UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY IN MANAGEMENT OF PUBLIC SECONDARY SCHOOLS IN MACHAKOS COUNTY, KENYA

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E55/CTY/PT/33215/2014

A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF EDUCATION IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTERS DEGREE IN EDUCATIONAL MANAGEMENT

OCTOBER, 2020
DECLARATION

I confirm that this project is my original work and has not been presented in any other university for certification. The project has been complemented by referenced work duly acknowledged. Where text, data, graphics have been borrowed from other works, the sources are specifically accredited through referencing in accordance with antiplagiarism regulations.

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DEDICATION

I dedicate this study to my loving husband, Jones M. Mulonzia, My two children, Carol and Victor who have been my source of inspiration.
ACKNOWLEDGEMENT

First and foremost I thank the Almighty God for endless love in my life. Secondly, I would like to appreciate my supervisor Dr. Elizabeth Katam for tireless and intelligent supervision and timely feedback in my study. May the Almighty God bless her abundantly.

I offer my heartfelt thanks to the teaching and non-teaching staff in the Educational Management, Policy and Curriculum Studies department for their support throughout this study. My sincere gratitude to Dr. Mutuma for his input and encouragement towards my study. My genuine appreciation to Roselyn Morema for creating time to guide me in this study. May God bless you always.

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**ABBREVIATIONS AND ACRONYMS**

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<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>ACE</td>
<td>Accelerating 21st Century Education</td>
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<td>BECTA</td>
<td>British Educational Communications and Technology Analysis</td>
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<td>BG</td>
<td>Bulk Grant</td>
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<td>BOM</td>
<td>Board of Management</td>
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<td>CATS</td>
<td>Continuous Assessment Tests</td>
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<td>CEMASTEA</td>
<td>Centre for Mathematics, Science, Technology in Education in Africa</td>
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<td>CFSK</td>
<td>Computer for Schools Project, Kenya</td>
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<td>EGRA</td>
<td>Early Grade Reading Assessment</td>
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<td>ESP</td>
<td>Economic Stimulus Programme</td>
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<td>FMIS</td>
<td>Financial Management Information System</td>
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<td>GPE</td>
<td>Global Partnership for Education</td>
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<td>HODs</td>
<td>Heads of Departments</td>
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<td>HRM</td>
<td>Human Resource Management</td>
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<td>ICT</td>
<td>Information and Communications Technologies</td>
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<td>IT</td>
<td>Information Technologies</td>
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<td>K.C.P.E</td>
<td>Kenya Certificate of Primary Education</td>
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<td>KEM I</td>
<td>Kenya Educational Management Institute</td>
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<tr>
<td>K.C.S.E</td>
<td>Kenya Certificate of Secondary Examination</td>
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<td>K.N.E.C</td>
<td>Kenya National Examination Council</td>
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<tr>
<td>LAN</td>
<td>Local Available Network</td>
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<td>MOE</td>
<td>Ministry of Education</td>
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<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>MEOST</td>
<td>Ministry of Education Science and Technology</td>
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<td>NEPAD</td>
<td>New Partnership for Africa’s Development</td>
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<td>NI3C</td>
<td>National ICT Innovation and integration Centre</td>
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<td>NACOSTI</td>
<td>National Commission for Science Technology and Innovation</td>
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<td>NEMIS</td>
<td>National Educational Identification System</td>
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<td>N.G.Os</td>
<td>Non-Governmental Organizations</td>
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<tr>
<td>SMS</td>
<td>Schools Management System</td>
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<td>S.S.P.S</td>
<td>Statistical Packages for Social Sciences</td>
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<td>TAM</td>
<td>Technology Acceptance Model</td>
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<td>TS</td>
<td>Teachers Salaries</td>
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<td>Teachers Service Commission</td>
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<td>Teacher of Trainers</td>
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<td>T. T. Cs</td>
<td>Teacher Training Colleges</td>
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<td>UK</td>
<td>United Kingdom</td>
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<td>USA</td>
<td>United States of America</td>
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<td>USAID</td>
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ABSTRACT

In the twenty first century, technology use has had huge impact in every sphere of life. Information and Communication Technology has been used enormously in school administration as an aid in data control. With high level of investment in Information and Communication Technology, still there is limited integration of Information and Communication Technology in school management. The purpose of this study was to investigate the utilization of Information and Communication Technology in management of public secondary schools in Machakos Sub-County, Kenya. Specific objectives were: to establish the extent to which Information and Communication Technology is used in curriculum and instruction in management of public secondary schools in Machakos Sub-County, to identify how Information and Communication Technology is used in supervision of personnel in management of public secondary schools, to find out ways in which Information and Communication Technology is used in financial control in management of public secondary schools in Machakos Sub-County. The study would be of significance to the Ministry of Education in coming up with relevant educational policies on management of schools. It would also be significant to Kenya Educational Management Institute in training Principals on the use of Information and Communication Technology in school management. Technology acceptance Model by Fred Davis (1985) guided this study. Data was analyzed qualitatively and quantitatively. Quantitative data was analyzed using descriptive statistics assisted by SPSS. Quantitative data were presented in tables, percentages, and graphs. Qualitative data were organized into themes according to study objectives and described using words and analyzed was presented in form of tables and graphs. Quantitative data was displayed first, and qualitative data were collaborated. The study was carried out in public secondary schools in Machakos Sub-County. The study targeted 45 public secondary schools, 45 principals and 513 teachers. Stratified sampling was used to categorize schools into 3 strata. Simple random sampling was used to sample 2 girls’, 2 boys’ and 7 mixed schools totaling to 11 schools. Systematic sampling was used to sample 7 mixed schools out of the 35 mixed schools. Thus, from the 11 sampled schools, principals became automatic respondents of the study. From the 11 schools, teachers were sampled using simple random sampling. Interview guides were used to collect data from principals while questionnaires were administered to teachers. One secondary school, one principal and one teacher were chosen for pilot study. The main findings of this study indicated that ICT use in curriculum and instruction for effective school management was minimal. Schools rarely use ICT in personnel management. Most schools do not use time attendance software to supervise teachers and majority of schools do not use biometric sign-in system to monitor students. Majority of teachers lack skills on ICT especially on NEMIS use. Most teachers are not aware of how ICT can be used in management of school finances. The study recommends more teacher in-service training on utilization of ICT in schools, government to create more incentives on use of ICT, school administration to purchase more computers to enable teachers have more accessibility.
CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Introduction

This chapter entails background information of the study, statement of the problem, purpose of the study, objectives of the study, research questions, and significance of the study, limitations and delimitations of the study, assumptions made in the study, theoretical and conceptual framework and finally operational definition of key terms.

1.2 Background Information of the Study

The use of Information and Communication Technology (ICT) in educational administration has rapidly increased due to its efficiency and effectiveness. Information and Communication Technology use has led to immense changes in the way schools are managed. This is because of increased students’ enrollment rate, changes in ICT itself, communication in and outside the school setting (Makewa, Meremo, Role, & Role, 2013). However, the use of ICT in school management has not received a lot of attention like the attention given to ICT integration in curriculum and instruction (Muema, 2015).

Prior to introduction of ICTs in management of schools, educational managers used to spend a lot of time solving difficult educational problems like staff and resources allocation, timetabling and monitoring how schools operate. However, with increased technology, school managers have better ways of managing their schools (Shah, 2014). In developed countries like United States of America (USA) and Europe, the use
of ICT has been integrated in school management. Additionally, Britain, Australia, Mexico and Netherlands, have utilized ICT in schools’ tasks like timetabling, keeping of school records, financial accounting and students’ assessment (Muema, 2015). The utilization of ICT in school management has proved to be beneficial to school managers in maintaining school programmes thus enhancing effective school administration.

According to (Okoli, 2015), school managers were expected to give direction to the other members of staff in order to achieve good academic performance. Most schools in Ohio, USA had adequate computers, 99% of the teachers had access to computers in their respective schools but the school administrators and the teachers were not willing to use them, reason being, school administrators had a negative attitude towards ICT use. They were also not sure how they would use the data generated using ICT to carry out their role as school administrators. Additionally, they did not know how data generated would have an impact on their work as school administrators (Makewa et al. 2013). Access to computers in schools is the first step to effectively carry out administrative and supervisory activities in schools. Unwillingness of the principals and teachers to use the available computers may hinder successful carrying out of school duties.

Canada on the other hand has a national ICT education policy directing schools to integrate ICT in curriculum and instruction. However, as much as the policy is in place, Canada does not have a formal established ICT secondary school curriculum. Without an ICT curriculum, teachers might not have a good guidance on how to utilize ICT in
teaching and learning. It’s also not clear whether teachers received any in-service training on how to utilize ICT in curriculum and instruction. Yes, ICT policy on education is there but the implementers seem to lack direction on how to implement the policy. The ICT policy on education therefore depends on the willingness of the school teacher and principal to use ICT to perform their designated tasks. This informal policy expectation does not fully guarantee the use of ICT integration in curriculum and instructions in Canadian schools. Therefore, teachers in Canadian schools integrated ICT in curriculum and instruction bit by bit (Tondeur, Braak, & Valcke, 2007).

In Caribbean countries especially in St. Lucia, Information and Communication Technology is used in schools to maintain students’ records including class attendance, biographies and their learning achievements in terms of continuous assessment tests (CATs) and exam performance. Information and Communication Technology was used in preparation of students’ transcripts and report cards and tracking personnel attendance in schools. School administrators could see, enter and edit all information concerning school personnel by use of ICT. According to (Oyier,Odundo, Lilian & Wangui, 2015) personnel duty schedules and timetabling was done by use of ICT. Use of ICT allowed transfer of information, retrieve and store data by almost all members of staff. This implies that, ICT integration in school management makes it easy to access all records of school personnel and schedule classes for members of staff. Thus the researcher found it important to carry out a research in Machakos County, to find out to whether schools utilize ICT to supervise school personnel for effective school management.
Information and communication Technology is used to supervise and monitor teachers in schools. In Bahamas, principals utilize technologies to maintain records of members of staff in terms of their class attendance and also students’ class attendance. Supervision is important because it improves schools’ academic performance and enables school managers make informed decisions in school management (Alexander, 2015). With the integration of ICT, it was noted that, teachers work load of keeping learners records on daily basis had reduced significantly. Technology was used to formulate and implement schemes of work, lesson plans and records of work (Okoli, 2015). Therefore, the use of technology has proved to have a great impact in supervision of school personnel, hence the researcher found it appropriate to find out how ICT is utilized in supervising personnel in public secondary schools.

In South Africa, ICT helps in promoting new methods of teaching and learning. Use of ICT in curriculum and instruction leads to increased learners’ creativity, motivation, improved knowledge acquisition and skills, team work and self-esteem (Mdlongwa, 2012). South African teachers were in agreement that ICT enabled them work faster. Efficient communication with other teachers within schools was necessitated by use of ICT. The use of Information and Communication Technology enhances faster transfer of information in schools thus enabling efficient running of school activities leading to effective school administration.

In Tanzania, school managers are tasked with the responsibility of running school accounts. They supervise officers in charge of school accounts. Budget is both an
administrative and a planning tool (Muema, 2015). If school budget is well captured by use of ICT, it makes financial control an easier job for school managers. Auditing of school accounts is easily done by use of ICT not to mention, preparation of balance sheets, schools’ income and expenditure records. Utilization of ICT in financial management creates transparency among school administrators thus avoiding misappropriation and misuse of school funds.

According (Diamond & Khemani, 2005), ICT software improves the use and maintenance of accounts books which are: Cash books, fees registers, and petty cash and receipt books. The main areas of concern are keeping financial records, transfer, use and account for funds. Technology is used to keep and analyze financial data such as fees payment, allocation of budgets, accounting and auditing of school accounts (Oyier, et al. 2015). School managers can utilize ICT to make orders and pay staff members (Katitia, Tanui & Oruta, 2019). Application and use of technology in financial management in schools has proved to be safe and efficient in carrying out all financial transactions within a limited period of time. Therefore, school managers should utilize technology in controlling school finances thus enhancing efficient keeping of financial records. For a manager to monitor school expenditure, appropriate keeping of school records, accounting and auditing procedures are followed. With introduction of ICT, school managers are able to retrieve information concerning their schools’ finances enabling the managers make informed decisions concerning their schools.

Kenya ICT policy was introduced in 2006. It aimed at utilizing ICT at all levels which included teaching and learning and support decision making and effective management
of schools. The Kenya ICT policy on education expected a certain standard to be established in developing software, hardware and in training of school personnel. Through the Ministry of Education, Science and Technology (MoEST, 2006), the Kenya government provided a foundation for ICT integration in education and training through which learners and school managers are able to cope with school management challenges associated with globalization and technology (Muthoni, 2015). The computer for schools project Kenya was developed in 2002 through which public schools in the country have been receiving computers and training on use of ICT. With a grant of 8.8 billion shillings from the Global Partnership for Education (GPE) on implementation of technology in Kenyan schools, it is not yet established how technology is used in management of public secondary schools (MOE, 2015).

Use of ICT in school management is very important as it saves school managers and other education officers’ time and energy in running their specific tasks. In Kenya, ICT has been reasonably utilized by the ministry of education to manage schools’ data. For example, ICT is used by the Kenya National Examination Council (KNEC), the body charged with conducting of exams in Kenya, to register exam candidates online with great success. KNEC came up with a website where all Kenya Certificate of Primary Education (K.C.P.E) and Kenya Certificate of Primary Education (K.C.S.E) candidates continue to register for their specific exams online.

