the administration of secondary schools in Kiambu Sub-County. The study also made recommendations to the MoEST to come up with an ICT training program for secondary school administrators."

2.5 Conceptual Framework

The researcher proposes the following conceptual frame work to identify the variables that will be measured in this study. As indicated Figure 2.1, the variable will be categorized as independent. Independent variables will be further been classified under two concepts; ICT infrastructure and Principals' ICT competency. Principals in secondary schools need effective and fast communication and accessibility to information as Wiley (2003) remarks.

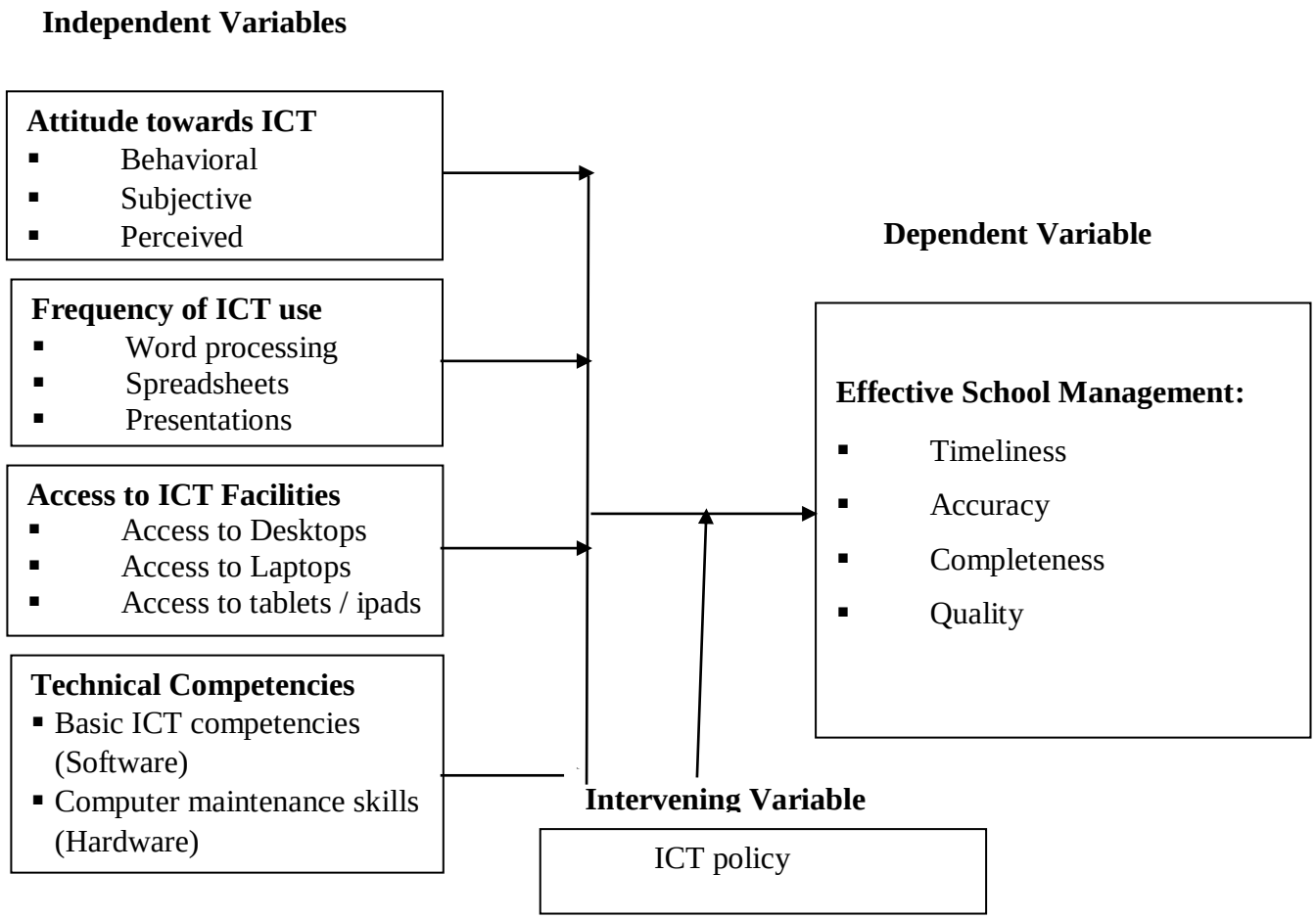

Figure 2. 5: Conceptual Framework

Source: Author (2022)

The conceptual framework shows that administrators' attitude towards ICT, frequency of use of ICT, administrators' access to ICT hardware and software, administrators' technical competencies (independent variables) have an influence on Effective School Management (dependent variable). However, this relationship is subject to the influences of Government policies, and Location/Environment (intervening variables).

The dimensions of administrators' attitude towards ICT include: behavioural, subjective, and perceived attitudes. Frequency of ICT use is looked at from the point of frequency of using computer applications such as word processing, spreadsheets, and presentations for school management, as well as frequency of use of ICT equipment. Access to ICT hardware is looked at in terms of access to desktops, laptops, ICT gadget s such as tablets / ipads, and mobile phone technologies. Technical Competencies are measure in terms of Basic ICT competencies (Software), and computer maintenance skills (Hardware). The study conceptualizes that effective school management will be measured through timeliness, accuracy, completeness and quality in managerial outputs.

The intervening variables which in this case is ICT policy is argued to affect the relationship. The policyought to be supportive in helping schools acquire relevant technologies to be utilized for effective school management. Ismail, Ahmad and Affandy (2013) observed that the location or environment of a school determined availability or access of ICT infrastructure. The study revealed that access to ICT infrastructure in the rural secondary school is limited as there are costs involved.

2.6 Identification of Knowledge Gap

"It is now accepted that computers should play a central role in school administration. However, progress has generally been limited to computer assisted instruction and learning. In addition to instruction and learning another major area that can benefit from the use of computers is educational administration and organization. Less attention has been paid to the topic of ICT and administration (Barta *et al.,* 2012). It is well recognized that there is limited research in Africa and specifically in Kenya to identify and address key challenges that stand on the way of adoption and use of ICT in general and particularly in education sector (ROK, 2011)

Most of the research focused on the impact of ICT on student and how it is enhancing teaching and learning, challenges and success of ICT in teaching of mathematics in primary and secondary schools in Kenya (Kamau, 2012). In secondary schools' research has been conducted in the use and impact of ICT in administration in Kilungu and Nairobi (Mumbua, 2009; Kanyeki, 2016). Although many secondary schools in Kenya introduced computers in great numbers starting early 1990's there is limited data on their use to facilitate school administration. There is little research on ICT competencies of administration of secondary schools. Due to this glaring gap this study is designed to examine principal's competencies on ICT use and effective management."Some of the studies were conducted in a different geographical location and environment from Kenya. For instance, Hashim *et al*. (2010) was in Malaysia, Takach *et al* (2018) was carried out in Lebanon, whereas Afshari, *et al* (2010) was carried out carried out in Iran. These are nations that are technologically advanced compared to Kenya. They have more advanced ICT infrastructure, which is available and easily accessed by school administrators.

, generalizing such findings to Uasin Gishu in Kenya should be with much caution.

Some of the studies reviewed in this chapter rely heavily on the use of questionnaires as the only tool used for collecting data. For instance, the studies by Takach*et al.* (2018) in Lebanon, Papaioannou *et al* (2011) in Cyprus, Oluyemisi (2015) and Njathi *et al* (2018) in Kenya only collected quantitative data using questionnaires. Therefore, they are vulnerable to the weaknesses associated with questionnaires which include dishonest answers, unanswered questions, and difficulty of conveying feelings and emotions. The current study uses triangulation, whereby the study will benefit from several research instruments.

Another gap is related to variation in context. Some of the studies mentioned in the study were in different levels of educational institutions and not secondary schools. For instance, a study by Papaioannou *etal.* (2011) was carried out in primary schools and not in public secondary schools, and thus the findings may not reflect the happenings in public secondary schools. Moreover, this study had another gap also found in a study by Hashim, *et al.* (2010), Ghamrawi (2013) and Ogachi (2015) concentrated much on school principals and left out other school administrators such as bursars, heads of departments as well as project managers.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The chapter provides highlights on research design, location of the study, target population, research design, sampling procedures and sample size, research instruments, validity and reliability of the instruments, pilot testing, data collection procedures, data processing and analysis procedure.

3.2 Research Design

The study used both convergentparallel and correlation research designs. A convergent parallelresearch design is a type of design in which qualitative and quantitative data are collected in parallel, analyzed separately, and then merged (Creswell, 2014). This design was chosen because both qualitative and quantitative data was collected, analyzed and interpreted. The purpose of the convergent design was to obtain different but complementary data on the same topic to best understand the research problem. Creswell and Poth (2017) state that; a correlational research design collects background information. Particular studies directed to determine the existence and extent of problems, usually pertaining to a specific population. This design helped gain insight in generalizing a situation without utilizing the whole population. It is suitable in determining reasons or causes for the current status under study (Marshall & Rossman, 2014).

Further, Gall, Gall and Borg (2007) argue that it also aims to obtain information from a representative selection of the population from which the investigator presents the findings as being representative of the population as a whole.

3.3 Location of Study

The study was carried out in Uasin Gishu County. Uasin Gishu County is located in Rift Valley region of Kenya and 330km North West of Nairobi. The county borders Trans-Nzoia County to the north, Elgeyo-Marakwet and Baringo counties to the east, Kericho County to the south, Nandi County to the south, south-west and Kakamega county to the west. Uasin Gishu has a total of six sub-counties namely Turbo, Kesses, Moiben, Kapseret, Ainabkoi, and Soy (The County Government of Uasin Gishu, 2021). In connection to learning, Uasin Gishu County has an assortment of both fundamental and higher institutions of learning. The county has a number of colleges. Uasin Gishu County has 166 secondary schools. Uasin Gishu County was selected as a representative of other counties because it is believed that the study area willgive a wider view of the problem under the study (The County Government of Uasin Gishu, 2021). Moreover, there was limited socio-technical issues influencing effective use of ICT in the management of public secondary schools in the county.

3.4 Target Population

Target population describes an aggregate of individuals or subjects that share common or similar characteristics. As described by Cooper and Schindler (2013) a population is the total collection of elements about which the researcher wishes to make inferences. In this respect, the principals and teachers constitute the target population. There were 166 public secondary schools (Uasin-Gishu Education Office, 2021). The study targeted of 166 principals and 166 school bursars, and 166 main school secretaries from the 166 public secondary schools in the county and 6 sub-county directors of education from the six sub-counties.

Table 3. 1

Target Population

Population Category	Target population
Principals	166
School Bursars	166
School Secretaries	166
Sub County Directors	6
Totals	504

Source: Uasin-Gishu Education Office, (2022)

3.5 Sample and Sampling Procedures

This section presents the sample size determination and the sampling procedures adopted by the study.

3.5.1 Sample Size

This section presents the determination of the schools' sample, sample of principals and school bursars, and main school secretaries. The number of schools on which basis the samples was determined was computed using the following formula by Kothari and Garg (2014) as shown in Appendix VII. Using the formula, the number of schools sampled were 61. Sampling was thus accomplished as shown in Table 3.2. This means that for each school, the study utilized 61 principals, 61 school bursars, and 61 main school secretaries (1 of each stratum per school).

Table 3. 2

Sample Distribution

Population Category / Strata	No. of Schools	Number per School	Sample
Principals	61	1	61
School Bursars	61	1	61
School Secretaries	61	1	61
Sub County Directors			06
Totals			189

Source: Researcher (2022)

The sample allocated in each sub county was equal respectively of the population holdings. This means the schools sampled were distributed equally to the six sub counties. That is, 10 schools per Sub County except in Soy Sub County, where the research plans to visit 11 schools owing to its vastness and population as captured in the 2019 Census Report, and thus, there was a feel of each sub county in the study. All the 6 sub-county directors of education from the six sub-counties were interviewed since they were few and would therefore represent all the sub-counties sampled.

3.5.2 Sampling Procedures

The sampling frame is a comprehensive list of all the sampling units from which a sample can be selected (Mugenda & Mugenda, 2013). All the secondary schools in Uasin Gishu County constitute the sampling frame for purposes of this study. The sampling frame for the principals and teachers were lists in their respective schools.

Cluster random sampling technique were used whereby; the schools were classified and selected according to the Sub Counties. According to Kothari and Garg (2014) in cluster sampling, the total population is divided into smaller divisions (geographical or other boundaries) and randomly selected for inclusion in the study sample.

Stratified sampling technique was used in classifying the accessible population into two strata, namely, principals, school bursars and main secretaries. Kothari and Garg (2014) recommend that stratified random sampling is to be used with respect to the heterogeneous group, as is the case in this study.

The principals, school bursars and main secretaries were selected using purposive sampling technique. The technique is appropriate given that there is only one each of three categories per school. Mugenda and Mugenda (2013) explain that purposive sampling technique focuses on sampling techniques where the units that are investigated are based on the judgment of those who have the required information the researcher needs, as is the case with the respondents.

