

**ICT INTEGRATION IN TEACHING IN SECONDARY SCHOOLS IN
EMBU COUNTY: BENEFITS AND CHALLENGES REALISED**

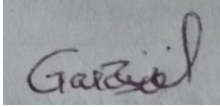
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**A research project submitted in partial fulfillment of the requirement for the award of post
graduate diploma in education of the University of Nairobi**

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DECLARATION

This research project is my original work and has not been submitted to any other university for the award of any degree



1/12/2022

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This project has been presented for examination with my approval as the University Supervisor



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DEDICATION

I dedicate this study to my late dad Silas Muchiri, my grandparents, my family and my daughter Sharleen Wakio for being the pillars that have supported me throughout my life.

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I sincerely thank my supervisor Dr. Anne Aseey, who has guided me and provided technical support throughout the study. I also sincerely thank my lecturers for be being supportive and understanding all through without forgetting the almighty God whose grace has been sufficient during this study.

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ABBREVIATIONS AND ACRONYMS

ICT- Information and Communication Technology

KCSE- Kenya Certificate of Secondary Education

EAC- East African Community

ESP-Education Support Professionals

EU- European Union

UNESCO- United Nations

GOK- Government of Kenya

MOE- Ministry of Education

UN- United Nations

SAIDE- South African Institute for Distance studies

ABSTRACT

In the spirit of digitalizing learning, schools in Kenya have adopted the use of various technologies. This study concentrates on finding out the benefits and challenges arising from ICT integration in teaching and learning. It will take place in secondary schools within in Embu County, Kenya. The following were the study objectives: to examine the availability of ICT resources in the schools, to determine the accessibility of ICT infrastructures in secondary schools in Embu County, Kenya, to investigate the impact of integration of ICT skills on teaching and learning in secondary schools in Embu County, Kenya and finally to establish the impact of adoption of ICT by the school administration on the school management.

While adopting a descriptive research design and quantitative methodology, the study was guided by technology acceptance theory. Simple random sampling was used to select 30 secondary schools for the study from 143 secondary schools located within Embu County. Three target groups were identified, namely head teachers, teachers and students. Respondents were selected from each group through purposive sampling, 30 head teachers, 150 teachers and 150 students were selected to participate in this study. The study collected data using questionnaires. The data obtained from the study was analyzed using descriptive statistical techniques which included percentages, frequencies and mean and the presentation of data done using frequency distribution tables.

The study observed that most of the secondary schools in Embu County had necessary technologies for use in teaching and learning. The teachers had also received training on ICT integration hence they were competent in their teaching activities. The conclusions were that the availability, accessibility and users' ICT skills caused problems and benefits as well in the process of digitalizing learning in the county. It recommended that the government, parents and the private sector should increase their support and keep funding the schools in order to ensure sufficient ICT resources are available. The study was helpful to the Education stakeholders in Embu County.

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

ICT refers to infrastructure and components used in modern communication. ICT integration in education involves use of computers and other ICT resources in teaching and learning. Globally, education is believed to affect economic development and the living standards of a country. Previous studies indicate that countries are investing in improving their quality of education so as to outsmart stiff economic competition. One way they are doing so is by providing technology and incorporating it in their teaching methodologies.

Most students in Australia are conversant with technology and they are able to learn using available ICT resources effectively. They like using technology in their learning activities. Integration of ICT became successful because it helped in knowledge dissemination and improved the learning outcomes according to Jamieson-Procter et al (2013). Further research establishes that the digitalization of education in China raised the students' expectation and aroused their interest since the students were exposed to technology in other areas of their life. According to the European Commission (2018), Europe uses different ICT resources in their schools.

In Africa, many Governments among them Egypt, South Africa and Ghana have put a lot of efforts in integrating ICT in the process of teaching. They have been able to achieve significant progress in this by creating enabling environment and enacting education policies that facilitate

integration of ICT. Kozma and Anderson (2002) states that there are various significant barriers commonly referred to as the digital divide that hinder most countries from exploiting the benefits of advancement in ICT to improve their learning. Developing countries experience limitations related to availability and accessibility of various educational technologies when integrating ICT in their schools. Irrespective of these challenges, most of the countries in Africa like South Africa, Mauritius, Ghana and Algeria have managed to overcome the challenges and they have the best education systems in Africa.

The East African Community (EAC) is made of Kenya, Burundi, Uganda, Rwanda, Tanzania and the United Republic of Congo. It acknowledges that education is compulsory and important in the region. Through the harmonization of education systems process, East African Community (EAC) strives to improve education in the region through digitalization of teaching and learning. This has seen Rwanda and Kenya embark on incorporating ICT resources in teaching methodologies. However, there has been a difference between the levels of integration. Rwanda has been able to fully digitalize learning in all the schools while Kenya lags behind and it has not been able to fully digitalize learning in all the schools, nonetheless Kenya can learn from Rwanda vital lessons and speed up the implementation process.

The government of Kenya recognizes the benefits and it emphasizes on digitalizing learning in all schools in the country. The Ministry of Education aims at facilitating acquisition and incorporations of technology from the lowest level to the highest level education institutions. However this has not been realized due to the challenges that ICT integration faces. Many counties among them Embu County lack the necessary support structures like electricity, access to internet, qualified and skilled personnel and sufficient ICT resources. Kenya National ICT Strategy GoK (2006) recommended that the Ministry of Education can achieve its dream by

ensuring all educational institution in kenya, teachers and students are provided with ICT infrastructures both software and hardware, competent ICT skills and necessary policies that will guide the process. This was anchored on Pelgrum and Law (2003) which states that, policy formulation and planning are the back born of the implementation process. The government has then launched various programs in different counties to facilitate the implementation process among them Digital Literacy Program and ESP program. Embu County is among the beneficiaries of these programs and therefore a study that will ascertain the impact especially challenges and benefits realized.