In Kenya, some school managers are able to monitor the movement of their students in school. For instance, State House girls High School in Nairobi, boarding students sign
in using a biometric sign-in system when they arrive and leave school, while students in
day schools are expected to sign in and out every day using the biometric system every
day they get in and leave school. Recent studies show that, over public 100 schools in
Nairobi are expected to install the biometric system to supervise their students while in
school (Nyabwa, 2018). Apart from students, ICT can be used to supervise teaching and
non-teaching staff. School management can use ICT to monitor teachers’ class
attendance. Staff personnel can be monitored by use of time - attendance software
where the staff can sign in as they arrive and sign out as they leave school.

A study carried out in Nairobi County on ICT in management of private schools reveal
that, ICT was used effectively in curriculum and instruction, supervision of personnel
and in control of finances (Muthoni, 2015). Private schools in Nairobi have websites,
use ICT in co-curricular activities, managing infrastructure and in school personnel. Use
of ICT has made management of schools less demanding. In supervision of personnel,
ICT is used in directing and controlling teachers’ and students. In curriculum and
instruction, ICT is used in timetabling, in managing exams, academic records and
generally in teaching and learning processes. This shows ICT has been utilized
successfully by most private schools in Nairobi. The researcher therefore deemed it fit
to carry out a research in Machakos Sub-County, to find out whether public secondary
school utilized ICT efficiently and effectively in curriculum and instruction, in
supervision of school personnel and in control of school finances.

School administrators are charged with five administrative tasks which includes
curriculum and instruction, taking care of school plant, supervision of personnel, control
of school finances and maintaining good school and community relationships for effective management of public secondary schools. With the introduction of ICT policy, schools are required to utilize ICTs in all school activities yet it is not clearly established how and the extent to which school administrators use ICT in curriculum and instructions, supervision of personnel and control of finances to enhance effective management of public secondary schools in Machakos Sub-County.

1.3 Statement of the Problem

The use of Information and Communication Technology has increased immensely due to its efficiency and effectiveness. Information and Communication Technology use has led to changes in the ways schools are managed. This is due to increase in students’ enrolment in schools and the changes brought by the dynamic nature of ICT. In this digital era, school administrators are expected to be in the forefront in preparing students for the world economy so as to enable learners overcome challenges associated with globalization. In Kenya, before the introduction of Information, Communication and Technology (ICT), schools and other related education agencies used various tools in collecting and maintaining education data manually which led to duplication of information. Introduction of ICT is expected to curb the challenges associated with traditional methods of school management.

Kenya government received a huge financial support from the World Bank and Global Partnership for Education (GPE) on implementation of ICT in Kenyan schools. However, today it is still unclear how and the extent to which schools utilize ICT in
secondary school management. Secondly, with the introduction of ICT policy in 2006, the Ministry of Education developed the National ICT strategy for education and training. Through this ICT strategy, public schools were expected to integrate ICT in teaching and learning as well as utilize ICT in carrying out administrative functions in schools. The pertinent issue is whether schools in Kenya, specifically in Machakos County utilize ICT in running administrative activities in spite of the ministry of education directive.

The computer for schools project Kenya was developed in 2002 through which public schools in the country have been receiving computers and training on use of ICT. The pertinent concern of this study was to find out if public secondary schools in Machakos County utilize ICT in management of public secondary schools in spite of these government efforts. There is therefore the need to investigate the extent of ICT utilization in management of public secondary schools in Machakos County. The study concentrated on finding out, if ICT was being utilized in curriculum and instruction, in supervision of school personnel and in financial control in management of public secondary schools in Machakos Sub-County, Kenya.

1.4 Purpose of the Study

The purpose of this study was to investigate the utilization of ICT in management of public secondary schools in Machakos Sub-County, Kenya. It is important to establish the level of ICT usage in curriculum and instruction, supervision of school personnel
and in controlling school finances for effective secondary schools management in Machakos County.

1.5 Research Objectives

By the end of the study, the researcher was able to:

i) Establish the extent to which ICT was utilized in curriculum and instruction in management of public secondary schools in Machakos Sub-County.

ii) Identify ICT utilized in supervision of personnel in management of public secondary schools in Machakos Sub-County.

iii) Find out ways in which ICT was utilized in financial control in management of public secondary schools in Machakos Sub-County.

1.6 Research Questions

i) To what extent is ICT utilized in curriculum and instruction for effective management of public secondary schools in Machakos Sub-County?

ii) How is ICT utilized in supervision of personnel in management of public secondary schools in Machakos Sub-County?

iii) What ways is ICT utilized in financial control in management of public secondary schools in Machakos Sub-County?

1.7 Significance of the Study

This study may be of importance to the Government of Kenya (GoK) in formulating education policies like continuous professional development of teachers’ programmes
on the use of ICT. This may enable the teachers acquire the necessary ICT skills required for effective curriculum and instruction implementation.

The Ministry of Education (MOE) and its agencies may benefit from this study as it may lead to improvement in educational operations in the country. Specifically, utilization of ICT may impact positively in curriculum and instruction, supervision of school personnel and in control of school finances which may lead to effective management of public schools. Additionally, The MOE may gain further knowledge on where to solicit money to purchase computers and related software from other Non-Governmental Organizations (N.G.Os). With availability and easy access of computers in schools, teachers may be more enthusiastic not only in integrating ICT in curriculum and instruction but also in performing other administrative duties thus enhancing effective school management.

Through this study, the Kenya Educational Management Institute (KEMI) may gain insight in training of school principals on the use of ICT in school management.

1.8 Limitations of the Study

This study faced some limitations. One of the main challenges was getting information from both secondary school principals and teachers within the stipulated time. This was because of their busy schedule. Also, some teachers were not willing to participate in the study hence some teachers did not answer some questions. To overcome this challenge, the researcher gave out more questionnaires than were required in order to take of the incomplete questions.
Secondly, there is limited information on use of ICT in controlling school finances. This is because much of the available data is basically on ICT utilization in curriculum and instruction. The researcher explored literature from other countries to overcome this challenge.

1.9 Delimitations of the Study

There are five administrative functions of a school manager namely: Curriculum and Instruction, management of the school plant, personnel management, financial management and school-community relations. However, the researcher opted to establish the extent to which ICT was being utilized in curriculum and instruction, supervision of school personnel and school financial control in management of public secondary schools in Machakos Sub-County, Machakos County.

The researcher wished to cover more population in Machakos County but due to time and financial constraints, the study was carried out in Machakos Sub-County. In addition, the study excluded private secondary schools as the researcher was interested in utilization of ICT in management of public secondary schools only.

Notably, Boards of Management (BOM), parents and students are among key stakeholders in public schools, they were excluded in the study as they could not be reached easily because of time and financial constraints.
1.10 Assumptions of the Study

The study made the following assumptions that: all schools in Machakos Sub-County have the required ICT infrastructure. All respondents have knowledge and skill on ICT utilization in schools. The study assumed that, all schools in Machakos Sub-County have integrated ICT in curriculum and instruction, supervision of school personnel and in control of school finances. All respondents gave honest information on the use of ICT in school management. All respondents have knowledge on the study objectives which are: ICT utilization in curriculum and instruction, supervision of school personnel and in control of school finances.

1.11 Theoretical Framework

Technology Acceptance Model (TAM) developed by Fred Davis in 1985 was found to be appropriate by the researcher for this study. TAM is used to explain the way in which its users are able or not able to adopt or accept the model together with its infrastructure using technology (Nchunge & Sakwa, 2013). This theoretical model was first developed by social psychologists who termed it as the “reasoned action theory”. The theory operated on causal chain which followed the pattern of peoples’ beliefs, their attitudes, intentions and lastly their actual behavior.

Davis asserted that, user motivation could be explained by three factors: Perceived ease of use, perceived usefulness and attitude toward using the system. He emphasized the attitude of a user towards a system as a major determinant whether the user would adopt or reject the system. User attitude is influenced by two things; perceived usefulness and perceived ease of use. That is, the user's attitude is determined by the user's perception
of the technology’s usefulness or how easily he would use the system. Both believes; that is, the perceived usefulness and perceived ease of use are influenced by the characteristics of the system design (Chuttur, 2009).

Perceived usefulness is the extent to which a person believes that by using a particular technology or system, one would improve his or her performance. Perceived ease of use is the belief that, when one used a particular technology or system, he or she will not be able to use mental or physical efforts. Therefore, perceived usefulness and perceived ease of use is about attitude towards adoption or rejection of a certain technology or system (Nchunge & Sakwa, 2013).

According to (Chuttur, 2009), the use of system can be predicted or explained. An external stimulus which is the system features and capabilities motivates a user to use the system. According to (Oloo, 2017), a person's behavior depended on his intentions. The intentions were derived from subjective norms and the person’s attitude. Therefore technology acceptance model depended on the user's attitude and his willingness to use the model.

A system is believed to be useful if the user can perform his job successfully resulting in good returns. If technology is perceived to be useful, then it is likely to be used. Perceived ease of use is where little or no effort in performing a task is expected. A technology which is less strenuous is likely to be adopted. So if utilization of ICT in education is deemed to be easy to use and school managers perceived it to be useful, then it is likely to be adopted in school management. In this study, perceived ease of use
is the utilization of ICT in curriculum and instruction, utilization of ICT in supervision of school personnel and the utilization of ICT in controlling school finances. Perceived usefulness is the utilization of ICT in management of public secondary schools.

1.12 Conceptual Framework

The conceptual framework in figure 1.1 shows the relationship between the independent variables, intervening variable and the dependent variables. It shows how the three variables influence ICT utilization in secondary schools management.

![Conceptual Framework Diagram](image)

**Independent variables**

Utilization of ICT in:

1. **Curriculum and Instruction**
   - Updating schemes of work, records of work, making time tables, planning and delivery of lessons
   - Evaluation of students’ marks (CATS & EXAMS)
   - ICT use in library services

2. **Personnel Management**
   - Monitoring students using NEMIS
   - Monitoring teaching and non-teaching staff using Time Attendance Software
   - Monitoring staff in in-service training
   - Proper communication in school

3. **Financial control**
   - Formulating profit and loss account
   - Capture fee payment
   - Preparation of payroll
   - Making of school budget
   - Auditing financial transactions

**Intervening variables**

- Government policy
  - Availability and accessibility of ICT resources
  - Skills on ICT use

**Dependent Variable**

Management of public secondary schools

**Figure 1.1: Conceptual framework**

**Source:** Own conceptualization of ICT Utilization in Management of Secondary Schools
The conceptual framework shows how the independent variables determine utilization of ICT in school management. Conceptual framework show how ICT is utilized in curriculum and instruction, in personnel management and in control of finances in school management hence forming the independent variables. Under curriculum and instruction, teachers ought to use ICT to update their lesson plans, schemes of work, records of work, making time table and in planning and delivery of lessons. Additionally, schools should use ICT in evaluation of students’ marks and in rendering library services. This would enhance effective management of secondary schools.

Personnel management is crucial for successful school management. Thus ICT should be utilized in monitoring regular in-service training of school staff, monitoring students, teachers and non-teaching staff and ensuring there is proper communication in school. Teachers need to be updated on new ICT innovations in order to use them in their administrative duties.

Schools get finances mainly through fees paid by students. This money is used to run school activities. There’s need therefore to track how much money is received and how much money is spent and for what purpose, hence the need to use ICT in school financial control, which makes it easy to record, store and retrieve school’s financial records. Under financial control, ICT should be used to come up with profit and loss account, capture students fees payment, preparation of payrolls, making of school budgets as well as auditing school finances.
Intermediate or intervening variables include: Government policy on ICT utilization in management of secondary schools. The government should formulate policies which may enable teachers acquire skills on ICT use and also ensure availability of enough ICT infrastructure and access to the available ICT resources for effective management of public schools.

The dependent variable is management of public secondary schools. If ICT is fully utilized in curriculum and instruction, in supervision of school personnel and in controlling school finances, schools’ administrators may be able to carry out these roles effectively.

The above conceptual framework highlighted how management of public secondary schools is affected by independent variables. However, the success of utilization of ICT in school management in curriculum and instruction, in supervision of personnel and control of school finances will depend on the government policy in place, in terms of availability of ICT infrastructure and skills on ICT use as they form the intervening variables of the study.
1.13 Operational Definition of Terms

Control of school finances – This includes formulating profit and loss account, capture students’ fees payment, preparation of payrolls, making of school budgets and auditing financial transactions by use of ICT for effective planning and decision making.

Curriculum and Instruction – These are all experiences that involve updating of schemes of work, records of work, making school timetables, planning and delivery of lessons, evaluation of students’ marks and rendering library services by use of ICT for effective management of public secondary schools.

Management of secondary schools - This involves the use of technology in carrying out administrative tasks in order to achieve objectives and goals of a school.

Supervision of Personnel – This involves the use of ICT in monitoring students, teaching and non-teaching staff, staff in-service training and communication in school for effective management.

Utilization of Information Communication Technologies – This involves the use of technology in carrying out administrative tasks which include curriculum and instruction, supervision of personnel and financial control for effective school management.
CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This paper has presented literature review on utilization of Information and communication technologies in curriculum and instruction, supervision of personnel and control of finances as well as the summary of the literature reviewed.

