FACTORS INFLUENCING INTEGRATION OF INFORMATION COMMUNICATION TECHNOLOGY IN TRAINING TEACHERS IN PUBLIC TRAINING COLLEGES IN KENYA: A CASE OF KILIMAMBOGO, MACHAKOS AND KITUI TEACHERS TRAINING COLLEGE.

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DECLARATION

This project report is my original work and has not been presented for a degree in any other University or examining body.

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DEDICATION

I dedicate this project work to the Almighty God, my wife Josephine, my beloved children Job, Ian, my dear mother Kalondu and late father for disciplined they instilled on me.

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ABBREVIATIONS AND ACRONYMS

AAU	Association of Africa Universities
APEID	Asia-Pacific Programme of Educational Innovation for Development
ICT	Information Technology Communication
KIE	Kigali Institute of Education
LAN	Local Area Network
MDG	Millennium Development Goals
MoE	Ministry of Education
NISAD	National Information Society and Development
PTTC	Public Teachers Training Colleges
SPSS	Statistical Package for the Social Sciences
TSC	Teachers Service Commission
TTC	Teachers Training Colleges
UNESCO	United Nations Educational Scientific Cultural Organization
UoN	University of Nairobi
USAASA	Universal Service and Access Agency of Southern Africa
WAN	Wide Area Network
WWW	World Wide Web

ABSTRACT

This study investigated factors influencing integration of ICT in public primary teacher education. The study adopted descriptive survey. The research investigated the extent to which public primary teachers colleges by taking a study of Kilimambogo, Machakos and Kitui colleges, Kenya, how they have integrated ICT in learning process. The study was guided by four objectives which are: cost of ICT training materials, personnel skill development, administrative support and infrastructural capacity in seeking to find on how they influence the integration of ICT in primary teacher education. The research targeted population of 305 made of 195 academic staff and 110 ICT students council. A total of 175 respondents were picked from academic staff while 45 students were picked from ICT students however 153 responded. Questionnaires and interview schedules were used to collect data. The obtained data was analysed systematically using descriptive statistics and presented with help of frequency table, graphs and percentages. The study established factors that influence ICT integration in learning and their percentage of responds support as the cost of ICT materials (90.34%) ,installation (45.44%) and maintenance (81.48%) of ICT materials said is very high due to high VAT imposed by the government, minimal administrative support in terms of finance assistance (34.48% support) , managerial assistance and technical support(19.15% support given), personal ICT skill development as in; tutors ICT competency, knowledge and proficiency(50.17% poor) not forgetting tutors' and students' attitude (57.15% negative), and ICT structure facilities such as; computer labs (3), power supply and security. Study found that poor ICT policy (68.67%) both institutions level and government level influenced ICT adoption in training teachers. Based on study the researcher recommends that teacher trainers and students be persuaded to integrate digital resources in learning process as well as training teachers to apply digital resources in their programs. The findings from this research provide government and teachers' training colleges with better framework of reference on successful adoption of technology in pedagogy of training teachers especially in this era the government is introducing Competency Based Curriculum.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Information Technology and Communication (ICT) knowledge, skills and even attitude have become the corner stone which have been shaped our way of thinking and viewing on how to live and interacting with global at large. In the past few years, universal education systems of education have been taken over by a large demand on the use of ICT to demonstrate students expertise needed in this twenty first century Omwenga, (2007), Abwago,(2010).There has been also a lot of efforts by different governments which has been witnessed by allocating resources towards education so as to upgrade education systems mainly in ICT. Not even allocating resources but also governments through legislation have come up with laws which favour introduction both ICT in theirs countries. Such major strides have been experienced in countries like Kenya, Uganda, Rwanda, South Africa, Asia, and Japan not for getting to mention United States of America. Though according to Waema, (2005) he noted that at the start of the 1980s, developed countries made it compulsory for ICT to be integrated into their education system. In developing nations such as Kenya this was not the case, where ICT adoption in education to be more experimental and minimal use. Also, the uncoordinated and limited approach to impacting the required ICT and competencies to teachers becomes the main hindrance into ICT integration in Africa and in Kenya in particular.

As from 2003 to 2007 a country like Bhutan, between through UNESCO in working together with Asia Pacific programme of Educational Innovation for Development(APEID, adopted a project which was dumped as Development of Professional Training of Teacher and other educationalist efficiency application of ICT in improving learning and teaching.

Bhutan government made the teachers to go through IT trainings which enable them to teach students the ICT curriculum which the ministry of Education has integrated in education system. Conventionally in Bhutan teachers were being trained on how to use a teacher – centred approach, however upon developing the new design teachers lead to more constructivist and independent learning. However some of the factors that the government of Bhutan faced in adoption of the ICT are: inadequate computer resources, teaching resources, references materials, economic factors and textbooks for references among others as been noted by Pomp,(2009)

However Africa countries have wakened up and have a lot invested all towards ICT integration in their education sectors. In South Africa ICT integration in education enjoys more than decades of consistence accumulated experience and expertise from its wide coordinated range of programmes and ICT supported projects from the stakeholders' realm of communities, civil society, donors, government agencies not forgetting private sector. Different types of tested methods on ICT access, digital material development, optimal usage, teacher training, professional development and resources mobilization has totally boosted significant learning in the fields of practitioners, innovators and more importantly the policy makers. Through all these interventions inputs to date it has gained to at least 22% ICT breakthrough in public schools. In addition tertiary institutions have also some ICT access, ICT research that is ICT teaching programmes.

February 2007, South Africa through the cabinet adapted National Information Society and Development (NISAD) plan as a framework for establishing an inclusive Information Society. This plan, the vision is expressed as: "To establish South Africa bas an advanced Information Society in which ICT information and tools are key drivers". Through different acts the government of South Africa have established different agencies like Universal Service and Access Agency of Southern Africa (USAASA), Education Network (EduNet)

and Universal Service Fund (USF), all of which serve as support: - access to, affordable to, efficiency and use of ICT in education institutions. However South Africa government has reported various obstacles in ICT integration in educational sector. Some of the issues have been in inadequately equipped teachers and poor serviced internet to rural areas.

At the blink of millennium, more of the countries in East African, through the aid of donors, agencies, formulated Information Communication Technology policies as it has been noted by Waema (2005).Despite all such efforts to implement ICT integration in education studies carried out by Afshari.M.Abubakar, (2010) have shown that the factors influencing ICT integration and acceptability by different stakeholders in the global especially by the teachers, tutors and trainers are almost uniform. They have slighted such factors like administration stylish, financial resources infrastructural facilities, personnel ICT competencies not leaving cultural issues to mention but a few. This has necessitated researchers to deepen their research in different ways.

In Rwanda's Vision 2020 on ICT in education is a key pillar of the country's National information and communication infrastructure plan and policy, which was adopted in the year 2000. In the state of ICT infrastructural nationally is a key in the progress in education systems on providing technology and availing connectivity as well as teacher training. According to recent research done by UNESCO Rwanda has primary enrolment of 94%, meaning almost meeting millennium development goal (MDG). The Kigali Institute of Education (KIE) which was established in 1999, with the financial support from the government and a number of donor's likes of World Bank, Swiss Co-operation, USAID as well as UNESCO provides teacher training in ICT. Rwanda has gone milestone a head and it has set up Rwanda education and research Network (Rwadnet) which has enabled broadband access to every higher education learning institutions and of more important research centres. All the same it has not been such easy for Rwanda to achieve such steps in

ICT integration in teacher trainings. Research have shown that just like any other Africa country they face such challenges like economic issues, social-cultural factors, lack of skilled ICT personnel to mention but a few.

In Kenya the birth to integrating ICT started with the ICT policy promulgation in January 2006.Kenya Information Communication Technology integration in education has been well outlined in various frameworks for example 2012 education policy which states that: Government of Kenya appreciates ICT knowledge and literature is the pillar Kenyan government can base to economy by 2030. Therefore the Government of Kenya has embraced education as best non artificial platform for building its citizens with technology skills for economic growth. Through the Ministry of Education (MoE) the government has been supplying ICT content, equipment and by training teachers on ICT skills since they are the main vehicle in delivering ICT. It is at a very young years that the learners are getting digital skills which in turn is increasingly been used to exploit and explore the world of information and even craft that into useful knowledge. Also ICT facilitates the opportunity for more learners centred and peer teaching and learning situations. Internet and social media have in one way or other affected the learning and teaching realm so it's of great important that teachers master the situations created by these developments. Added to this challenge is the anticipated introduction of technology schools through the Government Programme. Primary Schools Teacher capacity building is the gate to successful implementation of this program. It is for this reason that in accordance with TSC Act 2012, the Teachers Service Commission has embarked on capacity building of teachers and education managers to effectively lead in the utilization of ICT tools in education. The rolling out the laptop project through the MoE the first phase took place August 2013 which targeted 18,825 teachers from 6,275 public primary schools. Phase two took place in 2014 where 21,138 teachers from 7,046 schools were trained, with a similar number of teachers

being trained in the final phase in 2015. This was aimed to easing of adaptation and innovation in the classroom for all teachers that handle children in schools. The MoE came out with a plan to have all or most of the teachers trained in the application of ICT in education by 2016. Thereafter, it was noted that trainee teachers entering teaching profession were to be expected to have taken as a unit of study at college.

According to Mumtaz ,(2000), besides facilitation in class, ICT is an authoritative tool for tutors and administrators. Tutors participate in class regulatory duties such as keeping students' record, planning of lessons, guidance and presentation slides, and exam papers preparations, terming of papers and documenting results among other functions. The study also explains that management is also involved in diverse tasks that need automation like the computing of school achievement for a suggested time, record-keeping of the staff and preparing school budget. Despite mostly PTTC in Kenya having struggled to integrate ICT in their training, there still exist hindrance factors in fully adoption of ICT in training teachers. A study carried out in PTTCs in central region of Kenya revealed a myriad of shortcomings affecting adoption of technology namely; the equipping personnel on ICT, maintenance of ICT infrastructure, inadequacy of computer software influenced adoption and application of technology on the process of equipping skills, knowledge and attitude, inadequacy of storage was another factor and inadequacy of internet connectivity influenced application of technology. The research also found trainer workload also influenced adoption of ICT infrastructure and presence of ICT policy.

1.2 Statement of the Problem

No doubt world has been experiencing an economic overturn, the use of ICTs particularly, the Internet, computer and telephony, is on a surge. Research has shown that the global today is proving to be a place for knowledge and skills competition for economic growth driven by and even enabled by the use of ICT. This is in line with what Ssewanyana, (2007)

says that ICTs have been identified in almost all societies in the world as an enabler and driver of economic growth and change. According to Sanya, (2001) adoption of ICT by institutions needs to be well handled in order to efficiently equip for future utilization of ICT.