1.2 Statement of the problem

Kenya emphasizes on the importance of ICT integration. A committee mandated with digitalization of learning in the Kenyan schools was formed in 2006. Its main roles included facilitating use and stimulating incorporation of ICT resources in teaching methodologies in order to enrich learning experiences in Kenyan schools. Previous literature established that a few secondary schools have sufficient ICT infrastructures while others are moderately equipped. Most of the schools with sufficient ICT infrastructures mainly use them for some lessons. Computer studies subject has benefitted the most from this occurrence. Other schools lack electricity, internet and well equipped computer labs that facilitate ICT integration. Embu is among the 47 Counties in Kenya and proper ICT integration policies have not been formulated or they are poorly implemented. This has reduced the benefits that the government expected from ICT integration. For instance, Mbeere North is a Sub County in Embu County and it is among the beneficiaries of the digitalization program and ESP program but still lags behind. This study was necessitated by need to evaluate the effects of these government initiatives in Embu

County. This study analyzed the effects of these initiatives by carefully observing and analyzing the situation on the ground.

1.3 Purpose of the study

This study purposed to investigate the challenges and benefits that arise from incorporation of ICT in performing various tasks in secondary schools in Embu County, Kenya.

1.4 Objectives

The research objectives of this study were as follows:

- i. To find out whether Educational media was available in secondary schools situated in Embu County, Kenya.
- ii. To ascertain the accessibility of various educational technologies in secondary schools situated in Embu County, Kenya.
- iii. To look into the integration of ICT skills in secondary schools situated in Embu County, Kenya.
- iv. To inquire on the impact of adoption of ICT by the school administration and management in secondary schools situated in Embu County, Kenya.

1.5 Research questions

The study answers the following questions:-

- i. What impact does the availability educational medium have on secondary schools situated in Embu County, Kenya?

- ii. Does integration of ICT resources accessibility impact in secondary schools found within Embu County, Kenya?
- iii. How integration of ICT skills affects secondary schools situated in Embu County, Kenya?
- iv. How does integration of ICT adoption in the school administration impact on secondary schools situated in Embu County, Kenya?

1.6 Significance of study

The study is important to the stake holders in the education sector. Schools in Kenya have continuously received immense support from the government and the private sectors in terms of educational infrastructures. In the 21st century where technology has taken up every sector of the economy, digitalization of education has become the norm in most countries. This study will pin points the challenges faced in the process and the benefits realized. It will help County Education Officers, the head teachers and the teachers come up with measures that will help overcome the challenges in order to enrich learning experiences and in so doing improve students' academic performance.

1.7 Delimitation of the study

The study took place within the County of Embu in Kenya. It focused on secondary schools mainly looking at the challenges that were experienced in the process of using technology and the benefits enjoyed. It interrogated head teachers, teachers and students in those schools on the ICT resources present, were they reachable, accessible and usage in the schools. Kenya embarked on digitalization of education with the aim of improving learning outcomes in schools in Kenya through programs such as ESP (Educational Support Professionals) and Embu County benefited from them, this study sought to look into the reasons behind posting poor results in

national examinations by analyzing the challenges experienced and benefits realized in the process.

1.8 Limitations of study

The researcher experienced the following issues that could have an effect on the research finding, for example, reluctance of respondents to disclose all the information. They felt that some information is very confidential. The researcher promised to keep it confidential. Low return rate of questionnaires by the respondents was also a limitation. The researcher personally gave out the questionnaires and picked them once they were filled. The respondents also give unreliable information. To overcome this, the questionnaires had similar items in order to compare and identify disparities from the responses given by the respondents.

1.9 Basic Assumptions of the study

The researcher hoped that the teachers had ICT qualifications and competency to use various ICT media in their teaching methodologies. She also believed that the respondents had good moral values like being honest and reliable and they would participate in the study willingly.

1.10 Definition of significant terms used in the study

Impact -It means to have a strong effect on someone or something

ICT Integration- It means using technology in communicating, storing and managing information

Information and Communication Technology (ICT)-It is the process of manufacturing technologies that enable access to information and telecommunication

Teaching- It is the process of engaging with learners in order to enable their understanding and knowledge

Learning- It is changing the process of changing behavior through acquisition of new ideas, understanding, knowledge and skills

Secondary School- It is an intermediate learning institution between elementary school and a tertiary institution

Student- A person who is studying in a school or any other teaching and learning environment

Administration- It is the process of running an organization or an institution

Internet-It is an interconnection of PCs worldwide by utilizing web conventions to connect gadgets and allowing regular transmission of information through different media

E- learning- It is learning that is characterized by use of electronic technologies to access educational content

1.11 Organization of the study

The study constitutes of five divisions. The first one presents background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, delimitation of the study, limitation of the study, basic assumptions of the study and the definitions of significant terms. The second one presents literature review of the study while the third has the research methodology used by the study. The fourth contains data presentation,

analysis, interpretation and findings of the study. And the last one contains the summary of the finding, discussion, conclusion, recommendation and suggestions for further studies.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section contains literature review. It reviews literature related to the study. The review is divided into four categories each discussing the objectives of the study. Theoretical framework and conceptual framework will also be contained in this chapter.

2.2 Integration of ICT in teaching and learning

In teaching and learning, ICT resources are commonly the communication tools that are used in the classrooms. They can either be a software or hardware and sometimes both of them can be used concurrently. Various ICT tools are available and their use depends on the learning objectives of the user just like other teaching and learning aids commonly used in the classrooms. Digitalization of teaching methodologies entails incorporating ICT resources in the teaching activities. According to Hodgkinson (2006) and Duplessis (2010), it takes place in three ways. They include learning about ICT resources without associating them with teaching and learning tools, using ICT resources as a media for knowledge transmission and using ICT resources to process and transform data. SAIDE (2003) analysis indicates that most schools in Africa do not integrate ICT in their schools knowledge transmission purposes. A study by

Muchiri (2008) indicates that schools in America use ICT resources for lesson preparations, preparing learning materials and actual teaching in the classrooms. While citing Poole (1998), he concludes the implementation process was successful and they are enjoying the associated benefits. Teachers across the globe have realized the benefits of integrating ICT in teaching methods in their schools. They believe that ICT resources are important in supporting technical skills and practices compared to how they were taught as concepts previously. With use of ICT resources, students are able to share and exchanges knowledge, skills and ideas easily. It also believed that ICT resources provide students with networking opportunities and exposure into real life experiences.