3.6 DataCollection Instruments

According to Williams and Volberg (2014), a researcher should use methods that provide high accuracy, generalizability and explanatory power with minimum management demands with administrative convenience. Mwiria and Wamahiu (1995) note that: “quantitative and qualitative researcher uses multi-techniques for data collection in order to obtain holistic view of the respondent”. For this case data were collected using three instruments namely; the questionnaire, interview schedule and observation schedule for the principals and school bursars, and main school secretaries.

The instruments supplemented each other to close the gap of data sufficiency. The researcher was guided by the study objectives when constructing these instruments. The following section discusses each of the data collection instruments.

3.6.1 Questionnaire

Questionnaires were the main instrument for data collection in the study. According to Kothari (2014), advantages of using questionnaires are due to low cost, freedom from the Interviewer's bias as answers are in respondents' own words and that it gives respondents adequate time to give well thought out answers. The questionnaires comprised of open ended and close ended questions. These questionnaires were administered to the principals only. These questionnaires had six sections as per the objectives with demographic information inclusive. The questionnaires were developed to address specific objectives (Orodho, 2014).

The questionnaires were divided into various sections based on the research objectives. Section 'A' of the entire questionnaire dealt with demographic characteristics. Section 'B' covered the principals' ICT competencies and effective school management, section C dealt with principals' attitude towards ICT utilization and the effective school management, section D dealt with principals' use of ICT in the management of teaching and learning resources and effective school management, and section E dealt with principals 'use of ICT in financial management and procurement management and effective school management, and section F dealt with competencies of the principals in ICT use in financial management. Both open and closed ended questions were used.

3.6.2 Interviews

Hoek *et al.,* (2016) states that, interviews can be modified to fit needs of the situations, they can convey empathy, build trust, collect rich data and provide a clear understanding of the respondents' view. The researcher utilized interview schedules because it gives a researcher an opportunity for in-depth data by ensuring high response rates and it encourages naturalness (Owens, 2002). Thus, ensuring that more information is obtained just as Orodho (2008) notes. Interview schedules were prepared for the Sub County directors in all 6 Sub Counties in Uasin Gishu County. Interview guide captured information on physical infrastructure and access to computers, Principals' competence in using ICT tools, government policies related to ICT use, attitudes towards ICT equipment training and support needs, issues impending institutional support to operate an ICT environment.

3.7 Data Collection Procedures

An introduction letter was obtained from the University of Kabianga by the researcher for purposes of introducing the researcher to the respondents and the relevant authorities. A permit was also sought from the National Commission for Science Technology and Innovation (NACOSTI) and an introductory letter was presented to the school principals who granted the researcher permission to conduct the study in their schools. The researcher personally administered the data collection instruments. Earlier bookings and arrangement were made so as to ensure that the respondents are available for the exercise. The data collection was planned in such a way that the exercise was continuous for a period of two months.

On the same the researcher arranged with the principals of the 33 schools when to carry out the study with them. The researcher agreed with the Sub County directors on

the convenient time for the interviews to be done. The researcher then interviewed the Sub County directors on agreed time that was convenient to them. On the day the researcher gave out the questionnaire to the school principals, the researcher requested for permission from the principals so as to administer the observation checklists.

3.7.1 Pilot test

In order to ensure that the entire schools, principals and Sub County directors are circumscribed, a try-out were conducted. This was undertaken to determine the effectiveness of the research tools that were used to give the feasibility of the proposed study. A pilot study to pre-test the research tools were carried out in five schools using 5 principals purposely selected from the neighboring, Elgeyo Marakwet County and who were not be featured in the actual study. As Owens (2002) advices the schools will not be used in the main study. The purpose of pilot study was to ascertain whether the instrument is logical and clear.

3.7.2 Validity of research Instruments

The study conducted face validity, content validity, construct validity, internal validity and external validity for the instruments before use. According to Gay, Mills & Airasian (2009), validity refers to the extent to which a research instrument measures what it is designed to measure. Face validity refers to the researcher's subjective assessments 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 breadth (Cohen, Manion & Morrison, 2008). Does the content of the test appear to be suitable to its aims?

Construct validity was concerned with the degree to which the research measures the construct (as compared to things outside the construct). In other words, does the test measure the concept that it's intended to measure? Internal validity refers to the extent to which the independent variable can accurately be stated to produce the observed effect. External validity refers to the extent to which the results of a study can be generalized beyond the sample. Which is to say that the researcher can apply the study findings to other people and settings.To validate the test items, the questionnaires and interview were submitted to the two supervisors for verification, and other experts from the Department of Educational Administration, Psychology and Foundations. A pilot study was conducted in two secondary schools in Elgeyo Marakwet County to eliminate items that were likely to elicit irrelevant or no responses. After piloting the instrument was amended accordingly.

3.7.3 Reliability of research Instruments

According to Cooper and Schindler (2014) reliability is a measure of the degree to which a research instrument yields consistent results on repeated trials. Reliability for interview schedules was carried using the test-retest approach. Internal consistency of the questionnaireswas tested by computing Cronbach's alpha reliability coefficients.

Orodho (2008) posits that a correlation coefficient of >0.7 level is considered high enough for judging the instruments as reliable. Instruments yielding a correlation coefficient of >0.7 were used for the study since it yielded 0.778 hence reliable as shown in Table 3.3.

Table 3.3

Reliability Statistics

Variables	Coefficient	Items	Comments
Administrator's Attitude	0.814	9	Acceptable
Frequency of Use	0.820	4	Acceptable
Accessibility of ICT facilities	0.724	10	Acceptable
Competencies	0.701	15	Acceptable
Effective School Management	0.829	7	Acceptable
Average Score	0.778	45	Acceptable

Source: Research Data, (2022)

3.8 Data Analysis Procedures

This section presents the data analysis techniques and procedures that were adopted in this study.The data was coded and electronically analyzed using the Statistical Package for Social Sciences (SPSS) version 25 software. Both descriptive and inferential statistics were used in the data analysis. Primarily, descriptive statistics (frequencies, means and percentages) encapsulated measures of distribution, and measures of central tendencies was computed. On the other hand, inferential statistics constituted correlation and regression analysis that helped determine the relationship between the study constructs.

A statistical model is constructed to show the influence of the independent variables on the dependent variable.

To determine the significance of relationships between the independent variables (principals' ICT competencies, principals' attitude towards ICT utilization, principals' use of ICT in the management of teaching and learning resources, principals 'use of ICT in financial management and procurement management and the dependent variable (effective school management in selected secondary schools) as captured by the null hypotheses H_{01}-H_{04}, a multiple regression analysis will be employed to illustrate the extent to which socio-technical issues influence effective school management.

The coefficient of determination R squared were used to indicate the percentage of variability of the variables accounted for by the factorsunder study while beta β coefficient values indicates the direction (+ or -) and the degree of the influence as well as compare the relative contribution of each independent variable on the dependent variable. Finally, for the purpose of communicative effectiveness to ultimate users the study findings were presented in statistical tables and charts that reflected both descriptive and inferential statistical results.

3.8.1 Test of Normality

For almost all of the parametric tests, a normal distribution is assumed for the variable of interest in the data under consideration. Normality is one of the essential assumptions for drawing reliable inferences about the underlying population of data. This study tested the assumption of normality using the Kolmogorov–Smirnov and Shapiro–Wilk tests. The test established that the data was normally distributed as shown in Table 3.4 since all the p-values were greater than 0.05 as suggested by (Pallant, 2007).

Table 3.4:

Tests of Normality (Kolmogorov-Smirnov and Shapiro Wilk test)

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	p-value	Statistic	Df	p-value
Effective Management	.887	171	.086	.908	171	.081
Attitude towards ICT	.874	171	.074	.876	171	.088
Frequency of use	.267	171	.083	.952	171	.065
Access to H/W & S/W	.451	171	.087	.914	171	.068
Technical competencies	.287	171	.079	.902	171	.076

Source: Research Data (2022)

3.8.2 Test of Homogeneity

The homogeneity of variances ensures that the samples are drawn from the populations having equal variance with respect to some criterion. The assumption for homogeneity is called "Homoscedasticity," which is strongly influenced by non-normality.Levene's test of homogeneity of variances was used to examine homoscedasticity. The statistical results should be above 0.05 for it to be homoscedastic. The results of homoscedasticity test is given in Table 3.5. The significance is .435 which is greater than .05 indicating that the samples drawn from the population had equal variances.Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

Table 3.5

Levene's Test

F	df1	df2	Sig.
.975	98	104	.435

Dependent Variable: Effective Management of Schools

Source: Research Data (2022)

3.8.3 Test of Multicollinearity

Multicollinearity test if variables of interest are highly correlated or not. High correlations should not be present among variables of under study. To test the assumption of multicollinearity, Variable Inflation Factor (VIF) was used where a value of VIF >10 indicates multicollinearity is present and the assumption is violated. Variance Inflation Factor (VIF) where a value between 1 and 10 as suggested by Field (2009) indicates the absence of multicollinearity. The findings indicated the absence of multicollinearity (Table 3.5) as the test statistics fell within the range of 1-10.

Table 3.6:

Test of Multicollinearity (Variable Inflation Factor)

Independent Variables	Collinearity Statistics		
	Tolerance	VIF	Comments
Effective Management Attitude towards ICT	.540	1.922	Acceptable
Frequency of use	.431	2.785	Acceptable
Access to H/W & S/W Technical competencies	.443	2.62	Acceptable

Source: Research Data, (2022)

3.8.4 Type I and Type II errors

Type I and type II errors were lastly checked since the findings of the study may be affected by the wrong interpretation arising from hypotheses testing influenced by these errors. A failure to accept a true null hypothesis result in type I error being committed, it means concluding that results are statistically significantwhen in reality they came about purely by chance or because of unrelated factors.

Type II error occurs when the researcher fails to reject a false null hypothesis (Cooper and Schindler, 2008). Type I errors are normally considered more serious as compared to Type II errors.

The hypotheses tested in this study used $p<0.05$ which is within the threshold of the conventional significance levels to ensure that the probability of committing type I error was lowered on the other hand type II errors were addressed by ensuring the sample size was large (171). Zikmund (2003) suggested that the type II errors can be addressed through the sample size by ensuring that it is relatively large.

3.9 Ethical Considerations

The researcher followed the necessary steps for data collection which involved getting a research permit from the National Council for Science and Technology to undertake research from the selected secondary Schools in Uasin-Gishu County, Kenya". This procedure of getting clearance was followed all through the field work period by getting permission from the County Director of Education, Sub County Directors of Education and School principals before distributing questionnaires.

Informed consent was requested from the participants, they were informed about the purpose of the study. In doing this research the researcher respected the respondents' privacy. The participants were not expected to write their names on the questionnaires. The participants were assured that the information given would be treated with a lot of confidentiality and for the intended purpose only. The participants were given the freedom to withdraw from the study at any point or time.

The name of the institution was not disclosed due to the sensitivity of the research problem. Respondents was briefed about the findings of the study after the study.

The research observed confidentiality especially from the information given on questionnaires. The respondent's information was used for any other purposes other than educational purpose to insulate one against violation of privacy. The researcher used personal identification before respondents and her mission is clearly stated. There was no physical nor psychological harm to the respondents of the study. Anonymity of Respondents was guaranteed in the questionnaire. The findings will also not be shared without respondents' permission. The researcher ensured document originality and that no work was plagiarized. Reviewed texts were paraphrased to suit the themes of this thesis and referenced according to the source to avoid plagiarism. Safety of data collected was ensured by ensuring proper storage in formats such as pdf and sav using compact disks and external hard drives.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter is a presentation of the study's data analysis, its presentation, interpretation, and discussion. Detailed data analysis sections in the form of descriptive analysis, descriptive statistics, and inferential statistics, as guided by the methodology in Chapter three, are included in the chapter. Questionnaires and interview schedules were used to collect data. The analysis and presentation are guided by the study's objectives and are related to the literature review in chapter two.

4.1.1 Respondents Response Rate

The researcher distributed 183 questionnaires targeting principals, school bursars and school secretaries in public secondary schools in Uasin-Gishu County, and the response rate was as presented in Table 4.1.

Table 4. 1:

Respondents Response Rate

Population Category	Target	Actual	% Response
Principals	61	57	93.4%
School Bursars	61	57	93.4%
School Secretaries	61	57	93.4%
Sub County Directors	6	6	100%
Total	189	177	95.05%

Source: Research Data (2022)

The study was able to obtain a response from 177 respondents out of the targeted 189, translating to a response rate of 95.05%. That was adequate to enable the researcher to arrive at reliable findings and recommendations. According to Dommeyer, Baum, Chapman, and Hanna (2002), for on-paper surveys, the correct answer rate is 75%; hence, the percentage obtained was perfect and satisfactory to the researcher.

4.2 Demographic Characteristics

The responses for the demographic characteristics of the research participants are captured in this section. These include age of the respondents, gender of the respondents and their level of education.

4.2.1 Gender of the Respondents

The results showing gender of the respondents were as presented in figure 4.1.