2.2 ICT use in Curriculum and Instruction

Management of instructions involves improvement in teaching and learning, a deliberate process of ensuring there is excellent delivery of the instructional objectives. Management of instruction and curriculum entails directing and influencing staff members and students to work harder in order to achieve desired educational objectives and goals. This has been achieved through the use of ICT. ICT advances expects teachers to come up with more efficient and modernized instructional methods which can equip learners with knowledge, attitudes and skills which would make learners more creative (Oyier et al. 2015). Educational institutions are meant to educate students and train them for work. Creativity therefore cannot be achieved without integrating ICT in curriculum and instruction.

Access to ICTs especially computers has brought about improvements in management and administration of schools (Mwaba-chiluba, Akakandelwa, & Chiluba, 2020). ICT materials like data projectors, interactive whiteboards, scanners and digital cameras have become part of teachers’ professional materials for curriculum and instruction.
Implementing ICT in secondary school curriculum required different countries to come up with national educational policies to guide and give direction on its integration into education. United States of America (USA) came up with a national ICT policy which laid down strategies, objectives and indicators for use in education (Bariu, 2020). American secondary schools are able to incorporate ICT programs in their curriculum to meet the demands of the 21st Century. Drastic changes in the 21st Century require schools to adjust in order to cope with the changing ICT demands in the society. For effective use of ICT in management of schools, there is need for proper ICT policies in schools, availability and accessibility of ICT resources.

Studies carried out in Europe by British Educational Communications and Technology Agency (BECTA) show, that United Kingdom (UK) government invested £1.8 billion in the national grid meant to transform curriculum and instruction in schools by the use of ICT of which 99% of secondary schools were able to acquire network and were connected to internet. On average, however, most secondary schools tend to utilize ICT for class presentations and displays only. Other aspects of curriculum and instruction, for example, lesson planning; updating schemes of work, records of work and evaluation of students seem to be done manually. However, teachers increasingly (50%) were using ICT to plan their lessons. Generally, teachers seem to have a positive attitude towards ICT use in curriculum and instruction. This was evident by a number of teachers who stayed behind after school working hours to use ICT facilities available in the school (Morante F.C & Lopez B.C, 2014). This could lead to effective curriculum delivery hence enhancing proper management of school activities.
In United Kingdom (UK), teachers who use ICT as a tool for teaching are more confident and consistently use ICT in preparation and delivery of lessons. They perceive ICT as an important tool for teaching. Lessons are perceived to be more fun, interesting and easier to comprehend on the part of the students. Students feel motivated to learn hence the need for integrating ICT in teaching and learning (Mumtaz, 2000). It is with this information in mind which prompted this study to be carried out to investigate whether public secondary schools in Machakos County, use ICT in preparation and delivery of lessons.

Recent studies carried out in Malaysia on ICT integration in education suggests that teachers need to be competent and possess mastery of ICT skills to enable them deliver instructions effectively (Ghavifekr S., Razak A.Z.A., Ghani M.F.A., Meixi Y, n.d.) The MOE in Malaysia noted the need to integrate ICT into national secondary school curriculum. ICT was included as one of the transformative shifts in Malaysia’s Education system. The shift aimed at providing and establishing more accessibility to internet in all national schools by 2013, have a video library for subjects they termed as critical and lastly to maximize distance learning by use of ICT. Through these measures, the Malaysian government intended to upgrade ICT skills in Education. Thus, this study intended to find out the extent to which ICT is utilized in curriculum and instruction, whether schools in Machakos County have access to internet and if they utilize technology in rendering library services for effective management of public secondary schools.
In most developing countries like India, Pakistan and Sub-Saharan countries, majority of these countries have limited ICT infrastructure in spite of ICT Education policies put in place in their respective countries. In Africa for example, majority of countries are in their initial stages of using ICT infrastructure. Majority of these African countries have been slow in implementing their ICT policies hence risking lagging behind other countries in technological advancement. African countries have policies which are not in tune with their specific educational needs. The policies emphasizes on use of ICT for economic gains outside education (Bariu, 2020).

There has been poor performance in Early Grade Reading Assessment (EGRA) in developing countries. In Mozambique, Ghana and Philippines, schools were not able to come up with sufficient data to enable school managers monitor students’ learning outcomes. Ghana for example was found to duplicate educational data because students’ marks were entered manually on paper and not by use of ICT (Trucano, 2006). With the use of ICT, it is easy to capture, store and retrieve data for proper decision-making.

Secondary schools in Nigeria utilize ICT in supervision of staff personnel. ICT is used to allocate duties to members of staff, both teaching and non-teaching. It is also used to manage teachers’ leave days, appraising teachers and generally in collecting data of all members of staff. Performance appraisal of teachers is important as it makes teachers to be more competent in their duties by reducing teachers’ absentees, contributing to improved management of schools (Kongo, 2011). The study found out that, teachers who had taught for considerable period of time used computers and the internet more
than those with less than 20 years of teaching. Many schools have acquired enough computers but the school principals and teachers are reluctant to utilize them in their respective roles (Makewa et al. 2013). This is associated with negative attitude and school managers not confident on how data generated would impact on their specific roles.

In Tanzania, ICT is used to develop school timetable and offer library services. However, Tanzania has been experiencing challenges of internet connectivity which has made communication within schools by use of email inefficient. In addition, ICT use in curriculum and instruction is not in it’s advanced stage. Further, it has not been clear how ICT has been used in school administration, professional development of teachers and for teachers’ personal needs (Mwalongo, 2011). This may lead to limited use of technology in carrying out administrative tasks.

Lack of ICT infrastructure has been a challenge in ICT integration in curriculum and instruction in Kenya. According to (MoEST, 2005), school managers and teachers perceive use of computers in classroom a worthwhile course, a tool for curriculum and instruction. Teachers who use ICT in teaching are found to be more eager to work unlike their counterparts who use the traditional method of teaching. Some teachers felt they were not prepared to use computers in classrooms even after attending teacher training colleges (TTCs). Availability of ICT resources is the first step towards integrating technology in management of schools. Lack of technology resources like
computes may hinder teachers and principals from integrating ICT in management of schools.

Schools and teachers have continued to get support and help-desk services in ICT integration through the National ICT Innovation and integration Centre (NI3C). Apart from hosting the national teachers’ portal, NI3C also tested new innovative solutions. It offers advising services to senior management about new innovations (MoEST, 2015). Through some initiatives like the Multi-media lab project (TELEVIC), New Partnership for Africa’s Development (NEPAD) e-schools, Economic Stimulus Programme (ESP-ICT), Computer for Schools project Kenya (CfSK-2002), NEPAD e-schools initiative (2005) and the Accelerating 21st Century Education (ACE), there has been a continuous supply of ICT infrastructure to schools in Kenya.

In Kenya’s private schools especially in Nairobi, it is revealed that, pedagogical methods of teaching and learning are quickly changing with ICT incorporation in instruction (Oyier et. al., 2015) whereby books are being replaced with flash discs and memory cards, blackboards are being replaced by smart boards, while text based assignments are replaced by ICT presentations and slide shows which are more simulative and creative. ICT is considerably reducing teachers’ work load of making learners’ progressive records and analyzing learners’ exam performance. These private schools also utilize ICT to formulate and implement schemes of work, records of work and writing students’ academic reports. ICT is also used to schedule classes for teachers. This being the case in Nairobi’s private schools, the study sought to find out if
public schools in Machakos Sub-County utilize ICT to formulate and implement schemes of work, records of work, progressive records and evaluating students for effective school management.

2.3 Supervision of School Personnel

Personnel management and Human resource management both focus on managing people. Personnel management originated in United Kingdom while Human Resource Management came from North America between 1910s -1920s (Muhia, 2016). School personnel include teachers, non-teaching staff and students.

School managers should have the right procedures and systems to ensure there is collection and analysis of valid data to enable decision making which is important in school management (Trucano, 2006: Shah, 2014). Availability of valid data enables school managers to track how resources are being used in their respective schools. School managers should be able to ascertain whether ICT resources are being used effectively and efficiently to avoid wastage. School managers are crucial in a school setting as they are expected to raise qualified and responsible students despite the rapid changes taking place in education. They should follow up on the students’ issues and offer solutions to the same. Skilled human workforce is necessary if at all the school is to be successful. This is determined by how well the available work force is utilized.

Use of technology provides various possibilities and facilities which enables school managers perform their duties effectively and efficiently (Makewa et al. 2013). A school manager is expected to lead in the use of ICT in the school. He is expected to
promote staff professional development of his teachers. The school Principal is expected to organize and facilitate in-service training for his staff in order for the staff to acquire the necessary ICT skills. This would enable the staff to be confident in the use of ICT in their respective responsibilities. Professional development makes members of staff feel valued and well taken care of which in return boosts their morale (Gronow, 2007). Therefore it is not well established if schools use ICT to monitor teachers’ in-service training.

In developing countries, a lot of money was used to buy infrastructure for Integrating ICT in schools by external donors like the USAID but ICT integration in curriculum and instruction was not as fast as expected. ICTs in most developing countries is said to be poor in terms of quality and timeliness despite the heavy investment on it. These developing countries face difficulties in data management in terms of collection, integration and dissemination in school management (Ellison, 2004). In these developing countries, Sub-Saharan countries included, school data is usually collected and disseminated manually, at times data is not available and if it is, it is ambiguous. This makes it difficult to come up with an informed decision (Mugo, 2014) hence use of ICT is expected to curb these challenges associated with school management.

In Pakistan, data base security was one of the challenges which affected use of National Educational Identification System (NEMIS) in schools. This was because most computers in schools were not secured with antivirus software thus making data not to be secure from virus attack. Unauthorized persons could have access to data very easily.
and could alter data because of lack of passwords. Data loss, manual database integration, lack of information sharing, non-availability of adequate student information, slow data dissemination process, slow internet, lack of enough ICT software and hardware and lack of finances were the major hindrances affecting NEMIS use in schools in Pakistan. Teachers were not educated on the use of the NEMIS software thus limiting use of ICTs in capturing and storing students’ data (Oyier et al., 2015). This study is being carried out to find challenges associated with utilization of NEMIS system to capture students’ data as a crucial component of personnel supervision.

Nigeria school managers are custodians of all school data. These data includes: Finances, students’ academic performance, enrolment of students and staff maintenance. The Nigerian law expects the managers to provide data for inspection by government officials at any time it is required. School managers ensured school staff personnel had adequate welfare services like loans and bonuses at the end of the year, hiring and dismissal of staff was captured in an ICT system whereby all information of each member of staff could easily be traced (Okoli, 2015). However, many schools in Nigeria use manual system to keep school records. Duties like personnel supervision were still done manually. In most schools, students were registered manually not to mention keeping of students’ performance records. This makes it difficult to store and retrieve accurate data whenever needed. According to (Ereyi et al, 2018), Nigeria is way behind in terms of ICT use in educational management. In spite of its gigantic material resources, Nigeria does not qualify to be counted as having progressed in using
ICT in supervision of personnel. The researcher therefore deemed it fit to research on the situation in Kenyan schools specifically in Machakos County to find out if schools utilize ICT in personnel supervision.

In Mozambique, there is no use of ICT in supervision of school personnel. Students’ marks and reports are captured manually on paper. Reports concerning members of staff are also done manually. In general, there are no comprehensive and regular reports on students and members of staff (Trucano, 2006). Therefore, ICT in Mozambique is not effectively utilized in supervision of school personnel.

Studies carried out in Kenya in 2008 concerning computers for schools through the Kenya education management capacity assessment showed that, most school principals had not acquired computers hence were not able to supervise members of staff attendance to classes and students’ examination performance which is very crucial for effective management of schools (Muhia, 2016). School managers should have ICT skills and embrace ICT for effective management of schools. Principals should be made aware of the benefits associated with ICT innovations, which they should implement in their schools. Introduction of ICT innovations are tasks related to school management. ICT use in management of schools is concerned with tapping technology for use in planning, setting school’s standards and in monitoring which are the main duties in school management.

A study by Ayere, Odera, and Agak, (2010) on E-learning in secondary schools in Kenya reveal that, a number of teachers in secondary schools had not received any
training in ICT use during their formative years at teacher training institutions before joining the profession. Accordingly, a report by MOE (GOK, 2010) on the implementation and use of ICT by secondary school teachers’ indicated that only a low number of secondary school teachers were skilled in ICT use. Interestingly, a more recent study by (Mariga G., Ogenga S., 2017) show that, Teachers Service Commission (TSC) in partnership with the MOE has trained 150 National master trainers whose aim is to train other Trainers in all the counties. The study further revealed that over 70,000 teachers had been trained by December 2016, and training of Trainers (ToTs) was also taking place concurrently in the counties whereby 2 teachers were expected to be trained from each school benefitting from the program. The training takes place either at Zonal centers or at school level, whichever convenient for logistic purposes (MoEST, 2005). However, this training targets only Science and Mathematics teachers. The question is, ‘What happens to the other subject teachers? Does it mean the other subject teachers are of less value than Science and Mathematics teachers?’ It’s also not clear whether in this CEMASTEA training, teachers are trained to integrate ICT in curriculum or ICT is taught as a subject.

National Education Management Information System (NEMIS) in Kenya was introduced in 2017 by the Ministry of Education (MOE) to aid in digital registration of all secondary and primary going pupils in Kenya. According to (MOE, 2018), students registered in NEMIS have a unique identification number, meant to track student’s performance from primary, secondary to higher levels of learning. NEMIS captures details like name of the student, age, information of the student’s parents and household
details of the students which can be used to track student’s performance in curriculum and co-curriculum (MOE, 2017). This may lead to improved accountability, efficiency and transparency in educational sector leading to proper planning and decision making by the government and schools.