Kenya has experienced a slower rate despite extensive support from the Ministry of Education. According to Ndiku, (2003), school managers and computer teachers faced several problems in Uasin Gishu County. The study noted that the challenges include insufficient ICT resources and lack of proper skills in ICT. The study by Ndiku mainly dealt with the problems that hindered successful integration in teaching and learning in Uasin Gishu County but it did not deal with other counties in Kenya. The study also did not investigate the impact that the process of integrating ICT has.

This study investigates challenges related to availability of the necessary technologies in the schools. It investigates whether the teachers and the students can reach them for use when need arises and further ascertains the rate of usage of ICT resources in teaching methods. It also investigates whether the schools have adopted ICT in school administration and management. The data obtained was used to determine the impact when making conclusions.

2.3.1 Integration of ICT resources availability

There has been extensive focus on Integration of ICT in schools since technology is being incorporated in all sectors of the economy. Several scholars have been concerned with the roles of various ICT resources in education. Among the major concerns in ICT integration are the challenges encountered and benefits realized in the implementation process and the impact on teaching and learning. According to Davis (2000) use of educational media has a lot of benefits to the students especially those that are abled differently. This is because the teachers are able to offer individualized instructions effectively. There are authors that contradict Davis (2000)s' perception. Cox (1999) believes when students are allowed to use ICT resources during lessons they can easily get distracted due to various entertainment programs available. One of the key concerns on the issues of availability ICT resources is whether the teachers and students can access them conveniently and have sufficient time to use them. Furthermore, possessing necessary ICT skills is an advantage when performing various tasks using ICT. This is believed to increase the benefits. Having enough ICT resources increases efficiency, efficacy and improves performance as evidenced by the previous studies. Not all schools are able to enjoy the benefits due to insufficiency of these. Several recommendations have been made from previous studies on the need to avail ICT resources to the schools so that the country can integrate ICT in education successfully.

Through programs initiated by the government, schools in Embu County have received a lot of support through provision of ICT infrastructures and professional support. This study will seek to ascertain their availability.

2.3.2 Integration of ICT resources accessibility

Presence of enough ICT resources is not the only factor that facilitates effective incorporation of different educational technologies. ICT resources have to be made accessible to teachers, students and any other user. ICT resources should be sufficient in numbers and located where the teachers can be able to use them easily. Computer labs should have enough computers, printers, photocopiers and well connected to the internet. The computer labs should be spacious and conducive in order to allow teachers and students access. The internet should be strategically located and accessible to users all the time. Previous studies show that the above requirements are not met in most schools in Africa. Several barriers exist in most countries thus slowing down the process. Singh, (1993) noted that accessibility of ICT resources is crucial when using them. There are several benefits of accessibility of ICT resources among them is the provision of readily available learning materials for the students. The students are able to access information at any given time thus creating an enabling learning environment. Information can be easily and quickly shared in the learning institutions thus enhancing the teaching and learning process and making communication easier. Inaccessibility of ICT resources is a physical barrier revolving around the location and structure of computers labs in schools and other buildings where ICT resources are.

Makerere University ICT policy 2002 is applauded by many researchers and many countries have embraced it. The policy noted that as much as training on integration of ICT is important, availability and accessibility of ICT resources is equally important if countries are to successfully implement the policy. It is worth noting how the studies above concentrated on whether teachers and students could access ICT resources in schools especially the computer labs but ignored the accessibility of ICT resources in the classroom, staffrooms, libraries and the school compound in general. This study mostly seeks to find out the situation in the schools.

2.3.3 Integration of ICT skills

Rapid innovations in technology pose a great challenge on equipping teachers with appropriate skills necessary for incorporating technology in teaching and learning. Despite this challenge, ICT remains a suitable platform for acquiring and disseminating knowledge and skills. The teaching profession is the most affected by these rapid innovations since new technologies require different skills thus burdening the teachers with a lot of work where they are supposed to upgrade the skills while at the same time attending to the students. British Education Communication and Technology Agency carried out a research on the requirements for successful integration of ICT in Britain. ICT skills was identified as one the key requirements. Owing to this realization, governments across the world have laid down policies that will equip the teachers with the skills in ICT. For instance, Kenya embarked on the process of reviewing its' education curriculum. In the process the Kenyan system of education was changed from 8-4-4 to CBC (Competency Based Curriculum). The teachers training institutions also revised their syllabus and aligned it to the emerging issues. Teachers in developed countries have overcome these challenges and have fully incorporated ICT in their teaching methodologies. Developing countries are still left behind but they have made a lot of progress. They have formulated policies that emphasize digitalization of teaching and learning. The teachers are able to share their experiences, access learning materials from a wide range of online sources thus improving the learning outcomes. The students are also able to improve their performance. According to a report by UNESCO (2002), ICT stimulates the teachers and the students to explore new learning opportunities. Bitner & Bitner (2002) noted that despite the expected benefits, it is the altitude and the skills of the ICT user that determines the benefits that they will achieve. Therefore,

possessing ICT skills is crucial in helping the teachers and the student overcome challenges that they experience in the process.

From previous studies, students get easily motivated when they learn using ICT resources and they are more active during the lessons. Most of teaching techniques assume that students understand once they are able to name the components of ICT resources and explain the functions but this is not true. The students understand the ICT resources better through interacting with them and performing various tasks using them. This helps the students by increasing their confidence and increasing their competency. Therefore the students should be allowed to interact with the various ICT resources available in their schools during the studies in order to gain experience. Jonassen,(2000) stated that students retain more of what they see than what they hear hence memorizing notes about ICT resources does not equip the students with the ICT skills. While most of these studies identify the benefits the skills, the challenges experienced are not fully explored. This study will bridge this gap by investigating how ICT skills competency affects the process.

2.3.4 Integration of ICT adoption by the school administration

ICT integration in administration involves usage of ICT resources in management of various functions in the schools. It entails making use of technology to make better plans, set standards, administer and monitor examinations as well as keep records.

ICT has become vital in management at all sectors. Secondary schools have therefore embraced it due to the benefits accrued. Mangesi (2010) acknowledges that the ongoing revolution in technology increases productivity and competitiveness through transfer and provision of information. Past studies from World Bank Report (2007) state that teachers are able to maintain

proper student records. These records can be used to track the students' progress and make suitable decisions that will help in improving their academic performance.