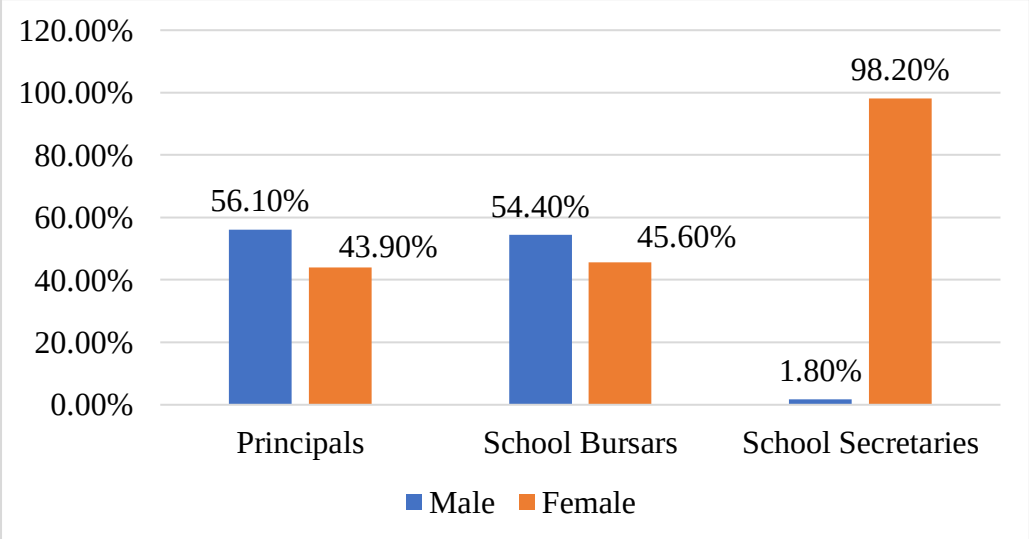

Figure 4. 1:Gender of the Respondents

Source: Research Data, (2022)

Figure 4.1 shows that 43.9% of the principals, 45.6% of school bursars and 98.1% of the school secretaries were female, while the rest in all the three categories were male.

The results suggest that there were more female principals and school secretaries than males that participated in the study. This is in contrary to the findings of Wozney, Venkatesh and Abrami (2006) who argue that gender differences influence the use of ICT and that male teachers use ICT more in teaching and learning than female.

4.2.2 Age of the Respondents

The results showing the age of the respondents were as provided in Table 4.2.

Table 4. 2:

Age of the Respondents

		Strata					
		Principals		School Bursars		School Secretaries	
		F	%	F	%	F	%
Age	21-30 years	0	0.0	9	15.8	43	75.4
	31-40years	1	1.8	39	68.4	7	12.3
	41 -50 years	45	78.9	9	15.8	7	12.3
	Over 50 years	11	19.3	0	0.0	0	0.0
Total		57	100	57	100	57	100

Source: Research Data (2022)

The results in Table 4.2 and Figure 4.1 show that 45 (78.9%) of the principals, 9 (15.8%) of school bursars and 7 (12.3%) of the school secretaries were aged 41 to 50 years, 1 (1.8%) of the principals, 39 (68.4%) of school bursars and 7 (12.3%) of the school secretaries were aged 31 to 40 years, 9 (15.8%) of school bursars and 43 (75.4%) of the school secretaries were aged 21 to 30 years, while 11 (19.3%) of the principals were aged over 50 years. This implied that majority of the respondents were aged 31 to 50 years.

This finding is in line with Edward (2015) who argued the age is a pointer to the use of ICT. Nevertheless, the researcher was able to collect data from a representation across all targeted ages.

4.2.3 Respondents' Level of Education

The responses showing gender of the respondents were as presented in Table 4.3.

Table 4. 3:

Respondents' Level of Education

		Principals		School Bursars		School Secretaries	
		F	%	F	%	F	%
Highest Academic Qualifications	Certificate	0	0.0	9	15.8	42	73.7
	Diploma	0	0.0	20	35.1	13	22.8
	Degree	4	7.0	28	49.1	2	3.5
	Masters	40	70.2	0	0.0	0	0.0
	PhD	13	22.8	0	0.0	0	0.0
Total		57	100	57	100	57	100

Source: Research Data (2022)

The results in table 4.3 indicates that 40(70.2%) of the principals indicated that their highest attained level of education was Masters Level, while 13(22.8%) indicated that they had a PhD. The findings show that 4(7%) of the principals, 28(49.1%) of the school bursars and 2(3.5%) indicated that they had a degree. The results also show 20(35.1%) of the school bursars and 13(22.8%) of the school secretaries cited Diploma as their highest attained education level.

It is also shown that 9(15.8%) of the school bursars and 42(73.8%) of the school secretaries cited certificate as their highest attained level.

This was likely to influence the ICT integration as argued by Wanjala, Khaemba and Mukwa (2011) who argue that the principals' knowledge, skill, and philosophy determine their ICT integration methods.

4.2.4 Experience as School Administrators

The respondents were asked to indicate how long they had worked as administrators and the results were as captured in Table 4.4

Table 4. 4:

Experience as School Administrators

		Principals		School Bursars		School Secretaries	
		F	%	F	%	F	%
Number of years as an Administrator	Less than 1 year	0	0.0%	5	8.8%	5	8.8%
	1-5 years	0	0.0%	14	24.6%	40	70.2%
	6-10 years	18	31.6%	38	66.7%	9	15.8%
	Over 10 years	39	68.4%	0	0.0%	3	5.3%
Total		57	100	57	100	57	100

Source: Research Data (2022)

The results in Table 4.4 shows that only 5(8.8%) of the school bursars and 5(8.8%) of the school secretaries had been administrators for a period of less than 1 year. The results also show that 14(24.6%) of the school bursars and 40(70.2%) of the school secretaries had been administrators for a period of 1 to 5 years.

The results show that 18(31.6%) of the principals, 38(66.7%) of the school bursars, and 9(15.8%) of the school secretaries were had been administrators for a period of 6 to 10 years. It was established that 39(68.4%) of the principals and 3(5.3%) of the school secretaries were over 10 years of experience. This study implies that most teachers had over ten years of experience and hence ensured that teacher had great experience in issues affecting them and therefore they articulated better.

4.2.5 Length of Service in the Present School

The results showing how long the respondents have been administrators in their present school, and the response was as provided in Table 4.5.

Table 4. 5:

Length of Service in the Present School

	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 1 year	24	14.0	14.0	14.0
1-5 years	52	30.4	30.4	44.4
6-10 years	67	39.2	39.2	83.6
Over 10 years	28	16.4	16.4	100.0
Total	171	100.0	100.0	

Source: Research Data (2022)

The results in table 4.5 points out that 67(39.2%) indicated that they had been administrators in their present schools for a period of 6 to 10 years, 52(30.4%) indicated a period of 1 – 5 years, 28(16.4%) indicated a period of over 10 years, while 24(14%) indicate a period of less than 1 year.

This implies that the teachers had been in their respective schools for a good number of years and therefore had good record of issues that were affecting the schools which yields to better results of this study. This finding is in line with the findings of Mutisia (2017) who argued that the experience of the teacher is a pointer to quality leadership and management.

4.3 Descriptive Statistics of Administrators

This section presents the findings with respect to the study objective;

4.3.1 Administrators' Attitude towards ICT Utilization and Effective Management of Public Secondary Schools

This section presents the findings with respect to objective one which sought to examine how principals' attitude toward ICT influences the effective utilization of ICT in management of public secondary schools in Uasin-Gishu County. The respondents were asked to indicate their level of agreement on statements in Table 4.4 describing their attitude towards ICT integration in management of secondary schools. The means and standard deviations were also presented therein.The responses were guided by a 5-likert scale where; 5 –Moderately Agree. 4 – Disagree, 3 – Undecided, 2 – Agree, 1 - Strongly Agree.

Table 4. 6

Administrators' Attitude and Effective Management of Public Secondary Schools

Parameters on Administrators Attitude	*N*	*D*	*MA*	*A*	*SA*	*Ms*	*StD*
I feel demoralized when I fail to fix small computer malfunctions	171	2.3	43.3	51.5	2.9	3.55	0.60
I believe that ICT helps me to do management tasks	171	2.3	45.0	52.6	0.0	3.50	0.55
I always look forward to working with computers	171	1.2	47.4	38.0	13.5	3.64	0.73
I enjoy trying to solving school administrative problems using ICT during my free time	171	2.4	65.7	29.0	3.0	3.33	0.57
Using ICT makes managerial decision making more complicated	171	2.9	64.9	32.2	0.0	3.29	0.52
Schools have always been managed effectively without ICT	171	3.5	61.8	34.7	0.0	3.31	0.54
Reliance on ICT for management makes management difficult	171	3.5	59.6	36.8	0.0	3.33	0.54
I think ICT is not practical	171	5.8	54.4	39.8	0.0	3.34	0.59
I can g*et al*ong well in everyday life without ICT	171	9.9	60.8	29.2	0.0	3.19	0.6

Source: Research Data (2022)

The results presented in Table 4.6 show that 51.5% of the respondents agreed that they feel demoralized when they fail to fix small computer malfunctions, 43.3% moderately agreed, while 2.3% disagreed. This attracted a mean score of 3.55, which when rounded off equates the 4.0 mean score, the "agree". The results suggest that most of the principals (51.5%) indicated that they feel demoralized in fixing small computer malfunctions, thus implying negative attitude towards handling ICT issues.

These findings are in line with the findings of Bahrain, Abdul Razzak (2013) who reported that the status and conditions of the implementation of ICT in public secondary schools was poor due to the attitude of the implementers.

The results show that 52.6% of the respondents agreed that they believe that ICT helps them to do management tasks, 45% moderately agreed, while 2.3% disagreed. This attracted a mean score of 3.50, which when rounded off equates the 4.0 mean score, the "agree" response strength. The results suggest that most of the principals (52.6%) believe that ICT helps them to do management tasks, thus implying a positive attitude towards handling ICT issues. However, the remaining 47.4% did not believe so. When asked to comment on the attitudes of principals on using ICT, all of the 6 sub county directors (100%) indicated that the principals had positive attitudes towards the use of ICT. One Sub County director is quoted saying. *"The principals are always willing to use ICT, as they believe that this will help them perform their work effectively."*

The findings reveal that 32% of the respondents agreed that they enjoy trying to solve school administrative problems using ICT during their free time, 65.7% moderately agreed, while 2.4% disagreed. This attracted a mean score of 3.33, which when rounded off equates the 4.0 mean score, the "agree" response strength. The results suggest that most of the principals (62%) did not agree to the assertion that they enjoy trying to solving school administrative problems using ICT during their free time. The results point to the fact that the administrators had a negative attitude towards ICT.

The results revealed that 32.2% of the respondents agreed to the statement implying that using ICT makes managerial decision making more complicated, 64.9% moderately agreed, while 2.9% disagreed.

This attracted a mean score of 3.29, which when rounded off equates the 4.0 mean score, the "agree" response strength. The results suggest that most of the principals (67.8%) did not agree to the assertion that using ICT makes managerial decision making more complicated.

The findings reveal that 34.7% of the respondents agreed to the statement implying that schools have always been managed effectively without ICT, 61.8% moderately agreed, while 3.5% disagreed. This attracted a mean score of 3.31, which when rounded off equates the 3.0 mean score, the "moderately agree" response strength. The results suggest that most of the principals (67.8%) did not agree to the assertion that schools have always been managed effectively without ICT, and this shows that most of the principals had a positive attitude towards use of ICT.

The findings reveal that 36.8% of the respondents agreed that reliance on ICT for management makes management difficult, 59.6% moderately agreed, while 3.5% disagreed. This attracted a mean score of 3.33, which when rounded off equates the 3.0 mean score, the "agree" response strength. The results suggest that most of the principals (63.12%) did not agree to the assertion that reliance on ICT for management makes management difficult. The results further revealed that 39.8% of the respondents agreed that they think ICT is not practical, 54.4% moderately agreed, while 5.8% disagreed. This attracted a mean score of 3.34, which when rounded off equates the 3.0 mean score, the "moderately agree" response strength. The results suggest that most of the principals (60.2%) did not agree to the statement that implied that ICT is not practical. This was in line with Muthomi, Mbugua & Githua (2013) who found out that all the head teachers who participated in the study believed that it was very important for them to learn how to use computers.

4.3.2 ICT frequency of Use and Effective Management of Public Secondary Schools

This section presents the findings with respect to the second objective which sought to determine how the frequency of use of ICT affect the effective utilization of ICT in management of public secondary schools in Uasin Gishu County. The respondents were asked to indicate how often they use ICT in the management of schools, their responses were captured in Table 4.7.

