INFLUENCE OF APPLICATION OF INFORMATION AND COMMUNICATION TECHNOLOGY ON PERFORMANCE OF PUBLIC PRIMARY SCHOOLS IN KENYA: A CASE OF KATHIANI SUB – COUNTY MACHAKOS, KENYA

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A Research Project Report Submitted in Partial Fulfillment of the Requirements for the Award of the Degree of Master of Arts in Project Planning and Management of the University of Nairobi

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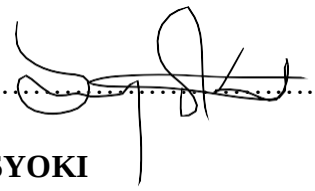
DECLARATION

This research project report is my original work and has not been presented for examination in any University.

Signature……  …… Date ……27/11/2021……

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I dedicate this research report to my loving wife Winnie, our kids Emmanuel and Immaculate who have been my sources of encouragement and inspiration.

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ABBREVIATIONS AND ACRONYMS

ESP: Economic Stimulus Programme

EMIS: Education Management Information systems

GoK: Government of Kenya

ICT: Information & Communication Technology

IMS: Information Management Systems

KII: Key Informant Interview

MoE: Ministry of Education

NICI: National Information and Communications Infrastructure

NEMIS: National Education Management Information System

PCRs: Pupil: Computer Ratios

SCDE: Sub County Director of Education

SPSS: Statistical Package for Social Sciences

UK: United Kingdom

UNESCO: United Nations Educational, Scientific and Cultural Organization

USA: United States of America

WSIS: World Summit on the Information Society

ABSTRACT

This study sought to determine the influence of application of ICT on the performance of public primary schools in Kathiani Sub County, Machakos County, Kenya. The specific objectives were: to determine the influence of application of Information Management Systems on performance of public primary schools; to establish how ICT incorporation in teaching influences performance of public primary schools; to determine the influence of incorporation of ICT in learning on performance of public primary schools; and to establish the influence of use of electronic communication on performance of public primary schools. The study was based on the Technology Acceptance Model and the ICT Impact Assessment Model. This study utilized a descriptive survey research design to collect information from 265 teachers and 21 head teachers and Sub County Education Officer who were selected using stratified random sampling and purposive sampling techniques respectively from a target population of 1 Sub County Education Officer; 71 heads teachers and 781 teachers. Self-administered questionnaires were used for purposes of collecting data from the teachers and key informant interviews used to collect data from the head teachers and the sub county education officer. Descriptive analysis was used to analyze quantitative data with the aid of the SPSS software. Thematic analysis was used to analyze qualitative data. This study established that overall the independent variables significantly influence the dependent variable as they account for 78.2% variation in performance of public primary schools. Information Management Systems accounts for 51.0%; Incorporation of ICT in Teaching accounts for 40.2%; Incorporation of ICT in learning accounts for 61.7% & Electronic Communication accounts for 22.1%. Findings of the study showed that: Application of Information Management Systems enables the school administration to determine adequacy of the facilities, education materials and teachers in comparison to the number of students and plan accordingly; facilitates monitoring of students performance; enhances efficiency in allocation of teaching responsibilities; and accountability in utilization of funds. However, only 10% of the school had incorporated the financial information management systems which may affect accountability of funds. The study also found out that incorporation of ICT in teaching reduces monotony of conventional teaching approaches; facilitates teachers access to a wide variety teaching materials; reduces the time teachers have to develop teaching aids & scheme of works; and makes it easy for teacher to analyze students' performance. However, only 14% of teachers in Kathiani used power point & video presentations in class; 13.9% used ICT tools for developing lessons plans & schemes of work; and only 43.0% of the teachers had advanced computer application skills. Incorporation of ICT in learning contributes to active participation of pupils in class, increases the probability of pupils grasping and remembering concepts; and enables students to access KCPE revision materials. However only 23.9% of the schools had conducted virtual classes, none of the schools had online library services and 47.7% of teachers observed that pupils used the internet to conduct academic research. The study further established that use of electronic communication enables the school administration to generate regular reports for communication; enhances efficiency in communication; and facilitates sharing of information on issues affecting pupils. Therefore this study recommends: The Kathiani Sub County Education office fast tracks the incorporation of the Financial Information Management Systems among all public primary schools; the Ministry of Education facilitates acquisition of the necessary ICT facilities and infrastructure and provide ICT training to teachers.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The efficiency and convenience associated with the utilization of Information & Communication Technology (ICT) have led to the increased utilization and application of ICT in all aspects of human life. Information & Communication Technology has virtually permeated all circles of human life with the vast application including the education sector. Consequently, there has been a growing demand for the application of ICT to improve educational outcomes and equip learners with ICT required in life as well as the job market. School managers have therefore been compelled to integrate ICT in their schools to enhance professionalism in service delivery and efficiency in school management (Mbatia, 2017). This can be attributed to the numerous applications of ICT in the education sector (Muli, 2017): ICT can be used for keeping digital records in schools; to facilitate fast and effective communication with parents, teachers, and students by use of email and the internet; it can also be used for marketing through the social media and school websites; ICT can also be applied in learning and teaching; and procurement of essential supplies in schools.

The world is in a digital age that demands learning institutions to integrate the use of ICT to equip students with the knowledge needed in the digital age. ICT is increasingly playing significant roles in the education sector by enabling students and teachers to take advantage of the efficiency of ICT to enhance the quality of education (Lawrence & Usmar, 2018). ICT applications in educational institutions include registration for course work, registration for examinations, submission of assignments, accessing exam results, and acquiring information about institutions and the programs they offer. Various aspects of E-learning require educational institutions to have well-maintained websites. Consequently, managers of various learning institutions have been forced to focus on the creation of school websites to ensure the smooth running of key educational functions

The primary school level provides a unique opportunity to develop and nurture ICT skills in young and tender minds. At the primary school age, the young minds of children are open to new ideas, easily absorb new information, are highly creative with high potential capacity for developing critical thinking and easily comprehend new information. This makes the primary school age a crucial time to expose children to ICT. The realization of the significance and potential for enhanced use of ICT at this level has led to the introduction of ICT at the primary level in many

countries. This is based on the logic that the intake ICT for teaching at the primary level lays a solid foundation for the young learner to be obtain skills in ICT that are essential at higher level of education (Alshmrany & Wilkinson, 2017).

The significance of ICT in education was recognized in 2003 and 2004 during the World Summit on Information Society. The summit culminated in the commitment by world governments to facilitate the realization of an all-encompassing informative society leading to the intake of the WSIS Geneva Plan of Action. The plan identifies key 10 strategic targets to be achieved by 2015. Two among these targets relate to education: To Connect all secondary and primary schools with ICTs" and to "Adapt all primary and secondary school curricula to meet the challenges of the information society, taking into account national circumstances" (UNESCO, 2016). The Sustainable Development Goals underscores the critical role played by ICT in the realization of its goals. Target 4.4 specifically seeks to enhance the acquisition of technical and vocation skills by youths and adults for purposes of enhancing their access to employment and enhancing their entrepreneurial skills.

To ratify the WSIS Geneva Plan of Action, countries have to develop ICT policies to facilitate utilization of ICT in education; avail the necessary ICT facilities and allocate adequate resources for the program. Budget estimates from different countries have revealed huge budgetary allocations targeting ICT incorporation in the education system. Studies by Buabeng-Andoh (2012) have revealed that government spending on incorporation of ICT in education in the United Kingdom (UK) for the financial year2008/2009 was £2.5 billion; the budget on ICT in education in the United States of America (USA) for K-12 schools was $6 billion while that of higher learning institutions was $4.7 billion; while the New Zealand expenditure on ICT in schools is estimated to be over 410 million US dollar per financial year.

A global evaluation of the Pupil: Computer Ratios (PCRs) has revealed that access to computers greater in developed countries in America, Europe, Eastern Asia & the Gulf States. The survey showed that the USA has achieved the recommended ratios of around 2:1 or 3:1. PCRs were 6:1 in Japan in 2013; 5:1 in the UK and 7:1 for the United Arab Emirates in the year 2010. However, over 500 learners share a computer in sub-Saharan countries such as Niger, Madagascar, Zambia, Lesotho and Guinea. However other ‘African Countries have improved their PCRs. Reports by UNESCO, (2016) have shown that Mauritius had PCRs of 23 computers: 1 student in 2014 and Botswana 55:1, in 2012.

In some parts of Asia such as Saudi Arabia, effective strategies essential for the incorporation of ICT in primary schools are largely absent. Even though the government has put in place measures to enhance the utilization of ICT in education, primary schools have largely been overlooked. ICT in schools was first used in 2007 under the King Abdullah bin Abdul-Aziz ICT project in public schools. However, the project was only introduced in secondary schools. The project sought to reform secondary school education by enhancing its efficiency through the incorporation and utilization of ICT. However, the project failed to prepare children to use ICT at an early age (Alshmrany & Wilkinson, 2017). This is likely to create challenges at high levels of education where ICT is highly integrated into teaching and learning

Most public schools in Africa have been slow in the application and utilization of ICT more so among lower levels of education (Muli, 2017). Inadequate ICT infrastructure remains a major impediment for most African countries. Statistics indicating that the student: computer ratio to be 1:150 compared to 1:15 in developed countries. Most schools in Africa lack the basic infrastructural facility for the incorporation of ICT in education (UNESCO, 2016). The computer program for secondary schools in Nigeria was finalized in 2004 however due challenges such as poor ICT infrastructure, inadequate ICT facilities, frequent power interruptions, lack of ICT technicians, and high installation costs have led to slow application of ICT. In Zimbabwe even though computers have been purchased, they lie idle in classrooms due to inadequacy of personnel skilled in ICT, unreliable electricity, and computer laboratories (Kabanda, 2012). This makes it hard to successful incorporate ICT into learning.

Among the East African Community, the enactment of ICT policies supporting the use of ICT in teaching began taking shape in the early 2000s. In Tanzania, the national ICT policy was developed in 2003. The policy sought to facilitate the expansion and development of the use of ICT in at all levels of education and to enhance education quality. The implementation entailed the development of essential infrastructure to facilitate the incorporation of ICT in the education sector; and the development of an ICT curriculum. However an evaluation of the progress made reveals that very few schools in Tanzania have incorporated ICT in teaching students. The evaluation has also revealed that schools that have the requisite ICT infrastructure are primarily located in urban areas (Hennessy *et al.,* 2010). Therefore ICT has not been fully incorporated.

The National ICT policy in Uganda was enacted in 2003. The policy is anchored on 4 activities: training of teachers/lecturers in ICT; provision of technical support to schools; development of an ICT curriculum; the provision of ICT equipment and the development of the Education Management Information Systems (EMIS). A review of the state of ICT in schools in the country has revealed that the government has invested heavily in the Education Management Information System (EMIS) which facilitated the capturing of school and pupils details at the District level and uploading this information to the national systems. Districts in Uganda have been provided with experts in ICT and computers that have access to the internet. The government has also partnered with Microsoft to provide schools with essential infrastructure such as computers including the required hardware and software components; internet connectivity; and capacity building of teachers in ICT. However the ICT facilities are still inadequate with studies showing a recent study a student: computer ratio ranging between 40 to 160 students against 1 computer primary and 20-30 students: 1computer in secondary schools (Hennessy *et al.,* 2010). These computers are therefore inadequate in comparison to students.

In Rwanda, the National Information and Communications Infrastructure (NICI) Policy was enacted in the year 2000 as one of the key anchors of Vision 2020. This led to the development of the NICI plan which seeks to facilitate the training on ICT in education teacher both at secondary and primary level and the creation of a pool of teachers skilled in ICT; the development of an ICT curriculum in secondary and primary schools; development of E-learning content; the conversion of the ICT content and training into Kinyarwanda; acquisition of ICT equipment; linkage of Rwanda to international schools; and the intake of the Education Management Information System (EMIS) (Hennessy et al., 2010). This has enabled Rwanda to reduce its PCRs to 40:1 both in secondary and primary schools (UNESCO, 2016). This can be attributed to significant investments made by the government in ICT.

The Kenyan government has acknowledged the significance of ICT in education through Vision 2030 which underscores the significance of ICT as a catalyst for the transformation of Kenya into a middle-income economy by 2030. The Ministry of education is mandated by the social pillar of Vision 2030 to facilitate the production of quality education that produces a human capital that is highly skilled in ICT skills to enhance their competitiveness in a knowledge-based economy. The National ICT policy and E-government Strategy was developed as the country's National policy framework for ICT incorporation.

The policy provides the legal framework that supports investment, research, and application of ICT; seeks to ensure that ICT is accessible and affordable to Kenyans, and provides guidelines for the development of institutional ICT framework policy. The two documents provided a basis for the development of the policy regulations contained in Session Paper 1 of 2005. This is the policy provides guidelines for the incorporation of ICT in schools (GoK, 2005) and places recognizes the critical role played by ICT in facilitating the economic growth a country. The paper seeks to support the acquisition of ICT skills by teachers as well as research and expansion of ICT in education.

To integrate ICT in the education sector, the Kenya government has undertaken several initiatives: the Economic Stimulus Programme (ESP) ICT initiative; the Laptop Project; digitization of education by the KIE; and introduction of National Education Management Information System (NEMIS). The NEMIS is online system that produces, manages, and disseminates educational data on: quantity of school equipment and facilities & teaching and learning materials; students' bio-data and their academic performance and progression; teachers' bio data, academic qualification, mobility and performance; and fee, income and expenditure of public primary schools (MOE, 2017). The ESP ICT initiative is part of the flagship projects under Vision 2030 which seeks to integrate ICT in education to produce skilled human resources required to transform the country into a middle-income economy. According to the government, (GoK, 2013), the Laptop program on the other hand seeks to ensure that every standard one pupil in Kenya public schools will have a laptop to be used for purposes of learning.

An evaluation of these programs has revealed that there has been a steady increase in the number of computers bought across Kenyan schools following increased budgetary allocation however utilization of the facilities remains low. Successful incorporation of ICT in education requires proper ICT infrastructure, adequate ICT facilities, support from the school administration, ICT literate staff, and support from ICT technicians. However, most public schools in the country are faced with the challenge of unreliable power supply due to frequent power outages; unreliable internet due to poor networks; shortage of teachers skilled in ICT; inadequacy of ICT facilities such as computers and laptops due to the high cost of purchasing and installation of software (Tonui *et al.,* 2016). These challenges have been a major impediment to access to ICT in primary schools especially public schools. Consequently, the ICT has not been fully incorporated in these schools (Muchiri, 2014) denying schools benefits of ICT.

1.2 Statement of the problem

Incorporation of ICT in schools has been linked to improved educational outcomes (Mbugua *et al.,* 2015; Hussein & Suleiman, 2017) enhanced efficiency in the performance of school administrative/managerial duties (Kiberenge, 2015; Odhiambo, 2015); and performance of teacher's duties (Kathure, 2015). The primary school level provides a unique opportunity to nurture ICT skills in young and tender minds. It prepares and equips learners with essential ICT skills at an early phase of education (Alshmrany & Wilkinson, 2017). The government of Kenya has deliberately instituted various policies and measures aimed at enhancing the incorporation and utilization of ICT in schools. However, the incorporation of ICT in public primary schools remains low in comparison to secondary and tertiary institutions.

While some of the Sub-Saharan countries have realized up to 41% incorporation of ICT in learning institutions, the proportion of schools utilizing ICT in Kenya remains substantially low (Muchiri, 2014). Government attempts to introduce the laptop project in lower primary has faced insurmountable challenges leading to the abandonment of the project altogether. This can be attributed to the shortage of ICT trained teachers; unreliable power supply; poor internet connectivity and insufficient ICT facilities in public primary schools (Andiema, 2015; Tonui *et al.*, 2016). Low levels of application of ICT deny young learners opportunity to acquire ICT skills that are essential in the technologically advanced modern world.

Studies have shown that incorporation of ICT in schools has enhanced efficiency in learning and teaching (Mbugua *et al.*, 2015; Hussein & Suleiman, 2017; Kathure, 2015). Whilst these studies have shown that ICT facilitates efficiency in teaching and learning, they overlooked the role of ICT in enhancing school managerial functions. Other studies have revealed that Information Management Systems positively influence management of schools (Madiha, 2013; Kiberenge, 2015; Odhiambo, 2015; Akaranga & Makau, 2016). However these studies overlooked how ICT incorporation influences performance of teacher's duties and students and were conducted in different context from the current study.

Even though Kathiani Sub County is in a rural setting where a substantial part of the sub- county is not connected to the national electric grid making, the schools have invested in solar panels ensuring that there is adequate power for running the ICT program; NEMIS and the laptop project have been implemented successfully; each of the school heads has a laptop. Additionally, two laptops per school have been allocated for teachers (SCDE, 2020).

This study therefore sought to establish the influence of intake of ICT on performance of public primary schools in Kathiani to determine if incorporation of ICT in the schools has enhanced efficiency in the management, teaching, learning and communication.

1.3 Purpose of the Study

The purpose of the study is to explore the influence of application of information and communication technology on performance of public primary schools in Kenya.