This study looks at the ICT resources used in school administration and management. It assesses the programs that are available and used in management, their benefits and challenges experienced.

2.4 Theoretical framework

The two theories that will guide this study include;-Technology Acceptance Theory (TAM) and Technological Pedagogical Content Knowledge (TPACK) focusing on the technology users. These Theories will be used because they give information regarding the research problem and the research objectives.

2.4.1 Theory of Technology Acceptance (TAM)

The Theory of Technology Acceptance (TAM) is a theory that illustrates how people accept and make use of technology. Davis was the first person to propose it in 1989 and it outlined the factors that users consider when choosing how to use new technology and areas that it will be used. These factors included how it is perceived and how easy it is to use. Many studies have used the Theory of Technology Acceptance (TAM) among them Edward 2015 which investigate the influence of ICT in management in secondary school. The Theory will be the most appropriate for this study since it will enable achieve the first and second study objectives.

2.4.2 Theory of Technological pedagogical Content Knowledge. (TPACK)

This study is guided by the theory of technological pedagogical content knowledge which argues appropriate skills and knowledge are required for successful utilization of technology in performing various operations. This theory is vital in carrying out the study since it deals with users of the technology and in this case ICT hence it will help in achieving the study objective by illustrating how the technology users in this study being teachers and students relate with the technology in question.

2.5 Conceptual frame work

A conceptual frame work is an illustration of the interconnection between the independent variables and dependent variables in the study.

The figure below shows how the variables in the study are related.

INDEPENDENT VARIABLES

Availability of ICT resources.
Indicators-(presence of computers, internet, printers and projectors in the schools)

Accessibility of ICT resources.
Indicators-(presence of ICT resources in computer labs, libraries and classrooms.)

ICT skills
Indicators-teachers' qualification and competency and students' proficiency in using ICT resources.

DEPENDENT VARIABLES

ICT integration

Indicators- (use of power point)

Access of information online and ICT

Resources' use in School management

Adoption of ICT in administration.

Indicators-use of ICT resources in keeping students records, setting examinations, management of examinations, analysis of examinations and setting timetables



2.6 Summary of literature review

ICT is vital in teaching and learning especially in this digital era where digitalization of learning is vital in creating important opportunities for the students to learn and acquire relevant 21st century skills. The study and analysis of challenges and issues emanating from the process is of great importance to the teachers so as to overcome challenges and use ICT successfully. Previous studies indicate that countries across the globe both developed and developing have laid down programs aimed at initiating comprehensive use of educational technology in their schools. Britain, USA and Australia are among developed countries that have enacted policies aimed at ensuring that their schools make use of ICT fully. Countries that are said to be developing among them India, South Africa, Ghana, Rwanda and Kenya have also initiated the process in their education systems irrespective of the difference that exists in embracing, initiating and the actual process of ICT integration. In Kenya, ICT integration is not standardized nor regulated as this has been the responsibility of school management boards. This study mainly aims at finding out the situation on the ground by investigating the challenges and benefits arising from ICT integration. It evaluates factors that may affect the process. The outcome of this study is believed

to give a clear picture on the state of ICT integration. The product of this study will be useful in giving recommendations on how teaching and learning can adopt ICT resources for maximum benefits.

2.7 Knowledge gap

Previous studies provide little information regarding computerized teaching methodologies in secondary schools in Embu County. A lot of interventions in the education sector in the country have not borne fruits since good performance and benefits of using technology have not been attained. Very many studies have been carried out globally especially on use of technology in school. A study by the University of Nairobi looked at “the effects of ICT integration in management of private secondary schools in Nairobi County” but there has been not such study carried out in Embu County, Kenya. Mutisya (2017) studied “factors that influenced integration of ICT in management of public secondary schools in Kitui County”. Very few studies exist on integration of ICT particularly in Embu County hence there is no much information regarding ICT integration in the County. A study that would evaluate the impact of integration of technologies schools in Embu would provide useful recommendations on the situation.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The third chapter discusses the research design, target population, sample size and sampling procedure, data collection instruments, pilot test, validity and reliability, data collection procedure, data analysis and ethical considerations.

3.2 Research design

The research method adopted is a descriptive research design. A research method outlines the procedural steps in collecting data while a descriptive research design investigates the situation in the presences situation. It enables the researcher get up to date and accurate information on the nature of the problem since it does not allow change of variables but only the description of what is happening. The respondents were able to give and explain the situation of ICT integration by detailing what they experienced in the school

3.3 Target population

It is any population that a study uses to generalize the results. It is made up of a group of people with similar characteristics in a given area. For this study it includes the head teachers, teachers and the students in secondary schools in Embu County. The total target population for this study is 5,420 which is made of 680 head teachers and teachers and 4,750 students. This data is collected from the County Education Offices. This target population is suitable for this study because the students' in these schools continue performing poorly in their national examinations despite numerous interventions. The study will give insights into the impact.

3.4 Sample size and Sampling procedure

A trivial proportion derived from the target population in a study is a sample size. Choosing a sample from any population is called sampling and it may be difficult to obtain a sample and therefore there are some basic techniques used in sampling. Borg and Gall (1989) defines sampling procedure as a technique used in research to pick a sample to represent the target population. This study will adopt simple random sampling and purposive sampling technique.

Data was collected from 30 secondary schools in Embu County which were identified through simple random sampling. 30 head teachers, 150 teachers and 150 students were selected through purposive sampling technique. The sample size for this study is 330.

3.5 Data collection instruments

Questionnaires were the research instruments in the study. They were used because they are easily administered and they give the respondents sufficient time to give out their responses and saves a lot of time during the study. The questionnaires also guarantee privacy and confidentiality. The questionnaire contained four sections. Section one contains the respondents demographic information. Section two contains distribution of ICT resources, accessibility and

usage in the schools. Section three has integration of media in teaching methodologies and section four impact of adoption of ICT in school administration and management. A pilot test for this study took place in selected secondary schools in Embu County, Kenya. It included two secondary schools composed of two head teachers, four teachers and eight students. This helped ensure validity and reliability of the research instruments.