The responses were guided by a 5-level scale provided whether you agree or not where 5 = Very Often [VO]; 4 = Often [O]; 3 =Sometimes [S]; 2 =Rarely [R]; and 1 = Never [N]

Mean and Standard deviation values are also indicated. The results are presented in Table 4.7

Table 4. 7:

ICT frequency of use and Effective Management of Public Secondary Schools

Parameters on Frequency of Use	*N*	*R*	*S*	*O*	*VO*	*M*	*StD*
Management of student records	171	4.1	52.6	43.3	0.0	3.40	0.56
Management of financial and procurement records	171	5.8	50.9	43.3	0.0	3.42	0.56
Management of teaching and learning materials	171	3.5	51.5	45.0	0.0	3.42	0.56
Planning and controlling of school functions	171	3.5	57.9	38.6	0.0	3.35	0.55

Source: Research Data (2022)

The results in Table 4.7 demonstrates that 52.6% of the respondents indicated that they sometimes used ICT in the management of student records, 43.3% indicated that they often used ICT for this function, while 4.1% rarely used it for that purpose. The results suggest that a minority (43.3%) of the school administrators often used in the management of student records. The implication is that school administrators rarely

used ICT for managing student records. The findings reveal that 50.9% of the respondents indicated that they sometimes used ICT in the management of financial and procurement records, 43.3% indicated that they often used ICT for this function, while 5.8% rarely used it for that purpose. The results suggest that a minority (43.3%) of the school administrators often used in the management of financial and procurement records. This further implied that most of the school administrators rarely used ICTs in the management of financial and procurement records.

The results show that 43.9% of the respondents indicated that they sometimes used ICT in the management of teaching and learning materials, 45% indicated that they often used ICT for this function, while 11.1% rarely used it for that purpose. The results suggest that a minority (45%) of the school administrators often used ICT in the management of teaching and learning materials.

The findings revealed that 57.9% of the respondents indicated that they sometimes used ICT in planning and controlling of school functions, 38.6% indicated that they often used ICT for these functions, while 3.5% rarely used it for that purpose. The results suggest that a minority (43.3%) of the school administrators often used in planning and controlling of school functions. These findings were in consonance with the findings of Abuga (2014) who argued that most of the administrators did not frequently use the ICT in their schools.

4.3.3 Administrators' Access to ICT Facilities and Effective Management of Public Secondary Schools

This section presents the findings with respect to the third objective which sought to establish how school administrators' access to ICT facilities influence the effective management of public secondary schools in Uasin-Gishu County.

The following statements relate to access to ICT facilities. The respondents were asked to indicate their level of agreement with the parameters of ICT facilities indicated. The responses were guided by a 5-Likert-scale as; 5 = Strongly Agree (SA); 4 = Agree (A); 3 = Moderately Agree (MA); 2 = Disagree (D); and 1 = Strongly Disagree (SD) (See Table 4.7).The results are presented in table 4.8.

Table 4. 8:

Access to ICT Facilities

Parameters of ICT Facilities	*N*	*D*	*MA*	*A*	*SA*	*M*	*StD*
The school provides me with a laptop for use at home	171	1.8%	36.8%	61.4%	0.0%	3.60	0.53
The school provides me with a desktop computer for use at home	171	16.4%	67.3%	16.4%	0.0%	3.01	0.57
The school provides me with additional computer hardware for use at home	171	21.1%	67.3%	11.7%	0.0%	2.91	0.57
The school provides licensed software for use at home	171	2.3%	59.1%	38.6%	0.0%	3.36	0.53
The school pays internet charges at home	171	11.7%	50.3%	38.0%	0.0%	3.26	0.66
I can access school e-mail at home	171	5.8%	53.8%	40.4%	0.0%	3.35	0.59
I can access my school computer and transfer files electronically to my home computer	171	8.2%	54.4%	37.4%	0.0%	3.29	0.61
I can access the school website and staff resources from home	171	18.7%	56.7%	24.6%	0.0%	3.06	0.66

Source: Research Data (2022)

The results presented in Table 4.8 show that 61.4% of the respondents agreed that the school provides them with a laptop for use at home, 36.8% moderately agreed, while 1.8% disagreed. This attracted a mean score of 3.60, which when rounded off equates to 4.0 mean score, the “agree”. The results suggest that most of the school administrators (54.4%) indicated that they were provided with a laptop for use at home by their school.

The results show that 16.4% of the respondents agreed that the school provides them with a desktop computer for use at home, 67.3% moderately agreed, while 16.4% disagreed. This attracted a mean score of 3.01, which when rounded off equates to 3.0 mean score, the "moderately agree". The results suggest that a small percentage of the school administrators (16.4%) indicated that they were provided with a desktop for use at home by their school.

The findings show that 11.7% of the respondents agreed that the school provides them with additional computer hardware for use at home, 67.3% moderately agreed, while 21.1% disagreed. This attracted a mean score of 2.91, which when rounded off equates to 3.0 mean score, the "moderately agree". The results suggest that a small percentage of the school administrators (11.7%) indicated that they were provided with additional computer hardware for use at home by their school. The results are in line with those from 5 out of the 6 Sub County Directors of Education (83.3%) who indicated that most schools lack quality ICT facilities and this hampers effective utilization of ICT.

One Sub County Director is quoted saying, *"Most secondary schools in this sub county lack quality ICT infrastructure and thus, cannot utilize ICT effectively for management."*

This finding were contrary to the findings ofGhavifekr, Razak, Ghani, Ran, Meixi & Tengyue (2013) who stated that there is inadequate ICT facilities and low level of ICT usage this can lead to low administrative effectiveness.Similar to this, a research by Bariu (2020) found that most schools invest little in ICT infrastructure since the associated gear, software, and accessories are so expensive. The usage of ICT infrastructure has made it necessary for teachers, school administrators, and

students to obtain new skills and abilities. Due to the fact that the process is still in its early phases, all parties involved must solve all issues that prevent the use of ICT in teaching and learning. Otherwise, schools risk falling behind.

The results reveal that 38.6% of the respondents agreed that the school provides licensed software for use at home, 50.3% moderately agreed, while 2.3% disagreed. This attracted a mean score of 3.36, which when rounded off equates to 3.0 mean score, the "moderately agree". The results suggest that a minority of the school administrators (38.6%) indicated that they were provided with licensed software for use at home by their school. This was in contrary to the findings of Hoque, Razak, and Zahora (2012) which showed that most of the schools do not have ICT policy at the school level though the facilities and equipment of ICT are available.

The findings reveal that 38% of the respondents agreed that they can access school e-mail at home, 53.8% moderately agreed, while 5.8% disagreed. This attracted a mean score of 3.35, which when rounded off equates to 3.0 mean score, the "moderately agree". The results suggest that a minority of the school administrators (38%) indicated that they can access school e-mail at home. This meant that most of the school administrators had access to internet. The findings are in agreement with those by Nikolopoulou and Gialamas (2015) who found that lack of internet access was among the major barriers to the use of computers in high schools. This suggests a possibility of a school having computers without having access to internet due to the digital divide related issues.

The findings show that 37.4% of the respondents agreed that they can access their school computer and transfer files electronically to their home computer, 54.4% moderately agreed, while 8.2% disagreed. This attracted a mean score of 3.29, which

when rounded off equates to 3.0 mean score, the "moderately agree". The results suggest that a minority of the school administrators (37.4%) indicated that they can access their school computer and transfer files electronically to their home computer.

The findings show that 24.6% of the respondents agreed that they can access the school website and staff resources from home, 56.7% moderately agreed, while 18.7% disagreed. This attracted a mean score of 3.29, which when rounded off equates to 3.0 mean score, the "moderately agree". The results suggest that a minority of the school administrators (37.4%) indicated that they can access the school website and staff resources from home computer. The findings in this section are not in agreement with those in a study by Gadzama (2019) who found that not all public secondary schools across the Adamawa State had been equipped with computers and ICT resources. This is to say, with the absence of software and hardware issues, teachers could not integrate the ICT effectively, as to integrate the ICT effectively, there should be essential software and hardware facilities in schools.

4.3.4 Administrators' ICT Technical Competencies and Effective Management of Public Secondary Schools

This section presents the findings relating to the fourth objective which sought to investigate how School administrators technical competencies affects the effective utilization of ICT in management of public secondary schools in Uasin-Gishu County. The respondents were asked to indicate how skilled they are in using ICT resources in executing school management functions. The responses were guided by a 5-Likert-scale provided as follows: Very skilled [5]; Skilled [4]; Moderately skilled [3]; Somehow knowledgeable [2]; and Not Knowledgeable [1]. The mean and standard deviation was computed and the results presented in Table 4.9.

Table 4. 9:

School administrators' ICT Technical Competencies and Effective School Management

	N	Min	Max	Mean	Std. Deviation
Word processor	171	2.00	4.00	3.40	0.71
Spreadsheet	171	2.00	4.00	3.39	0.65
Search the internet	171	2.00	4.00	3.26	0.70
E-mail	171	2.00	4.00	3.26	0.51
School intranet	171	1.00	4.00	3.16	0.65
Database	171	2.00	5.00	3.15	0.68
Desktop publishing	171	2.00	4.00	3.15	0.65
Administration and management software	171	2.00	4.00	3.14	0.65
Presentation software	171	2.00	4.00	3.12	0.68
Internet discussion boards or chat rooms	171	1.00	4.00	1.70	1.01
Create web pages	171	1.00	4.00	1.69	1.00
Peripheral hardware scanner, printer	171	1.00	3.00	1.64	0.93
Video conferencing	171	1.00	3.00	1.64	0.93
Authoring own multimedia or web resources	171	1.00	3.00	1.63	0.93
Personal digital assistant (PDA)	171	1.00	3.00	1.60	0.90

Source: Research Data (2022)

The findings in Table 4.9 show that all the mean scores were below 4.0, which is the mean score representing the "skilled" strength. The results indicate school administrators were more skilled in the word processor (3.46), and spreadsheet (3.39). The rest of the software recorded a mean score ranging between 1.6 and 3.16, thus implying that the school administrators were not skillful in the IT software.

The overall mean score was 2.6, implying that the results suggest that the ICT software listed in the table, were not frequently used for school management by the school administrators. The results from the interview schedules show that 3 out of 6 of the Sub County directors (50%) felt that the principals are not well prepared enough to use ICT in management. One SCDE is quoted stating. *"ICT utilization in*

schools in this sub county is affected by the fact that most teachers are still not ICT literate".

These findings were in line with Okoroafor (2010) in a study in Nigeria who observed that majority of the principals lacked requisite skills on how to search the internet and get information for school management.On the same note, Sincar (2013) observed that school administrators with necessary skills of technology leadership are more likely to facilitate all stages of instruction and school management by.

4.3.5 Effective Management of Public Secondary Schools

The respondents were asked to indicate their level of agreement on parameters used to indicate effective school management. The responses were guided by a 5 Likert-scale labelled as: 5 – Very Effective. 4 – Effective, 3 – Moderate, 2 – Ineffective, 1 – Very Ineffective. The results are as presented in table 4.10below.

Table 4. 10:

Effective Management of Public Secondary Schools

Parameters of Effective Management of Public Secondary Schools	N	Min	Max	Mean	Std. Dev
Accuracy of school management records	171	2.00	4.00	3.09	0.65
Availability of timely information for managerial decision making	171	2.00	4.00	3.04	0.57
Completeness of managerial tasks such as school project management assignments	171	2.00	4.00	3.06	0.55
Success in the implementation of school budgets	171	2.00	4.00	3.13	0.59
Management of teaching and learning materials	171	2.00	4.00	3.06	0.60
Availability of teaching and learning materials	171	2.00	4.00	3.08	0.57

Quality of teaching and learning materials acquired	171	2.00	4.00	3.09	0.58

Source: Research Data (2022)

The results in Table 4.10 show that none of the parameters used to measure effective school management met the mean score associated with the effective rate at 4.0. All the aspects resultant means scored revolve around the 3.0 mean score which is the equivalent of moderately effective. The overall mean score was 3.08. The results suggest that according to most the school administrators, school management was moderately effective, and this is therefore, interpreted in this study as a serious concern that needs to be tackled if schools are to meet their set goals. The responses from all of the 6 sub county directors of education (100%) revealed that ICT contributed to timeliness, accuracy and quality of records made by school administrators. One sub county director is quoted stating. *"ICT helps enhance the quality in task performance."* Another Sub County stated that *"There is the advantage of accuracy in records such as (teacher records, student records, budgets management quality. ICT also helps in enhancement timeliness in report preparation".*

This is in line with Mutisya, Mulwa and Mwania (2017) who revealed that majority of the school principals were not able to integrate ICT in school management effectively, owing to the fact that they lacked requisite ICT competencies.

With respect to what can be done to promote effective school management through ICT use by the principals, the sub county directors suggested that there was need to obtain funds for resources via non-traditional sources, (e.g., crowdfunding, grants); seek guidance from the ISTE to identify effective professionaldevelopment programs.

The expertise of master teachers in professional learningcommunities; request training on newly adopted educational software directly from softwarecompanies; and to ensure that adequate technical, administrative, and peer support is available toteachers during the implementation

4.4 Tests of Hypotheses

The purpose of this study was toanalyze the relationship between Socio-Technical issues influencing effective use of ICT and Management of Public Secondary schools in Uasin Gishu County. This objective was realized by answering the following research question: How do Socio-Technical issues influence successful implementation of ICT in the Management of Secondary Schools in Uasin-Gishu County? Multivariate regression analysis was utilized to examine the hypotheses in order to ascertain the nature of the relationship between the independent and dependent constructs of the study.