1.4 Objectives of the Study

2. To determine how the application of Information Management Systems influence performance of public primary schools.
3. To establish how incorporation of information communication technology in teaching influences performance of public primary schools.
4. To determine the extent of incorporation of ICT in learning on the performance of public primary schools.
5. To establish how the use of electronic communication influence the performance of public primary schools.

1.5 Research Questions

1. How does the application of Information Management Systems influence the performance of public primary schools?
2. How does the incorporation of Information Communication Technology in teaching influence performance of public primary schools?
3. How does the incorporation of ICT in learning influence performance of public primary schools?
4. In what ways does the use of electronic communication influence performance of public primary schools?

1.6 Significance of the Study

This study may be beneficial to the Ministry of Education for purposes of evaluating the effectiveness of the National Education Information Management Systems to determine extent of its usage in public primary schools and its influence in enhancing effectiveness and efficiency in the management of schools as intended. The findings from this study revealed the module of Information Management Systems adopted in schools hence the determination of the extent of implementation of the system among public primary schools. This study also established the influence of the systems in planning,

decision making, information management and reporting hence providing the basis for evaluating effectiveness of the systems in schools.

This study may also be beneficial to education policymakers and education stakeholders in Kathiani Sub County and the larger Machakos County in reviewing the effectiveness of incorporating ICT in education. Findings from this study revealed level of ICT incorporation in schools and how this has influenced performance of teachers' duties and performance of students. Recommendations made thereof may be useful to policymakers and stakeholder in the enactment of policies to ensure successful incorporation of ICT in school for improve educational outcomes among public primary schools. The study may also beneficial to future scholars who may want to research in this field as it provides information for literature review and offer a suggestion on areas for further studies.

1.7 Limitation of the Study

Data collection through the use of questionnaires requires physical contact with the respondents. This posed a challenge given the high number of respondents (265) and the prevailing circumstances of Covid-19. Social distancing regulations discouraged close contact and exchange of materials that could transfer the virus. To counter these challenges, the researcher used Computer-Assisted Telephone Interviewing to conduct interviews with all the school heads and Sub County Education Officer. The researcher utilized online distribution of questionnaires. The questionnaires were uploaded online on Google forms and the link sent to the selected respondents via email. The respondents were given time to fill the questionnaires and submit upon completion for analysis.

1.8 Delimitation of the Study

The study was conducted among the public primary schools in Kathiani in Machakos County Kenya. Therefore private schools were excluded from this study. It focused on the influence of application of Information Management systems; ICT incorporation in teaching; incorporation of ICT in learning; and use of electronic communication on the performance of public primary schools. The study sought to determine the influence of ICT on performance of key school functions: administration and management of public primary schools; performance of teaching duties; performance of students and communication with teachers, parents, students and education stakeholder.

1.9 Assumptions of the Study

This study operated under the following assumptions: Public primary schools in Kathiani had incorporated ICT in the management, teaching, learning and communication. The study was also

based on the assumption that the school administrators of the selected public primary schools for the study would grant permission for the collection of data; and the sampled population would be cooperate in data collection and freely and honestly give true reflections of their current practice and course of operations.

1.10 Definition of Significant Terms

Electronic Communication- Electronic communication refers to communication that uses electronic media for purposes of transmitting information or message. These include use of school websites, e-mail, telephone, video calling and social media by public primary schools for communicating with teachers, parents, students and education stakeholders.

Information & Communication Technology - refers to a wide variety of technologies used in the management, teaching, learning and communication in public primary schools.

Information Management Systems (IMS) - refers to an online system that produces, manages, and disseminates educational data on: quantity of school equipment and facilities & teaching and learning materials; students' bio-data and their academic performance and progression; teachers' bio data, academic qualification, mobility and performance; and fee, income and expenditure of public primary schools

ICT incorporation in teaching- refers to the incorporation of technology by public primary school teachers in performing their duties such as ICT-based teaching in class; utilization of ICT in designing & developing lessons plan and schemes of work; use of teaching materials downloaded from the internet; & utilization of ICT in analyzing the performance of students.

Incorporation of ICT in learning- refers to the use of ICT by public primary school students for attending virtual classes; accessing learning and revision materials through the internet; using the internet for academic research; and using E-library services.

Performance of Schools- refers to the efficiency in the execution of school administrative duties, teaching, learning and communication functions among public primary schools.

1.11 Organization of the Study

The study is organized into five chapters. Chapter one consists of the introduction of the study including the background of the study, statement of the problem, the purpose of the study, objectives of the study, research questions, significance of the study, scope and delimitations of the study, assumptions of the study and the definition of terms. Chapter two reviews the literature of previous studies on ICT incorporation in schools, provides the theoretical framework, conceptual framework, and the knowledge gaps. Chapter three consists of research methodology including the

research design, target population, sample size and sampling procedure, research instruments, pilot testing, validity and reliability, data collection procedures, data analysis, and ethical consideration. Chapter four provide analysis, presentation and interpretation of the findings of the study. Chapter five provides a summary of the findings, conclusions and recommendations.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter empirically reviews the literature of previous studies on the influence of intake of ICT on public primary schools performance focusing on the intake of Information Management Systems; ICT incorporation in teaching and learning; and use of electronic communication. This chapter also provides the theoretical & conceptual framework. The chapter ends with an analysis of the knowledge gaps that this study filled and the contributions of the study.

2.2 Performance of schools

ICT has a many applications in a number of administrative duties in the schools (Olaore, 2014). These applications include the management of students' data and personnel administration. The student management system captures the student's bio data and provides identifies a student with a unique identification number and contains information such as the student's gender, class and performance in addition to a unique that identifies their schools. This information can show trends in students' performance over time hence enabling the school administration to determine whether the schools performance is improving or declining. This information can be used to make decisions and develop strategies to enhance students' performance. A study by Mwadulo & Odoyo (2020) has shown that Information and Communication Technology enhances the safety and security of sensitive and crucial school information such as students' fee payments and accounts; students' performance and progression; and staff performance and mobility.

The study by Mbugua *et al.*, (2015) further established that teachers who integrated ICT in teaching recorded the best means cores in KCSE compared to those who had low incorporation of ICT in teaching or did not utilize ICT completely. According to findings of the study, students whose teachers did not incorporate ICT while teaching had a lower mean mark of 4.6 compared to those whose teacher had a high level of incorporation of ICT when teaching students. Students whose teachers had low level incorporation of ICT in teaching had a KCSE mean score of 4.76; those who had medium level incorporation had a KCSE mean mark of 5.61 while those who had a high level incorporation had mean mark of 6.14. This implies that incorporation of ICT has appositive influence on the academic performance of students. ICT has also been identified as a motivating factor for students in learning.

A study on the effects of ICT on the performance of students Talkuder *et al.,* (2016) found out that 86% of the teachers that participated in the study stated that integrating ICT in learning motivates students and makes learners to be more attentive in class compared to the traditional approaches to teaching.

2.3 Application of Information Management Systems and Performance of Schools

The efficiency and effectiveness in the utilization of ICT has seen an increase in the incorporation of Information & Communication technology in the administration and management of learning institutions. ICT now has a wide variety of applications in management functions including analysis, planning and decision making. School managers are now implementing the Information Management System to perform key managerial functions. Intake of Information Management Systems plays an instrumental role not only in the managing information required for purpose of decision making and planning but also in the execution of fundamental managerial and school administrative functions. Information provided through the system enhances efficiency in school management by enabling school managers to equitably allocate resources in the budgeting process; distribute the teaching load among teacher; scheduling of school activities through the school timetable; and provision of information on students' and teachers ' performance which is used for purposes of monitoring and evaluating the performance of the school (Akaranga & Makau, 2016; Mwadulo & Odoyo, 2020).This enhances effectiveness in the school and significantly improves the performance of school.

ICT plays an instrumental in enabling the school administration to take an inventory of the school facilities and its human resources to determine their adequacy and make decisions in terms of planning for purposes of resource allocation (Madiha, 2014). The study revealed that the teacher management information system provides the teacher's bio data; their qualifications; number of teachers in the school; teachers training & professional development; and their performance. From this information the school administration is able to determine the adequacy of teachers in the school and their qualifications. This information is useful for human resource planning to ensure that the school has adequate number of qualified teachers. The school administration can make decisions on the additional number of human resources required to ensure the school functions optimally. Information on the performance of teachers can be used as the basis for evaluating the teachers to determine if they are meeting their targets (Madiha, 2014). This information is useful in the formulation of strategies to ensure optimal performance

The study further revealed that the School Management Systems contains details of the location of the school, the category/type of the school, and the facilities available in the school in terms of the number and adequacy of class rooms, library, science laboratories and toilets. This information is crucial for purposes of planning and development of the school. It also allows the school to sieve and easily access specific information for purposes of decision making. The school administration can make a determination of the adequacy of its facilities and make plans to ensure that the school has adequate facilities required for an effective learning environment (Madiha, 2014). Hence the school administration can use this information for purposes of making decisions on where to allocate financial resources to offset deficit in school facilities.

Therefore based on Madiha, (2014) findings, it can be established that the School Management Information Systems enhances efficiency and effectiveness in the management of schools by saving time and developing alternative solutions for sophisticated problems. This system eases management tasks by making data and information required for decision making easily available and accessible. Accessing such information without ICT would be a complex task that would take time. However with the use of School Management Information Systems, the school administration can easily manage, store, retrieve and maintain sensitive school information. The management can also prepare reports with much efficiency as they can easily access information and retrieve information needed. This effectively reduces the work load for the school administration staff.

In Kenya the National Information Management System (NEMIS) was introduced in 2017 and implemented in schools in 2018. According to the Ministry of Education (MoE, 2017), the system consists of 4 modules that are fundamental in the management of schools. The institution model captures the registration of the school with the ministry; the school infrastructure including school equipment and facilities by quantity and date of acquisition; education materials including the specific quantities of course books and supplementary books; and addition information on extra-curricular activities the school engages in and their achievement. The learner module allocates students a unique personal identifier that is used to track the learner in the education system. It also captures the performance of the students and the progress made in different levels of education. The staff module captures the teachers and non-teaching staff personal details in an institution; capture teachers mobility by capturing transfer of teachers from one institution to another including their transfer history; the teaching areas such as the subjects that the teachers is teaching in an institution; study areas which captures information on areas the teacher is trained on and the responsibilities

assigned to a teacher in an institution.

The financial module helps capture the income and expenditure in an institution by capturing information on fee amount of the school including the approved fee items; income returns which provides information on the amounts received by the school in a given financial year; development fund which captures projects funded in the school in a financial year; and the expenditure returns which captures information on the actual amount spent on a project, milestones achieved and percentage completion in a project. NEMIS also contains the report module with an interface that allows the school administration to generate regular reports related to their mandate as school administration (MoE, 2017). Therefore the school administration can use this interface to export data for advanced analysis in accordance with prescribed formats such as excel.

An evaluation of the Information Management systems in Bungoma County by Kiberenge (2015) revealed that implementation of the information management systems in the schools had improved decision making by availing information generated through the system which aided teachers in making informed decisions. Findings of the study revealed that the Information Management System enabled teachers to access information on student performance; timetable information and academic performance of the various classes in the school; the Information Management system had a positive influence on curriculum management through faster generation of information and reduction in cost of curriculum management; and the system had improve the supervision of core curriculum. However challenges in networking affected the effectiveness of the system by limiting sharing of data and information within departments. The system also limited teacher's access to crucial information on student's attendance and teacher's performance.

An investigation on the influence of Management Information Systems used in education on school management by Odhiambo (2017) revealed that EMIS has increased efficiency in the management and administration of schools in Nairobi. The study showed that intake of Education Management Information System had a positive influence on schools management through the reduction of time taken in performing repetitive/regular tasks thereby creating free time for the performance of other activities in the school by the school administration. The study further revealed that EMIS had application across key managerial functions that included the management of school curriculum and instruction through the preparation of the school timetable; finance through the preparation of the budget; human resource management through reporting of teachers attendance and tracking their performance; and community relations through the communication of relevant information

such as school calendar dates. However, ICT facilities in the school were inadequate to facilitate frequent use by the teachers. Unlike before where such sensitive information would be stored in files that could easily be destroyed by fire or stolen, ICT provides school managers with safer means of storing data that can easily be accessible. Cloud computing storage provides a safer means of backing up sensitive schools information without having to worry about it being destroyed by fire or other disasters. This information can easily be accessed at a convenient time through use of the internet and only requires log in credentials such as username and password.

A study on ICT application in managing Teachers Training College (TTC) showed that ICT had several applications in school management: 98% of the teachers said that they used ICT in the management of students data; 94% said that they utilized ICT in the registration of students; 98% use ICT for managing the results of the students, 96% used ICT in the management of school finances; and 53% used ICT in the managing personnel of their respective institutions (Kathure, (2015). This implies that ICT was widely used in the performance of a variety of management functions including registering students; managing students' data & results; and in managing school finances and personnel.

Incorporation of ICT in managing schools had enhanced efficiency in the performance of school administrative duties (Akaranga & Makau, 2016). According to the study, prior to the implementation of the Information Management Systems at Kitinga Primary school, teachers used to spend a most of their time in preparing, analyzing and storing of crucial school information. The complexity of performing these tasks manually had a negative effect on their efficiency as it took a lot of time as there were no clear guidelines on how to organize and keep vital school information. However the intake of Information Management System in the school had reduced the work load for the teachers as the use of computers made the execution of these tasks quite easy. Use of various computer application and software has made it easy to organize, analyze and store vital school information. The system also makes it easy to track and monitor individual components of the school data while enhancing good time management. The study established that the school had soft copies of vital school information well organized into tables that were saved in the head teacher's laptop and backed up in a flash drive. The school also hard printed hard copies that were well organized making it easy to retrieve essential information for decision making. However, the school had not fully digitalized its records.

2.4 ICT Incorporation in Teaching and the Performance of Schools

Incorporation of Information & Communication Technology in teaching of students has enhanced the efficiency of teachers in the delivery of education content to students. Utilization of technology in teaching has reduced teachers work load by: providing tools that teachers can use to design and develop teaching materials such as schemes of work, timetable, instructional materials; enabling teachers to download high quality teachings aids such as maps and images instead of drawing them; supplementing source of teaching materials by providing unlimited access to learning and revision materials in addition to soft copies of textbooks; providing tools for analysis of students performance, preparation of students' progress reports; and enabling teachers to conduct research and access information on effective pedagogical approaches to delivery of curriculum and instruction to students (Ali *et al.*, 2013; Kathure, 2015; Mbugua *et al.*, 2015; Mwadulo & Odoyo, 2020). This enables teachers to perform their duties more effectively and provide high quality education to learners unlike before where teachers had to perform these tasks manually. This took a lot of time and increased the work load.

A study by Mwadulo & Odoyo (2020) has shown ICT also provides cost effective tools that can be used by teachers to organize and conduct analysis of data on students' performance. Microsoft office applications such Excel can be used to evaluate students' performance in the exams by enabling teachers to add marks; calculate percentages; calculate means scores and rank students. Teachers can also conduct analysis to show trends in performance over time, performance across the gender and distribution of students on the performance curve. Unlike before where teachers had to do the calculations manually, the excel spreadsheets perform all the calculations and the teachers only need to feed information and formulas into the sheet. More sophisticated applications such as the Statistical Package for Social Sciences can be used to calculate complex analysis such as correlations between students' performance and the school environment with the aim of making decisions on strategies to enhance performance of students.

A study by Ali *et al.,* (2013) established that utilization of ICT reduces the workload for teachers. Prior to incorporation of ICT in teaching students, teachers had to use teachings aids that required them to draw images, diagrams and maps on manila papers and blackboards.

This was a tiresome task that took more time and drained teachers' energy. The case was worse for teachers who were not good in drawing and had to hire someone or involve students to draw for them. However with the incorporation of ICT, teachers no longer have to engage in the tiresome task. Teachers can now obtain already drawn maps/images/pictures in soft copy and only require

computers and projectors to display or a printed out copies for their students. Teachers can easily download high quality images/pictures and maps from the internet and save them time and energy that they could have used drawing these images. The downloaded images are often high qualityand better than hand drawn images as they are developed using specific drawing software. When teaching a bigger class with many students, teachers can easily use microphone that amplifies their voice unlike before where they had to shout. At times when they could not students at the far end of the class could not hear the teachers.

The study further established that technology has also made it possible for teachers to access a variety of teaching materials online which furnishes the teachers with enhanced educational content unlike before when they only had to rely on textbooks and teachers guidebooks. Teachers can now access books and other materials on the internet including published journals and research papers which expand their scope of knowledge. They can access materials from other schools within an outside the country which enables teachers to have unlimited access to a variety of teaching materials. Teachers can also use various ICT applications in planning and preparing lessons plans and designing instructional materials. They can now access materials from international sources and adopt the materials to their needs of the students (Ali *et al.,* 2013). This ensures that teacher are able to get information that is well researched and of international standards.