3.5.1 Validity of research instruments

Validity is the degree of accuracy of research instruments or tools in obtaining information in a research. It explains how meaningful and true is the actual situation on the ground during a study based on the results obtained. The research instruments were prepared with the research supervisors' guidance so as to cover specific objectives and identify areas of weakness. The study ensured instruments' validity through pilot testing of the tools and making necessary modifications in order to achieve the required objectives.

3.5.2 Reliability of research instruments

It is the percentage of consistency of the results after repeated experiments. To test the consistency of the results, the researchers used test retest method on the research instrument in this study. The same group of respondents was issued with similar questionnaires and under the same environment. The results obtained were evaluated using statistical method in order to ascertain the relationship between the two sets of results.

3.6 Data collection procedure

Authorization to conduct the study was obtained from the different offices. The researcher was issued with permission to carry out the study in Embu County from the County Education offices, Sub County Education Offices and the school Head teachers' office. The researcher also filled the necessary forms in the schools visited and finally issued questionnaires to respondents in the sampled schools. The researcher remained within the school vicinity during the filling of questionnaires and offered help to those who sought clarification while filling them. Once the questionnaires were filled, the researchers collected them and verified that they were duly filled. The study took a period of seven days.

3.7 Data analysis

The study used various statistical methods in analyzing data obtained from the respondents so that it could be easily interpreted. The questionnaires issued to the respondents were all collected and organized by giving them codes, tallying, tabulating and presenting the data in form of tables. Descriptive data analysis method was used in this study. Quantitative data that was drawn from the study was scrutinized using descriptive statistics and the mean, frequency and percentages were calculated. The results of the analysis were presented using frequency distribution tables. Responses from questions that were open-ended were grouped based on the responses and the ideas. They were analyzed using content analysis and used in drawing conclusions and recommendations. The relationship among the variables was measured using Pearson Product Moment Correlation (r).

3.8 Ethical consideration

The ethics that were considered regarding this study were taken care of through observing etiquettes and maintenance of confidentiality throughout the study. The researcher familiarized

herself with the respondent through introduction and explaining why this study was important to them. Information obtained during the study was used only in drawing conclusions during the study and it was not be used elsewhere. Permission was sought from all the pertinent bodies before the study was carried and all the rules and regulations followed during the study. The researcher had consent from the respondents and only those that fully consented participated.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSIONS

4.1 Introduction

This chapter contains data presentation, data analysis, interpretations and summary of the findings.

4.2 Return rate of questionnaires

A total of 330 questionnaires were given out during the study. 30 of them were issued to head teachers, 150 to teachers and 150 to the students in 30 secondary schools selected for the study. Questionnaires were the main tool used for collecting data.

Below is presentation of the summary of the number of questionnaires that were returned.

Table 1

Respondent	Administered	Returned	Percentage
-------------------	---------------------	-----------------	-------------------

	Questionnaires	Questionnaires	
Head teachers	30	29	97
Teachers	150	145	96
Students	150	140	93

From the summary above, the return rate of the questionnaires that were given to the head teachers was 97%, teachers 96% and students 93%. The average return rate was 95% meaning that only 5% of the questionnaires administered were not returned.

4.3 Demographic Details

The study assessed demographic information regarding the respondent which included their gender, age group, educational background and their experience in ICT integration. The information obtained helped ascertain how eligible the respondents were in participating in this study and how reliable was the data collected during the study

4.3.1 Distribution of the respondent's gender

In order to assess gender biasness in data collection during the study, respondents indicated their sex. The following are the results.

Table 2

	Head teacher		Teacher		Student	
	Male	Female	Male	Female	Male	Female

Frequency	18	11	87	58	42	98
Percentage	63	37	60	40	30	70

From the table above, the information obtained on the respondents' gender is that most head teachers and teachers were male at 60% and 63% respectively while the students were female at 70%. This did not render the study gender biased.

4.3.2 Education

The study investigated the educational background. The head teachers and teachers therefore indicated their educational attainment. The responses obtained are presented in the table below.

Table 3

Education level	Frequency	Percentage
Primary	-	-
Secondary	-	-
College	10	6%
University	164	94%
Others	-	-

From the above findings, 94% of the respondents had Bachelor’s degree from the university and only 6% had a diploma certificate from a college. The minimum requirement for teaching in Kenyan secondary school is a diploma certificate hence the respondents were highly competent. This implies that the information obtained during the study was reliable.

4.3.3 Age group

The study evaluated the age of the respondents. They indicated their age group and the summary of the results obtained is shown in the table below.

Table 4

Age group(years)	Frequency	Percentage
Below 18	135	43%
18-30	80	25%
31-40	55	18%
41-50	36	11%
50 and above	8	3%
Total	314	100%

From the table above, the highest percentage was below 18 years at 43%. This constituted of mostly the students since they are below 18 years apart from a few form fours who had already attained 18 years. The smallest percentage constituted mostly of the respondents above 50 years who were mostly head teachers.

4.3.4 Type of secondary school

The study investigated where the respondents came from. There were two types of secondary schools in Embu County namely public secondary schools and private secondary schools. Out the two categories there were day and boarding mixed secondary schools, girls only or boys only secondary schools. Public secondary schools are founded by the government of Kenya while the private secondary schools were founded and funded by the private. This study collected data from public secondary schools within Embu County.

Table 5

Type of school	Respondents	
	Frequency	Percentage
Mixed day schools	5	5%
Mixed boarding schools	5	5%
Boys day schools	5	5%
Girls day schools	5	5%
Boys boarding schools	5	5%
Girls boarding schools	5	5%
Total	30	100%

From the results obtained in the study as shown above, all types of secondary schools within Embu County were represented each at 5%. This implies that the data collected was not skewed.

4.4 Availability, accessibility and usage of ICT resources

The study assessed various ICT resources available and whether they were sufficient or not. The study looked for the percentage of accessibility and frequency of use of the available ICT resources.

4.4.1 Sufficiency of ICT resources

The table below shows the percentage of availability of ICT resources based on the responses from the respondents on whether they were sufficient in the schools.

Table 6

ICT resources	Availability			
	Sufficient		Not Sufficient	
	Frequency	Percentage	Frequency	Percentage
Computer labs	300	96%	14	4%
Computers	288	92%	26	8%
Printers	256	82%	58	18%
Photocopiers	295	94%	19	6%

Projectors	186	59%	128	41%
Internet	245	78%	69	22%

From the table above all the available ICT resources were sufficient since they are above 50%. Computer labs were the most sufficient at 96% while projectors were the least sufficient at 59%.