To test hypotheses, Multivariate linear regression model was conducted to generate relevant statistics to help determine the influence of independent variables on the dependent variable.

The model was run as;

$$\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \mathcal{E}}$$

Y Effective Management of Public secondary schools

$\beta_1$beta coefficient of the first predictor X_1

$\beta_2$beta coefficient of the second predictor X_2

β_3 beta coefficient of the third predictor X_3

β_4 beta coefficient of the fourth predictor X_4

X_1 Attitude toward ICT

X_2 Frequency of Use of ICT

X_3 Access to ICT Hardware and Software

X_4 Technical Competencies

ε error term assumed to be normally distributed with a mean of zero and constant variance.

4.4.1 School Administrators' Attitude on ICT and Effective Management of Public Secondary Schools

The first objective was to examine how School Administrators' Attitude on ICT influence Effective Management of Public secondary schools in Uasin-Gishu County.

Hypotheses Ho_1, stated,

H_{o1}: *There is no significant influence of School Administrators' Attitude towards ICT on Effective Management of Public Secondary Schools in Uasin-Gishu County.*

Table 4. 11:

Model Summary for Regression Analysis for Administrators' Attitude and Effective Management of Public Secondary Schools

Variable	No. of Observations	Beta	Standard Error	t- Statistic	p-value
Constant	171	1.873	1.702	1.101	
Attitude	171	.637	.056	11.294	.000
R =.637					
R^2 =.405					
F = 127.546					
Durbin Watson=1.266					

***p<0.05**

Predictors: (Constant), Attitude

Dependent Variable: School Management

Source: Research Data (2021)

The results in Table 4.11 indicates the regression analysis for administrators' attitude, the value for Durbin-Watson (D=1.226) is a perfect positive autocorrelation between access to ICT Facilities and school management, as it felt within the acceptable range of 1.5 to 2.5..

The correlation in the relationship between Administrators' Attitude and Effective Management of Public secondary schools was positive and significant ($R = 0.637$, $p<0.05$).

This means that there was a significant relationship between Administrators' Attitude and Effective Management of Public secondary schools indicating that whenever Public secondary schools in Uasin-Gishu County invested in ensuring that there is a good Administrators' Attitude towards ICT usage there was a positive and significant improvement on Effective Management of Schools.

The results of the regression further indicated that Administrators' Attitude significantly predicted Effective Management of Public School ($\beta1= .637$, $t= 11.294$; $p<0.05$), which means a unit increase in Administrators' Attitude produced a 0.637 variation in Effective Management of Public secondary schools in Uasin-Gishu County. The R squared value indicated that Administrators' Attitude explained 40.5 percent of the variance in Effective Management of Public Secondary Schools in Uasin-Gishu County ($R^2 = 0.405$, $F= 127.546$; $p<0.05$). This demonstrates that the larger proportion of disparity in effective management (59.5%) is explained by other factors not captured in the first model. The Hypothesis that there is a significant

relationship between Administrators' Attitude and Effective Management of Public secondary schools in Uasin-Gishu County is therefore supported.

The results illustrate that Effective Management in Public Secondary Schools may not necessarily be solely attributable to Administrators' Attitude but could be based on how Public secondary schools in the county can combined attitude, frequency of use, access to ICT facilities and their technical competencies to effectively achieve good management.

The results agree with those of Ghamrawi (2013) who found that school administrators valued computers as tools for the facilitation of the management of information in their schools and for administrative purposes.

The findings are also in agreement with those in a study by Papaioannou and Charalambous (2011) who established that school principals hold positive attitudes towards ICT, and are willing to integrate it in the management function.

Similarly, Oluyemisi (2015) posited that school administrators have a positive perspective towards the use of ICT tools in effective school management by solving the problem of poor communication in schools and achieving effective planning further lending credence to the findings of the current study, however the findings differed with those of Kavagi (2010) who found out that school administrators see the computer as another typewriter hence its use is likened to turning the boss into the school secretary.

4.4.2 ICT frequency of Use and Effective Management of Public Secondary Schools

The second objective was to determine how ICT Frequency of use influence Effective Management of Public secondary schools in Uasin-Gishu County.

Hypotheses Ho_2, stated,

H_{o2}:*There is no significant influence in Frequency of use of ICT on Effective Management of Public Secondary Schools in Uasin-Gishu County.*

Table 4. 12: Model Summary for Regression Analysis for ICT Frequency of Use and Effective Management of Public Secondary Schools

Variable	No. of Observations	Beta	Standard Error	t- Statistic	p-value
Constant	171	6.845	1.585	4.319	
Frequency of Use	171	.449	.118	8.989	.000
R =.549					
R^2 =.302					
F = 80.796					
Durbin Watson=2.201					

***p<0.05**

Predictors: (Constant), Frequency of Use

Dependent Variable: School Management

Source: Research Data (2021)

The results in table 4.12 indicates the regression analysis for Frequency of use, the value for Durbin-Watson (D=2.201) is also within the established range of 2 to 4 and

thus, this this was a negative autocorrelation between frequency of use and school management, as it fell within the acceptable range of 1.5 to 2.5. The correlation in the relationship between Frequency of use and Effective Management of Public secondary schools was also found to be positive and significant ($R = 0.549$, $p<0.05$).

This indicates a significant relationship between Frequency of use and Effective Management of Public secondary schools signifying that whenever Public secondary schools in Uasin-Gishu County ensured that there was frequent use of ICT there was a positive and significant improvement on Effective Management.

The regression results further indicated that Frequency of use significantly predicted Effective Management of Public School ($\beta1= .449$, $t= 8.989$; $p<0.05$), which means a unit increase in Frequency of use produced a 0.449 deviation in Effective Management of Public secondary schools in Uasin-Gishu County. The R squared value indicated that Frequency of use explained 30.2 percent of the variance in Effective Management of Public Secondary Schools ($R^2 = 0.302$, $F= 80.796$; $p<0.05$). This reveals that a higher proportion of disparity in Effective Management (69.8%) is explained by other aspects not captured in the second model. Therefore, the hypothesis that there is a significant relationship between Frequency of use and Effective Management of Public secondary schools in Uasin-Gishu County is therefore supported.

The results again demonstrate that Effective Management in Public Secondary Schools may not be attributable to Frequency of use only but could be explained further by the ability of the Schools in the County to integrate frequency of use,

attitude, access to ICT facilities and their technical competencies to effectively achieve good management.

Afshari, *et al* (2010), supported the findings of the current study where they established that most school administrators frequently use ICTs in maintaining administrative records about students. However, Biegon (2017) indication that School administrators rarely used ICTs for planning school activities contrasted the current results.

The study outcomes are also in contrary with those in a study by Lipesa (2018) which established that most school administrators such as school administrators and bursars had not integrated ICT in handling financial work, and where this was done it was not frequently done.

4.4.3 School Administrators' Access to ICT Facilities and Effective Management of Public Secondary Schools

The third objective sought to establish how school administrators' Access to ICT facilities influence Effective Management of Public secondary schools in Uasin-Gishu-County.

Hypotheses Ho_3, stated,*there is no significant influence in school administrators' Access to ICT facilities on Effective Management of Public Secondary Schools in Uasin-Gishu County.*

Table 4. 13:

Model Summary for Regression Analysis for Access to ICT Facilities and Effective Management of Public secondary schools

Variable	No. of Observations	Beta	Standard Error	t- Statistic	p-value

Constant	171	8.293	2.241	3.702	
Access to ICT facilities	171	.287	.078	5.673	.000
R =.383					
R^2 =.147					
F = 32.181					
Durbin Watson=1.115					

***p<0.05**

Predictors: (Constant), Access to ICT Facilities

Dependent Variable: School Management

Source: Research Data (2021)

In the regression analysis results for Access to ICT facilities in table 4.13, the value for Durbin-Watson (D=1.115) is a perfect positive autocorrelation between access to ICT Facilities and school management, as it fell within the acceptable range of 1.5 to 2.5. In the relationship between Access to ICT facilities and Effective Management of Public secondary schools, the correlation indicated that it was also positive and significant ($R = 0.383$, $p<0.05$).

This means there was also a significant relationship between the two variables suggesting that every time Public secondary schools in Uasin-Gishu County ensured that there was Access to ICT facilities by administrators' there was a positive and noteworthy improvement on Effective Management of such Schools.

The results further indicated that Access to ICT facilities significantly predicted Effective Management of Public School ($\beta1= .287$, $t= 5.673$; $p<0.05$), which means a component increase in Access to ICT facilities produced a 0.287 deviation in Effective Management of Public secondary schools in Uasin-Gishu County. The R squared value indicated that Access to ICT facilities explained 14.7 percent variation in Effective Management of Public Secondary Schools ($R^2 = 0.147$, $F= 80.796$; $p<0.05$). This shows that a greater share of variance in Effective Management

(85.3%) is accounted for by other facets not captured in the third model. The Hypothesis that there is a significant relationship between access to ICT facilities and effective management of public secondary schools in Uasin-Gishu County is therefore supported.

These findings indicate that effective management in public secondary schools is attributable to the ability of the schools in the county to uniquely blend access to ICT facilities, frequency of use, attitude and their technical competencies factors to effectively achieve good management results. The findings were similar to those in a study by Fidelis and Onyango (2022) where it was revealed that the schools faced non availability of ICT facilities and internet connection. They also faced limited electricity supply and limited funds for maintenance of facilities. This negatively affected management in public secondary schools**.**

4.4.4 School Administrators' ICT Technical Competencies and Effective Management of Public Secondary Schools

Finally, the fourth objective sought to investigate how School Administrators' ICT Technical Competencies influence Effective Management of Public secondary schools in Uasin-Gishu County.

Hypotheses Ho4, stated; *There is no significant influence in School Administrators' ICT Technical Competencies on Effective Management of Public Secondary Schools in Uasin-Gishu County.*

Table 4. 14:

Model Summary for Regression Analysis for ICT Technical Competencies and Effective Management of Public Secondary Schools

Variable	No. of Observations	Beta	Standard Error	t- Statistic	p-value
Constant	171	3.567	1.762	2.024	
ICT Technical Competencies	171	.506	.046	9.936	.000
R =.588					
R^2 =.346					
F = 98.717					
Durbin Watson=1.210					

***p<0.05**

Predictors: (Constant), ICT Technical Competencies

Dependent Variable: School Management

Source: Research Data (2021)

The regression analysis results for ICT Technical Competencies in table 4.14 shows that Durbin-Watson (D=1.210) is also within the acceptable range of 1-3 indicating the of autocorrelation absence in the sample.

This was a perfect positive correlation between ICT technical competencies and school management, as it fell within the acceptable range of 1.5 to 2.5. The relationship between ICT Technical Competencies and Effective Management of Public secondary schools was also positive and significant based on the correlation coefficient ($R = 0.588$, $p<0.05$). This means there was a significant relationship between the two variables demonstrating that when Public secondary schools in

Uasin-Gishu County ensured that there was Technical Competencies on ICT by administrators' there was a positive and remarkable improvement on Effective Management of Schools.

The findings further indicated that ICT Technical Competencies significantly predicted Effective Management of Public School ($\beta 1 = 0.506$, $t = 9.936$; $p<0.05$), which means a factor increase in ICT Technical Competencies produced a 0.506 deviance in Effective Management of Public secondary schools in Uasin-Gishu County. The R squared value indicated that ICT Technical Competencies explained 34.6 percent disparity in Effective Management of Public Secondary Schools ($R^2 = 0.346$, $F = 98.717$; $p<0.05$). This shows that a bigger share of variance in Effective Management (65.4%) is accounted for by other aspects not captured in the fourth model. The conclusion therefore is that the Hypothesis that there is a significant relationship between ICT Technical Competencies and Effective Management of Public secondary schools in Uasin-Gishu County is therefore, supported.

The findings on ICT Technical Competencies points out that Effective Management in Public Secondary Schools cannot be attributed only to ICT Technical Competencies in Public secondary schools in the County but can also be explained by access to ICT facilities, frequency of use and attitude towards Information and Communication Technologies.

The results from all of the sub county directors 100%) revealed that school administrators were well prepared to use ICT in school management. One of the Sub County Directors is quoted saying. *"I believe that through organized seminars, workshops and in-service training for the school administrator, they should be well prepared to effectively utilize ICT in school management".*The findings agree

with those of Obiekwe and Obadigie (2019) where it was found that that administrators of secondary schools in Anambra state in Nigeria need computer operational competency, internet / networking competency and ICT safety competency for effective management.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusions and recommendations of the study. The general objective of the study is to analyze socio-technical issues influencing effective use of ICT in the management of public secondary schools in Uasin-Gishu County, Kenya. The chapter contains a summary of the study findings, the conclusion, recommendations and suggestions for further studies.