Even though PTTCs have had computers for almost a decade ago some with modern ICT installation in place, how to integrate and adopt them has evolved slowly and patchily. Technological dynamism in PTTCs has been viewed as the best theoretical not justified that has continued to keep technology at the bottom of good established education system. According to (Yelland, 2001) in the research proves that traditional educational environment has shown that it's not suitable in equipping students to be of more productive in their work place of the today's society. However this may lead to Lecturers unable to adopt off-campus mode of programmes delivery if they have not have be familiarised with ICT basic knowledge and skills in course delivery in education system. Lastly, ICT is not mentioned well in the Education for all goals, it is arguable they play a pivotal role in achieving these goals, eliminating exclusion including broadening access, and improving quality UNESCO, (2002).This circumstances has prompted this study as has been noted in the aim and importance of the research.

1.3 The Purpose of the Study

The study purposed to examine factors that influence the integration of ICT in Public Teachers Training Colleges in Kenya.

1.4 Objectives of the Study

This research was guided by four objectives which are:

i. To examine influence of cost of ICT materials on integration of ICT in training teachers in public training colleges.

ii. To investigate influence of administrative support on integration of ICT in training teachers in public colleges.

iii. To examine influence of personnel ICT skills on integration of ICT in training teachers in public colleges.

iv. To investigate the influence of ICT infrastructural capacity on integration of ICT in training teachers in public training colleges.

1.5 Research Questions

This study was seeking the following research questions:

i. To what extent does the cost of ICT materials impact on integration of ICT in training teachers in public colleges?

ii. How does administration support influence the integration of ICT in training teachers colleges?

iii. How do the personnel ICT skills influence the integration of ICT in training teachers in public colleges?

iv. To what extent does ICT infrastructural capacity affect the integration of ICT in training teachers in public colleges?

1.6 Significance of this Study

Technology is essential vehicle in today's education. To make technology of benefit to teachers, trainers and lectures need vision of technological capabilities, chances to use them and enough time to put them into practice. By doing so it's the only way teachers can be well informed and also have the confidence in the adoption of the latest technologies. This study would serve as one of useful referring source of information to Ministry of education and to the teachers employer who is TSC towards accessing the much profitability of continued resource input in ICT and in turn inform policy makers on the gained information that would be helpful towards integration and adoption of ICT in PTTC as well as private teachers colleges in Kenya. Also it creates some eagerness and catalyses further study in this area of education towards adoption of technology as a tool in process of educating

1.7 Basic Assumption of the Study

This research was based on the following assumption:

ICT integration in public teachers training colleges is on-going in all colleges.

The sample to be covered represents the same conditions faced by other public teachers training colleges.

1.8 Limitation of the Study

The research anticipated the following limitations

Time, since the research was sourcing a lot of information from employed personnel who were sparing their time to give corresponds. However to meet this researcher tried to meet correspondents on their own free time for example after classes.

Financial shortage, the researcher printed and travelled to different locations to meet the resource persons. The researcher went for low cost resources but, did not compromise the quality.

1.9 Delimitations of the study

The study was restricted to PTTC that Kilimabogo Teachers Training College. However adoptability of the research outcomes will be applicable to other TTCs.

1.10 Definition of Significant Terms Used in the Study

Information Communication Technology: Refers to a wide range of set of tools, equipment and resources which are technological based and are equally used to communicate information, create, disseminate, store and manage that information. These technologies include computer, internet and broadcasting of the same information.

ICT integration training colleges: Is the use of technology for communication, data input, data processing, data store and output to impact knowledge, skills and attitude on trainees and learners training.

Personnel ICT Skills: This can be defined as know how before and after training or experience.

Infrastructural capacity: Facilities that range computer laboratories, computers and electricity and computer hardware, to software like internet and computer software in training colleges.

Administrative support: This can be defined as input or help extended by institution administrators to the other staffs

1.11 Organization of the Study

This research is organized in chapters. Where chapter one gives introduction of the research, where factors influencing adoption of ICT in TTC globally, in Africa, in East Africa and in Kenya have been discussed. The statement of the problem has highlighted out the problem under investigation, also the purpose of this research has been well highlighted. Also objectives of this research the objectives this study is stated where the project research questions have been retrieved. Chapter two reviews the related literature, and also it gives conceptual frame work. While chapter three far reaches framework of the strategies that were used to gather and analyse the information collected. The examination of the information to be collected in the field is portrayed in chapter four. Conclusion and suggestions are given in chapter five.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter will look into previous literature of different scholars who have highlighted out literature which will be related to this study. It covers the importance and role of ICTs in higher education, how integration and adoption of ICT in PTTC has been influenced by the cost of ICT materials, administrative support; personnel ICT skill and finally how ICT infrastructure has affected smooth adoption of ICT especially in PTTCs.

2.2 Importance Integration of ICT in Training Teachers.

Different types of societies and educating institutions lectures and trainers use ICT in different ways in teaching. Their view is on either nature of ICT or ICT functionality. The perceptions and views of departments and faculties in application of technology in education are mixed, some see it as an important tool while others discouraging, but others see it as a tool which should be blended with traditional way of education.

ICTs in higher educational institutions are perceived as one of the best vehicle towards building capacity and capability strategy to boost program delivery, performance and sustain the changing international pedagogic needs, James, (2004). In course designing guidelines for institutional internal assessment of ICT growth in African universities, by Association of Africa Universities (AAU), (2009) identified a number of ways that the different faculties members and universities view ICT in higher learning institutions. These are ICTs used for admissions, recruitment and enrolment; classroom allocation, students and faculty scheduling, and other schedules; assessments, records keeping and analysis of students' performance; placement of graduates and alumni relationship; and stationary purchase, food

services and other general logistics of community welfare at large. With these views, ICT adaptation could be successful.

Educational changes currently taking place in Africa and also in many other countries in the world is forced by external and internal forces of economic. These countries bases on adoption and application of computer technology as a package, along with teaching techniques that natures more independent thinking and creativity within the community. This is basically because for student to have independent research they need adequate internet so as to be able to do their research effectively. To date most of countries have fairly achieved universal education mostly in the area of literacy, for instance Saudi Arabia it's of rarer for learning institutions to have structures of libraries where learners can go and have their research. Contrary these countries prefer to take learners directly to e-library to carry out their research, which has been widely embraced by corporates Alkahtani, (2017)

Information Communication Technology is also largely promote work education in different ways. For instance ICT has been used in education world to deliver subject lessons by incorporating real world examples and even more importantly stimulating audio-visual illustrations from extremely wide rage area of coverage. Additionally technology offers better framed benefits such as new proving ways to organize and compose documents as well as storing of information in a small space. Perhaps Emails helps teachers and learners to communicate outside of the classroom environment, having online tutorial, returning or even submission of notes and assignments, as well as creating of a room where teachers and students share idea and views in other schools locally, nationally and globally. Dedicated software can also be made available to the students with special needs like visually impaired and also audio impaired. ICT has been basically welcomed in most of the learning institutions as a core of 21st century skill since it has given researchers and learners a wide variety of sources. Therefore, computers have been widely used and computer applied skills

have been widely considered to be a key factor in bridging world of institutional jobs as has been stated by Hawk ridge,(1989); and quoted by Alkahtani, (2017).

No doubt ICT, is of much significance and benefit to the teacher and to the education process. According to Sarama, (2001) the computer can accurately make a multi of decisions necessary to the planning and implementation of individualized programme of instruction on a mass basis in almost no time. Hence, this is an encouragement in the use of technology in education process; mostly it could allow network users share common resources via inter-computerized connections ranging from the Local Area Network (LAN), the Wide Area Network (WAN) to the World Wide Web (WWW) or the internet. These are how ICT is powerful vehicle in education.

2.3 Cost of ICT Training Materials in Integration of Technology in Training Teachers.

In business world the cost has been defined an expenditure incurred during the purchase of goods or services. Therefore, operation of ICT in this case denotes the usage of ICT in institutions and societies. The expenditure made on ICT training materials have been cited as one of the challenges that could mostly interfere with use of technology in primary schools, PTTCs and other institutions in Kenya at large. According to Ajayi, (2009) cited that if the cost of computers will be high then the less computers that can be bought with limited available resources. According to Lau, (2008), the price of a desktop computers linked to the internet is very high for majority of institutes of learning in the third world countries like Kenya where dependence on NGO initiatives is fairly typical way in several Sub-Saharan Africa countries in which according to Aradom, (2012) the most successful in the implementation of technology in practice are a few and often donor funded projects. In general over view across many counties proves that, even where the countries have developed ICT design materials and provided enough teachers training in some way, they

equally lack national umbrella body which can monitor over a co-ordinated implementation of the same.

As cited by Mulira, (2004) the actual cost of one desk top computer being connected to the internet is extremely high for the citizens in most of the countries which economically are not stable and even more importantly those who are able to afford a personal computer, the routine maintenance, servicing and virus protection , appears to be another un discussed obstacle that is not an easy task manageable by the first generation computer users as compared to traditional forms of off-campus learning. As cited by Oliver, (2002). Technology facilitated has actually proven to be quite costly in all areas of consideration, infrastructure and course development as well as course delivery.

A study on comparison between the cost of ICT implementation and trainings are numerous, Mumtaz, (2000)) in the study reported that limited resources within a learning institution as a great challenge to take up of ICT equipment and to some extend software in the classes also determines what instructors are able to apply with ICT. Zziwa, (2001),in his research paper about networking and application of ICT in French education system cited that the serious challenge in utilising computers in learning institutions is the costly computers peripherals and software

A study which was done in Saudi Arabia on "The obstacles facing adoption of technology in education in secondary schools" by Alkahtani, (2017) it noted the following areas; smart boards and computers, the core tools in design were not hard to grasp their concepts than any other technologies. But of more importance s was lack of consistence equipment repair, technical support which would have been wired by lack of enough funds or other necessary resources. However some efforts have been made by developing countries to handle the issue cost of ICT learning materials but it has been in vain for example according to , Hew,

(2007) study proved a different answer to the scarcity of technology in Chilean schools. The Chilean state went further to invest more in computers by making computer related resources ready available in schools where they were best able to use them. However this seemed not to offer any tangible solution to the country's acute shortage of technology equipment. Developing countries have been noted that in different researches that the integration and adoption of ICT is low in their education centres and office administration than advanced countries. A study by Ajayi, (2009) on the ICT distribution in particular secondary schools in Ghana, exposes the serious setback fronting infusion of technology in institutions is the dear prices of gadgets and absence of computer laboratories. Nevertheless, Ensafi, (2009) stated that the leading hindrance in the advancement of ICT assimilation in schools, administration segments and advanced bodies of education in Iran is not the great expense of computers but lack of administrations to budget for equipping campuses, colleges and schools with new technology gadgets. Providing machines to colleges is comparatively manageable task but servicing and controlling the machines is a bigger burden to most of these institutions.

According to Ssewanyana, (2007)in the area of adoption and application of ICT in developing countries, cited that though the application and usage of computers and internet was highly and relatively high in large owned foreign owned firms, in small firms owned locally proved to be minimal this is because capital, minimal skills and knowledge. The research further recommends that it is important to broaden the scope of technology training resources for local innovators and entrepreneurs so as to be able to take full advantage of available chances associated with adoption of ICT in order to minimise charges related to internet services and technology consumables to the cost of ICT acquisition. To add on according to Aradom, (2012) after research on cost of ICT in developing countries where he carried out in Botswana, Namibia and Seychelles he concluded that: Although there was

relatively steady decline in the cost of securing ICT , total cost of learning institution to own computer and maintaining sustainable computer systems proved to be rising

Learning in East African Countries Although Ministries of Education (MoE) in most sub-Saharan countries were under pressure to invest largely in technology. There was very minimal evidence upon which decision makers can confidentially base their decisions to allocate resources to technology, since fruits seemed to be limited. For instance in both Seychelles and Botswana the state supplied computer materials to all post-primary schools , ICT expenditure per each school proved to be more higher than in Namibia where computer facilities were funded by several sources including government , community and non-governmental organisations.