2.4 Control of School Finances

The management of any organization or institution pivots upon finances. Leadership in ICT is important in controlling school finances. Finances are part of material resources in a school. All other organizational decisions are based on the financial position of the school (Muema, 2015).

Utilization of ICT is immensely becoming an essential part of school life and a financial management tool. As a financial control tool, ICT use makes it easy for school managers to acquire reliable, timely information concerning school finances for supporting management decisions. This also helps in improving discipline in resource management within the school system (Oyier et al., 2015). Use of ICT has become more important in storing data in school financial management such as budget allocation, school expenditure, payment of fees and general accounting. ICT use enables prudent use of finances and effective supervision of personnel.

Studies carried out in London showed that majority of educational institutions had accounting software packages which enabled them to come up with statutory accounts. Bank reports and schools’ management reports were done by use of ICT (Katitia, et al., 2019). Utilization of ICT enables schools use electronic banking to verify the status of
their bank accounts in good time. This ensures that payments are received and paid timely. Utilization of ICT for accounting purposes needs typical software to be installed on computers which have to be interlinked. This enables all transactions to be generated automatically which in turn assist in formulating payrolls for staff, payment of school fees and in school procurement. However, the effectiveness of ICT use in control of school finances depends on the schools ICT environment. If a school has created a conducive ICT environment, data would flow smoothly between school departments. For example, from school accountant to the principal and back to the school accountant leading to better school management. Failure to use ICT in school financial management may lead to poor utilization of school finances resulting to delayed decision making due to lack of timely data. Use of technology is therefore crucial to all school personnel involved in management of school finances.

In New Zealand, the MOE funded schools through three ways: Operational funding or what is commonly as the Bulk Grant (BG), Staffing entitlements or the Teachers’ Salaries (TS) and the Property funding for capital works. Operational funding dealt with schools’ running cost which included maintenance of property, wages of non-teaching staff, leases and rentals, purchase and depreciation of capital items and professional development of members of staff. Operational funding is calculated using school rolls. Roll returns was generated from the Schools Management System (SMS). Schools are supposed to submit accurate roll returns which enable correct allocation of resources from the MOE. The school’s roll returns are verified by MOE using electronic attendance data got from schools (Tooley & Guthrie 2007). This was arrived at by using
school’s electronic attendance information and the schools roll return data. If the information got from the school was different from the MOE data, the school was contacted. This information shows that, schools in New Zealand used ICT in controlling finances. This research was therefore carried out to find out if schools in Kenya, specifically in Machakos Sub-County, utilized ICT in management of their finances.

India has a financial management information system (FMIS) whose duties are to generate and analyze financial school data which enables sound decision making in education sector. In India, FMIS enabled generation of data for school accounting, budgeting, and coming up with working capital reports, financial planning, modeling and ratio analysis. All state governments were mandated by the government to come up with their own state FMIS. State FMIS recorded all funds received from the state government for their schools’ operations. These operations were salaries for members of staff, making of school budget and buying teaching and learning materials. Money received from communities, parents and NGOs were not included in FMIS not even grants. Therefore, in India, FMIS was used to control school finances by the state governments (Byker, 2014). However, it is not clear whether public secondary schools in India used ICT in controlling their school finances. This prompted the researcher to carry out a study in Kenya, to find out whether public secondary schools in Kenya, specifically in Machakos Sub-County, used ICT to control finances in their respective schools.
In Nigeria, control of school finances is still done manually; there is no use of ICT in controlling school finances. List of supplies, inventory records, paying of bills and cost accounting is done manually. According to (Ereyi et al, 2018), time spent on these duties can be reduced immensely if only schools would use ICT as it enables accuracy and speed. There is lack of transparency and accountability if ICT is not utilized in managing schools’ finances. In Nigeria, the government expected school managers to have acquired basic knowledge in procurement to enable them make sound decisions in matters of school finances hence ICT was used in schools to plan and control finances (Oyier etal. 2015). Control of finances led to improved financial discipline as it was easy to store, retrieve and manage financial transactions. ICT helped school managers in carrying out this important role of controlling school finances as it provided accurate information not only to the principals but to the parents and government officials as well. Management of school finances is critical in any educational institution. With the application of ICT, school principals ought to have access to correct data for easy school management.

In spite of ICTs development in teaching and learning, it is yet to infiltrate in other areas of institutional administration like in financial administration. Successful integration of ICTs in financial administration leads to transparency, accountability and efficiency. According to (Muema, 2015), in Kenya, the business world has been able to tap the benefits of ICT use in running their organizations but it is not clear whether public secondary schools in Kenya are able to use ICT in financial school management.
According to (Diamond & Khemani, 2005), many schools in Kenya have received computers through the computer for schools program but, do schools use computers to control finances in their respective schools? Studies carried out in Kajiado county show that only 15 public schools out of a total of 61 public schools in the county have utilized ICT in school management. The report further indicated that, secondary schools do not use ICT in controlling school finances (Katitia, Tanui & Oruta, 2019). With this question in mind, the researcher found it prudent to carry out a study to find out whether schools utilize the available ICT resources to control financial resources for effective management of schools. The use of ICT in school financial management leads to transparency, thus preventing school principals from misappropriating and embezzling school funds. This would enable school money be used for the intended purpose. Use of ICT is recommended in paying non-teaching staff, procurement of school supplies among other functions for easy record keeping.

2.5 Summary of Literature Reviewed

From the literature review it was noted that, most countries globally utilize ICT in management of schools. Majority of African countries are way behind in using technology in management of schools. Most of the developed countries utilize ICT in curriculum and Instruction in time -abling, offering library services, preparation and delivery of lessons and in evaluation of students. Information on ICT use in management of curriculum and Instruction in Kenya seems limited in schools. Technology is fairly used in developed countries in supervision of school personnel. In most countries in East Africa, ICT use in supervision of personnel seems limited. In
financial control, it is not clear whether schools had adopted ICT in preparing ledgers, balance sheets, income and loss account and in accounting and auditing of school accounts. With provision of ICT resources, the government of Kenya and other initiatives like Computer for schools program Kenya, it has not been clearly established how schools were use the facilities in curriculum and instruction, supervision of personnel and financial control for effective and efficient management of public secondary schools. Thus, the study sought to find out the extent to which ICT is used in curriculum and instruction, supervision of personnel and financial control for effective management of public secondary schools.
CHAPTER THREE
RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter focused on research design, study locale, target population, sampling design, research instruments, validity and reliability, piloting, data collection procedure and data analysis.

3.2 Research Design

This study used descriptive survey research design. Descriptive survey is concerned with describing the status and the characteristics of a particular group (Kothari, 2004). A descriptive research is used in getting data on the status of a certain situation and describing what exists. This allows the researcher to describe existing phenomena as they are. Thus, the design was found suitable in this study as it enabled the researcher examine the existing status of ICT utilization in curriculum and instruction, supervision of school personnel and control of finances in school management. According to (Mugenda & Mugenda, 1999), descriptive survey is probably the best method available for social scientists concerned with gathering information to describe a situation, population or sample where observation method could not have been possible.

3.2.1 Variables

The independent variables of this study were: ICT utilization in curriculum and instruction, supervision of school personnel and financial control in secondary school management. Intervening variable of the study was government policy which covered:
training teachers on ICT use, availability and accessibility of ICT resources and skills on ICT. Dependent variable of the study was utilization of ICT in management of public secondary schools.

3.3 Study Locale

This study was purposively conducted in Machakos Sub-County’s public secondary schools in Machakos County. Machakos Sub-County was preferred because of its proximity to Nairobi city, the hub of ICT hence; most teachers are expected to have interacted with ICTs while carrying out their duties in schools. The study sought to investigate whether schools in Machakos sub-County utilize ICT in secondary school management. In addition, Machakos Sub-County was chosen for this study because it has one national school and the most number of extra-county schools (4) compared to the other sub-counties which have less or none at all. These extra-county schools are expected to be utilizing ICT in management of schools. Machakos sub-county faces education challenges such as high enrolment rate, uneven teacher: student ratio and dismal performance in national examination. This was according to data got from Machakos Education Office, 2019. These problems may be solved by effective utilization of ICT in school management.

3.4 Target Population

According to data obtained from Machakos Sub-County education office (2019), there are 45 public secondary schools in Machakos Sub-County. Thus, the study targeted all
the 45 principals of the public secondary schools and 513 secondary school teachers from the 45 public secondary schools. This totaled to 558 respondents.

3.5  Sampling Procedures and Sample Size

This section deals with sampling procedures and sample size of public secondary schools, principals and teachers.

3.5.1  Schools

The study targeted all the 45 public secondary schools in Machakos Sub-County. The study used stratified sampling to categorize schools into 3 strata. That is, boys’ only schools, girls’ only schools and mixed secondary schools to ensure schools produced a representative sample from the population (Kothari, 2004). Stratified sampling was preferred by the researcher because secondary schools in Machakos Sub-County are heterogeneous; hence each school has different characteristics. Simple random sampling was used to sample 2 boys’ only schools and 2 girls’ only schools in Machakos Sub-County in order to give a wider representation of above 10% (Gay, 1992). Simple random sampling was used in order to give each school an equal chance of participating in the study (Alvi, 2016). The representation for this study was 18%. Further, the study used systematic sampling to sample mixed secondary schools where every 5th mixed school out of the 35 mixed schools was sampled, thus 7 mixed schools were sampled giving a total representation of 20%. This ensured there is no bias of the sample. According to (Gay, 1992), 20 percent of the population is enough to represent a large
population. Thus a total of 11 secondary schools were sampled, giving a sample representation of 24%.

3.5.2 Principals

Machakos Sub-County has 45 public secondary schools thus, 45 principals from all the public secondary schools became automatic target population of this study. From the sampled public secondary schools, 2 boys’ schools, 2 girls’ schools and 7 mixed secondary schools were used as the representative sample in the study. Therefore, 11 principals from the all sampled schools were used for the study. That is 2 boys’ schools, 2 girls’ schools and 7 mixed secondary schools. Therefore, 11 principals from these schools were used as the representative sample in the study. This gave 24% representation of the target population which was above 10% of the minimum recommended sample size (Gay, 1992). The 11 principals from these schools then formed automatic respondents of the study. Principals are school managers hence they are expected to enhance utilization of ICT in school management in their respective schools.

3.5.3 Teachers

The study targeted all the 513 public secondary teachers from the 45 public schools in Machakos Sub-County. From the 11 sampled schools, the study used simple random sampling to sample 10 teachers from every school. Simple random sampling was preferred because it avoids bias hence gives each teacher from the 11 schools an equal chance of participating in the study (Kothari, 2004). Thus, the sample size for teachers
was 110. This represented 21% of the targeted teachers’ population, which is way above 10% representation as recommended by Kerlinger (1973). Teachers are important in this study because they are expected to implement curriculum and instruction as well as perform other administrative duties in their schools.

Table 3.1: Sample size summary

<table>
<thead>
<tr>
<th>Category</th>
<th>Target population</th>
<th>Sample size</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schools</td>
<td>45</td>
<td>11</td>
<td>24%</td>
</tr>
<tr>
<td>Principals</td>
<td>45</td>
<td>11</td>
<td>24%</td>
</tr>
<tr>
<td>Teachers</td>
<td>513</td>
<td>110</td>
<td>21%</td>
</tr>
<tr>
<td>Total</td>
<td>558</td>
<td>121</td>
<td>21%</td>
</tr>
</tbody>
</table>

3.6 Research Instrument

The study used questionnaires and interview guides to collect data. Questionnaires were for teachers while interview guides were for principals. Closed ended and open ended questionnaires were preferred because it ensured anonymity hence respondents were able to give honest information. Also, questionnaires were used to collect huge sample of data in a short duration (Orodho, 2009).

Interview guide were preferred for the principals because it produced in-depth information which was hard to get using questionnaires when conducted well (Orodho, 2009).
3.6.1 Questionnaire for teachers

The researcher came up with closed and open ended questions for the teachers. The questionnaires were preferred because they ensured anonymity hence respondents were able to give honest information. It was also used to collect huge sample of data in a short duration (Orodho, 2009). Teachers’ questionnaires were subdivided into four sections. Section A sought to collect bio data of teachers. Section B sought to collect data on ICT utilization in curriculum and instruction. Section C sought to gather information on ICT utilization in supervision of personnel and section D gathered information on ICT use in financial control in school management.

3.6.2 Interview guide for principals

The researcher used interview guide for principals because it produced in-depth information which was hard to get using questionnaires when conducted well (Orodho, 2012). The researcher presented interview guide in two sections. Section A solicited biographic data of the principals themselves and the school. Section B solicited information on ICT utilization in curriculum and instruction, supervision of school personnel and financial control as they formed the study objectives.

3.7 Pilot Study

A pilot study is important as it enables the researcher to collect data which helps in fine tuning and improving reliability and validity of the instruments and find out whether the respondents understand the objectives of the study hence come up with conclusive information about the tools of the study (Mugenda & Mugenda, 2003). Two public
secondary schools which did not participate in the actual study were selected for the pilot study. This enabled the researcher fine tune the instruments based on their responses and ensured the tools were complete, reliable and representative of the study. This helped in coming up with conclusive information and adjusted the tools based on the findings of data collected from the pilot study.