5.2 Summary

The study examined the influence of School administrators' attitude toward ICT, determined frequency of use of ICT, established school administrators' access to ICT facilities, and investigate school administrators' technical competencies on effective school management in public primary schools in Uasin-Gishu County, Kenya. The following are the summaries of each objective.

5.2.1 Administrators' Attitude and Effective Management of Public Secondary Schools in Uasin-Gishu County

The first objective of the study sought to examine how school administrators' attitude affects the effective utilization of ICT in management of public secondary schools in Uasin-Gishu County.

Most of the school administrators believe that ICT helps them to handle management activities and that schools can be managed effectively using ICT, and this is justified by a significant and positive relationship between administrators' attitude and

effective management of schools in the County implying that whenever school administrators in the County invest in developing a positive attitude towards ICT, there was likely to be effective management of public secondary schools.

5.2.2 Frequency of Use of ICT and Effective Management of Public Secondary Schools in Uasin-Gishu County

The second objective sought to determine frequency of use of ICT affect the effective utilization of ICT in management of public secondary schools in Uasin-Gishu County. The study established that a minority of the school administrators' often used ICT in their management activities. This is justified by a weak relationship between frequency of ICT use and effective management of schools in the county. The results however indicated a positive and significant relationship between ICT frequency of use and effective school management indicating that whenever there was an increase in ICT usage there was likely to be effective management of school in Uasin-Gishu County.

5.2.3 Administrators' access to ICT facilities and effective Management of Public Secondary Schools

The third objective sought to establish how school administrators' access to ICT facilities affect the effective management of public secondary schools in Uasin-Gishu-County. The study established that public secondary school administrators' in Uasin-Gishu County still had challenges with accessing most of the basic ICT facilities.

This is evident in the low strength of relationship between administrators' access to ICT and effective management of public secondary schools. However, the significant relationship between ICT access and effective management of public secondary schools established demonstrated that a component increase in access to ICT facilities

was able to produce a positive deviation in effective management of public secondary schools in Uasin-Gishu County.

5.2.4 School Administrators' ICT Technical Competencies and Effective School Management

The fourth objective Sought to investigate how School administrators technical competencies affects the effective utilization of ICT in management of public secondary schools in Uasin-Gishu County. The study found out that most of the school administrators did not have requisite technical competencies in the area of ICT. However, the study established a positive and significant relationship between administrators' ICT technical competencies and effective management of schools in Uasin-Gishu County, indicating that those administrators with technical ICT capabilities were more likely to use ICT facilities for effective management of their schools in the county.

5.3 Conclusions

The study made the following conclusions;

The study concludes that there was a statistically significantrelationship between administrators' attitude and effective management of public secondary schools. The

study concluded that school administrators' attitude toward ICT positively influenced the effective management of public secondary schools in Uasin-Gishu County.

Most of the school administrators believed that ICT can contribute significantly towards effective management of the schools they manage.

The study concludes that there was a statistically significant relationship between frequency of use and effective management of public secondary schools in Uasin-Gishu County. On the frequency of ICT use, it was established that minority of the school administrators utilizes ICT facilities frequently in their management functions. The study concluded that failure to utilize ICT facilities frequently due to unavailability of the same in most schools has led to a negative impact on the achievement of effective management in Uasin-Gishu County.

The study concludes that there was a statistically significant relationship between access to ICT facilities and effective management of public secondary schools in Uasin-Gishu County. The study found that school administrators' access to ICT facilities moderately influenced effective management of public secondary schools in Uasin-Gishu County. This is because in majority of the schools, the administrators did not have access to requisite ICT facilities hence hampering successful utilization of ICTs in management of public secondary schools in the County.

The study concludes that there was a statistically significant relationship between ICT technical competencies and effective management of public secondary schools in Uasin-Gishu County. The study concluded on ICT technical competencies that majority of school administrators' lack technical ICT skills required to utilize ICT facilities hence making it difficult for them to achieve effective management. These

administrators are not able to integrate and interpret information from multiple sources using ICTs.

This limitation in technical competencies makes it difficult for them to use requisite ICT equipment and software for school management.

Generally, the findings revealed that for management to be effective in public secondary schools in Uasin-Gishu County, all the variables must be put into place since no single variable can guarantee success. As demonstrated further by the study results, there is no single variable that contributes to the overall success in management of schools unless all the variables under study are leveraged to form a formidable contribution towards effective management of public secondary schools in Uasin-Gishu County.

5.4 Recommendations

The study made the following recommendations;

The Ministry of Education should consider organizing arranging for mentorship programs for school administrators geared at fostering positive attitude towards ICT use for effective school management. School administrators need to be

psychologically influenced so as to appreciate the benefits of ICTs in management of schools. This recommendation was informed by the fact that in many schools, the administrators still believe that schools have always been managed effectively without ICT, and still believe in conventional ways of doing things. This recommendation is also based on the fact that some administrators believe that reliance on ICT for management makes management difficult.

The Ministry of Education should consider revising policies related to monitoring the frequency of ICT use by school administrators for management purposes. The policy should be drafted in such a way that school administrators are encouraged to use ICT equipment and software for school management as frequently as possible.

This will help enhance the effectiveness of a school management tool. This is informed by the findings that revealed that many school administrators did not use ICT frequently in areas such as the management of student records, the management of financial and procurement records, the management of teaching and learning materials, and in the planning and controlling of school functions

The Ministry of Education should consider allocating adequate resources for procuring and distribution of requisite ICT equipment and appropriate licensed software, useful in management of school activities. The school management should consider adopting latest information and communication technologies and ensure there is reliable internet connectivity at all times. This is informed by the fact that majority of the school administrators did not have access to requisite ICT facilities hence affecting negatively their quest for effective management.

The Ministry of Education should consider organizing regular in-service training programs tailored to equip the school administrators with requisite ICT skills, so that

they are able to effectively use ICTs for school management. This recommendation was informed by the fact in many schools that school administrators' lack technical ICT skills required to utilize ICT facilities hence making it difficult for them to achieve effective management.

5.5 Suggestions for Further Studies

The study determined the analysis of Socio-Technical issues influencing effective use of ICT in the Management of Public Secondary Schools in Uasin Gishu County, Kenya.

The findings show that not all public secondary schools were using ICT frequently for school management. A study needs to be undertaken to find out the measures put in place by the Ministry of Education to ensure frequency of ICT use in school management.

The Ministry of Education should also consider revising policies related to monitoring the frequency of ICT by school administrators for management purposes.

There should also be a policy crafted in such a way that school administrators are encouraged to access ICT equipment and software established in school for management as frequently as possible.

The Ministry of Education should consider organizing regular in-service training programs tailored to equip the school administrators with requisite technical competencies in ICT skills.

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APPENDICES

Appendix I: Questionnaire for School Principals

Dear Respondent,

The study seeks to establish "Analysis of Socio-Technical issues influencing effective use of ICT in the Management of Public Secondary Schools in Uasin Gishu County, Kenya". The information collected will be used for purpose of this study only.

Do not indicate your name in the questionnaire

SECTION A: Background Information

1. Gender: Male [ ] Female [ ]
2. Age: 21-30 years [ ] 31-40years [ ] 41 -50 years [ ] Over 50 years [ ]
3. Education Level Diploma [ ] Degree [ ] Post Graduate [ ]

   Others specify) ……..……
4. Highest Professional Qualification? Dip. [ ] B.Ed [ ] PGDE [ ] M.Ed [ ] PhD [ ]

   Others (specify) ……..…….
5. How long have you been a principal?

   Less than 1 year [ ] 1-5 years [ ] 6-10 years [ ] Over 10 years [ ]
6. How long have you been a principal in your present school?

   Less than 1 year [ ] 1 - 5 years [ ] 6- 10years [ ] Over 10 years [ ]

Section B: Attitude, Frequency of Use, Hardware and Software, Technical Competencies and Effective School Management

Part I: Attitude towards ICT Integration in School Management

7. The following state describe school administrators' attitude towards ICT integration in management of secondary schools please indicate your level of agreement.

Please tick (√) where applicable based on the the Likert Scale given in Part I –V below

5 - Strongly Disagree. 4 – Disagree, 3 – Undecided, 2 – Agree, 1 - Strongly Agree

Attitude towards ICT Integration in School Management	**1**	**2**	**3**	**4**	**5**
I feel demoralized when I fail to fix small computer malfunctions					
I believe that ICT helps me to do management tasks					
I always look forward to working with computers					
I enjoy trying to solving school administrative problems using ICT during my free time					
Using ICT makes managerial decision making more complicated					
Schools have always been managed effectively without ICT					
Reliance on ICT for management makes management difficult					
I think ICT is not practical					
I can g*et al*ong well in everyday life without ICT					

Part II: Frequency of Use of ICT

8. How often do you use ICT in the management in the following areas of school management? Indicate your level of agreement with the statements below.

   Very Often - [5] Often - [4] Sometimes - [3] Rarely - [2] Never - [1]

Frequency of Use of ICT	**5**	**4**	**3**	**2**	**1**
Management of student records					
Management of financial and procurement records					
Management of teaching and learning materials					
Planning and controlling of school functions					

Part III: Access to ICT Facilities

The following statements relate to access to ICT equipment in your school. Indicate your level of agreement.

Key: 5 - Strongly Disagree. 4 – Disagree, 3 – Undecided, 2 – Agree, 1 - Strongly Agree

Access to ICT Facilities	**5**	**4**	**3**	**2**	**1**
The school provides me with a laptop for use at home					
The school provides me with a desktop computer for use in school					
The school provides me with additional computer hardware for use at home					

The school Provides printers, scanners and or digital cameras					
The school provides licensed software for use at home					
The school pays internet charges at home					
I can access school e-mail at home					
I can access my school computer and transfer files electronically to my home					
Computer					
I can access the school website and staff resources from home					

Part IV: School administrators' ICT Technical Competencies

How skilled are you in using the following ICT software in executing school management functions?

Very skilled - [5] Skilled - [4] moderately skilled - [3] Somehow Skilled [2] Not Skilled [1]

School administrators' ICT Technical Competencies	5	4	3	2	1
Word processor					
Database					
Spreadsheet					
Presentation software					
Desktop publishing					

Administration and management software					
School intranet					
Search the internet					
Create web pages					
Internet discussion boards or chat rooms					
E-mail					
Peripheral hardware scanner, printer					
Personal digital assistant (PDA)					
Video conferencing					
Authoring own multimedia or web resources					

Part V: Effective School Management

9. How can you rate the effectiveness of school management in the context of the parameters listed in the Table below? Please rate the following statements using the key below.

5 – Very Effective. 4 – Effective, 3 – Moderate, 2 – Ineffective, 1 – Very Ineffective

Effective School Management	5	4	3	2	1
Accuracy of school management records					
Availability of timely information for managerial decision making					

Completeness of managerial tasks such as school project management assignments					
Success in the implementation of school budgets					
Management of teaching and learning materials					
Availability of teaching and learning materials					
Quality of teaching and learning materials acquired					

Thank you for your co-operation

Appendix II: Questionnaire for Bursars and School Secretaries

Dear Respondent,

The study seeks to establish "Analysis of Socio-Technical issues influencing effective use of ICT in the Management of Public Secondary Schools in Uasin Gishu County, Kenya". The information collected will be used for purpose of this study only.

Do not indicate your name in the questionnaire

SECTION A: Background Information

10. Gender: Male [ ] Female [ ]

11. Age: 21-30 years [ ] 31-40years [ ] 41 -50 years [ ] Over 50 years [ ]

12. Education Level Diploma [ ] Degree [ ] Post Graduate [ ]

Others specify) ……..……

13. Highest Professional Qualification? Dip. [ ] B.Ed [ ] PGDE [ ] M.Ed [ ] PhD [ ]

Others (specify) ……..…….

14. How long have you been a principal?

Less than 1 year [ ] 1-5 years [ ] 6-10 years [ ] Over 10 years [ ]

15. How long have you been a principal in your present school?

Less than 1 year [ ] 1 - 5 years [ ] 6- 10years [ ] Over 10 years [ ]

Section B: Attitude, Frequency of Use, Hardware and Software, Technical Competencies and Effective School Management

Part I: Attitude towards ICT Integration in School Management

16. The following state describe school administrators' attitude towards ICT integration in management of secondary schools please indicate your level of agreement.

Please tick (√) where applicable based on the the Likert Scale given in Part I –V below

5 - Strongly Disagree. 4 – Disagree, 3 – Undecided, 2 – Agree, 1 - Strongly Agree

Attitude towards ICT Integration in School Management	**1**	**2**	**3**	**4**	**5**
I feel demoralized when I fail to fix small computer malfunctions					
I believe that ICT helps me to do management tasks					
I always look forward to working with computers					
I enjoy trying to solving school administrative problems using ICT during my free time					
Using ICT makes managerial decision making more complicated					
Schools have always been managed effectively without ICT					
Reliance on ICT for management makes management difficult					
I think ICT is not practical					
I can g*et al*ong well in everyday life without ICT					

Part II: Frequency of Use of ICT

17. How often do you use ICT in the management in the following areas of school management? Indicate your level of agreement with the statements below.