On other hand Mulira, (2004) and Ensafi, (2009) in their research seem to take different path on considering cost of computer as a minimal important factor. They have cited that cost of ICT training materials is not a major hindrance towards ICT implementations in higher learning institutions. Contrarily they posed lectures awareness and positive attitude to technology in education as necessary recipe for successful adoption of technology into such. They stressed that learning institutions can adopt freeware and open software for teaching and learning activities. Other research studied on secondary school teachers, Mooij, (2001) and others squarely did their research on post graduate lecturers like Namukangula, (2010). All in all such studies were carried out in line with higher learning National institutions like University of Nairobi , Mount Kenya University, Iranian University to mention but a few. Unfortunately none was related to PTTCs hence this research will help to closure of this unnoticed gap, which is investigating the effect of cost of technology materials in the ICT adoption in Kenya teachers colleges.

2.4 Administrative Support in Integration of Technology in Training Teachers

Administrative can be termed as an art of applying or giving out something in an institution or an organization as Saone (2006) defines. In the context of this research administrative input lays guidelines and much help extended by institution administration in higher learning institution to support to technology adoption into education design Sife, (2009) in their research cited that administration input is much important to successful technology adoption into teaching and learning programmes. Also they noted that administrators are in the best place to secure humble conditions that are recipe for putting into place ICT policies, resources and incentives. A study in USQ schools were questioned about their use of, attitudes towards educational technology and what could view as motivations, inhibitors and enablers associated with the development of e-learning environments. Consequently, barriers linked to institutions were identified as lack of clear vision, academic leadership and formal strategic planning and to some extend the absence of clear defined institutional processes, standards and policies. According to Ajayi, (2009) individual barriers, heavy workload and uncovered time on lectures were also noticed. In addition pedagogical barriers were lack of well-fitted designs .in fact interviewees complained of lack of clear e-learning course design, policies, strategic plans procedures and processes which should be provide by the institutions through administrators.

A research by Ali, (2009) proved that reasons that enabled successful technology in three Malaysian "Smart schools" and constrains that arose during the adoption process were related to course content, technical issues and even time. The element of time was identified as the major cause of problems in all three schools. Teachers complained of lack of sufficient time for their lesson preparations, which would largely require the use of un interrupted internet to collect information which administration did not avail and if not

adequately. These problems have been identified in many countries in which ICT is been introduced for the first time in learning institution

According to Alkahtani, (2017) the absence of three practical logistical management strategies have been hindrance to integration and adoption of ICT in learning institutions. They include, a developed strategy for making computers available, high quality learning software not forgetting electronic equipment which includes smart boards all in good conditions, schools providing space and time so as to provide computers readily available for usage. In addition pre-training of teachers on technology before the put them into practice in a classroom environment and continuing after that no doubt is of much benefit and so it should be provided by the administration. Make of personal computers reachable by teachers also creates an extra opportunities to teachers to acquire fined computer skills through online lessons, trial and error. Also it tends to encourage them to use computers for their own growth as well as for profession needs hence through that they gain boldness on how to handle them in future use. Lastly learning institution policies that would encourage informal assistant and collaboration towards computer use raises confidence, knowledge and skills in using of computers.

2.5 ICT Skill Development in Integration of Technology in Training Teachers

Skill can be defined as ability to perform something in the best way, Hornby (2006). Ralph (1999) as has been cited by Bauer, (2005) insists that information literacy is the core key to a lifelong learning which ranges technology information, library skills, information skills, and even learning to learn. In this research skill development recognises the expertise and special ability enabling someone to do a task in using technology with a sense of high degree of efficiency and effective in either teaching or learning. Recently some studies have tried to relate adoption and integration of skill development in ICT for example, Hawkins,

(2002) cited that most teachers in developing countries are intimidated by dynamic technology and thus prefer to use traditional methodologies.

Okebukola, (2007) noted that the ICT initiatives in teacher education institutions in Nigeria have not been as successful as expected. The potentials of ICT on the effective delivery of educational services appear not to be maximally harnessed, as most teacher education institutions seem unable and ill prepared to face the challenges of ICT. Therefore, the knowhow on ICT should be taken as a pre-requisite in order to be effective teacher. The study concludes that it should be taken as the first duty of the teacher training institutions to provide best opportunity for the teacher trainees to get necessary ICT skills while on processes of training. To add on ICT can make instructional process more effective and productive through availing of variety of tools to promote and facilitate best of teacher's professional skills in a number of ways. These ways includes e-learning, internet or online learning, e-mail, information literacy, digital virtual library and assessment, web delivery and virtual teaching.

Many learning and teaching institutions have paid special attention towards updating and revision of their design, educational materials and equipment on long term basis in facilities of education. But according to Orhan, (2001) a study carried in Turkey it was noted that, if teachers can be trained and equipped, ICT can create a better teaching and learning environment in learning institutions. These findings were further echoed by Karsenti, (2009) where he noted that Information Communication Technology in teacher education should be trained first for those trainers who in turn prepare educators. In addition various studies have pictured how skill development to the teachers has greatly influenced the integration and adoption of ICT in learning and teaching. According to Sabeih, (2001), although it may be relatively simple to teach technological skills, this may not be the case when it comes to learning how to adopt technology as a pedagogical tool. The acquisition of

ICT skills alone by teachers without the appropriate pedagogy it will be inadequate for better utilization of technology in education system. This was equally echoed by Keiyoro, (2010) indeed, teachers need ICT skills, but they also need knowledge and skills that enable them to use ICT in pedagogy. This made (Sabeih, 2001) to note that, it's necessary to teach teachers how to incorporate what they learn in their teaching strategies.

Afshari.M.Abubakar, (2010) cited that effective uses of computer do not only depend on trainers' attitude, but also training courses they have undergone. Teachers ICT competence pre-supposes ,positive attitude towards ICT, ability to use ICT effectively in design understanding of educational field and more importantly ability to manage ICT use in teaching environment. However, a study by Bauer, (2005) reported that teachers had enough ICT skills, were innovative, they lacked integration of the same in both teaching and learning tools reason was lack of appropriate software, lack of up to date hardware, student skills level and more importantly technical difficulties. The study significantly noted that professional development largely influence on how best ICT is adopted in learning environment.

Lack of computer's knowledge for persons using computer results to underutilising them in teaching environment. Skills and knowledge, empowerment and ability to put ICT skills into practice are of more beneficial and equally important to the society. ICT skills and knowledge are very important tools to enhance values and create more opportunities in new technologies. For the better of the society human capital should be created through trainings, capacity buildings and equally the same by research. However in higher learning and training institutions centres in most of developing nations are affected by this area. Teo, (2002) in their research cited that low ability of skills and so there is need to train ICT users influenced ICT implementation in any learning institution.

2.6 Infrastructural Capacity in Integration of Technology in Training Teachers

Bingimlas, (2009) Suggested that areas to be looked into when one is accessing ICT readiness for any organization or an institution includes; availability of manpower, infrastructure availability like electricity, policy and regulatory framework. In World Bank, (2009) World Bank Institute reported the backbone of ICT projects in education ties itself to infrastructural facilities that range from hard infrastructure like computer laboratories, computers and electricity and computer hardware. Availability of ICT resources in schools has played an important role towards increase teachers' readiness in usage of technology in learning environment. Ford, (2007) Cited that acquisition of technology materials, securing of communication facilities and maintenance has raised in third world countries hence, hindering their usage in classes. Many of these countries lack well planned infrastructural policies that can create reliable supply of technology materials hence translating difficulties to learning institutions successfully introduce technology in their education system to high risk exposure. Effective and efficiency use of digital materials is totally dependent on availability and ease access of ICT resources. Most countries in Africa do not have a good infrastructure in terms of their transportation, minimal electricity connections in schools and few broadcasting and communication facilities. This has made it difficult for schools to successfully equip and adopt digitalized materials in the classroom. In Kenya, until recently government is increasing electricity connection and subsidizing it to make it relatively affordable by institutions. For schools to encourage a positive attitude of digital resources, then there is need to adequately invest in providing and increasing availability of these resources.

In addition Isaacs, (2002) specifies main obstacles that face the African schools are more brought about by to poor access to internet connectivity. These are contributed by poor infrastructure particularly, high telephone and cost of internet, ICT skills level, limited

qualified personnel and poor policies. The level of technology is very low compared to developed countries. Mooij, (2001) noted that printed materials remains to be major delivery vehicle for education in Africa as to incorporation of moderate ICT in the system is constrained by lack of infrastructure and affordable connectivity in many areas of the continent.

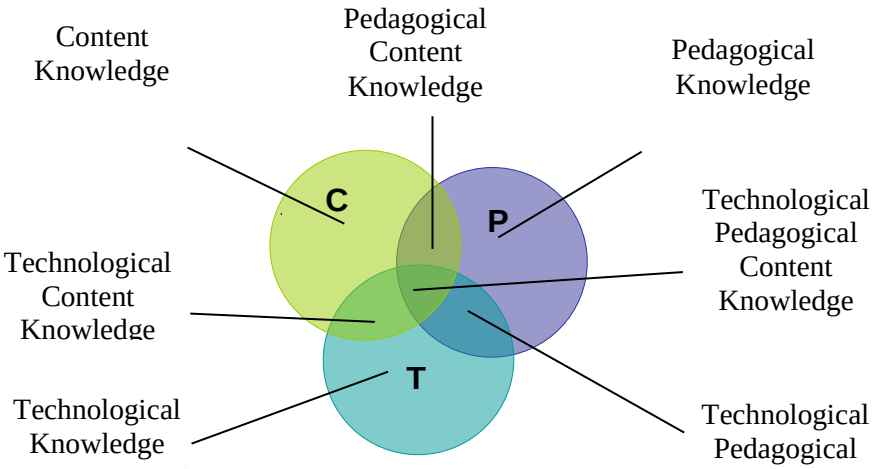
2.7 Theoretical Frame Work Koehler, 2005

The study will be base it's theoretical formulation of the TPCK model whose aim entails the practice of understanding and negotiating of the relationship among three knowledge components, namely Technology, Pedagogy and Content. This model was developed by (Koehler, 2005) for making decisions on integration of ICT that leads to the representation of new concepts and requires developing sensitivity to dynamic, transactional relationship between all the three components for enhancing effective and meaningful teaching methodologies and learning environment. TPCK framework is actually a complex interaction among three bodies of Knowledge, Content, Pedagogy and Technology. The components of the TPCK model are as follows:

T – Technology includes modern and varied technologies such as internet, digital videos, computers and common place technologies including projectors, interactive boards and books. By understanding their specific affordance and constrains, the teacher is able to determine when and which technology to use.