3.7.1 Validity of Research Instruments
Content and face validity of the instruments was achieved through a pilot study. Content validity determined whether an instrument represented the content being measured. Content validity was achieved through expert judgment. Expert judgment according to (Burns, 2000) is one method of measuring validity of research tools. Expert judgment was done by my supervisor who has more knowledge on ICT use in school management who confirmed that the tools were comprehensive, appropriate and representative of the theme being studied and assisted in improving the content validity of the instruments. Face validity of the tools was achieved because the tools appeared to be relevant with themes studied.

3.7.2 Reliability of the Study
Cronbach’s Alpha was calculated using statistical packages for social sciences (SPSS) to determine the reliability of the tools. This was considered appropriate because it required one administration of the test. It is appropriate when items have choices. Thus, the tools were termed reliable because they yielded a reliability coefficient of 0.78 for principals and 0.76 for teachers (Orodho, 2012).
Table 3.2: Case processing summary

<table>
<thead>
<tr>
<th></th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>84</td>
<td>76.4</td>
</tr>
<tr>
<td>Excluded</td>
<td>26</td>
<td>23.6</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 3.3: Reliability statistics

<table>
<thead>
<tr>
<th>Cronbach’s Alpha</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>.763</td>
<td>27</td>
</tr>
</tbody>
</table>

3.8 Data Collection Procedures

The researcher considered logistical stages of data collection. According to (Orodho, 2009), the researcher begun with verifying the research tools to ensure they were complete, identified them and checked whether the instructions appeared clear. Then an authorization letter from Kenyatta University graduate school was sought by the researcher. After getting the authorization letter, the researcher used it to apply for a letter from National Commission for Science Technology and Innovation (NACOSTI). Another letter was obtained from county office of education where the study locale lied. It was used to authorize the researcher to collect data from the schools in the Sub-County.

In order for the researcher to be familiar with the schools, she made a pre-visit to the schools in order to build a good rapport with the respondents and to make administration of the tools easier. The researcher dropped and collected questionnaires at an agreed period of time. The researcher booked appointments with the principals for
interviews. The researcher assured the respondents the information given was going to be treated with utmost confidentiality. Lastly, all instruments were collected from the field, assembled, edited, and coded to ensure they were ready for analysis.

3.9 Data Analysis Technique

Quantitative data was derived from the bio-data section of both the questionnaires and interview guide. Quantitative data was also generated from the Likert scale of the questionnaires. Frequencies and percentages were used to analyze data from the bio-data section of both the questionnaires and interview guides, and from the Likert scale. The closed ended questions of the questionnaire were based on YES, NO and NOT AWARE response hence the weighing was analyzed using frequencies and percentages. The scoring of Likert scale was based on five point rating scale ranging from Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree; hence the weighing was analyzed using descriptive statistics which comprised the use of percentages and frequencies. Data was presented in form of tables, charts and graphs.

Qualitative data generated from open ended questions from the questionnaire and from interviews were analyzed according to themes of the study hence described using words. Qualitative data was collaborated in quantitative data during data analysis.

Descriptive statistics aided by SPSS program was used to analyze quantitative data. This informed the decision whether ICT is utilized in curriculum and instruction, supervision of personnel and financial control in management of public secondary schools in Machakos Sub-County.
3.10 **Logistical and Ethical considerations**

A letter of approval was obtained from the university to enable the researcher obtain a research permit for NACOSTI. The researcher sought permission from the County Education office and from the heads of the sampled schools. The researcher assured the respondents that the data given was going to be kept confidential therefore used for the purposes of research.

The researcher sought anonymity of the respondents which was assured by telling them not to indicate their names on the questionnaires. It was made clear to the respondents that no payment of whatever kind was going to be given as a result of participating in the study.
CHAPTER FOUR

PRESENTATION OF FINDINGS, INTERPRETATION AND DISCUSSION

4.1 Introduction

The study purported to investigate the utilization of ICT in management of public secondary schools in Machakos Sub-County, Kenya. The independent variables of the study were: curriculum and instruction, personnel management and financial control and how they affect utilization of ICT in management of public secondary schools.

This chapter commences with presentation of biographical data of the respondents. The findings are presented thematically based on each objective of the study. A response rate of 110 teachers’ questionnaires representing 100% were returned and 11 principals’ interviews were conducted representing 100% return rate.

The study was guided by the following objectives:

i) Establish the extent to which ICT is utilized in curriculum and instruction in management of public secondary schools in Machakos Sub-County.

ii) Identify how ICT is utilized in supervision of personnel in management of public secondary schools in Machakos Sub-County.

iii) Find out ways in which ICT is utilized in financial control in management of public secondary schools in Machakos Sub-County.
4.2 Teachers and Principals Biographic Information

This section presents data on gender of teachers and principals, years taught in their particular schools, principals’ academic qualification, use of computers in their schools, number of working computers in their schools, how computers were acquired in their particular schools and internet connectivity in their schools. The findings are presented as follows:

4.2.1 Teachers and Principals gender

Teachers and principals were requested to indicate their gender. The responses are presented in Table 4.1.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Teachers</th>
<th>Principals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>Male</td>
<td>59</td>
<td>53.6%</td>
</tr>
<tr>
<td>Female</td>
<td>51</td>
<td>46.4%</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>100%</td>
</tr>
</tbody>
</table>

As presented in Table 4.1, 59 representing 53.6% of teachers were male and 51% representing 46.4% were female. On the other hand, nine representing 81.8% of the principals were male and two representing 18.2% were female. This shows that majority of the respondents in Machakos sub-county were male.
4.2.2 Number of years principals and teachers have been teaching

Teachers and principals were requested to indicate the number of years they have been teaching. The findings are presented in Table 4.2.

Table 4.2: Proportion of teachers and principals according to the duration of teaching

<table>
<thead>
<tr>
<th>Years of teaching</th>
<th>Teachers</th>
<th>Principals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>0-5 years</td>
<td>26</td>
<td>23.6%</td>
</tr>
<tr>
<td>6-10 years</td>
<td>25</td>
<td>22.7%</td>
</tr>
<tr>
<td>11-15 years</td>
<td>27</td>
<td>24.5%</td>
</tr>
<tr>
<td>16-20 years</td>
<td>14</td>
<td>12.7%</td>
</tr>
<tr>
<td>Above 20 years</td>
<td>18</td>
<td>16.4%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>110</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Findings presented in Table 4.2 reveal that 26, 23.6% of the teachers had taught for a period of 0-5 years, 25, 22.7% had taught for a period of 6-10 years, 27, 24.5% had taught for a period of 11-15 years, 14, 12.7% had taught for a period of 16-20 years and 18, 16.4% had taught for more than 20 years. From the findings, it can be noted that, majority of teachers had taught for a period of 11-15 years, thus are likely to use ICT in carrying out curriculum and curriculum duties hence making management of the institutions easier.

On the principals’ side, majority (82%) indicated that they had a teaching experience of more than 20 years, one, 9.1% indicated a teaching experience of 16-20 and 11-15 years.
each. Therefore, majority of the principals have taught for considerably longer time hence are expected to be able to integrate utilization of ICT in management of schools.

4.2.3 Principals Highest academic qualification

The researcher sought information from the principals on their highest academic qualification. Their responses are presented in Figure 4.1.

As represented in figure 4.1, seven principals noted that they have attained university degree, three have attained Masters Degree and one principal indicated he has a doctor of philosophy degree. This shows that, all principals have acquired the required academic qualification for them to be appointed principals in their schools and also to teach in a secondary school. Since all principals have the required qualifications, they are likely to use ICT in supervision of students and teachers and also monitor all the activities within the school.
4.2.4 Use of computers in schools

The researcher sought information from teachers on whether they use computers in their schools. Their responses are indicated in Table 4.3.

Table 4.3: Teachers responses on use of computers in schools

<table>
<thead>
<tr>
<th>Use of computers</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>108</td>
<td>98.2%</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>1.8%</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>100%</td>
</tr>
</tbody>
</table>

The results in Table 4.3 show that, two, few (1.8%) of teachers do not use computers in their schools while 108, 98.2% of teachers use ICT in their schools. This shows that, majority of secondary school teachers use computers in their schools implying that, most secondary school teachers have responded positively on the government policy in education, of 2006 that schools should integrate ICT in the curriculum. With majority of teachers using ICTs in schools, they are able to carry out their main role of curriculum and instruction efficiently.

4.2.5 Working computers in the school

The researcher sought information from the principals on the number of working computers in their schools. The responses are shown in Table 4.4.
### Table 4.4: Number of working computers in particular schools

<table>
<thead>
<tr>
<th>Number of working computers</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-50</td>
<td>9</td>
<td>81.8%</td>
</tr>
<tr>
<td>50-100</td>
<td>1</td>
<td>9.1%</td>
</tr>
<tr>
<td>100-150</td>
<td>1</td>
<td>9.1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>11</td>
<td>100%</td>
</tr>
</tbody>
</table>

Findings presented in Table 4.4 show that, nine, 81.8% of the principals indicated that they have an average of 0-50 computers working, one, and 9.1% noted that they have between 50-100 and one, 9.1% have between 100-150 computers working. From Table 4.4, it’s clear that majority of schools have few working computers, only a few schools have working computers as many available computers have become obsolete. This information is in tandem with UNESCO findings which showed that majority of countries in Sub-Saharan Africa have a poor computer density, meaning that, computers are not available to schools in most countries in Africa (UNESCO, 2015).

#### 4.2.6 Source of Computers for Schools

Information was sought from the principals on the source of computers available in their schools. Their responses are presented in Table 4.5.

### Table 4.5: Principals’ responses on source of computers in their schools

<table>
<thead>
<tr>
<th>Source of computers</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer for schools, Kenya</td>
<td>1</td>
<td>9.1%</td>
</tr>
<tr>
<td>N.G.Os</td>
<td>5</td>
<td>45.5%</td>
</tr>
<tr>
<td>School purchase</td>
<td>5</td>
<td>45.5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>11</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table 4.5 shows that, very few computers (9%) were acquired through computer for schools Kenya project (CfSK). Most schools have acquired their computers through parents’ initiatives (45%) and through donations from N.G.Os (45%). These findings are in tandem with (Farrell, 2007) whose findings show that, majority of secondary schools acquired computers through NGOs, directly from the government and from private sector like the New Partnership for Africa's Development e-Schools (NEPAD) program but not through CfSK as expected. Computer for schools Kenya project (CfSK) ought to execute its mandate of providing computers to schools and train teachers on the use of technology. This would ensure schools have enough working computers and enable teachers to integrate technology in curriculum and instruction for effective school management.

4.2.7 Availability of reliable internet connection

Data was sought from the principals on whether there is reliable internet connectivity in their schools. The findings are presented in Table 4.6.

<table>
<thead>
<tr>
<th>Availability of internet connection</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>4</td>
<td>36.4%</td>
</tr>
<tr>
<td>No</td>
<td>7</td>
<td>63.6%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>11</td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

As presented in Table 4.6, principals’ findings reveal that majority of schools (64%), do not have a reliable network connection in their schools only a few, (36%) noted that there is reliable internet connection in their respective schools. This information
contradicts with Mariga & Ogenga (2017) findings which indicated that, by 2016, over 150 schools in Kenya would have benefitted from Safaricom-Kenya, with free internet connections. Lack of strong internet connection may hinder utilization of the available ICTs in carrying out administrative duties.

4.3 Use of ICT in Curriculum and Instruction in Management of Public Secondary Schools

The first objective sought to find out the extent to which ICT is used in curriculum and instruction in management of public secondary schools. Questionnaires and interview guide were used to collect data. Teachers and principals were the main respondents of the study. The researcher used a likert scale to get views of teachers on ICT utilization in preparation and delivery of lessons, ICT utilization in formulating and updating schemes of work, lesson plans, records of work and progressive records, recording and retrieving data on students’ academic performance, ICT utilization in library services and in school time tabling, if teachers feel prepared to use ICT after ICT in-service course training, whether they have enough computers in schools and whether they are able to access computers at any time in their schools. The researcher also sought information from principals on the extent to which ICT is used in curriculum and instruction. The findings are presented in Table 4.7.
Table 4.7: Findings on ICT use in curriculum and instructions in management of public secondary schools

(SOW - Schemes of work, LP - Lesson plans, ROW - Records of work, PR – Progressive records)

<table>
<thead>
<tr>
<th>ICT use in curriculum and instruction</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>D</th>
<th>SD</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>I I use ICT in preparation and delivery of my lessons</td>
<td>10.9%</td>
<td>43.6%</td>
<td>5.5%</td>
<td>27.3%</td>
<td>12.7%</td>
<td>100%</td>
</tr>
<tr>
<td>ii I use ICT to construct and update SOW, LP, ROW and PR</td>
<td>19.1%</td>
<td>49.1%</td>
<td>10.9%</td>
<td>16.4%</td>
<td>4.5%</td>
<td>100%</td>
</tr>
<tr>
<td>iii I use ICT to record and retrieve data on students’ academic performance</td>
<td>28.2%</td>
<td>49.1%</td>
<td>6.4%</td>
<td>10.9%</td>
<td>5.5%</td>
<td>100%</td>
</tr>
<tr>
<td>iv Our school uses ICT for library services</td>
<td>3.6%</td>
<td>16.4%</td>
<td>11.8%</td>
<td>29.1%</td>
<td>39.1%</td>
<td>100%</td>
</tr>
<tr>
<td>v Our school uses ICT to make the school timetable</td>
<td>33.6%</td>
<td>45.5%</td>
<td>5.5%</td>
<td>10.0%</td>
<td>.5%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Findings on teachers on curriculum and instruction presented in Table 4.7 on ICT use in preparation and delivery of lessons revealed that, 10.9% and 43.6% strongly agreed and agreed respectively on using ICT in preparation and delivery of their lessons. In this case, majority of the teachers agreed on using ICT in preparation and delivery of their lessons. Contrary to the interviewed principals’, majority of teachers do not use ICT in preparation and delivery of their lessons. Two principals indicated that, some teachers use projectors and white boards in science laboratories to deliver their lessons. So, it is
prudent to argue that, only a few teachers use ICT in curriculum and instruction since principals are the school managers entrusted with the role of management of schools.