Very Often - [5] Often - [4] Sometimes - [3] Rarely - [2] Never - [1]

Frequency of Use of ICT	**5**	**4**	**3**	**2**	**1**
Management of student records					
Management of financial and procurement records					
Management of teaching and learning materials					
Planning and controlling of school functions					

Part III: Access to ICT Facilities

The following statements relate to access to ICT equipment in your school. Indicate your level of agreement.

Key: 5 - Strongly Disagree. 4 – Disagree, 3 – Undecided, 2 – Agree, 1 - Strongly Agree

Access to ICT Facilities	**5**	**4**	**3**	**2**	**1**
The school provides me with a laptop for use at home					
The school provides me with a desktop computer for use in school					
The school provides me with additional computer hardware for use at home					

The school Provides printers, scanners and or digital cameras					
The school provides licensed software for use at home					
The school pays internet charges at home					
I can access school e-mail at home					
I can access my school computer and transfer files electronically to my home					
Computer					
I can access the school website and staff resources from home					

Part IV: School administrators' ICT Technical Competencies

How skilled are you in using the following ICT software in executing school management functions?

Very skilled - [5] Skilled - [4] moderately skilled - [3] Somehow Skilled [2] Not Skilled [1]

School administrators' ICT Technical Competencies	5	4	3	2	1
Word processor					
Database					
Spreadsheet					
Presentation software					
Desktop publishing					

Administration and management software					
School intranet					
Search the internet					
Create web pages					
Internet discussion boards or chat rooms					
E-mail					
Peripheral hardware scanner, printer					
Personal digital assistant (PDA)					
Video conferencing					
Authoring own multimedia or web resources					

Part V: Effective School Management

18. How can you rate the effectiveness of school management in the context of the parameters listed in the Table below? Please rate the following statements using the key below.

5 – Very Effective. 4 – Effective, 3 – Moderate, 2 – Ineffective, 1 – Very Ineffective

Effective School Management	5	4	3	2	1
Accuracy of school management records					
Availability of timely information for managerial decision making					

Completeness of managerial tasks such as school project management assignments					
Success in the implementation of school budgets					
Management of teaching and learning materials					
Availability of teaching and learning materials					
Quality of teaching and learning materials acquired					

Thank you for your co-operation

Appendix III: Interview Guide for Sub-County Directors

The purpose of this interview is to gather information regarding the principals' preparedness on the use of information communication and technology in the management of selected secondary schools in Uasin Gishu County, Kenya. The information you provide will be kept confidential and will be solely used for research.

1. Comment on the availability of ICT hardware and software for use by principals in management of schools.
2. How does ICT facilitate the performance of administrative tasks in schools?
3. Comment on the attitudes of principals on the use of ICT in school management, and how this has influenced school management effectiveness.
4. Comment on the competency of principals on the use of ICT in administration in schools
5. Do you think the principals are well prepared enough to use ICT in management? Please explain
6. Has the use of ICT by school principals in your sub county enhanced efficiency and effectiveness of management of school facilities?
7. What do you think can be done to promote effective school management through ICT use by the principals?

Thank you for your cooperation

Appendix IV. List of Public Secondary Schools in Uasin Gishu County

Sub County	Secondary School
Ainabkoi	A.I.C Kiluka Mixed Day Secondary – Mixed
	Ainabkoi Secondary School – Mixed
	Bishop Birech Girls Tilol – Girls
	Chepkongony c o c Secondary School – Mixed
	Chepng'oror Secondary School – Mixed
	Kapsoya Secondary School – Mixed
	Olaare Secondary School – Mixed
	Plateau Secondary School – Girls
	Rurigi Secondary School – Mixed
	St.Gregory Naiberi Secondary School – Mixed
	Chesogor Secondary School – Mixed
	Illula Secondary School – Mixed
	Tendwo Secondary School – Mixed
Kapseret	A.I.C Lemook Secondary School – Mixed
	A.I.C Tulwet Secondary School – Boys
	Kipkenyo Secondary School – Mixed
	Mwiruti Secondary School – Mixed
	Ngara Falls Secondary School – Mixed
	Ngeria Secondary School – Girls
	Simat Secondary School – Mixed
	Suzy Peacock High School – Mixed
	Tuiyo Secondary School – Mixed
	Wareng High School – Mixed

	Kiambaa Secondary School – Mixed
	St. Joseph Kapsaret – Mixed
Kesses	A.I.C Teldet Secondary School – Mixed
	Bishop Muge Subukia Secondary School – Mixed
	Cengalo Secondary School – Mixed
	Chepkoiyo Secondary School – Mixed
	Cheplaskei Secondary School – Boys
	Chirchir Secondary School – Mixed
	Davies Secondary School – Mixed
	Kamuyu High School – Mixed
	Kapkoiga Girls Secondary School – Girls
	Koiluget Secondary School – Mixed
	Koiwoarusen Secondary School – Mixed
	Koros Secondary School Chemina – Mixed
	Lelmolok Secondary School – Mixed
	Lingway Sec – Mixed
	Mkombozi Secondary School – Mixed
	Moi Chuiyat Secondary School – Mixed
	Moi University Sec Sch – Mixed
	Ndungulu Secondary School – Mixed
	R.c.e.a Seiyo Secondary – Mixed
	Racecourse Secondary School – Mixed
	Rukuini Secondary School – Mixed
	Songoliet Secondary School – Mixed
	Sosiani Secondary School – Mixed

	St Catherine Girls Secondary School Kesses – Girls
	St. Michael's Tulwopng'etuny Secondary School – Mixed
	Tarakwa Secondary School – Mixed
	Barekeiwo Mixed Secondary School – Mixed
	Bindura Secondary School – Mixed
	Chepkigen Sec School – Mixed
	Isaac Kosgei (A.I.C) – Mixed
Moiben	A.I.C Torochmoi High School – Mixed
	AIC Chemungen Secondary School – Mixed
	Biwott Ng'elel tarit Secondary School – Mixed
	Cheburbur Secondary School – Mixed
	Chepkoilel Secondary School – Mixed
	Cheplelachbei East Mixed Secondary School – Mixed
	Kemeliet Secondary Schoool – Mixed
	Kimoning Secondary School – Boys
	Kimumu Secondary School – Mixed
	Moiben High School – Boys
	R.c.e.a Livingstone Secondary School – Mixed
	Seko Girls Sec Sch – Girls
	Sosiot Secondary School – Mixed
	St Mary's Girls Secondary School Kapsiliot – Girls
	St Peter's Kamukunji Secondary School – Mixed
	St. Peter's Secondary School –Ngoisa – Mixed
	St. Peter's Soin Secondary – Mixed
	Tachasis Girls' Secondary School – Girls

	Tembelio Secondary School – Mixed
	Toloita Secondary School – Mixed
	Chelalang Secondary School – Mixed
	Cheplelaibei North Secondary School – Mixed
	Cheptiret Secondary School – Boys
	DEB Mutwot Secondary School – Mixed
	Eldoret Central Secondary School – Mixed
	Eldoret G.K Magereza Secondary School. – Mixed
	Kalyet Secondary School – Mixed
	St. Joseph's Kapnasu Secondary School – Mixed
	Tugen Estate Rcea Secondary School – Mixed
	University Of Eldoret High School – Mixed
Soy	A.I.C Itigo Secondary School – Mixed
	A.I.C Mogoon Secondary School – Mixed
	A.I.C Kapsang High School – Mixed
	A.I.C Saramek Secondary School – Mixed
	Ack St. John Sigowet – Mixed
	Chebarus Secondary School – Mixed
	K.A.G Bwayi Secondary School – Mixed
	Kerotet Girls Secondary School – Girls
	Kiborom Secondary School – Mixed
	Kipsangui Girls Secondary School – Girls
	Legebet Secondary School – Mixed
	Lemoru Secondary School – Mixed
	Mafuta Secondary School – Mixed

	Moi's Bridge Secondary School – Mixed
	Ngeny Secondary School – Mixed
	R C E A Kuinet Secondary School – Mixed
	Sisyobei Adventist Secondary School – Mixed
	Sosiyo Secondary School – Mixed
	Soy Secondary School – Mixed
	St Michael Kipsombe Secondary – Mixed
	St Peter's Kapkoren – Mixed
	St Peter's Natwana Secondary School – Mixed
	St. Joseph's Mobett Secondary School – Mixed
	St. Paul's Makongi Secondary School – Mixed
	St.Antony Boinet – Mixed
	Uasin Gishu High School – Mixed
	Umoja Secondary School – Mixed
	Ziwa Secondary School – Mixed
	Eldoret Kandie Secondary School – Mixed
	Eldoret Township Secondary School – Mixed
	Excel High School – Mixed
	Kapkeben Secondary School – Mixed
	Kaplelach High School – Mixed
	Kapngetuny Gaa Secondary School – Mixed
	Kaptebengwet Secondary School – Mixed
	Keringet Secondary School – Mixed
	St. Stephen's Jabali Secondary School – Mixed
Turbo	A.I.C Seiyot Secondary – Mixed

A.I.C Tapsagoi High School – Mixed

Chepsaita Secondary School – Mixed

Kapsaos Secondary School – Mixed

Kosachei Sec School – Mixed

Lereru Secondary School – Mixed

Leseru Secondary School – Mixed

Murgusi Secondary School – Mixed

Ng'enyilel Secondary School – Mixed

Rcea Kiplombe High School – Mixed

St Mary's Osorongai – Mixed

St. John's Sokyot Secondary School – Mixed

Sugoi Girls Secondary School – Girls

Christ The King -Sambut Secondary School – Mixed

Kaptebee Secondary School – Mixed

Moi Barracks Sec – Mixed

A.I.C Kosyin Secondary School – Mixed

AIC Kapkei Secondary School – Mixed

AIC Kosirai Secondary School – Mixed

AIC Ndabarnach Secondary School – Mixed

Kipkabus Secondary School – Boys

Kokwet Secondary School – Mixed

Lolkinyei Secondary School – Mixed

Lorwa Sec – Mixed

Makongi High School – Mixed

St.Peter's Waunifor Secondary School – Mixed

Uswo Mixed Day Secondary School – Mixed

Appendix V Sample Determination Formula

Kothari and Garg (2014) as shown in Appendix VI.

$$n = \frac{Z^2 pqN}{e^2(N-1) + Z^2 pq}$$

Where: s secion

n = the sample size for a finite population

N= size of population which is the number of schools.

p = population reliability (or frequency estimated for a sample of size n), where p is 0.5 which is taken for schools' population

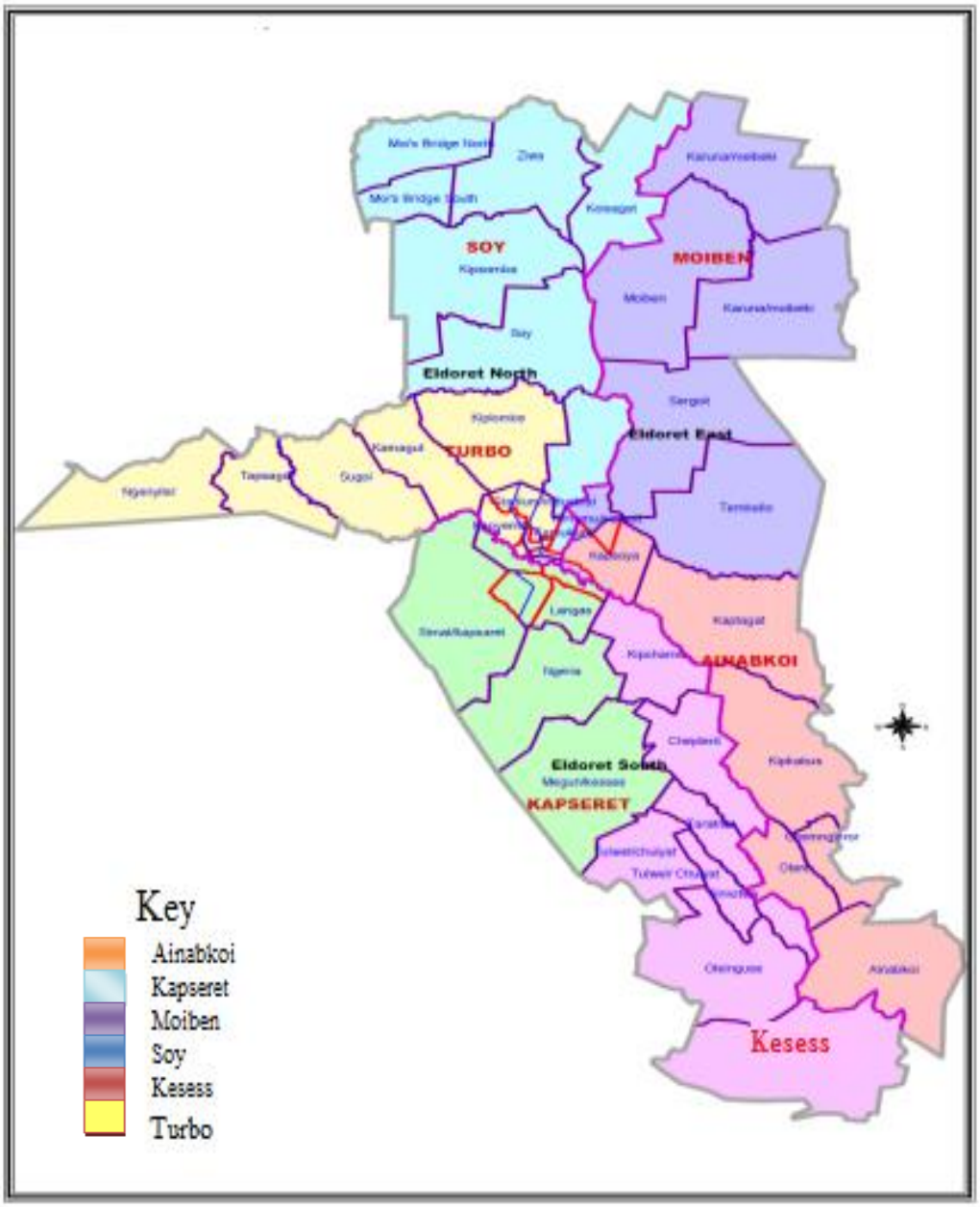
p + q= 1 e: margin of error considered is 10% for this study. Z α /2: normal reduced variable at 0.05 level of significance z is 1.96