P – Pedagogy describes the collected procedures, process, practices, and methods of teaching and learning. It carries knowledge about the aims of instruction assessment and learning as well as how leaners acquire skills.

C – Content is the real subject matter that is to be taught or learned. This can be easily understood in the following illustration:-



Source: Koehler and Mishap (2005)

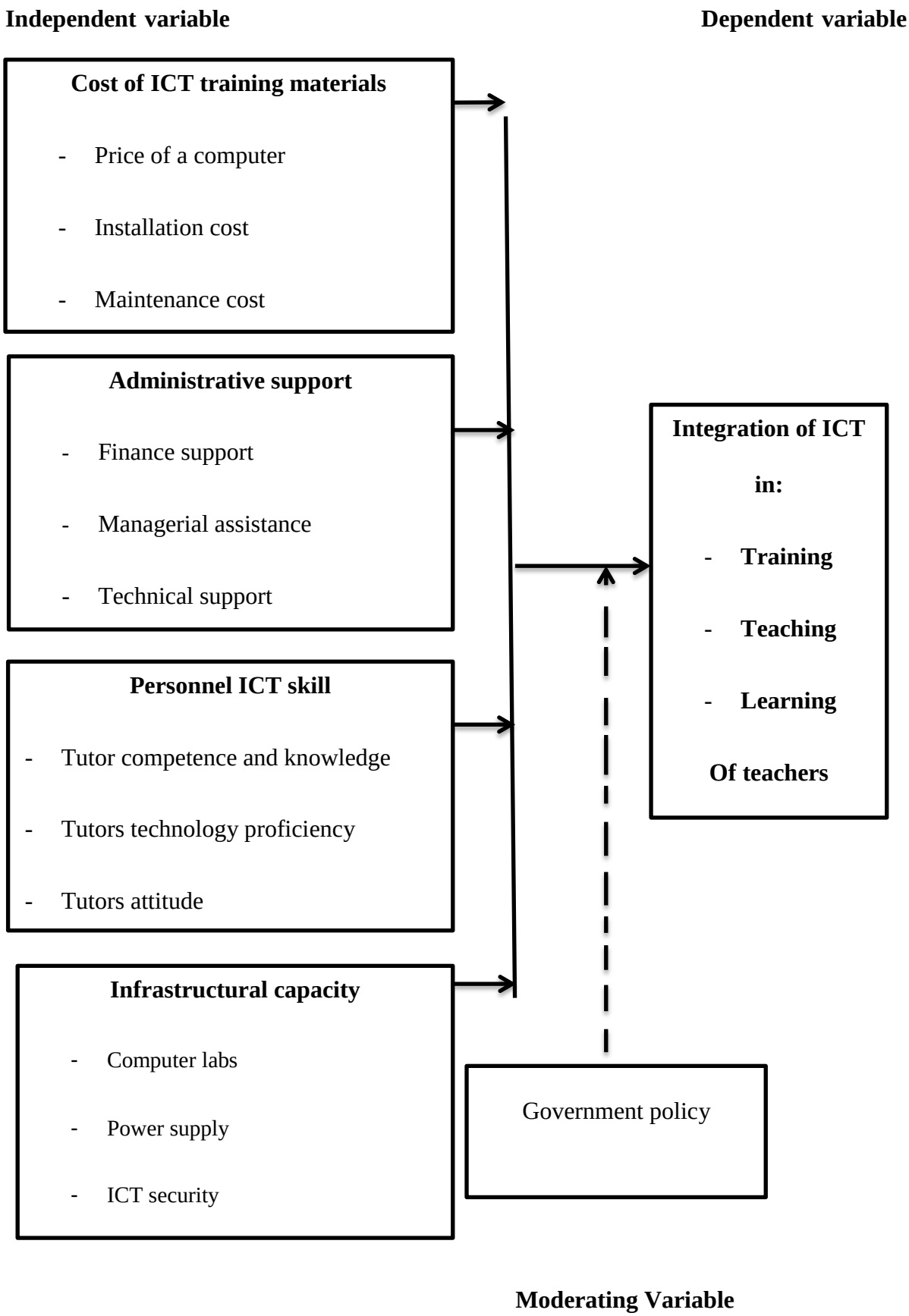
Figure 1: Theoretical framework

Technology integration involves understanding of how the above three mentioned component work together. It has been noted that best teaching is not only using technology to reserved teaching and content realm but, best introduction of technology brings birth to new ideas and concepts and therefore it requires developing sensitivity to the dynamic transactional relationship between all the suggested components by the TPCK framework Koehler, (2005).

2.8 Conceptual Framework

The research was examining the interrelationships between variables as shown in the conceptual framework below as how they influence integration of ICTs in PTTCs.

Figure 2.Conceptual framework



As indicated in Figure 2.2, the study was focusing on the interaction between the variables that influence the integration of ICTs in PTTCs. The independent variable is conceptualized in four problems which are: cost of ICT training materials, administrative support, skill development and ICT infrastructure. The factors interact to manipulate the dependent variables. From the figure above, it is hypothesized that factors like the cost of price in computers, installation cost and maintenance fee have a great influence in the rate which technology is adopted in PTTCs during trainings and learning. Administrative support which includes technical assistance, financial assistance and managerial assistance has been also noted to influence in the integration of ICT by teachers in the 21st century. In addition factors like, skills development and infrastructure facilities have also stood tall as key influencers of integration of ICT in PTTCs. In skills development factors like tutor's competence, knowledge and proficiency in ICT have been identified as they take big part in ICT integration in PTTCs. Lastly development or under development of ICT enabling infrastructures like electricity and well equipped computer laboratories influence ICT projects implementation in PTTCs.

2.9 Research Gaps

Researcher findings were very essential in integration of technology in teachers training colleges. This research intended to narrow down the following gaps as were not factored by the following researchers as highlighted in the Table 2.1.

Table 2.1 Research Gaps

Author	Topic of research	Findings of the research	Gaps to fill
Lai et al(2001)	Implementation of ICT in schools; -Professional development -Strengthening of current practice	-professional development and the weaknesses of the prevailing practices on ICT implementation in schools had an influence on ICT implementation in schools.	Administrative support, ICT policies both internal and government policies and Infrastructural facilities which will be filled by this research.
Justus Ariho (2011) unpublished thesis	Problems in ICT implementation in selected institutions of higher learning in Kabale district, Uganda. -ICT skills level -cost of ICT materials	-ICT level of the tutors and high cost of ICT materials posed as challenge on ICT implementation in higher learning institutions in Kabale district, Uganda	Influence of -Infrastructural capacity -attitude of tutors which this research intends to fill.
Alberton et al(2009)	A framework on ICT integration in teaching and learning and teaching includes- -motivation -course management -pedagogical and technological support systems	Motivation, course management, pedagogical and technological support systems had an influence on ICT integration in learning	Influence of - personnel ICT skills
Vitalis Gode (2013) Unpublished thesis	Factors influencing integration of ICT in primary training colleges in central region of Kenya. -college characteristics -Framework policies	College characteristics and Framework policies had an influence on technology implementation in central teachers colleges.	Infrastructural capacity and cost of ICT training materials were not considered where this study intends to narrow.

2.10 Summary of Literature Review

Today, the use of technology has proven to be integral part of everyday life. Using technology in teacher education programme is therefore a necessity. This will enable teachers see the need of developing and using computer based lessons in their own teaching. It is expected that the 21st century teachers should be technologically literate. As a result of this rapid generational change, teacher educators that is tutors should be dedicated to preparing a new breed of teachers who will utilize ICT in a dedicated and meaningful way to facilitate active learning.

It can be noted from the literature review that there is a multi-dimensional relationship between the factors influencing adoption of technologies in higher learning institutions. In some, where resources are available, other factors come in like lack of time, lack of enough skills in the field of ICT. Tutors need to be taught to be competent to be using ICT. Similarly, competence is linked to other factors such as professional development, leadership, time and technical support. Some schools allow the staffs to acquire and develop their skills in ICT thus becoming more competent such that are able to compete with others in rest of the world.

Therefore teacher trainers should be assisted to acquire these precious ICT skills in their trainings. Availability and ability to use of technology resources and having the basic skills to operate computers may increase tutors' use of the technologies thus implement ICT in training. Access to ICT is only possible with sufficient time and effective training and technical and administrative support from colleges.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

Chapter three highlights research design and methodology which was applied in conducting research. It gives a detailed analysis of research design, sampling design, research instruments, data analysis method and Operational Definition of Variables.

3.2 Research Design

The study used a descriptive survey design which was quantitative and qualitative in nature. Descriptive survey design is a rigid design which focuses attention on formulation of determined objectives, designing methods of data collection, selecting sample, collecting the data and processing. A descriptive research determines and reports the way things are, besides attempting to describe such things as their possible behaviour, characters, attitudes and even values. It was therefore appropriate in collecting data regarding opinions, perceptions and experiences of trainees, trainers and administrators as to regard to extend to which PTTC have integrated and adopted ICT in training in their respective institutions. Also more further describe the challenges PTTC face in use of technology in the process of training.

3.3 Target Population

Kombo, (2006) Defines target population as a group of persons, items or objects from which a sample is taken for measurement by a researcher. The targeted population in this study was administrators, teacher trainers and ICT students in Kilimambogo, Machakos and Kitui TTCs making total target population of 305 as in Table 3.1.

Table 3.1: Target Population

Departments	Kilimambogo	Machakos	Kitui	Totals
Administration	4	4	4	12
Creative	11	13	11	35
Education	10	7	7	24
Language	18	12	13	43
Mathematics	4	5	5	14
Science	8	11	8	27
Social science	11	12	8	31
ICT	4	3	2	9
ICT students	36	36	38	110
Totals	106	103	96	305

Source: Dean of curriculum at Kilimambogo, Machakos and Kitui TTC

3.4 Sampling Procedure and Sample Size

(Mugenda, 2003) Defined sample as small group taken from the accessible population. However research design means the procedures that was applied by a researcher to study a particular hypothesis or a question. Sampling involves the tasks of selecting a number of individuals, items or objects selected to represent the whole population from which have been picked. Proportional sampling was done from all the departments as shown below on Table 3.2. Based on Krejcie and Morgan's (1970), determining table for sample size. For a given population of 305, a sample size of 175 respondents was appropriate to adequately represent a cross-section of the targeted population as in Table 3.2.

Table 3.2: Sampled Population

Departments	Kilimambogo	Machakos	Kitui	Totals
Administration	3	3	3	9
Creative	8	7	7	23
Education	6	5	5	20
Language	10	9	8	26
Mathematics	3	3	3	9
Science	4	5	6	16
Social science	6	8	6	19
ICT	4	3	2	8
ICT students	16	16	16	45
Totals	60	59	56	175

From Table 3.2, 175 respondents was shared as follows Kilimambogo teachers got a share of 34.6% of the total, Machakos got a share of 33.4% of the total while Kitui was given a share of 33% of the total. Purposive sampling technique was applied to both administrator and ICT department. The other six (6), departments and ICT students shared the remaining total which was 158, proportionally and random technique was applied to sample them.