A study on ICT intake in managing public primary teachers training college, (Kathure, 2015) established that technology had a wide variety of application in teaching. According to the findings of the study, 31% of tutors and 32% of students used ICT for purposes of finding digital learning materials through the internet; 25% of the tutors and 27% of the students used ICT for purposes of preparing for lessons; 19% of the tutors and student training use ICT for designing students learning styles and personalizing learning; and 25% and 27% used it for supporting creativity in class. This implies that Information and Communication Technology had a wide variety of applications in teaching and instructions despite the low usage by students and tutors in the college.

Similar findings were established by Mbugua *et al*, (2015) whose findings revealed that ICT has a wide variety of applications on teaching of students: showed that 80% of the teachers use ICT in the preparation of school timetable; 52.2% utilize ICT in the preparation of schemes of work; 54.1% utilize ICT in preparing instruction materials; 54.8% utilize ICT in preparing reports on students' progress; 84.4% incorporate ICT in teaching students; 80% in managing the library; 79.3%

utilize ICT in the preparation of students records; and 85.2% utilize ICT in the management of class attendance. This implies that teachers use ICT mostly for purposes of teaching in class, management of class attendance and management of the library. ICT has the least application in preparing schemes of work, instructional materials and students' progress reports.

A study by Olaore (2014) in Nigeria established that ICT plays a significant role in enabling teachers to perform their duties more effectively. Findings of this study have shown that integrating ICT in the teaching process aids the teacher in designing and developing learning materials as teachers can access and download materials from the internet which can be adapted to suit specific instructional objectives. The teachers can also access electronic teaching materials such as E- Journals and E-books from the internet which they can download and use to teach students. ICT also enables teachers to store this information in a secure format that cannot be easily damaged or lost as it would be if it were in a hard copy format. Therefore they can reuse the information and only need to update it instead of buying new hard copy books whenever they get damaged or lost.

2.5 Incorporation of ICT in Learning and the Performance of Schools

Information & Communication Technology has brought about convenience in learning. Prior to the incorporation of ICT in learning, students had to be in class physically for learning to take place. However, application of ICT in learning has made it easy as students can now undertake learning at their own convenience without having to be physically present in class (Ali *et al.,* 2013). This approach to learning is particularly important during the COVID-19 Pandemic where public gatherings are discouraged to contain spread of the corona virus. Availability of the internet has made it possible for students to enroll for online classes and undertake learning through virtual classes; conduct research through the internet; do their assignments while at home. The convenience provided by the internet means that students can undertake learning at anytime from anywhere without being in a physical classroom.

A study by Hussein *et al.,* (2017) established that technology provides students with unlimited access to a wide variety of leaning materials. Through the use of the internet, students can conduct research and access different learning materials including E-books, articles, journals and research papers. This gives students information from a variety of sources that they can use to do their assignments and read extensively to increase their knowledge scope beyond the information provided in textbooks and teachers in classroom. This approach to learning encourages independence and initiative on part of the students which nurtures creativity unlike before where

students had to rely entirely on information provided by the teachers. The situation is aggravated by inadequacy of textbooks in most public schools where many students share a single textbook. In remote areas, the teacher is the only one having the textbooks. However with smartphones, tablets and laptops students can access information on the internet. Other mediums of learning include television programs with educational content; educational television channels; and You Tube videos. This can easily be accessed through mobile phones which are virtually available in all homes especially in urban areas (Hussein *et al.,* 2017). Therefore students can access unlimited information conveniently.

ICT facilitates the presentation of curriculum content to learners in an interesting and interactive which makes it easy for students to acquire the necessary literacy, creativity numeracy and communication skills. In an evaluation of the effects of technology on the learning outcomes, Sarkar *et al.,* (2017) found out that application of ICT in teaching enhances learning through the Utilization of more interactive teaching devices and aids. This is a more interesting approach than writing notes on the blackboard. Use of digital teaching aids such as videos and films enhances students learning abilities as they increase the learners' interest in the content being presented. Combining teaching of theory with video presentation adds learners' interest in the course content and increases their chances of understanding the concept being taught. Use of Microsoft Office applications such as power point enables the teacher to make the learning process to be more interesting through the presentation by use of slides aided by a projector.

In his study, Olaore (2014) revealed that ICT provides supplementary materials to those provided by the teachers in class. Students can access virtual library through the E-library sections of the school and download or read electronic versions of books or journals. These materials are not limited to those available within the school as students can access published materials and books form anywhere in the world.

Therefore students have a rich source of information where they can make references and conduct research beyond the boundaries of their school library as they have access to a world of resources in electronic form. These materials are also affordable as the only cost incurred is the internet cost used in downloading the materials. The books and journals can easily be shared with other students as they are in soft copy compared to hard copies of printed textbooks which can only be bought and cannot be reproduced. Students are therefore forced to share a single textbook however with soft copies; the books can be transferred in each student electronic gadget which ensures all

students can read comfortably.

ICT has also been identified as a motivating factor for students in learning. A study on the effects of ICT on the performance of students Talkuder *et al.,* (2016) found out that 86% of the teachers that participated in the study stated that integrating ICT in learning motivates students and makes learners to be more attentive in class compared to the traditional approaches to teaching. It makes students learners to be more responsible their learning as ICT enhances their ability to undertake tasks more effectively and independently. The motivation brought about by the use of ICT fosters a positive attitude towards learning among students which consequently increases their desire to learn. A positive attitude towards learning is related to commitment and hard work which leads to positive outcomes in students' performance. The use of interactive teaching aids and approaches by teachers increase the insertion of learners and enhances attainment of fundamental aptitudes by learners. Unlike the traditional approaches of learning, use of use of a wide variety of audiovisual aids and relevant computer applications provide a more attractive and challenging learning environment for the students which serves as a motivating factor for the students while learning.

However use of ICT may have negative influence on students and learning. Studies have found out that the internet can be a source of destruction to the learning process. The negative impact of ICT n students learning has been demonstrated by Talkuder *et al.,* (2016). This study revealed that utilization of the internet for learning has no negative influence on students however ICT addiction has a negative effect on students' performance. The established that the habit of using the internet everyday reduces the time that the students could have used in searching for learning and revision materials. The study showed that students spend a substantial part of their time browsing for social and non-academic reasons on a daily basis including during exam times. Students spend more than 15.6 hour per week for browsing. Out of these hours, 15.1 hours is spent on social media and other non-academic browsing. This means that the students only spend half an hour per week for academic browsing. According to the findings of the study, spending most time on the internet for non-academic reasons had no effect on the students' performance however addiction to the internet negatively affects students' performance.

2.6 Use Electronic Communication and the Performance of Schools

ICT facilitates plays a significant role in providing information required by the school administration for purposes of communication with education stakeholders such as parents, students, teachers and ministry of education officials. The National Education Management Information System

(NEMIS) captures , process, stores, updates and retrieves crucial information that school need to communicate to stakeholders. These include information of the number and performance of students and teachers; availability and adequacy of teaching materials and school facilities; income and expenditure of schools; and the progress of implantation of school project. Use of the Information Management System generates this information and makes it easily available to stakeholders in an organized manner that can easily be understood (Akaranga & Makau, 2016). This information is communicated to stakeholders and used for purposes of panning and decision making.

Use of information and communication Technology facilitates faster and easy access to information irrespective of the barriers caused by distance and time. The internet has made it possible for teachers, parents and students to access information at their convenience. A study by Mwadulo & Odoyo (2020) has shown that information can easily be accessed through the schools websites. The school administration can avail information to parents and teachers through the school administration website. This information can easily be accessed from anywhere at any time at the convenience of the learners and parents. The study further revealed that the school administration can create central databases where students can have direct access without having to go through any bureaucracy. The school for instance can post the results of its learners where parents and students can access this information without having to be physical in school.

The study by Mwadulo & Odoyo (2020) further revealed that Use of Information & Communication Technology provides cost-effective ways of disseminating information to students and parents. Prior to the incorporation of ICT in education, the school administration had to write hard copy letter to each and every parent informing them of a meeting in the school, opening and closing dates. However the incorporation of ICT has changed this and the school administration only needs to posts such announcements on the school websites or social media pages where parents and students can read. They can also send texts messages through Whats App groups which reduces the cost that would have been incurred in printing hard copies. The school administration only posts the message in one place and the information is shared across different platforms making it easy for a wider audience of learners and parents at a cheaper cost.

Information and Communication Technology enhances efficiency in communication by providing immediate feedback to the sender of the message. Effectiveness in the communication process is determined by the feedback provided by the recipient of the message which indicates that they

have received and understood the message. ICT offers a multiplicity of communication channels that provide immediate response enabling the sender to determine if the message has reached the intended recipient. Unlike before where teachers had to wait for a long time before they could receive a response to letter sent to parents, teachers can easily get immediate feedback by calling parents or sending text messages. Social media channels such as Facebook provides certain metrics that its users can use to get feedback on the effectiveness of their communication to fellow users. These metrics include number of likes, shares, views and comments on a post (Roberts, 2010). Therefore the school administration can use the App to determine effectiveness of their communication through the feedback provided by their fellow students. For instance, the number of likes on a particular post can be used indicate the popularity of a post. WhatsApp enables the sender to determine if the recipient has received and read the message; whether the recipient is available online to respond to the message; and the last time that he/she was available

Information & Communication Technology plays a significant role in enhancing communication in schools. A study by Kathure (2015) established that 56% of teachers and 31% of the students applied technology for purposes of communication and networking. However 44% of teachers and 69% of students were of the opinion that ICT was not adequately used for communication. With regards to the mode of ICT communication used, 99% of the teachers and students said that they use their mobile phones to send short message services (SMS) and make calls; 6% of teachers and 12% of students used electronic mails for personal communication while the school website was used by 6% of the tutors and 14% for student. Even though various modes of ICT were used for communication purposes, usage of technology for purposes of communication was very low as indicted by lo usage of emails and the school website.

A study by Olaore (2014) revealed ICT provides communication channels through social media that can be utilized by students to access help from their teachers or when they want to share ideas or hold discussions with their fellow students. Incorporation of ICT in education facilitates communication between students and their teachers. ICT provides a two-way medium of communication between students and teachers for solving leaning problems, seeking advice from teachers and general learning. Social media apps such as FaceBook and WhatsApp groups provide interactive channels that students can contact their teachers easily whenever they need help or when they want to share ideas with their fellow students. These channels offer immediate feedback to students hence ensuring efficient communication and provide means of finding immediate

solutions to challenges they may be experiencing when they are away from schools. Students also get a chance to share and discuss ideas with their fellow students on how to do assignments and solve problems.

2.7 Theoretical Framework

This study was grounded on the Unified Theory of Acceptance and Use of Technology and the Technology Acceptance Model

2.7.1 Unified Theory of Acceptance and Use of Technology

The unified theory of acceptance and use of technology was developed by Venkatesh, Morris, Davis and Davis (2003) to explain the extent of users' acceptance of the use of technology based on their assessment of the expected its benefits. The extent to which users' accept the use technology is referred to as the behavior intention. The intention to use technology is influenced by the users' attitude towards the technology. User's attitude is determined by their evaluation of the technology based on four main factors: performance expectancy; effort expectancy; social influence and facilitating conditions (Venkatesh *et al.,* 2003).

Performance expectancy refers to the extent to which the user believes that using ICT will be beneficial to their jobs. Users will be inclined to use technology if they perceive that it will enhance their job performance (Venkatesh *et al.,* 2003). Similarly schools will be more inclined to incorporate ICT in management; teaching and learning if they perceive that using technology will enhance efficiency in the performance of these duties by through achievement of more in less time and reduced work load.

Effort Expectancy refers to the degree of ease associated with the use of the technology. Users will be more inclined to use the technology if they perceive it to be easy to use. Hence users are likely to use technology that does not require a lot of effort to use (Venkatesh *et al.,* 2003). Therefore schools are likely to incorporate ICT in performance of their functions if it will be ease for the teachers and learners to use and if it requires less effort. However, successfully incorporation of ICT in schools requires training teacher to have skills and knowledge in ICT; purchasing new facilities such as computers hardware and software, laptops and installation of necessary infrastructure such as electricity and the internet. Hence this may be perceived as difficult leading to low levels of incorporation. Therefore this requires facilitating conditions.

Facilitating conditions refers to the extent to which the user perceives that there is organization and technical infrastructure to support the technology. Users will be inclined to use the

technology if there is technical infrastructure to support it (Venkatesh *et al.*, 2003). Schools will be more willing to incorporate ICT in the performance of their functions if there is adequate ICT infrastructure in form of laptops, computers with a reliable internet and power supplied coupled with well trained staff with technical skills in ICT or support from a ICT technician.

Social influence refers to the extent to which the user perceives that significant others believe that he/she should use the technology. Users will be inclined to accept and use the technology if the significant others in think that the technology is beneficial or have a positive evaluation of the technology (Venkatesh *et al.*, 2003). Teachers are likely to feel social pressure to incorporate ICT in teaching and learning if other teachers have incorporated it and realized the benefits. The pressure may also come out of the need to comply with the requirements of the ministry of education to use ICT systems such as NEMIS.

2.7.2 The Technology Acceptance Model

The Technology Acceptance Model was developed by Fred Davis and Richard Bagozzi (1989) as an information System theory that provides the theoretical explanation of the acceptance and utilization of technology by users. This model explains user's willingness to accept and use technology based on their evaluation of how useful the technology is and the ease of using the technology. The two factors determine the user's attitude which affects their behavioral intention of using the technology and eventually the actual intake of the technology in performing his/her duties (Davis & Bagozzi, 1989). Hence a positive evaluation of the usefulness of technology increases probability of using the technology.

Users' willingness to incorporate and utilize technology in performance of their duties is determined by 2 factors: the users perceived usefulness of the technology; and the users ease of using the technology. The user's perceived usefulness of technology refers to the user's subjective beliefs that utilization of a specific technology will enhance efficiency in the performance of their duties. According to Davis, (1989), user's ease of use refers to the extent to which the user believes that incorporation of the technology in performance of their duties will be effortless.

Therefore if they believe that utilizing a particular technology will enhance efficiency in performance of their jobs and the use of the technology will not require extra efforts, they will have appositive perception towards acceptance and utilization of technology. The positive evaluation of the use of technology leads to a positive attitude towards technology use. This influences the user

behavioral intention to adopt technology in performing their duties leading. The behavioral intention in return leads to the actual intake and incorporation of the technology in performance of duties.

The Technology Acceptance Model is instrumental in explaining the willingness of teachers in primary school to incorporate ICT in teaching as well as the school administration willingness to accept and use technology in the managing and running the school. The school administration and teachers are more accepting of integrating ICT in teaching and management of schools if they believe that enhances the performance of their schools. If they believe that the incorporation of ICT enhances effectiveness and efficiency in performance of their duties, they are likely to adopt use of ICT. Intake of ICT in teaching requires effort in terms of training teacher to have skills and knowledge that enhance their competence in use of ICT; purchasing new facilities such as computers hardware and software, laptops and installation of necessary infrastructure such as electricity and the internet. If the school administration views these as extra effort that is beyond their reach, the probability of incorporating ICT in teaching and management of the school is reduced. The proportion of primary schools that have adopted ICT remains substantially low in Kenya (Muchiri, 2014) and ICT has not been properly integrated into primary schools (Tonui *et al.*, 2016). This can be attributed to the extra effort required in the incorporation of ICT in schools.

2.8 Conceptual Framework

This study sought to establish the influence of intake of information technology and performance of public primary schools in Kenya. Intake of information Technology is the independent variable and performance of primary schools is the dependent variable. Incorporation of ICT in schools enhances efficiency and effectiveness in the performance of key primary school duties such as administration/management of the schools; performance of teaching duties; academic performance of students; and communication.