4.4.2 Accessibility of the available resources

The study investigated whether the available resources in secondary schools in Embu County were accessible to both the students and the teachers. The results obtained from the respondents are shown below.

Table 7

ICT resources	Accessible		Not Accessible	
	Frequency	Percentage	Frequency	Percentage
Computer labs	314	100%	0	0%
Computers	314	100%	0	0%
Printers	170	54%	144	46%
Projectors	100	32%	214	68%

Photocopiers	210	67%	104	33%
Internet	230	73%	84	17%

From the table above, computer labs and computers were fully accessible to the teachers and students at 100%. Internet and photocopy services were moderately accessible to the student at 73% and 67% respectively. Out of the 59% available projectors most of them were not accessible to students hence the low accessibility percentage of 32%.

4.4.3 Usage of the ICT resources

The study evaluated the frequency of use of the available resources. The results obtained are given below.

Table 8

ICT resources	Usage									
	Daily		Twice a week		Once a week		Once a month		Never	
	frequency	%	frequency	%	frequency	%	frequency	%	frequency	%
Computer lab	120	38	192	61	2	1	-	-	-	-
Computers	170	54	132	42	12	4	-	-	-	-
Printers	76	24	56	18	180	57	-	-	2	1
Projectors	15	5	30	10	5	2	221	69	43	13
Scanners	2	1	36	11	145	46	25	8	106	34
Photocopiers	124	40	108	34	57	18	-	-	25	8
Internet	265	8	49	1	-	-	-	-	-	-

		4		6						
--	--	---	--	---	--	--	--	--	--	--

From the table above internet services were used daily at 84% since most day school students accessed internet at home in the evening. Projectors and scanners were not used regularly since they were not available in most of the schools and the few that were available were used by the teachers. Computer labs, computers and photocopiers were used daily at 38%, 54% and 40% daily since most teachers used them for preparing lessons, keeping records and school management. Students used the computer labs during lessons hence the frequency of use is higher at 61% twice per week.

4.5 Integration of ICT

The study desired to find out whether the teachers had the appropriate skills. It assessed whether they had been trained on Integration of ICT and where they got the training from. It also sought to ascertain whether ICT resources were used in teaching and learning. The participants of the study were requested to state whether the training they had received was helpful, the challenges they faced and the recommendations they would make regarding ICT integration in teaching and learning from their experience.

4.5.1 Skills in ICT integration and training

The study evaluated skills for performing tasks using ICT resources in their schools. The respondents were requested to state the type of training they had. The results are shown below.

Table 9.

Type of training	Trained		Untrained	
	Frequency	Percentage	Frequency	Percentage
Computer studies	179	100%	-	-
ICT integration	124	69%	55	32%

From the results obtained, all respondents were had received training in computer studies but only 32% had been trained on ICT integration. This caused the challenges that most schools faced.

4.5.2 Challenges faced during the process

The study investigated the problems that respondents encountered while using various computer resources in teaching and learning. The table below shows the frequency of the challenges and the percentages.

Table 10

Challenges	Frequency	Percentage
Insufficient computers	4	1%
Insufficient computer labs	14	4%
Inadequate ICT tools	26	8%

Insufficient time	38	12%
Lack of enough software	18	6%
Students' lack of interest	2	-
Teachers' lack of interest	5	1%
Data loss	14	4%

From the results obtained, the respondents experienced few challenges with the highest challenge being at 12%. This implied that head teachers, teachers and students had embraced ICT in their school as evidenced by a negligible percentage lacking of less than 1% indicating lack of interest.

4.6 Adoption of ICT programs in administration and management

The study assessed the impact of adoption of ICT programs in the school administration and management. The head teachers were required to indicate whether vital software programs used in management were available in schools and the frequency of use in order to ascertain whether the used adopted ICT in its management. Respondents were further requested to state and explain their views on the impact that the use of various ICT resources had in the schools especially the benefits and challenges realized.

4.6.1 Availability of ICT programs for management

The table below shows the availability of various ICT programs used in management and their percentages as obtaining during the study.

Table 11

ICT programs	Available		Not available	
	Frequency and percentage		Frequency and percentage	
Microsoft excel	314	100%	0	-
Internet and e mails	314	100%	0	-
Microsoft word	314	100%	0	-

From the results obtained all the vital ICT programs were 100% available in the schools

4.6.2 Use of the available ICT programs

The study looked into the respondents' use of ICT programs when performing various tasks in school administration and management and how often. The table below shows the results obtained during the study.

Table 12

Tasks	Frequency of use	Percentage
Keeping students records	179	100%
Management of personnel records	179	100%
Accounting	177	99%
Keeping meetings records	179	100%
Preparing timetables	175	98%
Communication	153	86%

From the table above, most head teachers and teachers used the available ICT programs in management of the school. Only a few schools that old methods of communication and keeping records.

4.6.3 Impact of adoption of ICT programs in school administration and management

The study sought to evaluate the impact of adoption of computer technologies in school administration and management. The head teachers and teachers were requested to give details on whether they were helpful and the effect they had on school management. They unanimously agreed that it helped in performing various tasks in the school, made their work easier, saved time thus giving them enough time to attend to the students. This resulted in improved performance in the schools. Though the overall performance in the national examinations like KCSE was lower compared to other counties in Kenya, most schools had consistently improved their mean score.

CHAPTER FIVE

SUMMARY, DISCUSSIONS, CONCLUSIONS AND REMMENDATIONS

5.1 Introduction

Chapter five contains summary of the findings which summarizes the findings, discussions of the findings, conclusions and recommendations.

5.2 Summary

From the data collected from the respondents, the following observations are made. In regard to the availability of ICT resources most schools at 98% are equipped with computers and computer labs. It is worth noting that although the schools have computers labs and computers, they are not necessarily sufficient. Some schools had only one computer lab which catered for all classes. This lead to fewer computer lessons per week so that all the classes can be able to utilize the few available resources. The computers were also few in number forcing students to share in groups during the lessons. Some of the available computer labs were smaller in size leading to crowding and congestion during the lessons. Most schools had the computers but few had projectors, printers, scanners and internet making teachers and students use them for only studying computers. The few schools that had other ICT materials did not have sufficient numbers for use by all teachers and students and were therefore used by teachers and the school administration.