3.5 Research Instruments

Questionnaires were the main instruments of the data collection to be used. The questionnaire as a tool of research helped the researcher to collect data on perceptions, knowledge, attitude as well as, opinion of sampled population towards adoption of ICT in PTTCs. The questionnaire suited for this study because it is practical and it is relatively costly effective way.

3.6 Validity and Reliability of Research Instruments

Validity means the extent or level of accuracy, correctness and meaningfulness of a research instrument while reliability means the degree to which research instruments yields consistent results after a number of trails.

3.6.1 Pilot Study

Before the researcher administered research instruments to the respondents for the data collection, interview guide and questionnaire were tested for validity and reliability. A pilot study was carried out by the researcher to ascertain the reliability and validity of data collection instruments. Five per cent (5%) of the target population was used as the sample size for the pilot study as suggested by Mugenda, (2003) therefore two (2) administrators, nine (9) trainers and five (5) ICT students from Kilimambogo formed the sample size for the pilot study. Piloting helped in identifying problems in inadequate wording of the questionnaire. Items in the instruments found unclear with distorted meanings were rectified. The data from obtained from the pilot was not captured in the actual study.

3.6.2 Validity of Research Instruments

The researcher used content validity as measure of extent or degree to which the data collected using questionnaire meets the objective of the research. Content validity and construct validity were done using the results got from pilot study. Construct validity refers to whether a scale measures with theoretical constructs that it is required to measure. It is the extent to which what was supposed to be measured is measured Pennington, (2003). Construct is not confined to one set of observable variable attributes or indicators. It is common to a number of sets of indicators. The data collected during the pilot testing was prepared, analysed and interpreted. Based on the outcomes, the instruments were reviewed further in readiness for data collection. The instruments were verified by the supervisor and other senior lecturers in the University of Nairobi.

3.6.3 Reliability of the Data Collection Instrument

Reliability of data collection instrument is defined as the degree to which a study gives results which are consistent after a number of trails. It is influenced by random error Mugenda, (2003). Split half technique was applied so as to test the reliability of the data collection instrument where the questionnaire were divided into two groups by having all even numbered items grouped together and all odd numbered grouped together then correlated using the spearman Brown prophecy formulae thus;

$$\text{Reliability of total test scores} = \frac{2 \times \text{reliability of half test}}{1 + \text{reliability for half test}}$$

This will help me to eliminate the chance error.

Correlation coefficient was then be calculated as $r = \frac{\sum xy}{(\sum x2 \sum y2)\ l/2}$

Where x is the even numbered scores, y is the odd numbered scores.

$\sum x2$= sum of the mean of x taken away from each x score squared.

$\sum y2$= sum of the mean of y taken away from each y score squared.

$\sum xy$= the cross products of the mean taken away from that score.

The correlation for the pilot study was 0.92 for trainers, 0.89 for ICT students' questionnaire and 0.83 for interview guide. According to Mugenda, (2003) a coefficient of 0.80 or above shows that, there is high degree reliability of the data. Hence the results were considered to have positive correlation among the different responses and therefor the researcher concluded that the research instruments were reliable for the study.

3.7 Data Collection Procedure

This was being carried out simultaneously as researcher collects data. The researcher looked through the instruments and organized the responses as well as categorizing the responses. The researcher used inferential like confidence and descriptive analysis including frequency,

percentage and graphs. Researcher had to code items to enable in translating of question responses into specified categories. Data was presented in frequency tables, charts, and graphs. Qualitative data was arranged thematically and presented in narrative form.

3.8 Ethical Consideration

National Commission for Science, Technology and Innovation, County Commissioners, County Directors of Education of the three counties and Principals of the sampled colleges were all informed prior to the study by the researcher so as to avoid suspicion and resistance from the tutors /lectures/head of departments and administrators. Permission was taken from respondents whose participation in this study was totally voluntary. Any input provided by participants was carried out with a lot of confidentiality. Dignity and privacy of the sampled respondents was protected and highly considered during the research. Names of the respondents was not be exposed and instead codes were be used.

3.9 Operationalization of Variables

The study used various variables of study, indicators and measurement of scale as shown on Table 3.3.

Table 3.3: Operationalization Table

Objectives	**Variables**	**Indicators**	**Measure-ment scale**	**Types of analysis.**
To examine the influence of the cost of ICT materials on integration of ICT in training teachers in public training colleges	The cost of ICT training materials	Price of:- - Installation. -computers -Maintenance	Nominal scale Ordinal scale	Descriptive -Frequencies -Percentage
To investigate the influence of administrative support on integration of ICT in training teachers in public colleges	Administrative support	-Finance assistance -Managerial assistance -Technical support	Nominal scale Ordinal scale Inferential scale	Descriptive -Frequencies -Percentage
To examine the extent to which personnel ICT skills influence on integration of ICT in training teachers in public colleges.	Personnel ICT skill development	-Tutors competency -Tutors knowledge -Tutors technology proficiency -Tutors attitude	Nominal scale Ordinal scale	Descriptive -Frequencies -Percentage
To investigate the influence of ICT infrastructural capacity on integration of ICT in training teachers in public training colleges	ICT Infrastructure facilities	-Computer labs -power supply -ICT security	Nominal scale Ratio scale	Descriptive -Frequencies -Percentage

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DICUSSION

This chapter four presents results and the discussions of the research. The purpose of this research is to investigate factors influencing the integration of Information communication and technology in training teachers in Kenya a study of Kilimambogo, Machakos and Kitui Teachers Colleges. This study was being guided by four objectives which are: To examine influence of cost of ICT materials on integration of ICT, to investigate influence of administrative support on integration of ICT, examining influence of personnel ICT skills on integration of ICT and investigating the influence of ICT infrastructural capacity on integration of technology in training teachers.

4.1 Response Rate

This is defined as the percentage of the subjects who responded to the data collection instruments as issued by the researcher. In this research 175 respondents had been sampled to represent a targeted population of 305 out of the 175 respondents 169 questionnaires were issued and 8 interviews were carried out. Of these, a total of 145 questionnaires were given back and 8 interviews were conducted as tabulated in the Table 4.1.

Table 4.1: Analysis by Response Rate

Category	Frequency	Percentage
Sample population	175	100
Response	153	87.43
Non response	22	12.57

From Table 4.1, out of the 175 respondents sampled, 153(87.43%) of the respondents took part in the research which is representative of the target population. However it's regrettable

that 22(12.57%) did not respond to the questionnaires. This was due to some had left their station of work since the data was being collected during trainers free time especially after classes.

4.2 Demographic Characteristics of the Respondents

This part carries the demographic characteristics of the respondents. The respondents who were exhausted in this research were administrators, teacher trainers and ICT students. This would help the researcher to have the background information of the respondents who provided this information.

The involved demographic characteristics were: gender, age, academic qualification, department involved and working experience. The latter demographic characteristics did not apply to the students

4.2.1 Gender of the Respondents

This part presents the gender of the respondents who took part in this research. The researcher explored the gender of the administrators, teacher trainers and ICT students as tabulated in Table 4.2.

Table 4.2: Gender of the Respondents

Gender	Frequency	Percentage
Female	81	52.94
Male	72	47.06
Totals	153	100

From Table 4.2, it is clear that it can be ruled out that most of the respondents were females (52.94%) while males contributed the percentage of the correspondents (47.06%). Although the range is not wide it can be concluded that there is tangible gender parity in these

learning colleges which could be attributed by sensitization of girl child education. Therefore the government and other education stakeholders should do equally on boy child education.

4.2.2 Age Distribution

The research went further and looked into age distribution of the respondents and presented the results in Table 4.3.

Table 4.3: Analysis by age of Respondents

Age bracket (years)	Frequency	Percentage
20-30	32	20.92
31-40	35	22.88
41-50	64	41.83
Above 50	22	14.37
Totals	153	100

From the findings in Table 4.3, it clear demonstrates that most of the responds were at the age of between 41-50 years by constituting 41.83%. Followed by those of age 31-40 years, getting 22.88%. Those at the age between 20-30 years followed closely with 20.92%. Lastly responds with 50 years and above had 14.37% taking the smallest pie. It can be concluded that the trainees are in the hands experienced personnel.

4.2.3 Academic Level

The research explored the highest academic qualifications achieved by the teacher trainers and administrators. This was of great importance since the highest level of academic of the respondents is an attribute of a person level of academic knowledge and a vehicle of ability to understand new dynamics in education and integrate them effectively. Table 4.4, tabulates the results.

Table 4.4: Analysis by Academic Qualification

Qualification	Frequency	Percentage
Certificate	38	24.84
Diploma	16	10.46
Degree	54	35.29
Master's degree	42	28.10
PhD	2	1.31
Totals	153	100

From Table 4.4, it clear shows that those who have bachelor degree take the highest population which is 35.29% as those who had master's degree took 28.10%. However those who had certificate scored 24.84% and most of them were the students. Diploma level took 10.46% of the respondents and PhD holders satisfied with 1.31%. From these findings all the teacher trainers and administrators had acquired some form of professional qualification and could therefore understand and integrate ICT in their work.

4.2.4: Working Experience

The research explored the working experience of the teacher experience for the teacher trainers and administrators since he believed that it could greatly influences the teacher's trainers knowledge, skills and attitudes towards technology adoption in their work since it is a key in technology adoption in their field of teaching. Results are tabulated in Table 4.5.

Table 4.5: Analysis of Tutors and Administrators by Experience

Years of experience	Frequency	Percentage
Below 10	11	9.73
11 to 20	39	35.40
21 to 30	53	47.79
Above 31	8	7.08
Totals	111	100

From the results on Table 4.5, it can be concluded that most of the respondents' tutors had highest teaching experience of between 21 to 30 years which took 47.79%. Those who had working experience of between 11 to 20 years followed closely with 35.40%. However those who had below 10 and above 31 years of experience shared the rest percentage by taking 9.73% and 7.08% respectively. From these findings all teacher trainers and administrators had spent over a year in their current stations meaning that they had experienced enough to observe the integration of ICT in the respective college.

4.2.5 Distribution of Respondents in Departments

The researcher went further and explored the teacher's trainers' departmental service and captured the findings in Table 4.6. Noting that the department of service of the teacher trainee is of more important in knowing the level to which the study will represent.

Table 4.6: Analysis by Departments

Departments	Frequency	Percentage
Administration	8	5.24
Creative	21	13.74
Education	16	10.47
Language	22	14.39
Mathematics	7	4.49
Science	14	9.16
Social science	18	11.77
ICT	5	3.28
ICT students	42	27.46
Totals	153	100

From Table 4.6, it can be noted that out of 153 respondents of the study, 5.24% were from administration, 13.74% were from creative arts, 10.47% were from education department, 14.39% were from language, 4.49% were from mathematics department, 9.16% were from science department, 11.77% were respondents from social sciences, 3.28% and 27.46% were from the ICT department. There it can be strongly noted that the findings were representative since teacher trainers were sampled from all departments in this study. However some departments had high numbers of trainers probably due to they were common units to all trainees.