Policies by the ministry of education provide the legal framework for the incorporation of ICT in the managing schools, teaching, learning and communication. Moderating variables include: availability of reliable power supply; adequate ICT facilities; sufficient technical staff; and reliable internet. Intake of ICT in schools requires adequate ICT facilities; sufficient technical staff; and reliable internet. Therefore inadequacy or absence of these facilities may negate this relationship. This relationship is demonstrated in Figure 2.1:

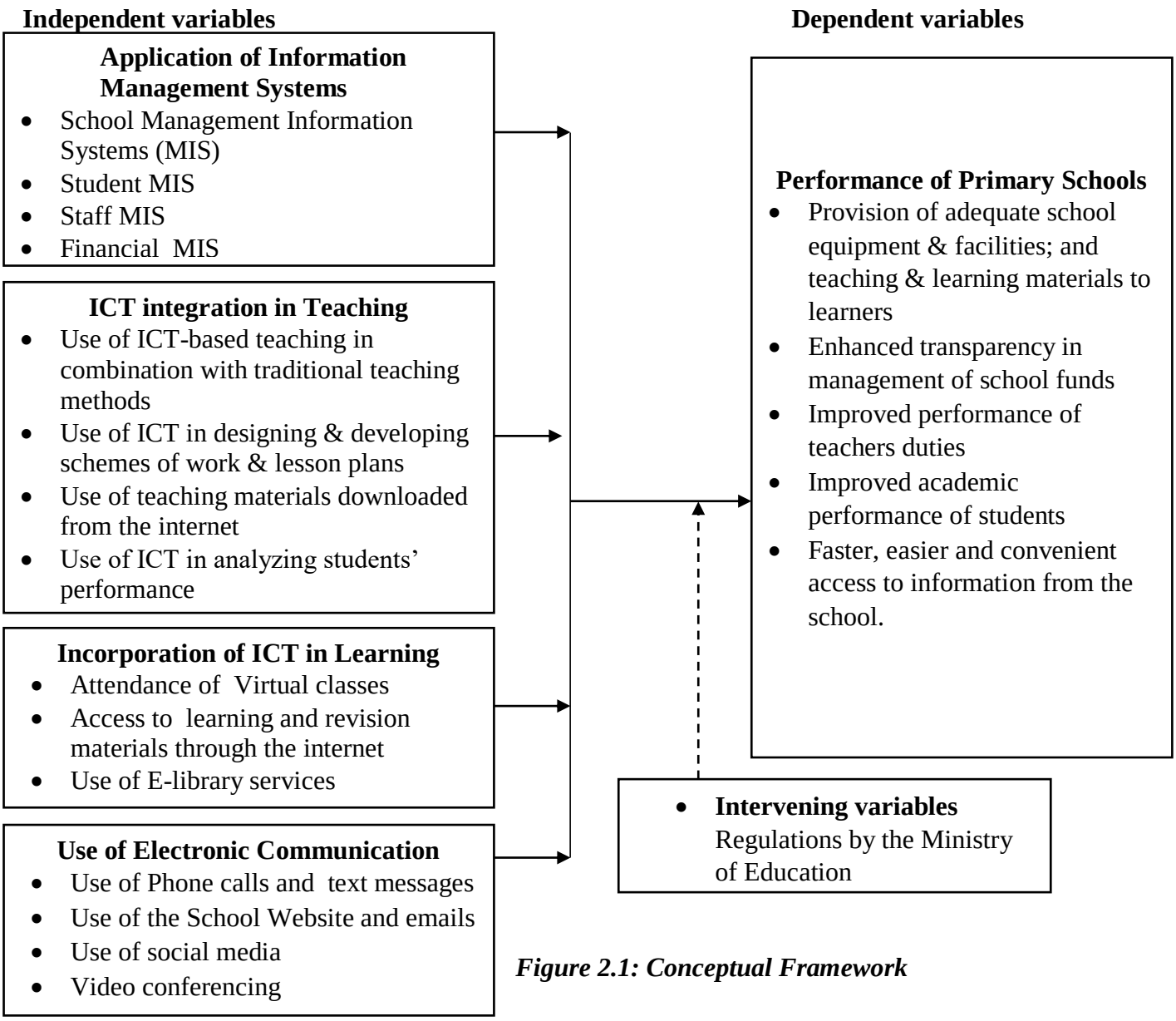

Figure 2.1: Conceptual Framework

2.9 Knowledge Gaps

Table 2.1 provides the knowledge gaps that this study will fill

Table 2.1: Knowledge Gaps

Author	The focus of the Study	Findings of the Study	Research Gaps	Contributions of the Study
Talukder *et al.,* (2015)	Impact of ICT on the performance of students: a case study of undergraduate university students	ICT incorporation in learning does not have a significant influence on the performance of students however addiction to ICT affects students' performance negatively	-Different study context; the study was conducted among university student in Bangladesh. This study was conducted among primary schools in Kathiani. -Influence of information management systems on performance of primary schools -Influence of ICT incorporation in teaching and use of electronic communication on performance of primary schools	**Information Management Systems:** -Enhances performance of administrative functions by enabling the school administration to determine adequacy of the facilities, education materials and teachers in comparison to the number of students and plan accordingly -Facilitates monitoring of students performance and put in place measures that will improve the performance of students; -Enhances efficiency in allocation of teaching responsibilities -Enhances accountability **Use of electronic communication:** -Enables the school administration to generate regular reports for communication -Enhances efficiency in communication by providing fast & convenient access to information with immediate feedback -Facilitates sharing of information on issues affecting pupils.
Hussein & Suleiman, (2017)	Effects of ICT on academic achievement of students and retention in chemistry	ICT incorporation in teaching chemistry was more effective in teaching compared to traditional approaches of teaching chemistry.	-Different study context; the study was conducted in secondary schools in Karak Pakistan. This study was conducted among primary schools in Kathiani. -Influence of information	**Information Management Systems:** -Enhances performance of administrative functions by enabling the school administration to: determine adequacy of the

			management systems on performance of primary schools	facilities, education materials and teachers in comparison to the number of students and plan accordingly -Facilitates monitoring of students performance and put in place measures that will improve the performance of students; -Enhances efficiency in allocation of teaching responsibilities -Enhances accountability
Mbugua *et al.*, (2015)	Influence of ICT incorporation in teaching on the academic performance of students	ICT incorporation in teaching has appositive influence on the academic performance of students	-Different study context; the study was carried out in secondary schools in Nakuru County. This study was conducted among primary schools in Kathiani. -Influence of information management systems on performance of primary schools	**Information Management Systems:** -Enhances performance of administrative functions by enabling the school administration to: determine adequacy of the facilities, education materials and teachers in comparison to the number of students and plan accordingly -Facilitates monitoring of students performance and put in place measures that will improve the performance of students; -Enhances efficiency in allocation of teaching responsibilities -Enhances accountability
Olaore, (2014)	The impact of ICT on education in Nigeria	ICT is useful in the management of students' data and personnel administration; incorporation of ICT in teaching helps teachers in designing and developing learning materials; & students use ICT to supplement learning materials	-Different study context; the study was conducted among schools in Nigeria. This study was conducted among primary schools in Kathiani. -Influence of incorporation of ICT in communication on performance of primary schools	**Use of electronic communication:** -Enables the school administration to generate regular reports for communication -Enhances efficiency in communication by providing fast & convenient access to information with immediate feedback -Facilitates sharing of information on issues affecting pupils.

Odhiambo, (2015)	Influence of education management information systems on management of secondary schools in Nairobi County	The use education management information systems (EMIS) positively influenced the management off secondary schools; EMIS was used in the preparation of school timetable, monitoring performance of teachers; communication and preparation of budget	-Different study context; the study was carried out in secondary schools in Nairobi. This study was conducted among primary schools in Kathiani -Influence of incorporation of ICT in learning and teaching on performance of primary schools	**Incorporation of ICT in teaching:** -Reduces the monotony of conventional teaching approaches -Facilitates teachers' access to a wide variety teaching materials -Reduces the time teachers have to develop teaching aids & scheme of works -Makes it easier for teacher to analyze students' performance.
Madiha, (2013)	Impact of information management systems on school administration	Information Management Systems positively had a positive effect on management of schools as it enhanced access to information;; efficiency in utilization of school resources; reduced workload; facilitated better time management and enhanced the quality of reports	-Different study context; the study was conducted among schools in Malaysia. This current study was conducted among primary schools in Kathiani -Influence of incorporation of ICT in learning on performance of public primary schools - Influence of use of electronic communication on performance of primary schools	**Incorporation of ICT in learning:** -Contributes to active participation of pupils in class -Increases the probability of pupils grasping and remembering concepts -Enables students to access KCPE revision materials. **Use of electronic communication:** -Enables the school administration to generate regular reports for communication -Enhances efficiency in communication by providing fast & convenient access to information with immediate feedback -Facilitates sharing of information on issues affecting pupils.

Kiberenge, (2015)	An evaluation of school management information systems	Management information systems positively influence curriculum management through faster generation of information and reduction of curriculum management costs; MIS provided information on academic performance of students and school timetable however teachers could not access information on performance &class attendance	-Different study context; the study was carried out in secondary schools in Bungoma County. This study was conducted among primary schools in Kathiani -Influence of incorporation of ICT in learning on performance of pubic primary schools -Influence of use of electronic communication on performance of public primary schools	**Incorporation of ICT in learning:** -Contributes to active participation of pupils in class -Increases the probability of pupils grasping and remembering concepts -Enables students to access KCPE revision materials. **Use of electronic communication:** -Enables the school administration to generate regular reports for communication -Enhances efficiency in communication by providing fast & convenient access to information with immediate feedback -Facilitates sharing of information on issues affecting pupils.
Kathure, (2015)	ICT intake in the management of public primary teacher training college in Meru County	Teachers use ICT for purposes of findings digital learning materials through the internet, preparing for lessons & designing students learning styles; teachers & students for communication	-Different study context; the study was conducted in primary school teachers college in Meru County. This study was conducted among primary schools in Kathiani. -Influence of information management systems on performance of primary schools	**Information Management Systems:** -Enhances performance of administrative functions by enabling the school administration to: determine adequacy of the facilities, education materials and teachers in comparison to the number of students and plan accordingly -Facilitates monitoring of students performance and put in place measures that will improve the performance of students; -Enhances efficiency in allocation of teaching responsibilities -Enhances accountability

Akaranga & Makau, (2016)	The Hermeneutics of Education Management Information Systems for Kitinga Primary School in Mwingi Central	EMIS has enhanced effectiveness and improved performance of primary schools by facilitating equitable allocation of resources, distribution of teaching load to teachers, scheduling a teaching time table and monitoring od school operations	-Different study context; the study was conducted at Kitinga primary school in Mwingi. This study was conducted among primary schools in Kathiani. -Influence of; ICT incorporation in teaching, incorporation of ICT in learning and use of electronic communication on the performance of primary schools.	**Incorporation of ICT in learning:** -Contributes to active participation of pupils in class -Increases the probability of pupils grasping and remembering concepts -Enables students to access KCPE revision materials. **Use of electronic communication:** -Enables the school administration to generate regular reports for communication -Enhances efficiency in communication by providing fast & convenient access to information with immediate feedback -Facilitates sharing of information on issues affecting pupils.

2.10 Summary Chapter

The chapter highlights the empirical review of studies conducted by other scholars in the area of ICT intake in schools. This study focused on reviewing literature related to the four objectives of the study; application of Information Management Systems on performance of public primary schools; incorporation of information communication technology in teaching influences performance of public primary schools; incorporation of ICT in learning on the performance of public primary schools and the use of electronic communication on the performance of public primary schools. The chapter also explains the theoretical framework and linking the two theories to the study. The two theories under study include Technology Acceptance Model and the ICT Impact Assessment Model. In addition the chapter highlights the conceptual mode and the research gaps identified during the empirical review.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents the research methodology. It describes the research design, location of study, and target population. It also describes sampling size & sampling procedures, research instruments, data analysis procedures and ethical issues.

3.1 Research Design

This study utilized a descriptive survey design. A descriptive survey is mainly concerned with determination of what is and the description of the phenomena under study as it exists. This approach enabled the researcher to conduct a study involving a large population through the collection of information through interviews and questionnaires from a sample of individuals (Prabhat & Mishra, 2015). Descriptive surveys mainly focus on the description of the features of a particular group or individuals. This approach was considered appropriate for this study as it enabled the researcher to provide a detailed description of the influence of ICT intake on the performance of public primary schools. The descriptive survey design further enabled the researcher to reach a larger population and cover a wide area through the use of a sample that was generalized to public primary schools in Kathiani. Mixed approaches involving qualitative and quantitative techniques were employed in determining the influence of ICT intake on performance of public primary schools.

3.2 Target Population

This study targeted teachers of public primary schools; the school heads; and the Education Officer in-charge of Kathiani Sub County in Machakos County. There are 71 public primary schools in Kathiani Sub County, 781 teachers and 71 heads of schools. The Sub County has three main zones Mitamboni, Kathiani, and Iveti (SCDE, 2020). The teachers were targeted as respondents due to the central role they play in using ICT for teaching students and therefore better placed to give accurate information on the influence of incorporation of ICT on performance of their respective schools. The head teachers were chosen as they are the administrators of these schools and are therefore better placed to provide an answer on administrative issues concerning the intake of ICT and how it influences on the administration and management of public primary schools.

The Education officer provided the Ministry's Perspective on the incorporation of ICT especially on policy issues and the general state of ICT incorporation in Kathiani Sub County. The target population is shown in Table 3.1:

Table 3.1: Target Population

Educational Zone	No. of Schools	No. of Head teachers	No. of Teachers	Percentage in Population
Mitaboni	17	17	235	30%
Kathiani	27	27	265	34%
Iveti	27	27	281	36%
Total	**71**	**71**	**781**	**100%**

3.3 Sampling Size and Sampling Techniques

A sample refers to a subset of the population under study. It is a representation of the larger population and is utilized in drawing inferences regarding the population under being studied (Hendricks-Wetcher, 2013). The sampling procedure refers to the techniques used for selecting respondents.

3.3.1 Sampling Size

A sample size of 10-30% chosen randomly from a stratified stratum is representative of the target population (Kombo & Tromp, 2009). For this study, the sample size was 30%. Therefore the sample size was composed of 21 public primary schools and 21 heads of schools. There was no sampling for the Sub County Education Officer. The sample size for the teachers was determined using Yamane's formulae (1967) as shown below:

$$n= \left\{\frac{N}{1+N(e)^2}\right\}$$

Where: n=Sample size

N= Target Population

e=Marginal error

Given: N= 781;

e= margin error of 0.05 or 5%.

Standard confidence level is 95%, for better accuracy which will give a margin error of 0.05.

Therefore, the sample size was calculated as indicated below:

$n=781 /1+781(0.05)^2$

n=781 /2.9525

n= 265

The respective number of participants in respective education zones were chosen proportionally based on the population in the respective zones as shown in Table 3.2:

Table 3.2: Sample Size

Educational Zone		Population	Sample	Percentage
Sub County Education	Officer	1	1	100%
Head teachers		71	21	30%
Teachers		781	265	34%
Total		**853**	**287**	

3.3.2 Sampling Procedure

Stratified and systematic random sampling techniques were used to identify teachers to who participated in this study. In this case, schools were stratified based on their education zones. Based on this stratification a sampling frame of the schools for each of the zones was obtained from the Sub County Education Office. The schools that participated in this study were chosen using systematic random sampling. All the school heads of the chosen school participated in the study. The staff in the chosen schools was chosen randomly to make up the study sample. Purposive sampling technique was used to identify key informants (school heads and the Sub County Education Officer).

3.4 Research Instruments

This study employed the use of a survey questionnaire and interview schedule to obtain information from the respondents. Questionnaires were administered to teachers in the 21 public primary schools in Kathiani Sub County. Interview schedule were used to conduct an in-depth interview with the school's heads.

The questionnaires had 6 sections: section one consisted of questions the background demographic information of the respondents 4 sections contained questions seeking information on the influence of intake of information management Systems; ICT incorporation in teaching; incorporation of ICT in learning; and use electronic communication on the performance of public primary schools. Section 6 sought answers on the performance of public primary schools. The questionnaires contained close-ended question. Closed-ended questions provide structured responses that facilitated tangible recommendation and collection of quantitative data.

3.5 Data Collection Procedures

This study collected primary data from respondents and secondary data was gathered from school records provided by the school heads and the Sub County Education Officer. Questionnaires were uploaded online on Google forms and the link sent to the selected respondents via email.

The respondents were given time to fill the questionnaires and submit upon completion for analysis. The researcher also sent requests to participants in the current study and to all the school heads in the selected schools requesting approval to conduct interviews at times and venues convenient to them. A similar request was made to the Sub County Education Officer.

3.6 Pilot Study

Before the actual study, a pilot study was conducted to ascertain suitability of the research instruments in measuring the study variables. The researcher conducted a pilot study involving the interview schedule and the questionnaire. The interview schedules and questionnaires were piloted for reliability using a sample of 3 primary schools, 3 heads of school and 26 teachers which form 10% of the population. The instruments were piloted among schools that were not part of the sample for this study to avoid respondents' contamination before the actual study. The school include: Kamwanyani Primary School, Kithangaini Primary School and Mang'aani Primary School. These schools were chosen due to their similarity to the schools where the study was conducted. The schools had ICT facilities such as laptops in the school; had implemented NEMIS and were connected to the electric grid.

Findings of the pilot study revealed that: All the three schools were using the Information Management Systems and had integrated the school, teacher, student and financial information managements systems. The NEMIS was mainly used keeping track of the number of students in the school which were identified using the unique NEMIS number, number of teachers in the school, quantities of learning materials such as textbooks and number of facilities in the school such as classrooms. However there was limited use of ICT in teaching and learning due to limited ICT facilities particularly laptops: there was only one (1) laptop and a desktop that was used by the school administration. As a result 84% of the teacher had not used projected power points presentations and videos in teaching; 89% had not ICT tools in designing & developing lesson plans and schemes of work; and 65% had not used teaching materials downloaded from the internet. However majority (93%) of the teachers used excel sheets to analyze their students' performance. It was only lower primary classes (1-3) that were using tablets for learning on a regular basis they had difficulty in operating the laptops due to limited ICT skills. Further none of the schools had conducted an online class. However students were able to access soft copy revision materials shared across social media platforms. In reference to communication the study established that the main forms of electronic communication used in all the schools were call and text messages, emails and Whatsapp groups. Therefore findings of the pilot study provided answers that sufficiently measured the study variables. Additionally the findings concurred with findings of the actual study hence their reliability.