According to the above formula, the sample size for all the teachers is:

$$n = \frac{(1.96)^2 \times 0.5 \times 0.5 \times 166}{(0.1)^2 (166 -1) + [(1.96)^2 \times 0.5 \times 0.5]}$$

$$= 61.07355195, \text{ that is, } 60 \text{ schools}$$

Appendix VI: Map of The Study Area



Appendix VII: Regression Model Adopted

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Y Effective Management of Public secondary schools

β_0 Constant term

$\beta_1$beta coefficient of the first predictor X_1

$\beta_2$beta coefficient of the second predictor X_2

β_3 beta coefficient of the third predictor X_3

β_4 beta coefficient of the third predictor X_4

X_1 Attitude toward ICT

X_2 Frequency of Use of ICT

X_3 Access to ICT Hardware and Software

X_4 Technical Competencies

The results from the analyzed quantitative data were presented using graphs, pie charts, frequencies, tables, and figures.

Appendix VIII: Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **889623**

Date of Issue: **31/May/2021**

RESEARCH LICENSE

This is to Certify that Mr.. STEPHEN KIPSANG KIRUI of University of Kabianga, has been licensed to conduct research in Uasin-Gishu on the topic: ANALYSIS OF SOCIO-TECHNICAL ISSUES INFLUENCING EFFECTIVE USE OF ICT IN THE MANAGEMENT OF PUBLIC SECONDARY SCHOOLS IN UASIN GISHU COUNTY, KENYA for the period ending : 31/May/2022.

License No: **NACOSTI/P/21/10956**

889623

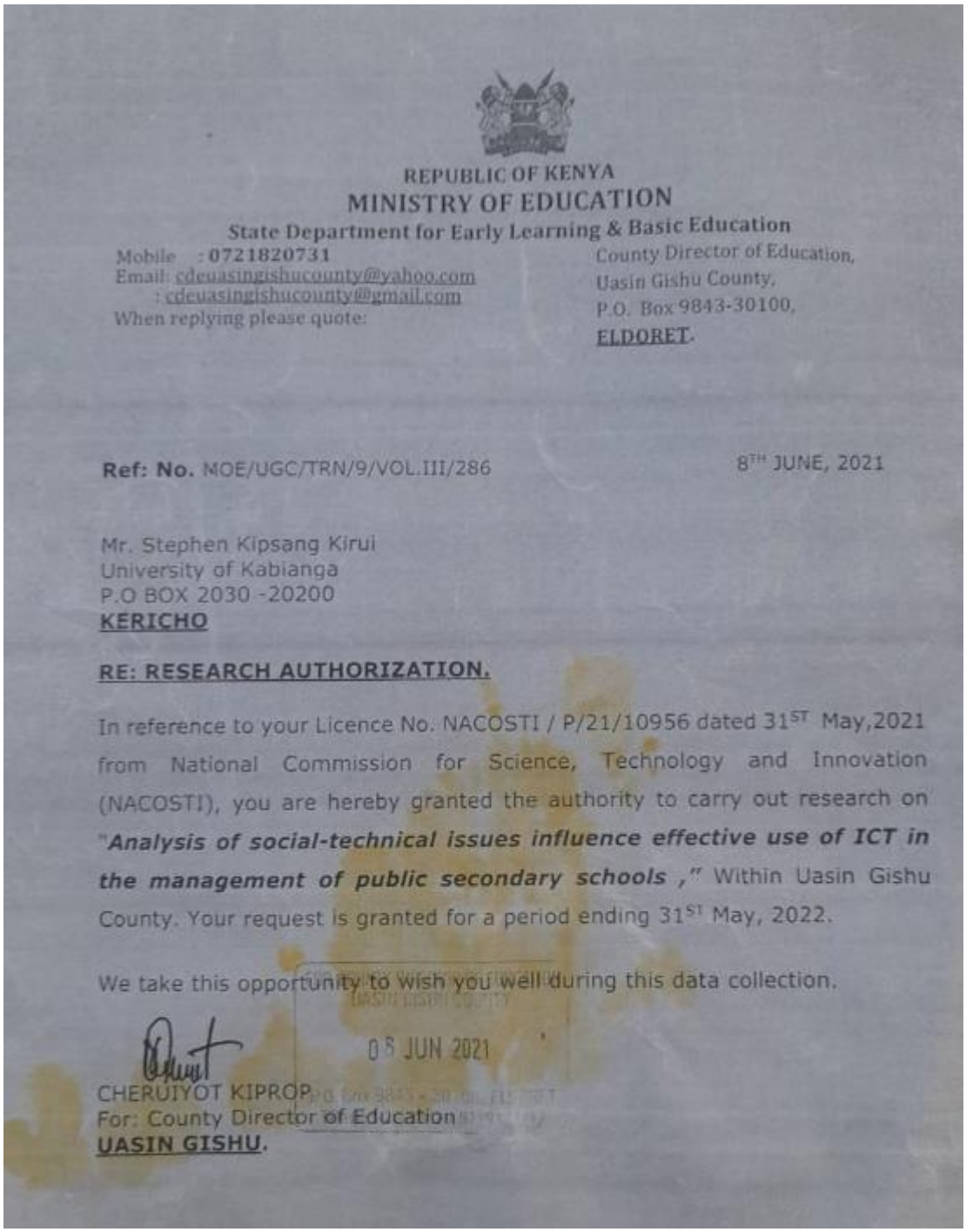
Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

Appendix IX: Research Authorization Letter



REPUBLIC OF KENYA
MINISTRY OF EDUCATION
State Department for Early Learning & Basic Education

Mobile : 0721820731
Email: cdeuasingishucounty@yahoo.com
: cdeuasingishucounty@gmail.com
When replying please quote:

County Director of Education,
Uasin Gishu County,
P.O. Box 9843-30100,
ELDORET.

Ref: No. NOE/UGC/TRN/9/VOL.III/286

8TH JUNE, 2021

Mr. Stephen Kipsang Kirui
University of Kabianga
P.O BOX 2030 -20200
KERICHO

RE: RESEARCH AUTHORIZATION.

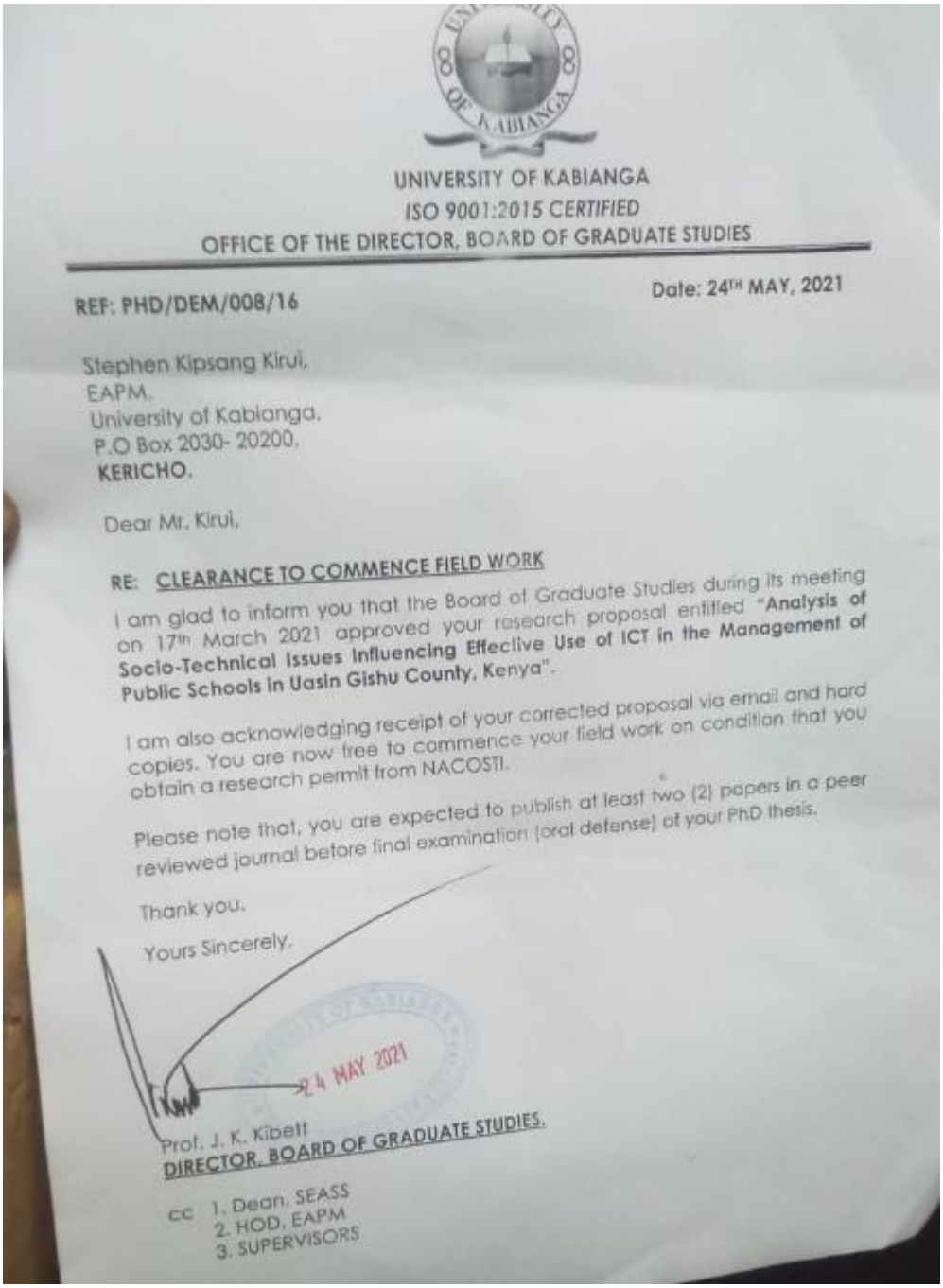
In reference to your Licence No. NACOSTI / P/21/10956 dated 31ST May,2021 from National Commission for Science, Technology and Innovation (NACOSTI), you are hereby granted the authority to carry out research on "***Analysis of social-technical issues influence effective use of ICT in the management of public secondary schools ,***" Within Uasin Gishu County. Your request is granted for a period ending 31ST May, 2022.

We take this opportunity to wish you well during this data collection.

08 JUN 2021

CHERUIYOT KIPROP
For: County Director of Education
UASIN GISHU.

Appendix X Research Clearance Letter



UNIVERSITY OF KABIANGA
ISO 9001:2015 CERTIFIED
OFFICE OF THE DIRECTOR, BOARD OF GRADUATE STUDIES

REF: PHD/DEM/008/16

Date: 24TH MAY, 2021

Stephen Kipsang Kirui,
EAPM.
University of Kabianga.
P.O Box 2030- 20200.
KERICHO.

Dear Mr. Kirui,

RE: CLEARANCE TO COMMENCE FIELD WORK

I am glad to inform you that the Board of Graduate Studies during its meeting on 17th March 2021 approved your research proposal entitled "**Analysis of Socio-Technical Issues Influencing Effective Use of ICT in the Management of Public Schools in Uasin Gishu County, Kenya**".

I am also acknowledging receipt of your corrected proposal via email and hard copies. You are now free to commence your field work on condition that you obtain a research permit from NACOSTI.

Please note that, you are expected to publish at least two (2) papers in a peer reviewed journal before final examination (oral defense) of your PhD thesis.

Thank you.

Yours Sincerely.

24 MAY 2021

Prof. J. K. Kibett
DIRECTOR, BOARD OF GRADUATE STUDIES.

cc 1. Dean, SEASS
2. HOD, EAPM
3. SUPERVISORS