4.3 The Influence of cost of ICT materials on ICT Integration in Training Teachers.

The first objective in this research was to examine influence of cost of ICT materials on integration of ICT in training teachers in the following areas.

4.3.1 Cost of Computers

The researcher started by investigating respondents' views both the students and teacher trainers how the cost of ICT material has been and is still high in the market. The results of the findings were tabulated on the Table 4.7.

Table 4.7: Analysis by Rate of Cost of ICT materials

Cost of ICT materials is very high in the market	Frequency	Percentage
Strongly disagree	1	0.69
Disagree	2	1.38
Not sure	11	7.59
Agree	45	31.03
Strongly agree	86	59.31
Total	145	100

From Table 4.7, it is evident clear that the cost of ICT materials is far much high in the market since 59.31% strongly agreed with the statement followed by 31.03% with the respondents who also agreed. On other hand 7.59% seemed not to be sure while 1.38% disagreed while 0.69% strongly disagreed that the cost of ICT materials are high in the market. This implies that colleges could not be able to secure enough ICT materials. This concurs with study by Zziwa, (2001), in his research paper about networking and application of ICT in French education system where cited that the serious challenge in utilising computers in learning institutions is the costly computers peripherals and software.

4.3.2 Cost of ICT Installation

The research also sought further to find out whether the installation cost of ICT materials is high as far as ICT integration in teacher training from teacher trainers and ICT students. The findings were captured in Table 4.8.

Table 4.8: Rate by Cost of ICT Installation

Cost of ICT installation is high in the market	Frequency	Percentage
Strongly disagree	15	10.34
Disagree	24	16.55
Not sure	40	27.59
Agree	54	37.24
Strongly agree	12	8.28
Total	145	100

From the findings in Table 4.8, it implies that the cost of ICT installation is high since 37.24% agreed, echoed by 8.28% who strongly believes that the cost of installation is high. However 27.59% seemed to be at neutral on the cost of installation while16.55% disagreed with the idea of the cost of ICT installation being high. Additionally 10.34% strongly disagreed that the cost of ICT installation is high. So it can be concluded that the high cost of ICT installation has made most of the colleges not to involve fully to ICT in learning hence being an influencing factor.

4.3.3 Cost of ICT Maintenance

In addition the research also sought to understand whether the maintenance fee for ICT materials both the software and the hardware could influence ICT integration in teacher training colleges. The researcher gathered the following findings from the tutors and ICT students as indicated in Table 4.9.

Table 4.9: The Rate Cost of ICT Maintenance

Cost of computer maintenance is very high in the market	Frequency	Percentage
Strongly disagree	5	3.45
Disagree	16	11.03
Not sure	6	4.14
Agree	92	63.45
Strongly agree	26	17.93
Total	145	100

From the Table 4.9, it is clear indication that, the cost of ICT maintenance is high in the market since the findings recorded that 63.45% agreed with the statement that the cost of maintenance in the market is high. This was purely supported by 17.93% who strongly agreed with the statement. However 11.03% seemed not to buy the idea of the cost of ICT maintenance is high by disagreeing. Additionally 3.45% strongly disagreed with the statement and 4.14% recorded not to be sure on the cost of maintenance in the market. Therefore it can be concluded that basing on the results the cost of ICT materials is much high in the market hence being an influence to technology adaption in education.

Having looked into high cost of ICT materials and installation the researcher was brought into attention what could have fuelled all this hence the researcher sought from the respondents view on whether the government lays high and unnecessary tax on ICT materials. The researcher found the following findings as summarized in Table 4.10.

Table 4.10: Government Tax on ICT Materials

Government lays high and unnecessary Tax on ICT materials	Strongly disagree	Disagreed	Note sure	Agreed	Strongly agreed
Frequency	3	24	61	56	1
Percentage	2.07	16.56	42.07	38.63	0.67

From Table 4.10, it can be strongly deducted that most of the respondents were not sure of government high tax in ICT materials by recording 42.07%. However 38.63% agreed that government lays high and unnecessary tax on ICT materials more importantly they were supported strongly by 0.67% of the total respondents and thus this high and unnecessary tax on ICT materials being one of the influencing factors. Whereas 16.56% disagreed that government lays high tax, they were supported by 2.07% who also seemed to strongly disagree. From the results perspective it shows that the government has relayed more on ICT tax as a major source of revenue. However it should be made aware that they is need for the government to lower or waiver tax on ICT materials since Kenya largely import them from developed countries. By doing so it will enable colleges to equip their ICT related equipment.

4.4 The Influence of Administrative Support on Integration of ICT in Training Teachers.

The second objective of this research was to investigate the influence of administrative support on integration of ICT in training teachers. Researcher based on the following aspects: managerial assistance, technical support and finally finance assistant towards ICT improvement.

4.4.1 Managerial Assistance.

The researcher presented the primary teacher trainers with questions on a like grind asking them to tick the areas where have received ICT-related training covering the following topics as a part of administration support as indicated in Table 4.11.

Table 4.11: Analysis by Managerial Assistance

Have you received any support from administration in :-	Frequency	Percentage
Using subject specific software	27	26.21
Use of tablets, laptops and phones as resources	32	31.07
Finding and using materials from internet	23	22.33
Planning lessons that integrate ICT	15	14.56
Presentation of exam in ICT platform	6	5.83

The findings in Table 4.11, revealed that 26.21% had received support from administration in using subject specific software, 31.07% had had also received support in using of tablets, laptops and phones as resources. Additionally 22.33% reported that had received support in finding and using materials from internet, while 14.56% had equally received support in planning lessons that integrate ICT. Only 5.83% reported had received support in presentation of exam in ICT platform. However the support they had received seemed to be very minimal and hence being hindrance to technology adoption in learning and teaching. This could be due poor ICT skills by the administration where one admitted that "ICT is dynamic and by not attending trainings my skills are out dated, I even belief most of trainers might be more equipped than most of the administrators". This proves that they are need for the colleges and government to be organizing for ICT refresher courses to all teacher trainers regularly.

4.4.2 Administration Technical Support

Teacher trainer respondents were provided with questionnaire where they were to rate how administrators help in ICT training under the guided aspects

The first aspect was to investigate whether, technical support is offered by administrators and timely managerial support from college administration to teacher trainers and students whenever needed and the findings were as follows in Table 4.12.

Table 4.12: Analysis by Administration Technical ICT Support

Indicator	V. true (%)	True (%)	At times (%)	Not sure (%)	Not true (%)
Administration offers ICT technical support when needed	22.07	38.62	31.03	1.38	6.90
Administration offers ICT managerial when needed	16.23	17.25	23.24	2.05	41.23

From the Table 4.12, under the aspect if administration offers ICT technical support when needed we can strongly deduct that 38.62% and 22.07% agreed that administration offers ICT technical support to tutors and to the students whenever needed contrary to 6.90% who said that they do not receive any administration ICT support. However 31.03% reported that not all the time they do receive ICT support from the administration when in need. Additionally 1.38% seemed not to be sure if they receive any ICT support from administration. Therefore this proves how the teacher trainers have been going through hard times when in need hence these will influence ICT integration in these training colleges.

Under the aspect whether administration offers ICT managerial support to tutors and students whenever needed can be noted from above Table 4.5, that 41.23% reported that no support they received from administration, 23.24% said that said they received ICT manage-

rial support at times. However 17.25% reported truly received managerial support from administration and 16.23% strongly agreed that they received support. However 2.05% reported that were not sure if they had received any ICT managerial assistant from administration. From above aspects it simply implies that administration has not been offering support to tutors and students timely who rather might be drawing back full integration of ICT in education process hence becoming an influencing factor to the ICT.

The researcher also sought to get the view of the students on how they have you received ICT-related training covering the following topics as a part of administration support.

The first aspect was if they have received administration support in learning using subject software and findings were recorded in Table 4.13.

Table 4.13: Administration Support to Students in Application Software

Administration support students in use of application software	Frequency	Percentage
Yes	7	16.67
No	35	83.33
Total	42	100

The findings on Table 4.13, it can be clearly deducted that 83.33% reported that students never received administration support in learning using subject software whereas, 16.67% had received administration support in learning using subject software. In fact one of the student respondents reported as quoted "by not receiving needed administration support from the administration on ICT related areas as compared to other areas it has made me to develop negative attitude towards the same"

The above aspect drew a researcher a keen interest to seek from the students if they had received support from the administration support on use of tablets, laptops, desktops and

phone as resources. The results were as 64.45% recorded had received administration support in using desktop as a learning resource followed by 26.19% who reported they had received administration support in using phones as a learning resource. On other hand those who had received support in using laptop as a learning resource were 7.14% while any support in using tablets as a learning resource seemed to be very minimal taking 2.22% within these learning institutions as summarised in Table 4.14.

Table 4.14: Administration ICT Support to Students in Use of ICT Resources

Indicator	Frequency	Percentage
Tablets	1	2.22
Laptops	3	7.14
Desktops	27	64.45
Phones	11	26.19
Total	42	100

From Table 4.14, it can been concluded that administration seemed to side line some of the ICT learning resource which have high potential in integrating ICT in learning and teaching when well supported and therefore influencing integration of technology in trainings colleges.

4.4.3 Administration Finance Assistance

The other aspect of concern by the researcher was to find to what extend are the tutors and students received financial assistance from the administration as ICT integration is concerned. The findings were as follows 16.55% reported strongly true that colleges supported ICT financially; they were echoed by17.93% who also seemed to agree with them. However 38.62% who took the highest pie seemed to be not sure if administration offers finance to the ICT sector in the colleges. To add on 26.90% did not agree with the statement that ICT in colleges are well financed as shown in Table 4.15

Table 4.15: Analysis by ICT Finance by Administration

Administration finance ICT sufficiently	Frequency	Percentage
Very true	24	16.55
True	26	17.93
Not sure	56	38.62
Not true	39	26.90
Total	145	100

Judging with the majority response in Table 4.15, we conclude administration did not finance technology acquisition as required and therefore inadequacy of funds influenced adoption of ICT to a very large extent in these colleges.

Research also extended the question to administrators by asking them if they made computers available to the trainers since by making them readily available it would make them learn from peer teachers hence enhancing their skills. The findings were as follows 62.5% of the administrators said that they made computers readily available to the tutors while 37.5% reported that computers were not made readily available to the tutors as tabulated in Table 4.16.

Table 4.16: Availability of Computers to Trainers

Administration has made ICT resources available to tutors	Frequency	Percentage
Yes	5	62.5
No	3	37.5
Total	8	100

From the findings in Table 4.16, it can be concluded that administration of the respective colleges have influenced towards ICT integration by not make technology tools readily available to the trainers and trainees as cited by Alkahtani, (2017) the absence to make of

personal computers reachable by teachers denies an extra opportunities to teachers to acquire fined computer skills through online lessons, trial and error. Also it tends to encourage them to use computers for their own growth as well as for profession.

4.5 The Influence of Personnel ICT Skills in Integration of ICT in Training Teachers.

The research was to examine to what extend do the personnel ICT skills influence the adoption of ICT in training teachers. For the researcher to concrete conclusion he did the data collection basing the following aspects.