3.7 Validity of the Research Instruments

Validity refers to the extent to which results collected data represents the actual phenomena under study. Validity ensures that the research instruments are appropriate and are not biased (Prabhat & Mishra, 2015). Content validity of the instruments was established to determine if the research instruments addressed all the relevant aspects of variables under study. This was done through the close supervision of university supervisors. The comments from the supervisors and research experts were incorporated into the instruments before the actual field study. The criterion validity for this study was enhanced through concurrent criterion validity where an existing standard instrument was used measure variable/concept under study. In this case the ICT Impact assessment Model is a theoretical framework developed by Adedokun-Shittu (2012) for assessing the influence of ICT on school performance was used to determine key areas of integrating ICT in school and the criterion for assessing the influence of incorporation of ICT on performance of public primary schools. To enhance the construct validity of the instruments questions were developed based on indicators from existing literature on the influence of ICT on school performance with guidelines from the ICT Impact Assessment Model. Additionally experts in ICT were consulted to make a determination if the instruments actually measured the ICT variables.

3.8 Reliability of the Research Instruments

Reliability is the extent to which research instruments yield consistent results after several trials (Prabhat & Mishra, 2015). To enhance the reliability of the research instruments, a pilot study was carried out prior to conducting the actual study. The pilot study sought to determine the appropriateness and clarity of the data instruments before conducting the actual study. The interview schedules and questionnaires were piloted for reliability using a sample of 3 heads of school and 26 teachers which represented 10% of the population. Results of this study were analyzed to determine if the research instruments actually provided answers to the research questions. All the necessary adjustments and corrections were made based on these results to ensure that the research instruments actually measure the variable under study.

The Cronbach Alpha Method was used to establish the reliability of the research instruments. The formulae for calculating the Cronbach Alpha Method:

$$\alpha = \frac{N\overline{c}}{\overline{v} + (N-1)\overline{c}}$$

Where:

α= Cronbach Alpha reliability coefficient

N=Number of Items

$\bar{c}$=Average Inter-Items Covariance among the items

$\bar{v}$=Average Variance

The Cronbach Alpha Method was calculated using the SPSS using the Reliability analysis function. The research instruments were considered to be reliable as they yield a reliability coefficient of 0.849 which is above 0.7 & above as recommended by Gall & Borg (2003). Table 3.3 shows the results of the Cronbach Alpha reliability coefficient:

Table 3.3: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	No. of Items
.849	.867	34

3.9 Methods of Data Analysis

Collected data was analyzed using qualitative and quantitative methods. Descriptive statistical analysis was used for purposes of analyzing quantitative data. The Statistical Package for Social Sciences was used for conducting analysis of data to generate descriptive statistics that included frequencies, percentages, means, standard deviations and tabulated reports. These were presented in frequency tables.

Thematic analysis was used to analysis of qualitative data. The researcher identified emerging themes and patterns based on the research objectives and nodes. This data was presented in verbatim quotes and narrative that provided an in-depth description of the influence of ICT on the performance of schools.

Regression analysis was used to determine the significance of the relationship between the independent variables: Information Management systems (X_1), ICT incorporation in teaching(X_2), Incorporation of ICT in learning (X_3) and Electronic communication (X_4) affect the dependent variable: performance of public primary schools.

The regression equation was expressed as follows:

$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$

Where:

Y = performance of public primary schools α = constant

X_1 = Information Management Systems

X_2 = ICT incorporation in teaching

X_3 =Incorporation of ICT in learning

X4 = Electronic communication

B_1… B_3 = regression coefficient of three variables

3.10 Operational Definition of Variables

Table 3.4 provides the operational definition of terms.

Table 3.4: Operational Definition of Variables

Variable	Type of Variable	Indicators	Type of Analysis	Scale of Measurement
Information Management Systems	Independent	-Use of School Management Information Systems (MIS); Student MIS; Staff MIS; Financial MIS -Use of IMS for reporting	Descriptive Analysis	Nominal Ordinal
ICT incorporation in Teaching	Independent	-Use of ICT-based teaching in combination with traditional teaching methods -Use of ICT in designing & developing lesson plans & schemes of work -Use of teaching materials downloaded from the internet -Use of ICT in evaluating students and analyzing their performance	Descriptive Analysis	Nominal Ordinal
Incorporation of ICT in learning	Independent	-Attendance of Virtual classes -Access of learning and revision materials through the internet -Use of the internet for conducting academic research -Use of E-library services	Descriptive Analysis	Nominal Ordinal
Use Electronic Communication	Independent	-Use of Information Management Systems to capture, stores & retrieve information -Use of the School Website and emails -Use of social media -Use of phone calls and text messages	Descriptive Analysis	Nominal Ordinal
Performance of public primary schools	Dependent	-Adequate number of teachers -Adequate school facilities (classrooms) -Adequate learning materials (text book) -Regular reporting on the utilization of school funds -Monitoring and evaluation of teachers and students performance -Regular monitoring & reporting on the progress and state school projects -Timely and convenient provision of information to teachers, students, parents & education stakeholder.	Descriptive Analysis	Ordinal Nominal

3.11 Ethical issues

The researcher adhered to the proper procedure of research by obtaining a research permit from NACOSTI. The researcher also ensured that the research permit accompanied questionnaires and interview schedule. Informed consent was sought from the respondents who were informed early enough through official communication channels to schedule for a convenient time and give their consent to be part of the study. The researcher carefully administered the questionnaires to protect respondents from any psychological harm. To ensure the confidentiality of the respondents, their names were not used and the findings were used for academic purposes only. The respondents were also assured of their confidentiality during the research.

CHAPTER FOUR

DATA ANALAYSIS, PRESENTATION, INTEPRETATION AND DISCUSSION

4.1 Introduction

This chapter provides an analysis, presentation and interpretation of findings on the application of ICT on the performance of public primary schools. It provides the demographic information of the respondents; findings of the study and a correlation analysis of the variables under study.

4.2 Response Return Rate

The researcher administered 265 questionnaires out of which 243 were adequately filled and returned for analysis. All the interviews were successfully conducted with the 21 heads of schools and the Sub County Education Officer. This gives an overall return rate of 92.3% which was considered to be adequate for analysis and drawing conclusions for the study as shown in Table 4.1:

Table 4.1: Response Return Rate

Category	Sample	Response	Response Rate (%)
Teachers	265	243	91.7
Head Teachers	21	21	100
Sub County Education Officer	1	1	100
Total	**287**	**265**	**92.3**

4.3 Socio-Demographic characteristics of the Respondents

The socio-demographic characteristics of the respondents are presented under the following sub-sections:

4.3.1 Gender of the Respondents

Table 4.2 shows the distribution of the respondents by gender across the different categories.

Table 4.2: Gender of the Respondents

Category	Male Frequency	(%)	Female Frequency	(%)
Teachers	151	62.1	92	37.9
Head Teachers	13	61.9	8	38.1
Sub County Education Officer	0	0	1	100
Total	**164**	**62.3**	**100**	**37.7**

Table 4.2 indicates that 62.1% of the respondents were male teachers while 37.9 of the respondents were female teachers; 61.9% of the head teachers were male and 38.1% were female; and the Sub County Education Officer was female. This implies that majority of the teachers in Kathiani Sub County were male teachers as they constituted 62.3% of the teachers while female teachers constituted 37.7%. Female teachers are less likely to be using computers at personal level compared to their male counterparts; they do not differ greatly in the extent of their pedagogical use of ICT (Gebhardt *et al.*, 2019). This implies that the high number of male teachers compared to female teachers may not have a bearing on their incorporation of ICT in teaching.

4.3.2 Age of the Respondents

Table 4.3 illustrates the age bracket of the respondents:

Table 4.3: Age of the Respondents

Age Bracket	Frequency	Percentage (%)
Below 30 years	42	15.9
31-40 years	116	43.9
41-50 years	85	32.2
Over 51 years	21	8.0
Total	**264**	**100**

Table 4.3 shows that 43.9% of the respondents were between the ages of 31-40 years; 32.2% were between the ages of 41-50 years; 15.9% were below 30 years and only 8.0% were over 51 years. This implies that majority of the teachers in Kathiani Sub County were young given that 60% of the respondents were below 40 years. According to Mutuku & Ogutu, (2018) there is low usage of ICT among compared to young and vibrant teachers who are more competent in technological issues. Most old teachers are unwilling to use technology in teaching because they have been teaching for a long time without using ICT and tend to be rigid about how they teach. As a result they may not see the usefulness of integrating ICT in teaching their students. Therefore a high percentage of teachers who are young increase the probability of incorporating ICT in teaching among public primary schools in Kathiani.

4.3.3 Teachers Level of ICT Skills

Table 4.4 indicates the level of ICT skills attained by teachers in Kathiani Sub County:

Table 4.4: Teachers Level of ICT skills

Age Bracket	Frequency	Percentage (%)
Fundamental Skills	226	93.0
Basic Computer Skills Application	187	76.9
Advanced Computer Application skills	107	43.0
Proficient Computing & Programming	20	8.2

Table 4.4 indicates that 93.2% of the teachers had fundamental ICT skills (switching the computer and turning it off and knowledge of computer hardware including keyboard, mouse CPU and screen monitor) 43.2% had basic computer applications skills (use of Microsoft office Word, Excel and PowerPoint); 43.9% had advanced computer application skills (use of the internet search engine, sending emails, scanning, printing and copying documents); and only 8.3% had proficient computing and programming skills (software/program installation and maintenance, web design and computer programing).

This implies that majority of the teachers in Kathiani Sub County had fundamental and basic computer application skills while less than half of the teachers had advanced computer applications skills. While teachers may not need proficient skills in ICT, basic computer application skills are not sufficient for incorporation of ICT in schools. Advanced skills in ICT are fundamental to the incorporation of ICT in teaching. Therefore this may affect the incorporation of teaching and learning in public primary schools in Kathiani.

4.3.4 Teachers Work Experience

Teachers work experience was relevant for making determination of teachers experience in the implementation of governments ICT programmes in the education sector. Table 4.5 indicates the work experience of teachers.

Table 4.5: Teachers Work Experience

Years	Frequency	Percentage (%)
Below 5 years	42	15.9
6-10 years	121	45.8
11-15 years	80	30.3
Above 15 years	21	8.0
Total	**264**	**100**

Table 4.5 indicates that 45.8%of the teachers had a work experience of 6-10 years; 30.3% had a work experience 11-15 years; 21% had over 15 years of work experience and only 15.9% had a work experience of less than 5 years. This implies that majority of the teachers have spent a considerable period of time working as teachers in their current schools and are therefore better placed to provide information on the incorporation of ICT in teaching and learning. The National Information Management System (NEMIS) was introduced in 2017 and implemented in schools in 2018 while the Digital Literacy Programme (Laptop project) was introduced in 2013 (MoE, 2017).This implies majority of the teachers in Kathiani have experience in the incorporation of ICT in schools as they were working when the government implemented programmes aimed at incorporating ICT in the education sector.

4.4 Information Management Systems and Performance of Public primary Schools

The first objective of the study was to determine the influence of application of Information Management Systems on performance of public primary schools. Findings of the study are presented in the following sub sections:

4.4.1 Type of Information Management System Incorporated in Public Primary Schools

Respondents were required to indicate the type of Information Management Systems incorporated in their schools as indicated in Table 4.6:

Table 4.6: Type of Information Management System Incorporated in Public Primary Schools

Type of Information Management System	Frequency	Percentage (%)
School information management systems	21	100
Teachers information management systems	21	100
Students information management systems	21	100
Financial information management systems	2	10

Table 4.6 indicates that all the 21 schools had incorporated the school, teachers and students Information Management Systems in the management and administration of schools. However, only 10% of the schools had implemented the financial information management system. The high levels of incorporation of the information management among the schools can be attributed to the introduction of the National Information Management System (NEMIS) by the government in 2017 making it mandatory for all the schools to incorporate the management information system in management and administration of schools (MoE, 2017).

This implies that the schools head teachers are able to: undertake administrative duties of keeping records of the quantities school equipment, facilities and education materials that they have in their schools; uniquely identify all the students in the school and track their performance and progress; and determine the number of teachers in their schools, teachers subjects of specialization and the responsibilities assigned to the teachers in the school.

However low levels of incorporation of the financial information management systems by only10% of the schools implies that most of the schools are not able to keep accurate records of income received, expenditures, development funds and the progress of implementation of school projects in a given financial year. This may affect the effective utilization of funds disbursed in the schools hence the performance of financial management in the schools.

4.4.2 Influence of Application of IMS on performance of Public Primary Schools

To determine the influence of application of Information Management Systems on the performance of public primary schools, respondents were asked to indicate their level of agreement with statements on application of Information Management Systems (IMS) in their respective schools on a likert scale where a mean of less than 1.5= strongly disagree; a mean of less than 2.5=disagree; a mean of less than 3.5=neutral; a mean of less than 4.5=agree and a mean of 4.5 and above =strongly agree. Findings are presented in Table 4.6:

Table 4.6: Influence of Application of IMS on performance of Public Primary Schools

Statement	Minimum	Maximum	Mean	Std. Deviation
Use of the School Management Information System helps to determine the adequacy of school equipment & facilities	1.00	5.00	4.788	.896
Use of the students Management Information Systems facilitates the tracking of the number of learners; their performance and progression in school	1.00	4.00	3.773	.793
Use of the Teachers Management Information Systems helps to determine the adequacy of teachers and track their performance in school	2.00	5.00	4.683	.923
Use of the Financial Management Information Systems ensure transparency in utilization of school funds	2.00	4.00	3.864	.504
Use of the National Education Information Management facilitates regular monitoring, evaluation and reporting of the performance of school projects	1.00	5.00	4.637	1.150
Aggregate			**4.349**	**.853**

Table 4.5 shows that respondents strongly agreed: the use of School Management Information systems helps to determine the adequacy of school equipment and facilities as indicated by a mean of 4.788 (std. dev. =0.896); use of Teachers Management Information Systems helps to determine the adequacy of teachers and track their performance as indicated by a mean of 4.683 (std. dev.=0.923); and use of the National Education Information Management facilitates regular monitoring, evaluation and reporting of the performance of school projects as indicate by a mean of 4.637 (std. dev.=1.150). Respondents agreed that use of the Financial Management Information Systems ensure transparency in utilization of school funds as indicated by a mean of 3.864 (std. dev.=0.504) and use of the students Management Information Systems facilitates the tracking of the number of learners; their performance and progression in school as indicated by a mean of 3.773 (std. dev.=0.793).

This implies that teachers in Kathiani Sub County agreed that application of Information Management Systems enhances the performance of management functions in public primary schools. Use of Information Management Systems enables heads of schools to keep accurate and updated records of the quantities of school facilities, equipment and education materials and the number of teachers and students. This enables them to determine adequacy of the facilities, materials and teachers in comparison to the number of students and plan accordingly to ensure that the school has adequate facilities and teachers. Information provided on the progress of students and their performance enables the school heads to monitor the performance of students and put in place measures that will enhance or improve the performance of students in the schools. Information provide on teachers subject specialization enhances efficiency in allocation of teaching responsibilities to teachers and ensure all the subjects are allocated to specific teachers. Information provided by the financial module enhances accountability of the finances received by the school in a given financial year.

Interviews conducted by the schools heads in Kathiani Sub County revealed that he head teachers were in agreement that the National Information Management System (NEMIS) had enhanced their ability to perform school management/administrative functions. According to one of the head teachers, the system allocates each and every student in the school has a unique NEMIS number that identifies them. This provides accurate records of the number of all the students in the school and keeps records of the number of teachers. This information enables the school administration to come up with a teacher: student ratio and make a determination as to whether the teachers are adequate based on the standards from the ministry. This information is used as basis for requesting for more teachers from the sub county education office.

The head teacher's sentiments were reiterated by the school head of another primary school who observed that the information management system keeps accurate records of the number of facilities such as classrooms and leaning materials such as text books unlike before where records were kept manually. The system provides information on the number of text books per subject and the number of classrooms in the school. According to the head teachers, this information is used by the school board of management in terms of the infrastructure projects to undertake such as classrooms and used by the administration to make request from the Sub County education office on the number of textbooks needed in the school based on the available textbooks and the number of students.

These findings concur with those by (Madiha, 2014) which showed that ICT plays an instrumental in enabling the school administration to take an inventory of the school facilities and its human resources to determine their adequacy and make decisions in terms of planning for purposes of resource allocation; and information provided by the teacher management information system is useful for purposes of make decisions on the additional number of human resources required to ensure the school functions optimally. Similar findings were established by Akaranga & Makau, 2016) who established use of information management systems makes it easy to track and monitor individual components of the school data while enhancing good time management. The study established that the system enables school to keep soft copies of vital school information in well organized into tables that were saved in the head teacher's laptop and backed up in a flash drive. This can be printed to provide hard printed hard copies that are well organized making it easy to retrieve essential information for decision making.

The interviews further revealed that the National Information Management System (NEMIS) was instrumental in enhancing the academic performance of students in their schools which reflects on the overall performance of the school. An interview conducted with a head teacher from one of the primary schools revealed that the system provides records of the performance of the students in various subjects and their performance as they progress in different classes. This enables teachers to monitor performance of the overall performance of the students and their performance across different subjects. As a result students who are performing poorly or subjects in which the students perform poorly are identified and measures are put in place by the teachers to enhance or improve school performance.