Accessibility of the various available resources was assessed in the schools and study found out that not all available ICT resources were accessible to everyone. Some resources like projectors, scanners, printers and photocopiers were not accessible to the students especially in cases where

they were few in number. Accessibility was also affected by location of the ICT resources as some were only found in the computer labs and school office hindering access by those in need.

It was noted that most teachers had the necessary ICT skills contrary to the expectation that they did not possess adequate skills. The minimum qualification for teachers in Kenyan secondary schools is a diploma in education but the study established 95% teachers had degrees in education instead making them more qualified than expected. Teachers training institutions had revised their syllabus and incorporated integration of ICT training. The Ministry of Education also recommended teachers to attend refresher courses. Therefore the teachers were able to teach students effectively and the students acquired the necessary ICT skills.

The study established that with the advantage of the enabling environment established from the above findings, ICT integration has been successful. Schools have also embraced use of ICT in the day to day management. However there have been several challenges that prevent them from benefiting from the integration. For instance schools continue performing poorly in their National Examinations and some of the reasons are lack of interest in ICT from both teachers and students. There are also challenges on time allocated for computer studies since there are other subjects that are taught in the schools and some schools make computer studies optional.

5.3 Discussions of the findings

From the past literature, studies have shown that most countries in Africa have embraced ICT in teaching and learning although there are several challenges. This observation is still correct as realized during this study although there has been improvement in availability of ICT resources since most schools have ICT resources even if they are not sufficient. The government has been committed in overcoming those challenges as evidenced by the situation in Embu County. The

challenge of integration of ICT skills has also been minimized if not fully eliminated by aligning teacher training programs towards offering courses that will enable teachers be competent in ICT use.

5.4 Conclusions

From the results obtained in the study and the analysis the following conclusions can be made. Most secondary schools in Embu County are furnished fully with the necessary computerized means for use in teaching and learning. There are challenges of acquisition of these infrastructures, accessibility and skills on how to use them. The teachers have basic skills for using technology. The head teachers and students have fully embraced ICT in their schools and this has slightly improved the academic performance of the students. There are however a few schools that are not well equipped with ICT resources, few teachers not trained on ICT integration and a few challenges though the number is almost negligible.

5.5 Recommendations

The study recommends that the head teachers and the teachers need to allocate more time to computer studies in their schools. ICT resources like the computers, projectors and internet should also be made available in other teaching and learning areas like the classrooms and libraries to avoid congestion and over reliance of computer labs. The head teachers and other relevant authorities should organize short term courses on ICT integration in teaching methodologies so as to furnish the teachers with skills and increase their knowledge. Teachers training institutions should also incorporate training teachers on ICT integration in their syllabus. The parents and the private sector should also help the government in supporting schools with acquisition of ICT resources through funding and donations.

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APPENDECES

APPENDIX 1: INTRODUCTION LETTER

Jedidah Gakii Muchiri,
University of Nairobi,
School of Continuing and Distance Studies,
Department of Educational Studies.

Dear Respondent;

REF: RESEARCH UNDERTAKING.

I am PGDE student in the University of Nairobi, carrying out a study on the impact ICT integration in Embu County, Kenya. You are invited to participate in this study which is a part of a research project. Your answers will be completely anonymous and confidential. Your contributions will be highly appreciated.

Thank you very much in advance

Yours Faithfully

.....

Jedidah Gakii Muchiri

APPENDIX 2: QUESTIONNAIRE FOR HEADTEACHERS AND TEACHERS

INTRODUCTION

Dear respondent, I thank you for taking part in this study which requires 5 minutes to complete the questionnaire. Kindly answer the questions correctly. Anonymity and confidentiality will be guaranteed on the information that you give. Thank you.

SECTION A:

1. Please indicate your gender.

Gender	Tick
Male	
Female	

2. Please indicate your age group in years.

Age group	Tick
18 and below	
18-30	
31-30	
31-40	
41-50	
50 and above	

3. Please indicate you level of education.(tick where appropriate)

Level of education	Tick
Primary	
Secondary	
College	
University	
Others	

4. Please indicate the type of your school.

Type school	Tick
Mixed day school	
Mixed boarding school	
Girls day school	
Girls boarding school	
Boys day school	
Boys boarding school	

v. Have you been trained on ICT integration in teaching and learning?

Yes [] No []

If Yes indicate;-

- a) Where you received your training.....
- b) What the training covered.....
- c) Whether the training you received has been helpful.....

6. Please indicate how competent are you while performing the following computer operations?

(Tick where appropriate)

Tasks	Very good	Good	Average	Weak	Poor
Connecting cables and switching ON and OFF computers.					
Operating Word processor					
Management of files and folders in the computers					
Browsing, downloading and retrieving information					

Communication via e mail					
Preparing power point presentations					
Using Facebook, twitter and other social sites.					
Printing documents using printers.					
Using projectors					
Performing operations using Access and Excel packages					
Trouble shooting and fixing common computer faults					

Section B: ICT Resources Availability and Accessibility

7. Please indicate whether the following ICT resources are available in your school. (Tick where appropriate)

	ICT resources	Available	Not Available
--	----------------------	------------------	----------------------

1	Computer/ PCs		
2	Projectors		
3	Printers		
4	Internet		
5	Others (specify)		

8. Is there a computer lab in your school?

Yes [] No []

If yes, indicate the number of computer labs that are there.

Number of computer labs	Tick
One	
Two	
Others (specify)	

9. Are the computer labs in your sufficient?

Yes [] No []

10. How many computers are there in your school?

11. How did your school acquire the ICT resources available in your school?

Source of funds	Tick
School fees	
government	
Private sector	
others	

12. Are the available ICT resources accessible to students and the teachers?

Yes No

13. Indicate whether your school is connected to electricity?

CONNECTED NOT CONNECTED

If CONNECTED above, does your school experience power outages?

Yes No

14. Does your school have a standby power supply back up in case of power outage?

Yes No

15. Do you use internet while preparing for your lessons?

Yes No

If yes which is your main source of internet access?