4.5.1 Tutor Competence and Knowledge

The researcher presented a questioner to the teacher trainers and the students seeking to sought on their depth of their ICT competence and knowledge as a tool of teaching and learning in colleges. The findings of the results were summarised in Table 4.17.

Table 4.17: Analysis by Tutors and Students on ICT Skills

Indicator	Poor (%)	Fair (%)	Good (%)	Very Good (%)	Excellent (%)
ICT basic knowledge and competence	15.05	24.04	36.06	12.05	12.80
Expertise and experience	14.04	40.06	28.08	14.09	3.19
Technology and familiarization	22.03	38.05	36.08	2.13	1.71

From Table 4.17, it can been asserted that the highest number tutors have no finer competence and knowledge skills on ICT since the highest percentage were either fair or good in all their rates. This translates that even if the colleges would be fully technologically equipped there would still be a gap in technology adoption. This seems to be backed by Hawkins, (2002) where cited that the highest number of teachers in developing countries are intimidated by dynamic technology and thus prefer to use their own traditional

methodologies. By going with Hawkins statement and the above findings ICT integration faces danger.

4.5.2 Tutors Technology Proficiency

The researcher after getting the teacher trainers competence and knowledge in ICT realm the researcher went notch higher to find out tutors technology proficiency by sampling various ICT tools by trying to get how frequently they use them in learning and teaching.

The researcher also sought to find out the specific technology tools being applied by teacher trainers in their process of content delivery. The results are presented in Table 4.18 tabulating ICT tools and how often were been used by teacher trainers. Computer was the most used tool with ninety three per cent of respondents using it often or very often. It was followed by Data projector by reporting fifty seven per cent used this tool often or very often. On other hand printer also seemed to be on high use by scoring fifty four per cent using often or very often followed by television with thirty nine per cent using it often or very often. However camera and scanner scored very strong level of never be utilised by the respondents. Therefore these imply that there was no balancing of multimedia exhaustion. These might be as result of lack of competence and knowledge on such ICT tools and equipment as reflected in Table 4.18.

Table 4.18: Analysis by Tutors' Technology Proficiency

Indicator	Never (%)	Sometimes (%)	Often (%)	Very often (%)
Computer	1.44	5.33	27.23	66.00
Digital camera	90.00	4.45	4.32.	1.23
Data projectors	15.45	26.33	25.01	33.21
Television	34.23	27.67	20.02	18..08
Printer	20.12	36.67	24.05	19.16
Interactive whiteboard	100.00	0.00	0.00	0.00
Scanner	90.00	5.67	4.33	0.00

The application of technology software in colleges was also sought by the study. The respondents reported to be more likely to adopt the use of Microsoft Word and to extend Internet as compared to other technology software. Very low percentage use of Creative software for photo editing. Unequally use of software could have been brought by poor technology proficiency, as summarised in Table 4.19.

Table 4.19: Analysis by Software Application

Indicator	Seldom (%)	Sometimes (%)	Often (%)	Very often (%)
Microsoft world	0.00	3.11	12.23	84.66
Microsoft PowerPoint	6.55	12.12	45.33	37.00
Microsoft excel	13.23	24.34	36.00	27.43
Digital video editing	89.49	10.51	0.00	0.00
Internet	10.23	34.45	24.01	31.31
Computer Aided design	92.23	4.25	3.32	0.20
Email	84.67	10.02	6.05	3.26

4.5.3 Tutors Attitude Towards ICT

After investigating teacher trainers on ICT competence, knowledge and technology proficiency the researcher went further to investigate attitude on use of ICT in colleges. The researcher asked the respondents to indicate if all tutors and students have a positive view in integration of ICT during trainings. The results were as 57.15% agreed that all tutors and students have positive view towards ICT in learning. However 15.42% disagreed that not all tutors and students have positive attitude towards ICT integration in learning while 27.43% were for partially tutors and students have developed positive attitude towards ICT adoption in teacher training as summarised in Table 4.20.

Table 4.20: Tutors and Students Attitude Towards ICT

Tutors and Students have positive attitude towards ICT	Frequency	Percentage
Agreed	83	57.15
Partially	40	27.42
Disagree	22	15.43
Total	145	100

By virtual of lacking almost a third of respondents having positive attitude towards ICT integration in education as shown in Table 4.20, the introduction of such in teaching and learning will have to some extent be faced by resistance and so incentives should be introduced to change both tutors and students attitude.

4.6 The Influence of ICT Infrastructural Capacity on Integration of ICT in Training Teachers

The researcher had tasked to investigate on how ICT infrastructural capacity influenced the integration of ICT in training teachers in public training colleges. For the researcher to have

better understanding he based the findings using different aspects which included computer labs, power supply and ICT security.

4.6.1 Computer Labs.

For the researcher to investigate whether the ICT infrastructural capacity influenced integration of ICT in teacher trainings he sought first to establish if the colleges had enough computer labs and well equipped. The results of ICT equipment were reflected on Table 4.21.

Table 4.21: ICT Facilities and Tools in Colleges

Indicator	Frequency
Computer labs	3
Desktop computers	123
Laptops	21
Projectors	1
Printers	17
Televisions	4
Radios	2
Digital cameras	0

From the Figure 4.21, it can be cleared noted each college had only one computer lab. Most of the colleges had partially enough desktop computers where they were 123 in number followed by the number of laptop which had 21. Also printers in these colleges seemed to be in high in number since they had 17 in number. However the rest of equipment which are projectors, radios, video cameras and televisions seemed to be on low rate in these learning institutions may due to their high prices in the market. These concurs with Ford, (2007) where cited that acquisition of technology materials, securing of communication facilities, and maintenance has risen in third world countries hence, hindering their usage in classes.

The researcher also drew attention to find out the efficiency of ICT tools and facilities in colleges and therefore asked the tutors and students to rate them. The results are summarized in Table 4.22.

Table 4.22: Analysis by Efficiency of ICT Tools in Colleges

Indicator	Poor (%)	Fair (%)	Good (%)	Very good (%)	Excellent (%)
Desktop, laptops and tablets	2.11	4.16	45.32	30.97	17.44
Application software	14.14	48.25	27.17	8.55	1.94
Projectors	25.16	40.45	18.68	10.67	5.04
Computer lab	2.98	10.06	12.67	45.55	28.74
Printers	1.65	10.45	30.23	56.87	0.80
Radio, TV and digital camera	49.23	30.23	16.37	2.11	2.06
College web	90.22	3.45	3.01	2.89	0.43

From the results in Table 4.22, it is evidently that though the computer labs are well a managed most of the ICT equipment in these labs might be in faulty. This can be strongly supported by ninety per cent of the respondents noted that college web was poor, followed by seventy nine point four six who reported that radios, televisions and digital cameras are poor or fair in terms of their efficiency. Similarly application software and projectors were equally in favour of poor or fair. Only desktops, laptops and tablets seemed to have high positive efficiency in these learning institutions. Therefore this could lead to low usage even further the users developing negative attitude towards the ICT hence influencing its adoption in training teachers.

4.6.2 Power supply

For the effective use of ICT tools and facility it would be of no use unless there is reliable source of power. Therefore the researcher sought to understand whether the colleges had

reliable sources of power. The responded were asked to identify the main source of electricity /power in colleges and presented the findings in Table 4.23.

Table.4.23: Sources of Power

Indicator	Electricity %	Electricity and Generator %	Generator %	Solar %
Kilimambogo	87.23	4.34	3.12	5.31
Machakos	89.45	4.53	2.43	3.59
Kitui	88.56	4.35	2.38	4.71

From Table 4.23, it is clear that all the colleges had been connected to Kenya power National Grind by Kenya Power Company which is the largest power supply in Kenya and hence being the most source of power in these colleges by reporting at average of 88.41%. However it seemed that all the colleges had generators which would be used as backups in case of blackouts and also during low voltages by reporting average of 4.06%. Solar as source of power has also been embraced by these institutions to light security lights and pavements by reporting an average of 4.54% which was recommendable.

To have power supply is not enough reason to influence ICT integration in teaching and learning. This called for the study to investigate its effectiveness and efficiency. The results were presented in Table 4.24, where most of the respondents seemed to be satisfied by the power supply by all recording above eighty per cent recording very good which is recommendable. Very low per cent seemed not totally fully satisfied with the mode of power supply. From the Table 4.24, it can be concluded that colleges had reliable power supply though it seemed there was very few challenges.

Table 4.24: Analysis by Power Supply Efficiency

Indicator	Very good (%)	Good (%)	Average (%)	Poor (%)	Very poor (%)
Electricity	90.23	4.35	3.45	1.34	0.63
Electricity and generator	93.89	4.31	1.45	0.35	0.00
Generator	80.78	6.34	4.67	4.21	4.00
Solar	88.78	4.78	3.98	2.46	0.00

4.6.3 ICT Security

The researcher extended to find on influence of ICT security in integration of ICT in training teachers and presented the findings in Figure 4.25.

Table 4.25: Analysis by ICT Security

How can you rate ICT security in college	Frequency	Percentage
Very good	24	16.14
Good	30	20.56
Average	64	44.25
Poor	22	15.45
Very poor	5	3.60
Total	145	100

Judging by majority we can conclude that colleges are having some lapses on ICT security since 44.25% scored average mark. In fact one of ICT tutor reported that “though our college has enough secured Wi-Fi it has been easily attacked by virus due to poor or weak firewall”. Therefore ICT security could be one of the factors influencing technology adoption in training.

4.6.4 Presence of ICT Policy in the College

The researcher examined the influence of presence of ICT policy on the adoption of ICT and presented the findings on Table 4.26.

Table.4.26: Influence of Presence of ICT Policy on Integration of ICT

To what extent doe ICT policy influence ICT integration in colleges.	Frequency	Percentage
Very large extent	4	50.00
Large extent	2	25.00
Average extent	1	12.50
Low extent	1	12.50
Total	8	100

From figure 4.26, it can be noted that 50.00% of administrators reported that presence of ICT policy influenced adoption of ICT in the colleges to a very large extent, 25.00% of administrators reported that presence of ICT policy influenced adoption of ICT in training to a large extent, 12.50% of the administrators reported that presence of ICT policy influenced adoption of ICT in colleges to average extent, whereas 12.50% of the administrators reported that said that presence of ICT policy influenced use of ICT in colleges to a low extent. Judging with the majority response we conclude that presence of ICT policy influenced adoption of ICT to a very large extent.

It came out clearly from all the administrators in the study that the college did not to have a policy for the integration of ICT in place at their colleges. These respondents reported that the lack of a college ICT policy was hindering the integration of ICT in the curriculum. The administrators recommended that in order for ICT to be integrated effectively, the manner in which teachers are to integrate ICT should be reflected on the college time-table. One administrator said: “On ICT specifically, there is no clear policy, not really. Within college

structure at the moment, I'm head of administration which means that all policy documents relating to curriculum and documents generally will often pass over my desk, so I believe there is no policy on ICT".