Findings on Information Management systems on enhancement of school performance are consistent to those by Olaore (2014) who found out that the student management system provides information can show trends in students' performance over time hence enabling the school administration to determine whether the schools performance is improving or declining. This information can be used to make decisions and develop strategies to enhance students' performance.

The findings are also consistent to those by Kiberenge (2015) revealed that Information Management System enabled teachers to access information on student performance; academic performance of the various classes in the school; the Information Management system had a positive influence on curriculum management through faster generation of information; reduction in cost of curriculum management; and the system had improve the supervision of core curriculum factors which enhance performance.

Efficiency in the allocation of duties and responsibilities to teachers was also identified as one of the ways in which ICT enhance performance of public primary schools. One of the schools heads observed that the teachers' module provides information on the number of teachers in the schools and the subjects that they

teach.

This has enabled the administration to determine if there are adequate teachers in the school in relation to the number of students and allocate teaching responsibilities effectively based on the teacher's subject of specialization. As a result developing of the school timetable has been made easy.

The findings of this study are in agreement to those by Odhiambo (2017) whose findings revealed that EMIS had application across key managerial functions through the preparation of the school timetable; and (Madiha, 2014) which showed that information provided by the teacher management information system is useful for purposes of make decisions on the number of human resources required to ensure the school functions optimally.

4.5 Incorporation of ICT in Teaching and Performance of Teacher Duties

The second objective of this study was to establish how incorporation of information communication technology in teaching influences performance of public primary schools. Findings are presented in the following sub sections:

4.5.1 Incorporation of ICT in Teaching Functions

Respondents were required to indicate ways that ICT had been incorporated in teaching as indicated in Table 4.7:

Table 4.7: Incorporation of ICT in Teaching Functions

Teaching Functions	Frequency	Percentage (%)
Use of projected power points presentations, interactive white boards and videos in teaching	35	14.4
Use of ICT in designing & developing lesson plans and schemes of work	34	13.9
Use of teaching materials (maps, images, pictures and notes) downloaded from the internet	107	44.0
Use of ICT tools in analyzing students' performance	185	76.1

Table 4.7 indicates that only 14.4% of the teachers used power point presentation and videos in teaching; 13.9% used ICT in designing & developing lesson plans and schemes of work; 44.0% used teaching materials downloaded from the internet; and 76.1% used ICT tools in evaluating students and analyzing students' performance. This indicates that it is only a small proportion of the teachers in Kathiani Sub County have incorporated use of ICT in teaching. Most of the teachers use ICT tools such as excel in analyzing students' performance a function that takes place outside the class. This implies that majority of the teachers in Kathiani still use conventional/ traditional approaches of teaching students. Therefore teachers in Kathiani have not full incorporated use of ICT in teaching students.

Even though findings in Table 4.3 indicate that a high percentage of teachers who are young increase the probability of incorporating ICT in teaching among public primary schools in Kathiani, findings in Table 4.4 indicates that majority of the teachers in Kathiani Sub County had fundamental and basic computer application skills while less than half of the teachers had advanced computer applications skills. While teachers may not need proficient skills in ICT, basic computer application skills are not sufficient for incorporation of ICT in schools.

The Sub County Education Officer attributes this to inadequate ICT facilities such as laptops. According to him, schools in Kathiani Sub County lack the necessary ICT facilities and infrastructure to successfully integrate ICT in learning. Even though most of the schools have electricity, poor internet connectivity in some areas and high cost of internet has hindered the schools from fully integrating ICT in teaching and learning. Each school of the head teachers was issued a laptop that is mainly used for administrative functions and cannot be used for learning or teaching purposes. Two laptops were issued per school for the teachers while only lower primary school students were issued with laptops under the Digital Literacy Programme that has since collapsed. Therefore these laptops are not adequate to integrate ICT in teaching and learning.

4.5.2 Influence of Incorporation of ICT in Teaching on Performance of Public Primary Schools

To determine how the incorporation of ICT influences performance of public primary schools,

Respondents were asked to indicate their level of agreement with statements on incorporation of ICT in teaching on a likert scale as shown in Table 4.7:

Table 4.7: Influence of Incorporation of ICT in Teaching on Performance

Statement	Minimum	Maximum	Mean	Std. Deviation
Combining use of ICT in teaching with conventional teaching methods makes the class more interesting and interactive	2.00	5.00	4.739	.846
The internet enables teachers to conduct research and access information on effective pedagogical approaches to delivery of curriculum and instruction to students	1.00	5.00	4.301	.968
Use of ICT tools makes the designing & developing schemes of work more easier compared to developing them manually	1.00	5.00	3.800	.759
Use of teaching materials (maps, images, pictures and notes) downloaded from the internet reduces the workload of having to draw them manually	2.00	4.00	3.803	.596
Use of Microsoft Office Tools such as Excel enables teachers to conduct analysis of data on exam and evaluate students' performance more effectively unlike doing manual calculations	1.00	4.00	3.818	.715
Aggregate			**4.093**	**.776**

Table 4.7 indicate that respondents strongly agreed that combining use of ICT in teaching with conventional teaching methods makes the class more interesting and interactive as indicated by a mean of 4.739 (std. dev.=0.846). The respondents agreed that: the internet enables teachers to conduct research and access information on effective pedagogical approaches to delivery of curriculum and instruction to students as indicated by a mean of 4.301 (std. dev. =0.968); and use of ICT tools makes the designing & developing schemes of work more easier compared to developing them manually as shown by a mean of 3.800 (std. dev. =0.759).

The respondents further agreed that use of teaching materials (maps, images, pictures and notes) downloaded from the internet reduces the workload of having to draw them manually as indicated by a mean of 3.803 (std. dev. =0.596); and use of Microsoft Office Tools such as Excel enables teachers to conduct analysis of data on exam and evaluate students' performance more effectively unlike doing manual calculations as indicated by a mean of 3.818 (std. dev. =0.715). This implies that teachers in Kathiani Sub County agreed that incorporation of ICT in teaching enhanced the performance of teaching duties.

Use of ICT tools such as power point presentations and videos reduces the monotony of conventional approach of writing notes on the blackboard making the class to be exciting for the students. Visual presentations are easier to understand and remember which enhances students' ability to grasp concepts and remember what they are taught. One of the school heads observed that students are always excited whenever teachers use audio-visual presentation in class. She gave an example of using video presentation to demonstrate to pupils a volcanic eruption which said makes it easy for pupils understand the process and remember it compared to using the traditional teaching approach of drawing on the blackboard. A similar opinion was shared by a head teacher of another school, who observed that, teachers in the school hardly use ICT approaches to teaching due to shortage of ICT facilities. Occasionally teachers may use power point presentations in class. Whenever teachers use such presentations, pupils are overly excited and actively participate in the class compared to the normal classes.

The internet enables teachers to conduct research and access a wide variety of information which they can use to supplement information provided through textbooks. They can also conduct research on effective approaches to teaching students and enhance their pedagogical approaches. According to one of the head teachers, the internet has a variety of revision materials and learning resources in soft copies that teachers can download and use to enrich the content provide in the text books as long as it is within the syllabus and curriculum. She added that the internet teachers can easily access teaching videos demonstrating how to interact with students in class and effective students centered approaches to use. The teachers can emulate these examples to advance and enhance their teaching capabilities.

Findings on the use of the internet to access learning resources are consistent to those by: Ali *et al.*, (2013) which revealed that technology has also made it possible for teachers to access a variety of teaching materials online which furnishes the teachers with enhanced educational content unlike before when they only had to rely on textbooks and teachers guidebooks; and Olaore (2014) which showed integrating ICT in the teaching process aids the teacher in developing learning materials as teachers can download materials from the internet which can be adapted to suit specific instructional objectives.

Using ICT tools such as Microsoft word to develop schemes of work and lessons plans and downloading

already drawn images from the internet reduces the saves teachers' time of having to draw or develop them manually. An interview with one of the school heads revealed that using images that are downloaded from the internet has been very helpful to teachers. Some of the teachers are not good when it comes to drawing and encounter a lot of difficulties when drawing maps and diagrams forcing them to hire people or use gifted students to draw. However the internet has made it easy for them. All they need to do is just search, download and print the maps or images. This is more efficient and fast. Another head teacher observed that images downloaded from the internet are very clear and accurate especially maps which are drawn to scale with a lot of precision. Teachers who are not good at drawing may draw diagrams/maps that are not clear for pupils and end up spending a lot of time trying to draw the correct diagram or map. Therefore it is easier for the teachers to download them from the internet rather than drawing them.

The findings on application of ICT in accessing teaching aids and instruction materials were also revealed by Mbugua *et al,* (2015) whose findings revealed that ICT has a wide variety of applications on teaching of students as 80% of the teachers use ICT in the preparation of school timetable; 52.2% utilize ICT in the preparation of schemes of work; and 54.1% utilize ICT in preparing instruction materials. Similar outcomes were revealed by findings of Ali *et al.,* (2013) which showed that the internet enables teacher to obtain drawn maps/images/pictures in soft copy and only require computers and projectors to display or a printed out copies for their students. Teachers can easily download high quality images/pictures and maps from the internet and save them time and energy that they could have used drawing these images.

Further using excel for analysis only requires teachers to create formulas and feed data into the excel sheet which process and analyze data giving the teachers results of how the students performed in terms of totals, mean scores and students ranking. It also makes it easy for teachers to analyze large volumes of data on students' performance across the whole school which would take a lot of time. Below are the advantages provide by some of the head teachers on the benefits of using excel sheet for data analysis: Excel has endless row and columns which the teachers can input data on the performance of the whole school and conduct the analysis get mean scores and rank students' performance; Excel enables teachers do an analytical comparison of the performance of the classes; it has made the analysis of pupils' performance more easier as the teachers only need to create formulas, key in data on the students' scores and give commands for excel to process the data; and analysis conducted using excel is accurate and does not contain errors as long as the teacher keys in the correct data compared to manual analysis.

These views were echoed by another teacher who said that Microsoft Excel has excellent functionalities that allows teacher to develop visual presentation of the performance of students in form of graphs showing trends in performance of students over time and pie charts showing proportion of students who have

excelled, performed averagely and those who have failed.

These findings are consistent to those by Mwadulo & Odoyo (2020) which showed that ICT also provides cost effective tools that can be used by teachers to organize and conduct analysis of data on students' performance and Mbugua *et al,* (2015) which revealed that ICT has a wide variety of applications on teaching of students as teachers utilized ICT in preparing reports on students' progress; preparation of students records; and management of class attendance.

4.6 Incorporation of ICT in Learning and the Performance of Students

The third objective of this study was to determine the influence of incorporation of ICT in learning on the performance of public primary schools. Findings are presented in the following sub sections:

4.6.1 Incorporation of ICT in Learning

The respondents were required to indicate ways in which ICT had been incorporated in learning in their respective schools as indicated in Table 4.8:

Table 4.8: Incorporation of ICT in learning

Learning Function	Frequency	Percentage (%)
Online/Virtual Classes	58	23.9
Conducting research through online Platforms	116	47.7
Accessing reading materials and revision Materials	0	0
Accessing E-library services	0	0

Table 4.8 indicates that 23.9% of the teachers said that their pupils us virtual/online classes for learning and 47.7% of the teachers said that their pupils have conducted research using the internet. However none of the pupils had used the internet to access reading or E-library services. This implies that ICT has not been fully incorporated in learning among public primary schools in Kathiani Sub County. The only learning function that that is used by almost half of the pupils is conducting online research. Less than a quarter of the schools have used online classes.

The Sub County Education Officer attributes this to lack of adequate ICT facilities among public primary schools in the sub county. He observed that schools in Kathiani Sub County have shortage of the necessary ICT facilities and infrastructure to successfully integrate ICT in learning. Even though most of the schools have electricity, poor internet connectivity in some areas and high cost of internet has hindered the schools from fully integrating ICT in learning. According to him, the virtual classes were only a trial among 3 schools during the COVID-19 pandemic. There is an average of 3 laptops per school of which one is used for administrative functions and cannot be used for learning or teaching purposes. The remaining two laptops are not adequate for purposes of learning and teaching. While the laptops issued under the Digital Literacy Programme would have been helpful, the education content was custom made for lower primary

school pupils.

4.6.2 Influence of Incorporation of ICT in Learning on Performance of Students

To determine the influence of incorporation of ICT n performance of students, respondents were asked to indicate their level of agreements with statements on a likert scale as indicated in Table 4.9:

Table 4.9: Influence of Incorporation of ICT in Learning on Performance of Students

Statement	Minimum	Maximum	Mean	Std. Deviation
Attendance of virtual classes provides the students with the convenience of attending classes while at home at anytime	1.00	5.00	4.652	1.066
The internet enables students to conduct extensive research for doing class assignments	1.00	5.00	4.818	.833
The internet enables students to supplement reading and revision materials provided in class	1.00	5.00	4.434	.809
Use of ICT based teaching approaches such as videos, power point presentations and interactive white boards makes the class more interesting and increases students concentration	1.00	5.00	4.483	1.234
Use of the internet may cause destruction to learners through use of social media pages	2.00	5.00	4.784	.775
Aggregate			**4.634**	**.943**

Table 4.9 shows that respondents strongly agreed that: attendance of virtual classes provides the pupils with the convenience of attending classes while at home at any time as shown by mane of 4.652 (std. dev. =1.066); the internet enables students to conduct extensive research for doing class assignments as indicated by a mean of 4.818 (std. dev. =0.833); and use of the internet may cause destruction to learners

through use of social media pages (Mean=4.784; std. dev. =0.775). The respondents agreed that the internet enables pupils to supplement reading and revision materials provided in class (Mean=4.434; std. dev. =0.809); use of ICT based teaching approaches makes the class more interesting and increases students concentration (Mean=4.483; std. dev. =1.234). This implies that teachers in Kathiani Sub County strongly agreed that incorporation of ICT in learning was instrumental in enhancing the performance of students.

Unlike physical classes where students have to be physically present for learning to take place, virtual classes can be attended at allocation that is convenient to the pupils. However only 3 primary schools had done a trial version of the virtual classes as indicated by the Sub County Education Officer. Whilst virtual classes are instrumental in facilitating learning especially during the COVID-19 pandemic, the Sub County Education Officer observes due to inadequate computers and laptops in the schools and lack of the same facilities at home made it impossible to conduct virtual classes.

Pupils who have access to the internet can access online revision and learning materials to supplement information provide by their teachers and textbooks and also and conduct research for purposes of doing assignments or expanding supplementing knowledge acquired in class. An interview with of the school heads revealed that soft copies of KCPE past papers are often shared through WhatsApp groups which pupils can easily access through their parents phones. This has been very resourceful as it provides additional revision materials to the pupils given the limited number of textbooks and revision materials in the school. Additionally teachers are able to share revision materials with teachers from different schools through social media platforms such as WhatsApp groups which are in turn shared with the pupils through their parents' phones. Some of the teachers also conduct research on the internet and share materials that they get with the pupils.

Additionally teacher's use of ICT tools such as power point presentations and videos reduces the monotony of conventional approach of teaching making the class to be exciting while use of visual presentations increase the probability of pupils to grasping concepts and remembering what they are taught. One of the head teachers observed that d*ue to* limited ICT facilities they rely mostly on traditional approaches to teaching. However, whenever teachers use video lessons and power point presentations, students actively participate in the class lively compared to the normal classes.

These findings are similar to a study by Hussein *et al.,* (2017) which established that technology provides students with unlimited access to a wide variety of leaning materials that gives students information from a variety of sources that they can use to do their assignments and read extensively to increase their knowledge scope beyond the information provided in textbooks and teachers in classroom.

The findings also concur to an evaluation of the effects of technology on the learning outcomes by Sarkar *et al.*, (2017). The study found out that use of digital teaching aids such as videos and films enhances students learning abilities as they increase the learners' interest in the content being presented. Combining teaching of theory with video presentation adds learners' interest in the course content and increases their chances of understanding the concept being taught. Similarly a study on the effects of ICT on the performance of students Talkuder *et al.*, (2016) found out that 86% of the teachers that participated in the study stated that integrating ICT in learning motivates students and makes learners to be more attentive in class compared to the traditional approaches to teaching. It makes students learners to be more responsible their learning as ICT enhances their ability to undertake tasks more effectively and independently.

However use of the internet may be a source of destruction to the pupils if they spend a lot of time chatting on social media platforms instead of using the internet for academic purposes. Pupils may also spend a lot of time watching music videos and funny video clips on the internet which effectively reduces the time they could have spent studying. According to one the head teachers, parents often complain that whenever they give their children phones to use for academic purposes the pupils often spend time viewing memes and watching comedy clips posted across various social media platform especially Facebook and twitter. Another head teacher observed that pupils are under immense pressure to keep up appearances on social media and often spend time taking photos and updating status on all the social media platforms. As a result they end up spending most of their time on social media rather than studying.