In line with the literature review, teachers who use ICT in preparation and delivery of lessons were found to be more enthusiastic to work unlike those who did not integrate ICT in lesson preparation. Some teachers also felt that they were not ready to use ICT in preparation and delivery of lessons (Makewa, et. al, 2013). Use of ICT in lesson preparation may enhance innovative ways of teaching and learning thus improving management of students in classroom.

Results on teachers use of ICT to formulate and update professional documents as presented in Table 4.7 indicate that, 19.1% of teachers strongly agreed and 49.1% agreed respectfully that they use ICT to construct and update schemes of work, lesson plans, records of work and progressive records. Of the total teachers, 10.9% were undecided, 16.4% and 4.5% disagreed and strongly disagreed respectively on use of ICT to constructing and updating professional documents. In this case, more than half of the teachers revealed that they use ICT to construct and update schemes of work, lesson plans, records of work and progressive records. Three principals agreed with majority of teachers’ finding that teachers use ICT in updating professional documents while one principal noted that they do not use ICT in updating professional books instead they updated their professional documents manually on exercise books. From the literature review, it is not well known how teachers use ICT in carrying out administrative functions in schools (Mwalongo, 2011). However, since majority of
teachers indicated that they use ICT in preparation and updating professional documents in school, this may ease teachers’ workload and enable them carry out other administrative duties in schools for effective administration.

Results on use of ICT to record and retrieve data on students’ academic performance as shown in Table 4.7, revealed that, 28.2% of the teachers strongly agreed and 49.1% agreed that they use ICT to record and retrieve data on students’ academic performance. Seven principals concurred with the teachers’ findings that, schools use ICT in recording and analyzing examinations. The findings are in tandem to that of the literature review that majority of schools use computers in storing, recording analyzing and retrieving students’ examinations (Oyier et. al, 2015). Since most schools use computers to record and retrieve students’ records of examination this may reduce duplication errors and loss of students’ records hence effective planning and decision making in schools.

Teachers findings on whether they use ICT for library services reveal that 3.6% and 16.4 % strongly agreed and agreed respectively that their schools use ICT for library services, 11.8% of the teachers were undecided and 29.1% and 39.1% disagrees and strongly disagreed on use of ICT for library services. Majority of the teachers indicated that they do not use ICT for library services. Principals findings indicate that majority of schools do not use ICT for library services. One principal indicated that ICT is used to receive textbooks. ICT is also used to keep records of borrowing and returning textbooks by students and teachers. Contrary to this finding, (Biegon, 2017) stated that
ICT is used in carrying out library services. ICT use in library service is crucial in tracking lost books and keeping records of all books in school. Therefore lack of ICT use in library services may hinder effective record keeping of books in the school library.

4.3.1 Teachers attendance of ICT in-service training

Teachers were requested to indicate whether they have ever attended any ICT in service course. Their responses are represented in Figure 4.2.

![Figure 4.2: Teachers responses on whether they attend in-service training on ICT use](image)

As presented in figure 4.2, majority (61%) of the teachers revealed that they have never attended any ICT in service course, only a small percentage (39%) of the teachers indicated they have attended ICT in service course. These findings are in agreement with studies carried out by MoEST show that, only a small proportion of teachers
(Science and Mathematics) had received ICT training on education through CEMASTEA (MoEST, 2005). The other subject teachers seem not to have attended any ICT in-service course as it is unclear whether there is an established body to cater for in-service training of other subject teachers. Lack of ICT skills on the part of teachers’ would therefore make it difficult for principals to effectively manage schools.

On the contrary, majority of the principals indicated that they have attended ICT professional development course through KEMI and CEMASTEA whereas three principals revealed that they have never attended any ICT course in the management of schools. Since majority of the teachers indicated that, they have never attended any in service training course on ICT use, this means there is little use of ICT in school management. A school manager is expected to lead in the utilization of ICT in the school. He should promote staff professional development of his teachers. This will enable the staff to be confident in the use of ICT in their respective responsibilities. Professional development makes members of staff feel valued and well taken care of which in return boosts their morale (Gronow, 2007). Since majority of teachers have not attended any ICT in-service course, use of ICT in management of schools may be limited.

4.3.2 Teachers Accessibility to Computers in Schools

The researcher used questionnaires to seek information from teachers on whether they are able to access computers at any time in their schools. The findings are presented in Figure 4.3 as shown.
As presented in figure 4.3, 49, representing 44.5% of the teachers indicated that they are not able to access computers at any time in their schools. On the other hand, 61 representing 55.5% of the teachers revealed that they can access computers at any time in their schools. Two principals noted that computers are not accessible in their schools because they are meant for heads of departments and computer studies students. Accessibility of computers at any time in schools may enhance effective control and supervision of school activities. From the literature review, access to ICTs especially computers has brought about improvements in management and administration of schools (Mwaba-chiluba et al., 2020). Lack of access to computers may make it difficult for teachers to carry out other administrative duties effectively.
4.4 ICT use in Supervision of School Personnel

Objective two of the study sought to examine ICT use in supervision of school personnel. The researcher used questionnaires and interview guides to collect data. Information was sought from the teachers on whether their schools use NEMIS to register and track students, use of ICT in capturing personal data of both teachers and support staff, use of time attendance software to supervise staff, use of biometric system to monitor students, use of ICT to supervise teachers class attendance, use of ICT to monitor staff in-service training and whether school managers use ICT in communication. Further, information was sought from teachers and principals on challenges associated with NEMIS in supervision of students in school and ways these challenges can be addressed. The findings are presented in Table 4.8.

Table 4.8: Teachers responses on ICT use in supervision of school personnel

<table>
<thead>
<tr>
<th>Use of ICT In Supervision of School Personnel</th>
<th>YES</th>
<th>NO</th>
<th>NOT AWARE</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our school uses NEMIS system to register and track students in school</td>
<td>70.9%</td>
<td>16.4%</td>
<td>12.7%</td>
<td>100%</td>
</tr>
<tr>
<td>Our school uses ICT in capturing personal data of both teachers and support staff like age, gender and year of recruitment into the school</td>
<td>71.8%</td>
<td>20.4%</td>
<td>8.2%</td>
<td>100%</td>
</tr>
<tr>
<td>Our school uses time attendance software to supervise staff personnel</td>
<td>38.2%</td>
<td>50.9%</td>
<td>10.9%</td>
<td>100%</td>
</tr>
<tr>
<td>Our school uses biometric system to monitor students in school</td>
<td>36.4%</td>
<td>57.3%</td>
<td>6.4%</td>
<td>100%</td>
</tr>
<tr>
<td>Our school uses ICT to supervise teachers’ class attendance</td>
<td>18.2%</td>
<td>69.1%</td>
<td>12.7%</td>
<td>100%</td>
</tr>
<tr>
<td>Our school uses ICT to monitor staff in-service training</td>
<td>16.4%</td>
<td>68.2%</td>
<td>15.5%</td>
<td>100%</td>
</tr>
<tr>
<td>The school manager uses ICT to communicate to teachers</td>
<td>53.6%</td>
<td>37.3%</td>
<td>9.1%</td>
<td>100%</td>
</tr>
</tbody>
</table>
As shown in Table 4.9, findings on use of NEMIS to register and track students, indicate that, 70.9% of the teachers agreed that they use NEMIS to register and track students, 16.4% indicated they do not use NEMIS to register and track students and 12.7% did not know whether their schools use NEMIS to register and track students in school. The findings of the principals agreed with that of the teachers in that all schools noted that they use NEMIS to register and track students in their schools. Use of NEMIS can help to register and track students from one level of education to another. This will help the school and government to come up with better policies that may enhance effective planning in schools (MOE, 2017). Since majority of teachers and principals revealed that their schools use NEMIS software to register and track students’ information, this may lead to effective planning and utilization of school resources.

Findings on use of ICT in capturing personal data on both teachers and support staff indicated that 71.8% of teachers agreed on use of ICT in capturing their personal data, 20.0% did not agree of ICT in capturing their personal data. Principals’ findings indicated that capturing personal data for teachers is a function of the Teachers Service Commission (T.S.C) but were in agreement of capturing data using ICT for support staff. Contrary to the literature review, majority of schools do not use ICT in capturing personal data for both teachers and support staff like age, gender and year of recruitment (Okoli, 2015). This may lead to in ineffective school personnel.

Teachers’ responses on use of time attendance software to supervise staff revealed that, 38.2% agreed, 50.9% did not agree on use of time attendance software and 10.9% are
not aware whether their schools use time attendance software to supervise personnel. All principals noted that they do not use time attendance software to supervise teachers and non-teaching staff. They indicated that teachers sign at the security desk while others sign at the reception. Generally, teachers and support staff used manual sign-in method when they get into schools and when leaving.

According to (Muhia, 2016), most school principals had not acquired computers hence could not supervise both members of staff attendance to classes and the students in terms of examination performance which is very crucial in effective management of schools. Use of time attendance software in schools may be an effective way to supervise teachers and support staff and be able to know who attended school and who did not attend school thus curbing the problem of absenteeism and lateness of both teachers and support staff thus leading to effective control of school system.

Findings on use of biometric system to monitor students revealed that, 36.4% of teachers use biometric system to monitor students, 57.3% indicated they do not use biometric system to monitor students. Principals’ findings reveal that, majority of schools do not use biometric system to monitor students. Only one principal indicated that they use biometric system to monitor students in school. This particular principal revealed that, the school had taken a notch higher as far as monitoring of students is concerned. Two of the school deputy principals had their phones configured in such a way that they could see what the students were engaged in: whether they were in the dining hall, at the field and in the dormitories. This ensures indiscipline cases in school.
are minimal as the students are aware they are being monitored all the time. According to (Nyabwa, 2018), schools should use ICT to monitor teachers ‘class attendance and use time attendance software to track students and staff within their respective school. This may lead to effective supervision and controlling of students and staff in school.

Results on whether school managers use ICT to communicate to teachers show that, 53.6% indicated that they use ICT especially Whatsapp for communication, 37.3% indicated they do not use ICT for communication and 9.1% were not aware whether managers use ICT for communication purposes in school. In line with the principals’ findings, majority of teachers indicated that they use Whatsapp for communication. Communication is critical for effective school management. With the emergence of new trends in communication especially by use of ICT, schools should be able to use ICT for communication purposes which may lead to proper planning and decision making.

4.4.1 Challenges associated with NEMIS in schools

The researcher sought data from teachers and principals on challenges schools face when using NEMIS. The results are presented in Table 4.9.
Table 4.9: Teachers responses on challenges associated with NEMIS in supervision of personnel

<table>
<thead>
<tr>
<th>Challenges associated with NEMIS in supervision of personnel</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unskilled personnel</td>
<td>20</td>
<td>18.2%</td>
</tr>
<tr>
<td>Slow NEMIS software</td>
<td>36</td>
<td>32.8%</td>
</tr>
<tr>
<td>Students don’t have all documents</td>
<td>34</td>
<td>30%</td>
</tr>
<tr>
<td>Loss of information and data</td>
<td>10</td>
<td>9.1%</td>
</tr>
<tr>
<td>Lack of funding</td>
<td>8</td>
<td>7.3%</td>
</tr>
<tr>
<td>Lack of awareness</td>
<td>3</td>
<td>2.7%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>110</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Findings presented in Table 4.10 show that 20, 18.2% of the teachers indicated that lack of skills on NEMIS use affected effective supervision of students, 36, and 32.8% indicated slow systems associated with NEMIS. In addition, 34, 30 % of the teachers revealed that, students do not have all the required documents to be keyed into the NEMIS system. Further, 10, 9.1% noted that some information can be lost, eight, 7.3% indicated lack of funding in use of NEMIS and three, 2.7% were not aware of challenges associated with NEMIS in supervision of students. Principals’ findings agreed with teachers’ findings that, the NEMIS software is slow; there was inadequate trained personnel to handle NEMIS system. Some principals opined that NEMIS home page is not user friendly; there was inaccurate data entry as students did not have all the required documents which led to duplication of information. There was lack of regular maintenance of the system to enable it function effectively.
The findings are in line with the literature review that, data loss, non-availability of adequate information, slow data dissemination process, slow internet, lack of enough ICT software and hardware, lack of finances, time constraints and ICT accessibility and lack of data base security are considered main challenges affecting use of NEMIS in schools (Oyier et. al, 2015). All these factors may hinder effective planning, organizing, controlling and decision making within the school system.

4.4.2 Ways of addressing NEMIS challenges in schools

Information was sought from teachers and principals on ways of addressing NEMIS challenges for effective supervision of students. The findings are presented in Table 4.10.