Source of internet	Tick
School	
Home	
Mobile phone	
Cyber café	
Modem	
Others	

16. Is your school connected to the internet?

Yes [] No []

If yes, please indicate the number of computers connected to the internet.....

17. Does your school offer computer studies?

Yes [] No []

If yes; - a.) How many students are doing computers?

18. State the policies that the school has regarding ICT integration in teaching and learning.

.....

.....

19. State the policies that the school has regarding use of ICT resources in the school

.....
.....

Section C; ICT integration in teaching and learning

20. Do you use the ICT resources available in your school to perform the following tasks? Tick where appropriate.

- a. Preparing lesson plans Yes [] No []
- b. Preparing lesson notes Yes [] No []
- c. Lesson presentation using power point Yes [] No []
- d. Lesson presentation using projectors Yes [] No []
- e. Preparing schemes of work Yes [] No []
- f. Preparing assignments and examinations Yes [] No []
- g. Keeping students records Yes [] No []
- h. Analyzing students' results Yes [] No []

21. Indicate how often you perform the tasks above using the ICT resources available in your school.

	Task	Daily	Twice a week	Weekly	Monthly
--	-------------	--------------	---------------------	---------------	----------------

A	Preparing lesson plans				
B	Preparing lesson notes				
C	Lesson presentation using power point				
D	Lesson plan presentation using projectors				
E	Preparing schemes of work				
F	Preparing assignments and examinations				
G	Keeping students' records				
H	Analyzing student' results				

22. Has the ICT resources available in your school helped you in teaching?

Yes [] No []

23. Do you experience the following challenges in your school?

a. Insufficient computers Yes [] No []

b. Inadequate ICT skills Yes [] No []

c. Insufficient time allocation Yes [] No []

d. Lack of software Yes [] No []

e. Lack of interest in computer studies Yes [] No []

f. Insufficient computer labs Yes [] No []

g. Loss of data, eg virus attack Yes [] No []

h. Lack of interest in teachers on ICT use Yes [] No []

24. Briefly give recommendations on how ICT integration in teaching and learning can be improved.....

.....

Section D; ICT adoption in the school administration and management

25. Indicate whether the following ICT programs are available in your school.

a. Microsoft word Yes [] No []

b. Microsoft excel Yes [] No []

If yes explain the challenges faced.....

iv) Maintenance of meetings records YES [] NO []

If yes explain the challenges faced.....

v) Making the school timetable YES [] NO []

If yes explain the challenges faced.....

vi) Communication YES [] NO []

If yes explain the challenges faced.....

29. What recommendations do you have regarding ICT use in the school administration and management?

.....

THANK YOU

.....END.....

APPENDIX 3: QUESTIONNAIRE FOR STUDENTS

Introduction

Dear respondent, thank you for taking part in this study which will require 5 minutes to complete the questionnaire. Kindly answer all the questions correctly. Anonymity and confidentiality will be guaranteed on the information you give. Thank you.

SECTION A: demographic information

1. Please indicate your gender.

Gender	Tick
Male	
Female	

2. Please indicate your age group in years.

Age group	Tick
18 and below	
18-30	
31-30	
31-40	
41-50	
50 and above	

3. Please indicate the type of your school.

Type school	Tick
Mixed day school	
Mixed boarding school	
Girls day school	
Girls boarding school	
Boys day school	
Boys boarding school	

4. Have you received any training on computer use?

Yes [] No []

a. If yes, where were you taught about computers?.....

SECTION B: ICT resources availability and Accessibility

5. Please indicate whether the following ICT resources are available in your school. (Tick where appropriate)

	ICT resources	Available	Not Available
1	Computer/ PCs		
2	Projectors		
3	Printers		
4	Internet		
5	Others (specify)		

6. Is there a computer lab in your school?

Yes [] No []

If Yes, indicate the number of computer labs that are there.

Number of computer labs	Tick
One	
Two	
Others (specify)	

7. Are the computer labs in your sufficient?

Yes [] No []

8. How many computers are there in your school?

9. How did your school acquire the ICT resources available in your school?

Source of funds	Tick
School fees	
government	
Private sector	
others	

10. Are the available ICT resources accessible to students and the teachers?

Yes [] No []

11. Indicate whether your school is connected to electricity?

CONNECTED [] NOT CONNECTED []

If CONNECTED above, does your school experience power outages?

Yes [] No []

12. Does your school have a standby power supply back up in case of power outage?

Yes [] No []

13. Do you use internet while preparing for your lessons?

Yes [] No []

If yes which is your main source of internet access?

Source of internet	Tick
School	
Home	
Mobile phone	
Cyber café	
Modem	
Others	

14. Is your school connected to the internet?

Yes [] No []

If yes, please indicate the number of computers connected to the internet.....

15. Does your school offer computer studies?

Yes [] No []

If yes; - a.) How many students are doing computers?

16. State the policies that the school has regarding ICT integration in teaching and learning.

.....

.....

17. State the policies that the school has regarding use of ICT resources in the school

.....

.....

SECTION C; ICT integration in teaching and learning

18. Please indicate the tasks that you can be able to perform.

Task	Tick
Connecting cables and switching ON and OFF computers.	
Operating Word processor	
Management of files and folders in the	

computers	
Browsing, downloading and retrieving information	
Communication via e mail	
Preparing power point presentations	
Using Facebook, twitter and other social sites.	
Printing documents using printers.	
Using projectors	
Performing operations using Access and Excel packages	
Trouble shooting and fixing common computer faults	

19. Please indicate the challenges that you face while performing the tasks above.....

.....

20. Indicate how often you perform the tasks above using the ICT resources available in your school.

	Task	Daily	Twice a week	Weekly	Monthly
A	Preparing lesson plans				
B	Preparing lesson notes				
C	Lesson presentation using power point				
D	Lesson plan presentation using projectors				
E	Preparing schemes of work				
F	Preparing assignments and examinations				
G	Keeping students'				

	records				
H	Analyzing student' results				

21. Please indicate whether the time allocated for computer studies is sufficient.....

22. Please indicate how the ICT resources available in your school have helped you in learning.

THANK YOU

..... END.....