The negative impact of ICT on pupils learning has also been demonstrated by Talkuder *et al.*, (2016). This study revealed that utilization of the internet for learning has no negative influence on students however ICT addiction has a negative effect on students' performance. The study showed that students spend a substantial part of their time browsing for social and non-academic reasons on a daily basis including during exam times. Students spend more than 15.6 hours per week for browsing. Out of these hours, 15.1 hours is spent on social media and other non-academic browsing.

4.7 Electronic Communication and the Performance of Schools

The fourth objective of this study was to establish the influence of use of electronic communication on the performance of public primary schools. The findings are presented in the following subsections:

4.7.1 Channels of Electronic Communication

The respondents were required to indicate the channels of electronic communication that were used in their schools as indicated in Table 4.10:

Table 4.10: Channels of Electronic Communication

Learning Function	Frequency	Percentage (%)
Use of Information Management Systems to capture, stores & retrieve information	7	33.3
Use of emails	21	100
Use of social media	21	100
Use of phone calls and text messages	21	100
Video conferencing (Zoom)	21	100

Findings in Table 4.10 indicate that all of the schools utilize various channels of electronic communication including emails, social media platforms, phone call and text messages and Zoom applications. However only 33.3% use the Information Management Systems to capture stores & retrieve information. This implies that schools in Kathiani sub county use a variety of electronic channels to communicate with teachers, parents, students and other stakeholder in the education sector. Phone calls are used in most of the schools both for official and non- official communication with education officials, teachers and parents. Whats App emerged as the main social media platform used for communication through Whats App groups. Emails are used for official communication with education officials mostly and with teachers. However Zoom is a relatively new channel of communication that was introduced during the COVID-19 pandemic for purposes of holding meetings. According to the Sub County Director of Education, Phone calls are the most common form of social and official communication preferred by most of the teachers. The Zoom App was introduced during the COVID-19 pandemic for purposes of holding meetings while emails are mainly used for official communication between the head teachers and this office. The main social media channels are Whats App groups which are used for sharing information and for social purposes.

4.7.2 Influence of Electronic Communication on Performance of Public Primary Schools The responses on the influence of electronic communication on performance of public primary schools are presented in Table 4.11:

Table 4.11: Influence of Electronic Communication on Performance of Public Primary Schools

Statement	Minimum	Maximum	Mean	Std. Deviation
The Education Management Information System generates information required for purpose of communication to stakeholders in an organized manner that can easily be understood	1.00	4.00	3.819	.715
Use of electronic communication facilitates faster and convenient access to information irrespective of the barriers caused by distance and time	2.00	4.00	3.871	.490
Information and Communication Technology enhances efficiency in communication by providing immediate feedback to the sender of the message	2.00	5.00	4.306	.696
Electronic communication through social media enables students to access help from their teachers or when they want to share ideas or hold discussions with their fellow students.	1.00	4.00	3.853	.649
Aggregate			**3.962**	**.638**

Table 4.11 indicates respondents agreed that Education Management Information System generates this information required for purpose of communication to stakeholders (Mean=3.819; std. dev. =0.715); use of electronic communication facilitates faster and convenient access to information irrespective of the barriers caused by distance and time (Mean=3.871; std. dev. =0.490); and information and communication technology enhances efficiency in communication by providing immediate feedback to the sender of the message (Mean=4.306; sd. Dev. =0.696). The respondents also agreed that electronic communication through social media enables students to access help from their teachers or when they want to share ideas or hold discussions with their fellow students (Mean=3.853; std. dev. =0.649).

This implies that teachers in Kathiani agree that use of electronic communication was instrumental in enhancing efficiency in communication with students, teachers, parents and other key stakeholders.

The Education Management Information System generates information required for purpose of communication to stakeholders in an organized manner.

According to the Ministry of Education (2017), NEMIS also contains the report module with an interface that allows the school administration to generate regular reports related to their mandate as school administration. Therefore the school administration can use this interface to export data for advanced analysis in formats such as excel. This makes it easy for the school administration to generate information

that is organized for communication.

Various channels of electronic communication have enhanced efficiency in communication by providing fast & convenient access to information and providing immediate feedback. Phone calls for instance can be made to a person far away irrespective of the distance and the receiver provides immediate feedback unlike writing letters which due to the need for physical delivery took a lot of time to pass information and offer feedback to the sender.

A head teacher in one of the schools observed that phone calls have made communication with parents easier. The school has all the contacts of the parents in the schools and whenever there is need to consult the parents within a short period of time the administration makes direct calls them to the parents to get their opinion. Whenever there is an emergency the school can easily call the parents immediately. Her observations were reiterated by another head teacher who said that the school no longer has to send the students home to come with their parents whenever there is an issue that requires the parents attention. The school calls the responsible parent to explain the situation and invite them to school.

Whats App group have been instrumental in facilitating sharing of information with parents and teachers through the different groups for parents and teachers. Through these platforms teachers and parents can socialize and get to know each other; they can pass important information; they can hold a discussion on issues affecting the pupils and easily ask questions to the teachers regarding the pupils or request clarity on information provided by the pupils from the school at the convenience of their homes. This has made communication faster and convenient both for the parents and teachers. The teachers and parents don't need to meet physically to discuss issues of concern for the pupils.

Findings on the influence of electronic communication are consistent to a study by Mwadulo & Odoyo (2020) which revealed that use of ICT provides cost-effective ways of disseminating information to students and parents. Incorporation of ICT in education enables the school administration to posts announcements on the school websites or social media pages where parents and students and share across different platforms making it easy for a wider audience unlike before where they had to write hard copy letter to each and every parent.

The findings are also consistent to those by Roberts, (2010) which showed that ICT offers a multiplicity of communication channels that provide immediate response enabling the sender to determine if the message has reached the intended recipient. Unlike before where teachers had to wait for a long time before they could receive a response to letter sent to parents, teachers can easily get immediate feedback by calling parents or sending text messages. Similarly a study by Olaore (2014) revealed that social media apps such as WhatsApp provide interactive channels that students can contact

their teachers easily whenever they need help or when they want to share ideas with their fellow students. These channels offer immediate feedback to students hence ensuring efficient communication and provide means of finding immediate solutions to challenges they may be experiencing when they are away from schools.

4.8 Performance of Public Primary Schools

In this section the researcher sought to determine how incorporation of ICT in schools had influenced the performance of various functions in the school. The teachers were therefore required to indicate the extent of their agreement on how ICT had influenced performance of various functions in their school on a likert scale. Table 4.12 presents findings on the performance of public primary schools:

Table 4.12: Performance of Public Primary Schools

Statement	Minimum	Maximum	Mean	Std. Deviation
Application on Information Management Systems enhances planning which ensures availability of: adequate school facilities & equipment; and teaching & learning materials	1.00	4.00	3.811	.675
Intake of Information Management Systems enhances transparency in utilization of school funds	1.00	5.00	4.475	.929
Incorporation of ICT in teaching has enhanced the performance of teachers Duties	2.00	5.00	4.818	.715
Incorporation of ICT in learning has led to improved academic performance of Students	1.00	5.00	4.766	.903
Intake of Information Management Systems has led to the timely monitoring and reporting on the progress & state of school projects	2.00	4.00	3.728	.686
Use of electronic communication has facilitated faster, easier and convenient access to information from the school	1.00	5.00	4.173	1.003
Aggregate			**4.295**	**.818**

Table 4.12 indicates that respondents strongly agree that incorporation of ICT in teaching had enhanced the performance of teachers duties (Mean=4.818; std. dev. =0.715) and incorporation of ICT in learning has led to improved academic performance of students (mean=4.766); std. dev. =0.903). The respondents agreed that intake of Information Management Systems enhanced transparency in utilization of school

funds (Mean=4.475; std. dev. =0.929) and use of electronic communication has facilitated faster, easier and convenient access to information (Mean=4.173; Std. dev. =1.003). The respondents also agreed that application on Information Management Systems had enhanced planning ensuring availability of: adequate school facilities & equipment; and teaching & learning materials (Mean=3.81; std. Dev.=0.675) and intake of Information Management Systems has led to timely monitoring and reporting on the progress & state of school projects (Mean=3.728std. dev. =0.686). This implies that teachers in Kathiani agreed that application of ICT in school had enhanced: performance of managerial and administrative functions in the school; performance of teacher's duties; performance of learning functions by students and communication among public primary schools in Kathiani Sub County.

4.9 Regression Analysis

Regression analysis was conducted to determine the influence of Information Management systems(X_1), Incorporation of ICT in Teaching(X_2), Incorporation of ICT in Learning(X_3) and Electronic Communication (X_4) influence performance of Public Primary Schools.

4.9.1 Model Summary

The model summary measures the proportion of variability in the dependent variable as explained by the regression line as indicated in Table 4.13:

Table 4.13: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.887[a]	.786	.782	.34374

a. Predictors: (Constant), Information Management Systems, Incorporation of ICT in Teaching, Incorporation of ICT in Learning, Electronic Communication

Based on the coefficient of determination in Table 4.10, the value of R square in 0.786 which is adjusted to 0.782. This means that the independent variables account for 78.2% variation in performance of public primary school. Therefore there is a significant relationship between the independent variables and the performance of public primary schools.

4.9.2 Analysis of Variance (ANOVA)

One way Analysis of Variance was used to determine the significance of the regression model as shown in Table 4.14:

Table 4.14: Analysis of Variance ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	112.734	5	22.547	190.822	.000[b]
	Residual	30.602	259	.118		
	Total	143.336	264			

a. Dependent Variable: Performance of Public Primary Schools

b. Predictors: (Constant), Information Management Systems, Incorporation of ICT in Teaching, Incorporation of ICT in Learning, Electronic Communication

Table 4.14 shows that the significance of the regression model is 0.000 and the value of F statistics is 190.822. The significance of the regression model is less than the significance level of 0.005 implying that the effects of the independent variables are statistically significant. Therefore Information Management Systems, Incorporation of ICT in Teaching, Incorporation of ICT in Learning & Electronic Communication have a significant effect on the performance of public primary schools.

4.9.3 Co-Efficient of Correlation

Multiple regression analysis was used to determine the relationship between Information Management Systems, Incorporation of ICT in Teaching, Incorporation of ICT in Learning, Electronic Communication and Performance of Public Primary Schools. This is illustrated in Table 4.15:

Table 4.15: Coefficients of Correlation[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.764	.261		6.747	.000
	Information Management Systems	.510	.044	.079	2.126	.000
	Incorporation of ICT in Teaching	.402	.048	.222	4.885	.000
	Incorporation of ICT in Learning	.617	.068	.149	3.587	.000
	Electronic Communication	.221	.033	.119	3.677	.000

a. Dependent Variable: Performance of Public Primary Schools

Performance of Public Primary Schools=1.764+0.510*Information Management Systems+0.402* Incorporation of ICT in Teaching+0.617* Incorporation of ICT in Learning+0.221* Electronic Communication

Therefore: $Y=1.764+0.510\ X_1+0.402\ X_2+0.617\ X_3+0.221\ X_4$

Table 4.12 demonstrated the Co-efficient of correlation of the regression equation. At zero the performance of public primary schools=1.764 when all the independent variables are constant. A unit rise in information management systems when the other independent variables are constant leads to a rise in the performance of public primary schools by 0.510 (p=0.000). A unit rise in the incorporation of ICT in teaching when the other independent variables are constant leads to a rise in the performance of public primary schools by 0.402; a unit rise in the incorporation of ICT in learning while the other independent variables are constant leads to a rise in the performance of public primary schools by 0.617; and a unit rise in use of electronic communication while the other independent variables are constant leads to arise in the performance of public primary schools by 0.221.

Therefore incorporation of ICT in learning has the most influence on the performance of public primary schools. Therefore it can be inferred that at 5% significance level and a confidence level of 95%, Information Management Systems, Incorporation of ICT in Teaching, and Incorporation of ICT in Learning & Electronic Communication have a significant effect on the Performance of Public Primary Schools.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study findings; the conclusion drawn thereof; policy recommendations based on the findings of the study and recommendations for further studies.

5.2 Summary of the Findings

Summary of the findings of this study are presented in accordance with the study objectives:

5.2.1 Influence of Application of Information Management System on performance of Public Primary Schools

Findings of this study showed that teachers in Kathiani strongly agreed: the use of School

Management Information systems helps to determine the adequacy of school equipment and facilities as indicated by a mean of 4.788 (std. dev. =0.896); use of Teachers Management Information Systems helps to determine the adequacy of teachers and track their performance as indicated by a mean of 4.683 (std. dev.=0.923); and use of the National Education Information Management facilitates regular monitoring, evaluation and reporting of the performance of school projects as indicate by a mean of 4.637 (std. dev.=1.150). Respondents agreed that use of the Financial Management Information Systems ensure transparency in utilization of school funds as indicated by a mean of 3.864 (std. dev.=0.504) and use of the students Management Information Systems facilitates the tracking of the number of learners; their performance and progression in school as indicated by a mean of 3.773 (std. dev.=0.793).

This implies that teachers in Kathiani Sub County agreed that application of Information Management Systems enhances the performance of management functions in public primary schools. Use of Information Management Systems enables heads of schools to keep accurate and updated records of the quantities of school facilities, equipment and education materials and the number of teachers and students. This enables them to determine adequacy of the facilities, materials and teachers in comparison to the number of students and plan accordingly to ensure that the school has adequate facilities and teachers. Information provided on the progress of students and their performance enables the school heads to monitor the performance of students and put in place measures that will enhance or improve the performance of students in the schools. Information provided on teachers' subject specialization enhances efficiency in allocation of teaching responsibilities to teachers and ensure all the subjects are allocated to specific teachers. Information provided by the financial module enhances accountability of the finances

received by the school in a given financial year.

All the 21 schools had incorporated the school, teachers and students Information Management Systems in the management and administration of schools. However low levels of incorporation of the financial information management systems by only10% of the schools implies that most of the schools are not able to keep accurate records of income received, expenditures, development funds and the progress of implementation of school projects in a given financial year. This may affect the effective utilization of funds disbursed in the schools hence the performance of financial management in the schools.

5.2.2 Influence of Incorporation of ICT in Teaching on Performance of Public Primary Schools

Findings of the study revealed that teachers in Kathiani strongly agreed that combining use of ICT in teaching with conventional teaching methods makes the class more interesting and interactive as indicated by a mean of 4.739 (std. dev. =0.846). The respondents agreed that: the internet enables teachers to conduct research and access information on effective pedagogical approaches to delivery of curriculum and instruction to students as indicated by a mean of 4.301 (std. dev. =0.968); and use of ICT tools makes the designing & developing schemes of work more easier compared to developing them manually as shown by a mean of 3.800 (std. dev. =0.759). the respondents further agreed that use of teaching materials (maps, images, pictures and notes) downloaded from the internet reduces the workload of having to draw them manually as indicated by a mean of 3.803 (std. dev. =0.596); and use of Microsoft Office Tools such as Excel enables teachers to conduct analysis of data on exam and evaluate students' performance more effectively unlike doing manual calculations as indicated by a mean of 3.818 (std. dev. =0.715).

This implies that teachers in Kathiani Sub County agreed that use of power point and video presentations in teaching enhanced the performance of teaching duties by reducing the monotony of conventional teaching approaches and making it easier for pupils to understand and remember enhancing students' ability to grasp concepts and remember what they are taught. The internet enables teachers to conduct research and access a wide variety of information which they can use to supplement information provided through textbooks and enhances their pedagogical approaches.

Further, downloading teachings aids that are already drawn images from the internet reduces the saves teachers' time of having to draw them manually; and using excel for analysis has enabled teachers to analyze large volumes of data on students' performance; obtain results on how the students performed in terms of totals, mean scores and students ranking; and developed graphical presentations of pupils' performance.

However only 14.4% of the teachers used power point presentation and videos in teaching; 13.9% used ICT in designing & developing lesson plans and schemes of work; 44.0% used teaching materials downloaded from the internet; and 76.1% used ICT tools in evaluating students and analyzing students' performance.

This indicates that it is only a small proportion of the teachers in Kathiani Sub County have incorporated use of ICT in teaching. Most of the teachers use Microsoft excels in analyzing students' performance a function that takes place outside the class. This implies that majority of the teachers in Kathiani still use conventional approaches of teaching students. Therefore teachers in Kathiani have not full incorporated use of ICT in teaching students.

Even though a high percentage of teachers were young which increased the probability of incorporating ICT in teaching, majority of the teachers in Kathiani Sub County had fundamental and basic computer application skills which are not sufficient for incorporation of ICT in schools. Less than half of the teachers had advanced computer applications skills.

5.2.3 Influence of Incorporation of ICT in Learning on Performance of Students

Findings of this study revealed that teachers in Kathiani Sub county strongly agreed that: attendance of virtual classes provides the pupils with the convenience of attending classes while at home at any time as shown by mane of 4.652 (std. dev. =1.066); the internet enables students to conduct extensive research for doing class assignments as indicated by a mean of 4.818 (std. dev. =0.833); and use of the internet may cause destruction to learners through use of social media pages (Mean=4.784; std. dev. =0.775). The respondents agreed that the internet enables pupils to supplement reading and revision materials provided in class (Mean=4.434; std. dev. =0.809); use of ICT based teaching approaches makes the class more interesting and increases students concentration (Mean=4.483; std. dev. =1.234). This implies that teachers in Kathiani Sub County strongly agreed that incorporation of ICT in learning was instrumental in enhancing the performance of students.