Table 4.10: Ways to address NEMIS challenges in supervision of students

<table>
<thead>
<tr>
<th>Addressing NEMIS challenges</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create the right incentives for enhancing data quality and</td>
<td>37</td>
<td>33.7%</td>
</tr>
<tr>
<td>improve education indicators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More staff training on NEMIS use</td>
<td>33</td>
<td>30%</td>
</tr>
<tr>
<td>Capturing accurate data for all students</td>
<td>20</td>
<td>18.2%</td>
</tr>
<tr>
<td>Provision of strong internet connection</td>
<td>11</td>
<td>10%</td>
</tr>
<tr>
<td>Have a back-up information</td>
<td>9</td>
<td>8.2%</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4.11, 33.7% of teachers indicated that the government should provide the right incentives for enhancing data quality and improve education indicators. 33, 30% indicated that there should be more teachers training on the use of NEMIS, 20, 18.2% noted that teachers should capture accurate data for all students and provide strong
internet connection to the available computers. In addition, schools should have backup data information in case of loss of data. All principals were in agreement with the teachers’ findings on creating the right incentives and awareness on use of NEMIS. For effective NEMIS use, ICT resources such as computers, internet connection and sufficient capacity of servers, and regular maintenance of the software and hardware should be improved to enhance effective decision making in secondary schools (Bhatti & Adnan, 2010).

4.5 ICT use in school financial control in management of secondary schools

The third objective sought to find out ways in which ICT is used in school financial control in management of secondary schools. Questionnaires and interview guides were used to collect information. Information was sought from teachers on whether schools use ICT to prepare school budget, to keep and retrieve students’ data on schools fee payment, how ICT is used to prepare profit and loss account, balance sheets, ledger accounts and income and loss account, use of ICT to process and pay non-teaching staff, other ways ICT is used to control finances in school and challenges teachers face when using ICT in school finances. The researcher sought data from principals on ways ICT is used to control finances and challenges of using ICT in controlling school finances. The findings are presented in Table 4.11.
Table 4.11: Teachers’ responses on ICT use in school financial control

<table>
<thead>
<tr>
<th>Ways ICT is used in financial control</th>
<th>Yes</th>
<th>No</th>
<th>Not Aware</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Our school uses ICT to prepare school budget</td>
<td>1.4%</td>
<td>20.4%</td>
<td>78.2%</td>
<td>100%</td>
</tr>
<tr>
<td>Our school uses ICT to keep and retrieve students’ data on school fees payments</td>
<td>15.5%</td>
<td>21.8%</td>
<td>62.7%</td>
<td>100%</td>
</tr>
<tr>
<td>Our school uses ICT to prepare profit and loss account, balance sheets, ledger accounts and income and loss account</td>
<td>30%</td>
<td>21.8%</td>
<td>48.2%</td>
<td>100%</td>
</tr>
<tr>
<td>Our school uses ICT to process and pay non-teaching staff</td>
<td>15.5%</td>
<td>51.8%</td>
<td>32.7%</td>
<td>100%</td>
</tr>
</tbody>
</table>

As presented in Table 4.12, 78.2% of the teachers indicated that they are not aware of whether the school utilizes ICT to prepare school budget, 1.4% noted that they utilize ICT to prepare school budget. Contrary to the teachers’ findings, 100% of the principals indicated they use ICT to prepare school budget. From the literature review, ICT in preparation of school budget is an easier way to control how schools use their finances thus leading to effective planning and use of the available resources (Oyier et al., 2015).

Findings on whether schools use ICT to keep and retrieve students’ data on school fees payment indicate that, 62.7% of the teachers indicated that they were not aware whether the schools use ICT to keep and retrieve students’ data. 21.8% noted that they do not use ICT and 15.5% indicated that, their schools use ICT to keep and retrieve students’ data on school fees payment. Contrary to the teachers’ findings, six principals opined that, ICT is used to keep and retrieve students’ records on school fees payment. In
addition, principals stated that, they use bulk text messages to remind parents of school fees balances.

As indicated in Table 4.12, 48.2% of the teachers were not aware whether the schools use ICT to prepare profit and loss account, balance sheets, and ledger accounts, 21.8% indicated they do not use ICT to prepare profit and loss account and 30% of the teachers indicated that their schools use ICT to prepare profit and loss account, balance sheets, and ledger accounts. Principals’ noted that, they use ICT in preparing balance sheets and ledger accounts. Majority of the teachers who were not aware how ICT is used in financial control noted that, use of ICT in school financial control is not part of their job description. For schools to monitor school expenditure, appropriate keeping of school records, accounting and auditing procedures should be followed. ICT can help school managers to retrieve information concerning their schools’ finances enabling the principals make informed decisions concerning school finances (Diamond & Khemani, 2005).

Findings on whether schools use ICT to process and pay non-teaching staff indicated that 51.8% that ICT is not used to process and pay non-teaching staff, and 15.5% of the teachers indicated ICT is used to process and pay non-teaching staff while 32.7% were not aware whether schools use ICT to process and pay non-teaching staff. In agreement with the teachers’ findings, 8 principals noted that they used manual method of paying non-teaching staff whereby non-teaching staff were paid either through school bursars, clerks or accountants.
Management of school finances in public schools is the responsibility of the school principal. School principals have a better understanding on the extent to which ICT has been integrated in school financial management (Katitia et. al., 2019). Most teachers were not aware of how technology is used or is being used in their schools to control school finances. Additionally, not all schools in Machakos County have been able to integrate ICT in all financial tasks in Machakos County as most schools lack ICT resources to enable them function effectively. Use of traditional methods to control finances may lead to financial malpractices like wastage and embezzlement of school funds.

4.5.1 Other ways ICT is used in school financial control

The researcher sought information from teachers on other ways ICT is used to control school finances for effective management of public secondary schools. The findings are presented in Table 4.12.

Table 4.12: Teachers responses on other ways ICT is used in school financial control

<table>
<thead>
<tr>
<th>Other ways ICT is used in school financial control</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not aware</td>
<td>44</td>
<td>38.2%</td>
</tr>
<tr>
<td>Supervising school bursar, clerks and accountants</td>
<td>17</td>
<td>15.5%</td>
</tr>
<tr>
<td>Paying school fees through M-pesa and bank accounts</td>
<td>16</td>
<td>14.5%</td>
</tr>
<tr>
<td>Preparation for final accounts for auditing purposes</td>
<td>13</td>
<td>11.8%</td>
</tr>
<tr>
<td>Monitoring school expenditure</td>
<td>11</td>
<td>10%</td>
</tr>
<tr>
<td>Making departmental requisition</td>
<td>11</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td>100%</td>
</tr>
</tbody>
</table>
As presented in Table 4.13, 38.2% of the teachers are not aware on ways ICT is used to control finances in their schools, 15.5% and 14.5% of the teachers indicated that ICT is used to supervise school bursar and pay school fees through M-pesa and school bank accounts. In addition, 11.8% indicated ICT is used in preparation of final accounts for auditing purposes, 10% of the teachers noted that ICT is used in monitoring school expenditure, making departmental requisition, in their schools. ICT use in financial control in schools may help school managers to know their schools financial positions for effective planning and decision making. Unlike the findings from literature review, most schools do not accept mobile transactions like M-pesa in paying school fees. This is because there is need for verification in case a need arose (Muema, 2015). Most schools in Machakos County prefer students depositing school fees in school accounts, then present receipts to school bursars for verification purposes. This would lead to transparency and accountability of school finances.

4.5.2 Challenges faced in using ICT to control school finances

Information was sought from teachers and principals on the challenges they faced while using ICT in school financial control. Teachers’ findings are presented in Table 4.13.
Table 4.13: Teachers responses on challenges faced in ICT use on financial control in schools

<table>
<thead>
<tr>
<th>Challenges faced in using ICT in financial control</th>
<th>f</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resistance to change</td>
<td>23</td>
<td>20.9%</td>
</tr>
<tr>
<td>Slow internet connection</td>
<td>21</td>
<td>19.1%</td>
</tr>
<tr>
<td>Lack of awareness</td>
<td>20</td>
<td>18.2%</td>
</tr>
<tr>
<td>Unskilled personnel on use of ICT</td>
<td>13</td>
<td>11.8%</td>
</tr>
<tr>
<td>Poor keeping of financial records</td>
<td>13</td>
<td>11.8%</td>
</tr>
<tr>
<td>Lack of enough ICT infrastructure</td>
<td>12</td>
<td>10.9%</td>
</tr>
<tr>
<td>Power outage leading to information loss</td>
<td>8</td>
<td>7.3%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>110</td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 4.14 indicates that 20.9% of the teachers are resistant to change when it comes to use of ICT in financial control, 19.1% indicated there is slow internet connection in their schools and 18.2% of the teachers were not aware of any challenges they face when using ICT in financial control. In addition, 11.8% of the teachers lack skills on the use of ICT and poor keeping of financial records. Of the total teachers, 10.9% noted lack of enough ICT infrastructure and 7.3% revealed power outages leading to loss of information.

Majority of principals noted lack of skill on ICT use, lack of time and effort put in using computers were the main challenges affecting ICT use in financial control in schools. One principal noted that slow internet was not among the main challenges of ICT use in financial control as the school had Local Available Network (L.A.N). Lack of ICT use in schools financial control may affect decision making and planning hence affecting effective management of public schools.
CHAPTER FIVE
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction
This chapter summarizes findings of the study, presents conclusions, recommendations, policy recommendations and suggestions for further research.

5.2 Summary of the Findings
The purpose of this study was to investigate how ICT is utilized in management of public secondary schools in Machakos Sub-County, Kenya.

The purpose of the study gave rise to the following objectives:

i) Establish the extent to which ICT is utilized in curriculum and instruction in management of public secondary schools in Machakos Sub-County.

ii) Identify how ICT is utilized in supervision of personnel in management of public secondary schools in Machakos Sub-County.

iii) Find out ways in which ICT is utilized in financial control in management of public secondary schools in Machakos Sub-County.

A descriptive survey research design was used by the researcher. The study was carried out in Machakos sub-county public schools in Machakos County. The study sampled 11 public secondary schools, 11 principals and 110 secondary school teachers. Qualitative data generated was analyzed thematically and described using words and quantitative data generated was analyzed using frequencies and percentages and presented by use of
tables, charts and graphs. SPSS was used to analyze data. The findings were summarized according to the themes of the study.

5.2.1 Establish the extent to which ICT is utilized in curriculum and instruction in management of public secondary schools in Machakos Sub-County

The study found that most schools have computers in their schools however their use in management of schools is limited. Principals noted that teachers do not use ICTs in lesson preparation and delivery.

Schools use the available computes to record and analyze examinations, hence enabling accuracy in tracking and keeping of students’ records in schools. Additionally, schools do not use ICT for library services. This makes it difficult to keep record of books found in the library.

Most schools use ICT in making school time table. More than half of the teachers do not attend ICT in-service training and schools do not use ICT in supervising and monitoring of teachers’ in- service training. A substantial number of teachers revealed that they were not able to access computers in their schools due to inadequate computers and computers are made for computer students thus affecting effective administration of schools.
5.2.2 Identify how ICT is utilized in supervision of personnel in management of public secondary schools in Machakos Sub-County

Most schools use NEMIS in registering and tracking students. Majority of teachers indicated that schools use ICT in capturing their personal data. However, principals opined that capturing teachers’ personal data has been a function of the Teachers Service Commission (T.S.C) before the introduction of NEMIS.

Majority of the schools do not use time attendance software to supervise teachers but rather use the manual sign-in method when teachers get in and out of school. More than half of the schools do not use biometric system to monitor students. Only one principal noted they use biometric system to monitor students in their school.

Principals and teachers revealed that there is no use of ICT to monitor teachers’ class attendance. Teachers’ class attendance is done manually by class captains by indicating on a piece of paper whether a lesson has been taught or not. This means that use of ICT in carrying out administrative duties is minimal.

In regard to the challenges teachers face on NEMIS use, most teachers lack skills on ICT use and are resistant to change when it comes to utilization of ICT. There is lack of strong internet connectivity to the available computers in schools. In regard to the ways these challenges can be solved, most teachers and principals cited that, the government should provide the right incentives for enhancing data quality and train teachers on NEMIS use for effective planning and decision making of public schools.
5.2.3 Find out ways in which ICT is utilized in financial control in management of public secondary schools in Machakos Sub-County

The study found that, schools use ICT to prepare school budget, keep and retrieve students’ data on school fee payment and in preparation of school profit and loss account, balance sheets and ledger accounts.

Principals revealed that they do not use ICT in paying non-teaching staff but rather they are paid through school bursar, clerks or school accountants. To meet Kenya’s vision 2030, schools are expected to have integrated ICT in all school activities including all financial transactions. In addition, principals noted that ICT is used in supervising of school bursar, paying school fees, monitoring school expenditure and making departmental requisitions. This may enhance effective control of finances and decision making in schools.

5.3 Conclusions

The study conclusions are per the objectives of the study. The first objective sought to establish the extent to which ICT is used in curriculum and instruction in management of public secondary schools in Machakos Sub-County. Based on the findings of the study, the study concludes that, teachers do not use ICT in lesson preparation and delivery, updating professional books and for library services. This hinders effective utilization of ICT in curriculum and instruction leading to poor school management.

The second objective sought to identify how ICT is used in supervision of school personnel management of public secondary schools in Machakos Sub-County. From the
study findings, it can be concluded that, schools do not use time attendance software to supervise teachers but rather use the manual sign-in system. Most schools do not use biometric system to monitor students in schools. Additionally, teachers do not attend in-service training on ICT use hence they lack ICT skills necessary for effective school administration.

Objective three sought to find out ways in which ICT is used in financial control in management of public secondary schools in Machakos Sub-County. From the findings of the study, it can be concluded that, schools use ICT to prepare school budget, keep and retrieve students’ data on school fees payment, preparation of schools profit and loss account, balance sheet and ledger accounts. Schools do not use ICT in paying non-teaching staff. Most schools use ICT in monitoring school expenditure and making departmental requisitions and this may enhance effective control of finances and decision making in schools.

5.4 Recommendations

Based on the study findings, the recommendations are made as per study objectives. Objective one sought to find out the extent of ICT use in curriculum and instruction in management of schools. The study recommends that, the Government of Kenya (GOK) through the Ministry of Education (MOE) should train teachers in ICT use in preparation and delivery of their lessons and updating professional documents for easy class management. School administration should provide stronger internet for faster connectivity to the available computers in schools to enable teachers perform their
duties efficiently. School managers should solicit for more computers and allow teachers easy access to the available computers. The Kenya government should ensure CfSK program avails enough computers and train teachers on ICT use.

The second objective sought to identify how ICT is used in supervision of school personnel in management of public secondary schools. Study findings recommend that: schools should use ICT in capturing personnel data for both teachers and support staff for effective school management. School managers should install time attendance software and biometric system to monitor both staff and students for easy school administration. There should be more in-service training of teachers on ICT and NEMIS use to enhance effective handling of school data. The Kenya government should create the right incentives to enhance data quality. This would prevent data loss hence enable education stakeholders make the right decision as far as school management of schools is concerned.

Thirdly, the study sought to find out ways in which ICT is used in financial control in management of public secondary schools. The study recommends more training of teachers on ICT use in financial control in schools to enable proper keeping of financial records in schools as teachers are also administrators. Schools should have backup information system on financial data in case of loss of information due to power outage. The ministry of education should come up with ICT policy requiring all teachers to use ICT in controlling school finances thus enabling better decision making in schools as far as finances are concerned.
5.5 Suggestions for Further Research

The study recommends the following areas for further research:

1. The study should be replicated after sometime to find out the extent of ICT utilization in management of public secondary schools.

2. A study on determinants of NEMIS use in administration of public secondary schools should be conducted since its use in schools seems limited.

3. A study on the extent of in-service training of teachers on ICT use should be conducted since most teachers are not adequately skilled on use of ICTs in school management.

4. A study should be conducted on how ICT should be utilized in other functions of school management.
REFERENCES


Orodho, J. (2012). *Techniques of Writing Research Proposals and Reports in Education*


APPENDICES

Appendix I: Interview guide for principals

Dear Respondents,

I am Salome K. Mulinge. I am conducting a research study on the topic, “Utilization of Information and Communication Technologies in management of Public Secondary Schools in Machakos Sub-County, Kenya”. The research is in partial fulfillment for the award of the degree of Masters in Educational Management, Policy and Curriculum Studies at Kenyatta University.

This research is conducted for academic purposes only and all information provided will be strictly confidential. Kindly, don’t write your name on the interview guide.

Kindly answer the questions with utmost honesty. Information provided will be highly appreciated.

SECTION A: BIO DATA

1. Gender
   Male (  ) Female (  )

2. Number of years in the institution

3. Highest academic qualification

4. How many working computers do you have in the school?

5. How did you get the computers in your school?
   i). Computer for schools Kenya project
   ii). N.G.Os
   iii). School purchase

6. Have you ever attended any professional development course on use of ICT in school management? Yes (  ) No (  )

7. Is your school well equipped with reliable internet connectivity? Yes (  ) No (  )
SECTION B: USE OF ICT IN CURRICULUM AND INSTRUCTION, PERSONNEL MANAGEMENT AND CONTROL OF SCHOOL FINANCES

1. Do you use ICT in Curriculum and Instruction in your school? To what extend is it used?

2. Do you use ICT in your school to supervise students? How and to what extent?

3. In what ways is ICT used to supervise teaching and non-teaching staff in your school?

4. What challenges do you face in using NEMIS in your school and how can these challenges be addressed?

5. i). In what ways is ICT used to control finances in your school?
   ii). What challenges does your school face when using ICT in controlling school finances?

THANK YOU
Appendix II: Questionnaire for teachers

Dear Respondents,

I am Salome K. Mulinge. I am conducting a research study on the topic, “Utilization of Information and Communication Technologies in management of Public Secondary Schools in Machakos Sub-County, Kenya”. The research is in partial fulfillment for the award of the degree of Masters in Educational Management, Policy and Curriculum Studies at Kenyatta University.

This research is conducted for academic purposes only and all information provided will be strictly confidential. Kindly, don’t write your name on the questionnaire. Kindly answer the questionnaire with utmost honesty. Information provided will be highly appreciated. Please tick the appropriate answer where applicable.

SECTION A: BIO DATA

1. Gender   Male ( ) Female ( )

2. How many years have you taught in this particular school?
   - 0-5 years ( )
   - 5-10 years ( )
   - 11-15 years ( )
   - 15 – 20 years ( )
   - Above 20 years ( )

3. Do you use computers in your school? Yes ( ) No ( )


**SECTION B: ESTABLISH THE EXTENT OF ICT USE IN CURRICULUM AND INSTRUCTION**

(Scale to be used).

Strongly agree (SA) ___________ 5  Disagree (D) ___________ 2  
Agree (A) ________________ 4  Strongly Disagree (SD) _____ 1  
Undecided (UD) ____________ 3

<table>
<thead>
<tr>
<th>CURRICULUM AND INSTRUCTION</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>D</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I use ICT in preparation and delivery of my lessons</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I use ICT to construct and update schemes of work, lesson plans, records of work and progressive records</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3. I use ICT to record and retrieve data on students’ academic performance (CATs &amp; Exams)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4. Our school uses ICT for library services</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>5. Our school uses ICT to make the school timetable</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

6. (a). Have you ever attended any ICT in-service course?
   
i) Yes (    )

   ii) No (    )

b). After attending ICT in-service course, do you feel prepared to use ICT in teaching?

   Yes (    )
   
   No (    )
   
   No change (    )
   
   Confused (    )

7. Do you have enough computers in your school to enable you accomplish your duties in school in time?

   Yes (    )
   
   No (    )
8. Are you able to access computers at any time you need to use them at your own convenience?
   Yes (    )
   No (    )
   If no in question 8. (i) Above, why not? .................................................................

SECTION C: TO INVESTIGATE ICT USE IN SUPERVISION OF SCHOOL PERSONNEL

<table>
<thead>
<tr>
<th>USE OF ICT IN SUPERVISION OF SCHOOL PERSONNEL</th>
<th>YES</th>
<th>NO</th>
<th>NOT AWARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Our school uses NEMIS system to register and track students in school</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Our school uses ICT in capturing personal data of both teachers and support staff like age, gender and year of recruitment into the school</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Our school uses time attendance software to supervise staff personnel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Our school uses biometric system to monitor students in school</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Our school uses ICT to supervise teachers’ class attendance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Our school uses ICT to monitor staff in-service training</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. The school manager uses ICT (emails) to communicate to teachers</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8. Briefly, state challenges associated with NEMIS in supervision of students in school? .................................................................

9. In what ways could the challenges in question 8 above be addressed? ............
   .............................................................................................................................
## SECTION D: TO FIND OUT WAYS ICT IS USED IN SCHOOL FINANCIAL CONTROL

<table>
<thead>
<tr>
<th>ICT use in controlling School Finances</th>
<th>YES</th>
<th>NO</th>
<th>NOT AWARE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Our school uses ICT to prepare school budget</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Our school uses ICT to keep and retrieve student’s data on school fees payment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Our school uses ICT to prepare profit and loss account, balance sheets, ledger accounts and income and loss account</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Our school uses ICT to process and pay non-teaching staff</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. What other ways is ICT used to control finances in your school? .................................................................

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

THANK YOU
## Appendix III: Work Plan

<table>
<thead>
<tr>
<th>Period</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAN 2018 - FEB 2019</td>
<td>PROPOSAL WRITING</td>
</tr>
<tr>
<td>MARCH - APRIL 2019</td>
<td>CORRECTIONS</td>
</tr>
<tr>
<td>MAY 2019</td>
<td>DEFENCE</td>
</tr>
<tr>
<td>MAY - SEPTEMBER 2019</td>
<td>CORRECTIONS</td>
</tr>
<tr>
<td>OCTOBER, 2019</td>
<td>FIELDWORK</td>
</tr>
<tr>
<td>NOVEMBER 2019-JANUARY, 2020</td>
<td>DATA ANALYSIS, CORRECTIONS</td>
</tr>
<tr>
<td>FEBRUARY, 2020</td>
<td>PROJECT EXAMINATION</td>
</tr>
<tr>
<td>DECEMBER 2020</td>
<td>GRADUATE</td>
</tr>
</tbody>
</table>
## Appendix IV: Research Budget

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAPTOP</td>
<td>45,000</td>
</tr>
<tr>
<td>INTERNET</td>
<td>50,000</td>
</tr>
<tr>
<td>TRANSPORT</td>
<td>20,000</td>
</tr>
<tr>
<td>TYPING AND PRINTING</td>
<td>25,000</td>
</tr>
<tr>
<td>MISCALLENEOUS</td>
<td>10,000</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>Ksh 150,000</strong></td>
</tr>
</tbody>
</table>
Appendix V: Research Authorization from Kenyatta University

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

Our Ref: E55/CTY/PT/33215/2014

DATE: 18th November, 2019

Director General,
National Commission for Science, Technology
and Innovation
P.O. Box 30623-00100
NAIROBI

Dear Sir/Madam,


I write to introduce Mulinge Koki Salome who is a Postgraduate Student of this University. The student is registered for M.Ed degree programme in the Department of Education Management Policy and Curriculum Studies.

Mulinge intends to conduct research for a M.Ed Project Proposal entitled, “Utilization of Information and Communication Technology in Management of Public Secondary Schools in Machakos County, Kenya”.

Any assistance given will be highly appreciated.

Yours faithfully,

PROF. ELISHIBA KIMANI
AG. DEAN, GRADUATE SCHOOL
Appendix VI: Research Approval

KENYATTA UNIVERSITY
GRADUATE SCHOOL

FROM: Dean, Graduate School
TO: Mulinge Koki Salome

DATE: 18th November, 2019
REF: E55/CTY/PT/33215/2014

SUBJECT: APPROVAL OF RESEARCH PROJECT PROPOSAL

This is to inform you that Graduate School Board at its meeting of 6th November, 2019 approved your Research Project Proposal for the M.Ed Degree Entitled, “Utilization of Information and Communication Technology in Management of Public Secondary Schools in Machakos County, Kenya”.

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University’s Website under Graduate School webpage downloads.

Thank you.

ANNBELL MWANIKI
FOR: DEAN, GRADUATE SCHOOL

cc. Chairman, Education Management Policy and Curriculum Studies Department.

Supervisors:

1. Dr. Elizabeth Katam
C/o Department of Edu. Mgt Policy & Curriculum Studies
Kenyatta University

AM/lnn
Appendix VII: Research Authorization from County Director of Education

MINISTRY OF EDUCATION
STATE DEPARTMENT OF EDUCATION

OFFICE OF THE
COUNTY DIRECTOR OF
EDUCATION
P.O. BOX 2666-90100,
MACHAKOS

MKS/ED/CDE/R/4/VOL.4/135
Date: 17th December, 2019

RE: RESEARCH AUTHORIZATION- MULINGE KOKI SALOME

Reference is made to the letter from National Commission for Science, Technology and Innovation Ref: NACOSTI/P/19/2901 dated 22nd November, 2019.

You are hereby authorized to carry out your research on, “Utilization of information and communication Technology in Management of Public Secondary Schools in Machakos County, Kenya.” for a period ending 22nd November, 2020.

NANCY AFANDI
FOR: COUNTY DIRECTOR OF EDUCATION
MACHAKOS
Appendix VIII: Research Authorization from County Commissioner

THE PRESIDENCY
MINISTRY OF INTERIOR AND COORDINATION OF NATIONAL GOVERNMENT

Telephone: 21009 and 21983 – 90100
Email Address: countycommasaku@gmail.com
Fax No. 044-21999

When replying please quote:
REF NO.CC/ST/ADMS/9VOL.11/190

DATE: 17th December, 2018

The Deputy County Commissioner
MACHAKOS SUB COUNTY

RE: RESEARCH AUTHORIZATION FOR – MULINGE KOKI SALOME

The National Commission for Science, Technology and Innovation has authorized the above named researcher to carry out a research on “Utilization of Information and Communication Technology in management of public secondary schools in Machakos Sub County” in Machakos County, Kenya for the ending 22nd November, 2020.

Please be notified and accord her necessary assistance.

FELIX NZIOKA
For: COUNTY COMMISSIONER
MACHAKOS
Appendix IX: Research License

Ref No: 911998
Date of Issue: 22/November/2019

RESEARCH LICENSE

This is to Certify that Ms. Salome Mulinge of Kenyatta University, has been licensed to conduct research in Machakos on the topic: Utilization of Information and Communication Technology in management of public secondary schools in Machakos County, Kenya for the period ending 22/November/2020.

License No: NACOSTI/P/19/2901

911998
Applicant Identification Number

NOTE: This is a computer generated License. To verify the authenticity of this document, scan the QR Code using QR scanner application.
Appendix X: Map of Machakos County