Unlike physical classes where students have to be physically present for learning to take place, virtual classes can be attended at allocation that is convenient to the pupils. Pupils have been able to access past KCPE revision papers shared from different schools on Whats App groups through their parents' smart phones. Due to limited ICT facilities in the schools teachers mostly use traditional approaches to teaching. Whenever teacher use video lessons and power point presentations increase the probability of pupils to grasping concepts and remembering what they are taught and makes students to actively participate in the class lively compared to the normal classes.

However use of the internet may be a source of destruction to the pupils if they spend a lot of time chatting on social media platforms instead of using the internet for academic purposes and spend a lot of time watching music videos and funny video clips on the internet which effectively reduces the time they could have spent studying.

Findings of the study indicate that 23.9% of the teachers said that their pupils us virtual/online classes for learning and 47.7% of the teachers said that their pupils have conducted research using the internet. However none of the pupils had used the internet to access reading materials or access E-library services. This implies that ICT has not been fully incorporated in learning among public primary schools in Kathiani Sub County. The only learning function that that is used by almost half of the pupils is conducting online research. Less than a quarter of the schools have used online classes.

5.2.4 Influence of Electronic Communication on Performance of Public Primary Schools

Findings of the study indicate that teachers in Kathiani Sub County agreed that Education Management Information System generates this information required for purpose of communication to stakeholders (Mean=3.819; std. dev. =0.715); use of electronic communication facilitates faster and convenient access to information irrespective of the barriers caused by distance and time (Mean=3.871; std. dev. =0.490); and information and communication technology enhances efficiency in communication by providing immediate feedback to the sender of the message (Mean=4.306; sd. Dev. =0.696). The respondents also agreed that electronic communication through social media enables students to access help from their teachers or when they want to share ideas or hold discussions with their fellow students (Mean=3.853; std. dev. =0.649). This implies that teachers in Kathiani agree that use of electronic communication was instrumental in enhancing efficiency in communication with students, teachers, parents and other key stakeholders.

The Education Management Information System contains the report module with an interface that allows the school administration to generate regular reports and export data for advanced analysis in formats such as excel. This makes it easy for the school administration to generate information that is organized for communication to key stakeholders. Phone calls have enhanced efficiency in communication by providing fast & convenient access to information and providing immediate feedback. Whats App groups have been instrumental in facilitating sharing of information and socialization with parents; holding discussions on issues affecting the pupils; and seeking clarity from teachers at the convenience of their homes.

All of the schools utilize various channels of electronic communication including emails, social media platforms, phone call and text messages and Zoom applications. This implies that schools in Kathiani sub county use a variety of electronic channels to communication.

5.3 Conclusions of the Study

Application of Information Management Systems enhances the performance of management functions in public primary schools in Kathiani Sub County by enabling by enabling the school administration to: determine adequacy of the facilities, education materials and teachers in comparison to the number of students and plan accordingly to ensure that the school has adequate facilities and teachers; monitor the performance of students and put in place measures that will enhance or improve the performance of students; enhance efficiency in allocation of teaching responsibilities; and enhance accountability of the finances received by the school in a given financial year. However low levels of incorporation of the financial information management systems may affect the effective utilization of funds disbursed in the schools.

Incorporation of ICT in teaching among public primary schools in Kathiani has reduced the monotony of conventional teaching approaches and made it easier for pupils to grasp concepts and remember what they are taught; facilitated teachers access to a wide variety teaching materials that supplement information provided through textbooks; reduced the time teachers have to develop teaching aids,, scheme of works and lessons plans; and made it easier for teacher to conduct analysis of pupils' performance. However majority of the teachers in Kathiani have not full incorporated use of ICT in teaching students due to low levels of ICT skills and inadequate ICT facilities.

Incorporation of ICT in learning made students to actively participate in class and increased the probability of pupils to grasping concepts and remembering what they are taught; enabled students to access KCPE revision materials. However some pupils spend a lot of time using the internet for non-academic reasons which effectively reduces the time they could have spent studying and ICT has not been fully incorporated in learning among public primary schools in Kathiani Sub County due to shortage of ICT facilities.

Use of Electronic communication among public primary schools in Kathiani Sub County enabled the school administration to generate regular reports and information for communication to key stakeholders; enhanced efficiency in communication by providing fast & convenient access to information and providing immediate feedback; and facilitated sharing of information, holding discussions on issues affecting pupils and seeking clarity from teachers.

At 5% significance level and a confidence level of 95%, Information Management Systems, Incorporation of ICT in Teaching, Incorporation of ICT in Learning & Electronic Communication significantly influence Performance of Public Primary Schools.

5.4 Recommendations of the Study

This study makes the following recommendations:

The Kathiani Sub county Education office fast tracks the incorporation and Integration of the Financial Information Management Systems among all the public primary schools to enhance transparency and accountability of funds disbursed to the schools. The Ministry of education provides ICT training to teachers to enable teachers acquire the necessary computer skills for the incorporation of ICT in teaching.

The Ministry of education through the Kathiani Sub County education office in collaboration with education partners facilitates the acquisition of the necessary ICT facilities and infrastructure including laptops, computers, internet and electricity to ensure that ICT is fully incorporated in teaching and learning among public primary schools. Teachers and parents to closely monitor and supervise pupils' utilization of the internet to ensure that they use it for academic purposes only when learning and limit usage of social media sites to reduce time spent on social media.

5.4 Recommendations for Further Studies

1. There is need to conduct a similar study on the influence of application of ICT on the performance of primary schools among private primary schools; among public primary schools in other sub counties in Machakos County and among other counties in the country.
2. There is also need to conduct studies to determine how incorporation of ICT influences the academic performance of pupils.

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APPENDICES

Appendix 1: Letter of Introduction

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: REQUEST FOR ASSISTANCE WITH DATA COLLECTION

My name is David Musyoki, a student at the University of Nairobi undertaking a Master of Arts degree in Project Planning &Management.

I am conducting a research on the **Influence of application of ICT and the Performance of Public Primary Schools in Kenya (Kathiani Sub County)** as partial fulfillment of the requirements for the conferment of the Master's Degree.

You have been chosen as a participant in this study and therefore I kindly request for your help in filling in the attached questionnaire. Any information provided will be kept confidential and only used for academic purposes only. There will be no financial compensation for participating in this study. Do **NOT** indicate your name on the questionnaire. There shall be no reference to you in writing of the report.

Your assistance in completing the questionnaire is highly appreciated.

You can reach me through 0727834819 for clarifications.

Appendix 2: Questionnaire for Teachers

My name is David Musyoki, astudent at the University of Nairobi undertaking research on the influence of application of ICT on performance of Public Primary Schools in Kathiani.

Instructions: Please complete the following questionnaire appropriately (Tick on the space provided and write on the provided space where applicable).

SECTION A: BACKGROUND INFORMATION

1. Gender of the respondent Male [ ]

   Female [ ]

   Others [ ]

2. Age Bracket Below 30 years [ ] 31-40 years [ ] 41-50 ears [ ] Over 51 years [ ]

3. Indicate the years that you been working in this School

   Below 5 Years [ ] 6-10 Years [ ]

   11- 15 Years [ ]

   16 ears & above [ ]

4. Indicate your level of ICT skills below:

   Fundamental ICT skills (switching the computer and turning it off and knowledge of computer hardware including keyboard, mouse CPU and screen monitor) [ ]

   Basic computer applications skills (use of Microsoft office Word, Excel and PowerPoint) [ ]

   Advanced computer application skills (use of the internet search engine, sending emails, scanning, printing and copying documents) [ ]

   Proficient computing and programming skills (software/program installation and maintenance, web design and computer programing) [ ]

SECTION B: APPLICATION OF INFORMATION MANAGEMENT SYSTEMS

5. Indicate the type/module of Information Management System that has been incorporated in your school

Type of Information Management System	TICK if utilized
School information management systems	
Teachers information management systems	
Students information management systems	
Financial information management systems	

6. Indicate your extent of agreement with statements on the influence of Information Management Systems in management of public primary schools

Q	Statement	SA	A	N	D	SD
1.	Use of the School Management Information System helps to determine the adequacy of school equipment & facilities and teaching & learning materials					
2.	Use of the students Management Information Systems facilitates the tracking of the number of learners; their performance and progression in school					
3.	Use of the Teachers Management Information Systems helps to determine the adequacy of teachers and track their performance in school					
4.	Use of the Financial Management Information Systems ensure transparency in utilization of school funds					
5.	Use of the National Education Information Management facilitates regular monitoring, evaluation and reporting of the performance of students and school projects					

SECTION C: ICT INCORPORATION IN TEACHI NG

7. Indicate the ICT tools/applications that have been incorporated in teaching in your school

Teaching Functions	TICK if ICT is incorporated
Use of projected power points presentations, interactive white boards and videos in teaching	
Use of ICT in designing & developing lesson plans and schemes of Work	
Use of teaching materials (maps, images, pictures and notes) downloaded from the internet	
Use of ICT tools in evaluating students and analyzing students' Performance	

8. Indicate your extent of agreement with statements on the influence of incorporating ICT in teaching on the performance of teachers in public primary schools

Q	Statement	SA	A	N	D	S D
1.	Combining use of ICT in teaching with conventional teaching methods makes the class more interesting and interactive					
2.	The internet enables teachers to conduct research and access information on effective pedagogical approaches to delivery of curriculum and instruction to students					
3.	Use of ICT tools makes the designing & developing schemes of work more easier compared to developing them manually					
4.	Use of teaching materials (maps, images, pictures and notes) downloaded from the internet reduces the workload of having to draw them manually					
5.	Use of Microsoft Office Tools such as Excel enables teachers to conduct analysis of data on exam and evaluate students' performance more effectively unlike doing manual calculations					

D: INCORPORATION OF ICT IN LEARNING

10. Indicate student's incorporation of ICT in the following learning functions

Learning Function	TICK if ICT is incorporated
Online/Virtual Classes	
Conducting research through online Platforms	
Accessing reading materials and revision Materials	
Accessing E-library services	

11. Indicate your extent of agreement with statements on the influence of incorporation of ICT in learning on the performance of students in public primary schools:

Q	Statement	SA	A	N	D	S D
1.	Attendance of virtual classes provides the students with the convenience of attending classes while at home at anytime					
2.	The internet enables students to conduct extensive research for doing class assignments					
3.	The internet enables students to supplement reading and revision materials provided in class					
4.	Use of ICT based teaching approaches such as videos, power point presentations and interactive white boards makes the class more interesting and increases students concentration					
5.	Use of the internet may cause destruction to learners through use of social media pages					

E. USE OF ELECTRONIC COMMUNICATION

10. Indicate which of the ICT channels that you use for purposes of communication

Channel of communication	TICK if utilized
Use of Information Management Systems to capture, stores & retrieve information	
Use of the School emails	
Use of social media	
Use of phone calls and text messages	
Video conferencing	

11. Indicate your extent of agreement with statements on the influence of use of ICT in communication in public primary schools

Q	Statement	SA	A	N	D	SD
1.	The Education Management Information System generates this information required for purpose of communication to stakeholders in an organized manner that can easily be understood					
2.	Use of electronic communication facilitates faster and convenient access to information irrespective of the barriers caused by distance and time					
3.	Information and Communication Technology enhances efficiency in communication by providing immediate feedback to the sender of the message					
4.	Electronic communication through social media enables students to access help from their teachers or when they want to share ideas or hold discussions with their fellow students.					

E: PERFORMANCE OF PUBLIC PRIMARY SCHOOLS

12. Indicate your extent of agreement with statements on the influence of use of ICT on performance of public primary schools.

Q	Statement	SA	A	N	D	SD
	Application on Information Management Systems has enhanced planning which ensuring availability of: adequate school facilities & equipment; and teaching & learning materials.					
	Intake of Information Management Systems enhanced transparency in utilization of school funds					
	Incorporation of ICT in teaching has enhanced the performance of teachers duties					
	Incorporation of ICT in learning has led to improved academic performance of students					
	Intake of Information Management Systems has led to the timely monitoring and reporting on the progress & state of school projects					
	Use of electronic communication has facilitated faster, easier and convenient access to information from the school.					

Appendix 3: Interview Schedule for the School Heads

1. What is your education level?
2. How old are you?
3. How many years you have been working in this school?
4. Which Information Management Systems have you adopted in your school?
5. How does the application of Information Management Systems influence the management and administration of the school?
6. Which ICT tools/applications that have been incorporated in teaching in your school?
7. In what ways does the incorporation of ICT in teaching influence the performance of teachers
8. How does the incorporation of ICT in learning influence the performance of learners
9. Which communication channels doe your school administration use to communicate with teachers, parents, students and education stakeholders?
10. How does the use of electronic communication channels influence communication in your school?

Appendix 4: NACOSTI Authorization

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: **164726** Date of Issue: **09/August/2021**

This is to Certify that Mr.. David Mutisya Musyoki of University of Nairobi, has been licensed to conduct research in Machakos on the topic: INFLUENCE OF APPLICATION OF INFORMATION TECHNOLOGY AND PERFORMANCE OF PUBLIC PRIMARY SCHOOLS IN KENYA: A CASE OF KATHIANI SUB –COUNTY MACHAKOS, KENYA for the period ending: 09/August/2022.

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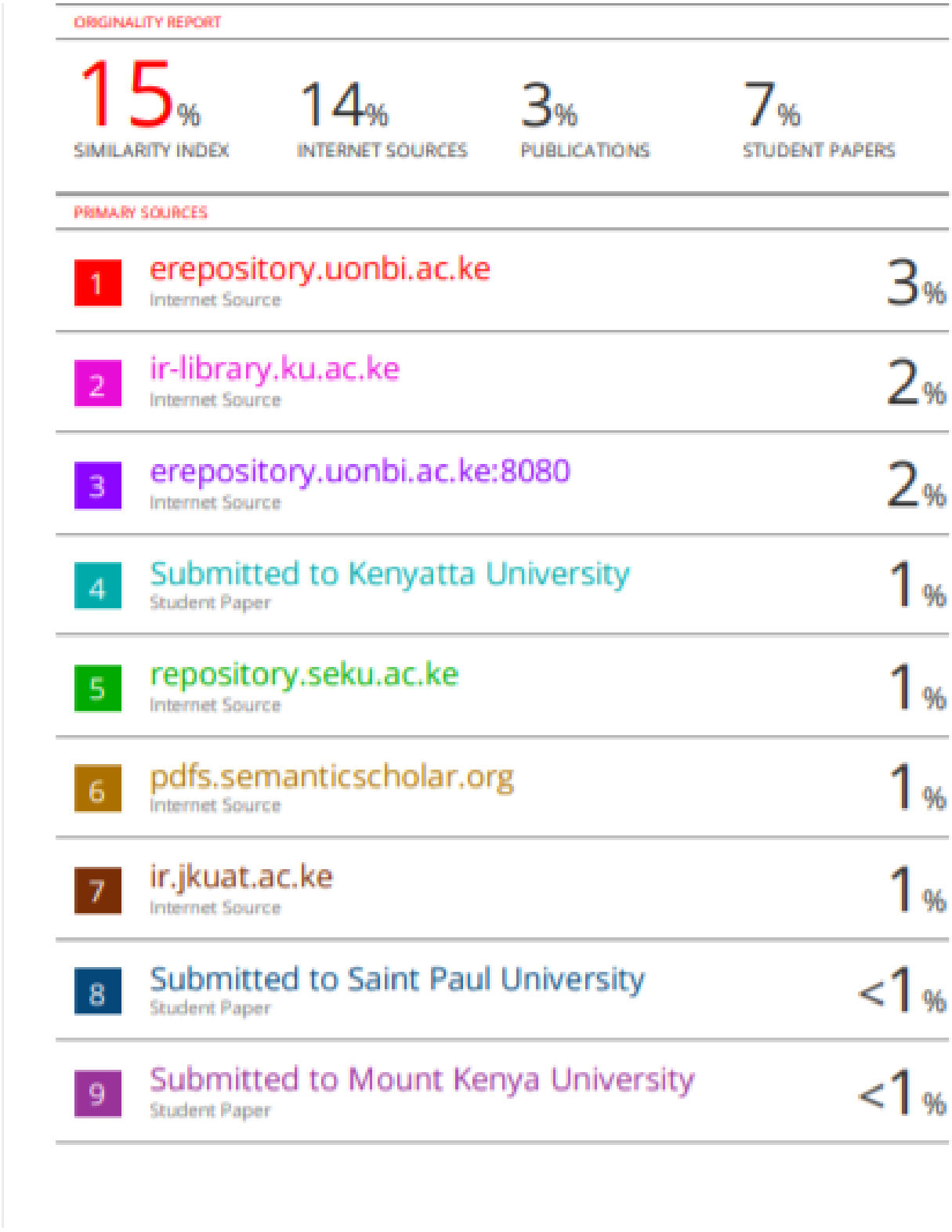

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