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMEDATIONS

5.1 Introduction

The main purpose of this study was to investigate factors influencing the integration of information communication and technology in training teachers in public training colleges in Kenya a study of Kilimambogo, Machakos and Kitui Teachers College. Purposive sampling technique was applied in staff while random technique was applied in students. Descriptive statistics as frequencies and percentages were applied to summarize gathered data.

5.2 Summary of Findings

This subsection presents a summary of the research findings. This subsection is subdivided into four parts each representing findings from each objective.

5.2.1: The Influence of Cost of ICT Materials in Influence ICT Integration in Training Teachers.

The cost of ICT materials had influence integration of technology in colleges. This was because most teacher trainers and students said that the cost of a unit of any ICT material is very high in the market. This was further supported by the number of computer tools and facilities found in these colleges which proved to be not enough to population due to high cost as was cited by administrators. The study also found that the cost of ICT installation was high in the market. Most of responds agreed that with statement that the cost of ICT installation was high in the market. This showed that almost more than half of the teacher trainers and student were not comfortable with the cost of ICT installation in the market. This contributed in triggering college administrators feel uncomfortable in venturing intensively in ICT integration in these colleges.

Additionally the study sought to investigate how the cost of ICT maintenance influenced the ICT adoption in learning. The research found that the cost of maintaining ICT tools and equipment is very high. Therefore the cost of ICT materials proving to be such high it influenced the integration of ICT in these respective colleges.

The research equally noted the government had laid high tax on ICT materials. For instance the teacher trainers and students who were questioned whether the government has highly taxed ICT materials the higher number agreed that the tax was too high. By such high per cent proving that the government had laid high tax on ICT tools it meant that the cost of such tools and equipment were high in the market. Consequently college could not equip ICT department in their colleges and so high government tax to ICT influenced ICT integration.

5.2.2: The Influence of Administrative Support on Integration of ICT in Training Teachers.

The research established that the teacher training colleges' administration had some gaps in offering managerial assistance towards ICT integration education field. Administration had not offered sufficient managerial support towards the application of different ICT learning resources. Tutors had received more support in use of tablets, laptops and phones from administration as compared to other learning resources like planning lessons that integrate ICT, presentation of exam in ICT platform, finding and using material from internet and also using subject specific software where they scored minimal percentage. By not giving enough managerial support to those learning resources, tutors have developed negative attitude toward ICT hence influencing integration of it education sector.

The study further found that the teacher trainers had received some ICT technical support whenever needed from administration. However there seemed to be no enough managerial

support provided by these learning institutions to the tutors whenever needed. Hence this seemed to influence ICT integration in training teachers.

Additionally the research also found that administrations in these colleges had hardly offered ICT support to the students in using application software. High percentage reported that they had not received any assistance from administration although they had sought. These in turn almost killed their motivation which would influence integration of technology in these learning institutions. Moreover students had not received sufficient support in using technologies in available resources for instance they had received more administration support towards the use of desktops as compared to other devices like tablets, laptops and even phones which was ready available to almost all the students. However the lack of such support was probably due to the poor technology familiarisation, poor ICT expertise and poor technology proficiency by both administrators and tutors.

The study found that adequacy of funds was a factor that influenced use of ICT in colleges' education. Most of teacher trainers felt that ICT was not well financed in their colleges and this could be one of the main reasons why ICT has not been fully integrated in college education. This finding concurred with the ICT infrastructural facilities in these institutions.

5.2.3: The Influence of Personnel ICT Skills in Integration of ICT in Training Teachers.

The study noted that the teachers' colleges were faced with the challenge of tutors and students minimal knowledge and competency in ICT. The research found that a third of tutors ICT knowledge and competency was either poor or fair. Similarly tutors ICT expertise and experience which are basics for integration of ICT in training processes recorded poorly. This was crowned by most of tutors admitting that they had poor or fair technology familiarization. They cited that due to ICT dynamics they were not able to use

some of the latest technologies. As indicated in table 4.18 most of the tutor s seemed to use computers in teaching and shone off other ICT tools. In fact interactive whiteboard and digital cameras which have good potential in ICT integration in teaching and learning were the most affected by scoring 100% and 90% never used. On other hand tutors seemed to exploit Microsoft world software at the expense of other software, digital video editing and computer Aided design were not in high use due to respondents poor technology feminization. With all these challenges there is no doubt to say that ICT integration in these colleges could not be fully undertaken.

Additionally administrators admitted that the tutors had not frequently organized for their tutors ICT trainings and seminars for them to be equipped with daily changing technologies ideas, knowledge and skills. This meant that some of the teachers' trainers had no the 21st century ICT skills hence influencing ICT integration in their process of teaching. These findings are echoed by Karsenti, (2009) where he noted that Information Communication Technology in teacher education should be trained first for those trainers who in turn prepare educators for an effective use of information and communication

Further, the study established that the teacher training colleges were faced with the challenge of lack of interest among the teacher trainers as well as the students in ICT which posed a challenge in the process of ICT integration.

5.2.4: The Influence of ICT Infrastructural Capacity on Integration of ICT in Training Teachers.

The research established that adequacy of computer hardware influenced adoption of ICT in teachers' colleges. Most of these colleges seemed to have at least done well in the side of desktop at the expense of other ICT facilities like laptops, projectors, radios, televisions and tablets which if enough equipped have high potential to influence ICT adoption in

education. This implies that by not having adequate of such hardware will lead to limited software since they use them to run for technology integration. Unfortunately the few ICT tools and facilities these colleges have, had some gaps in terms of efficiency. For instance college web which plays a vital role in any ICT adoption learning institution seemed to be in poor state. This was agreeable with college administrators where most of them admitted that adequacy of ICT tools was a challenge towards ICT integration in education processes.

The study also found that the colleges had enough power supply. Most of them had employed to some extend green energy like solar so as to cut the cost. They had also generators for power standby in case of blackouts and low voltage supply. Notably they had UPS in their computer labs. All the administrators in unison agreed that power supply has great influence towards adoption of ICT since all ICT hardware are run by power and so they had to make sure that was not a challenge.

The study established that most of the colleges ICT security was not stable. The research found that most of teachers' trainers were not comfortable with firewalls, security codes and password. These made most of administrators, teacher trainers and students not freely use the college Net and Wi-Fi. They cited that hackers could easily penetrate into their work and details due to weak security related software. This implied they were not able to engage fully in adoption of ICT in colleges.

The study also found that there was lack of proper ICT policy for guiding the process of integrating ICT in learning process. The study found that presence of ICT policy affected adoption of ICT in these institutions. Teacher trainers reported that presence of ICT policy influenced adoption of ICT in the colleges to a very large extent. The study further found that the colleges were faced with the challenge of lack of clear government ICT policy on ICT implementation in teachers training colleges.

5.3: Conclusion

The research was meant to seek for an answer for the question factors influencing the integration of information communication technology in training teachers in Kenya. A case of Kilimambogo, Machakos and Kitui teachers training college.

Based on the findings of the research, the following deductions were made:

i. The cost of ICT material in the market, maintenance cost and installation cost of ICT is relatively high in the market which was probably due to high VAT by the government and this consequently the teacher colleges were not able to acquire them in large number which means that integration is influenced by lack of enough ICT materials in classrooms.

ii. Administration financial support, managerial assistance and technical support was minimal towards ICT adoption in training process to both tutors and students who were seeking these services from administration. This means that to some extend they were frustrated and demotivated in using ICT, hence leading into a challenge towards technologies integration in teacher colleges.

iii. The research noted that there were a myriad of challenges which influence integration of these technologies such as; tutors poor ICT competence and knowledge, lack of expertise necessary for the integration of ICT in the training process, poor technology familiarisation and experience, and lack of interest among teacher trainers which prevented them from integrating ICT in content delivery and acquisition. Thus, posing a challenge in the integration process.

iv. Adequacy and readily availability of technology hardware and software influenced adoption of ICT in the training. The use of software should go beyond the use of basic computer packages such as word to the adoption of more specialized comput-

er packages for delivering subject specific content. Equally lack of proper ICT policy guidelines for the process of integrating ICT in the training process. Without such ICT policy guidelines means that integration of ICT in teacher training colleges is better theory than practice.

5.4: Recommendations

Based on the findings, the research recommends the following:

i. The government should lower or totally wave in total VAT on ICT related materials either locally assembled or imported so as the cost of ICT hardware and software can be affordable to these struggling colleges.

ii. Administration in colleges should develop tools to help in identifying strengths and weakness of various technological resources with a view to adopting ICT in the process of teaching and learning.

iii. Public teachers training colleges should equip teacher trainers with regular trainings and seminars on how to adopt ICT in training process. They should also provide refresher ICT courses to the teacher trainers on regular basis.

iv. Public teacher training colleges should widen their nets in sourcing for finance partners, people of good –will and sponsors to finance in securing of more ICT related infrastructure. Additionally the government in collaboration with these colleges they should formulate clear structured ICT policies. This in turn will promote ICT equipping in these trainings hence improving their use in training teachers.

5.5 Suggestions for Further Study

This research suggests further research in:

i. Similar study should be conducted in future in the same area so as to assess whether there has been any improvement on the factors influencing the adoption of ICT in the learning process.

ii. The influence of colleges' administrators, teachers' trainers and students' social cultural diversity on ICT adoption in teachers training.

iii. A study on how colleges' alumni can influence ICT integration in training process.

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APPENDICES

Appendix I. Letter of Transmittal

Benson M. Muasa

P.O Box 37-01031

Kindaruma.

Mobile +254 725 939908

Email:muasaben83@gmail.com

Dear Respondent

My name is Benson Mutunga Muasa, a student undertaking Master of Distance Education at the University of Nairobi. To fulfil the completion of this course, I am carrying out a study on the, Factors influencing the integration of Information communication and technology in training teachers in public training colleges in Kenya a study of Kilimabogo, Machakos and Kitui Teachers Training College.

Kindly assist in getting the required data by completing the questionnaire and interview schedule attached. Please answer all questions as honestly as possible. This research is for academic purpose only and thus the information given will be treated with utmost confidence. The results of the study can be availed to you if you so wish.

Yours Faithfully

Benson Mutunga Muasa -L45/6031/2017

Appendix II: Teacher Trainers' Questionnaire

The purpose of this questionnaire is to find out factors influencing integration of ICT in process of learning. All information provided will be highly confidential.

A. Bio data – Please use *tick* to:

1. Indicate your gender [ ] Male [ ] Female

2. Indicate your age (in years)

a) 21- 30 years [ ] (b) 31-40 years [ ]

c) 41 - 50 years [ ] (d) Over 50 years [ ]

3. Indicate your level of education

[ ] Certificate [ ] Diploma [ ] Bachelor's degree

[ ] Master's degree [ ] PhD others (specify) _____

4. Indicate your working experience

[ ] Below 10 years [ ] 11-20 years [ ] 21-30years

[ ] Above 30 years

SECTION B: Cost of ICT training materials.

5. Training ICT helps teacher trainers to use computer in their teaching.

Please rate how costly you find the following aspects of computers using a scale where 1= strongly disagree; 2= Disagree; 3= Not sure; 4=Agree; 5=strongly agree.

Statement	1	2	3	4	5
Purchase price of ICT materials has been and is still high					
Installation cost is high as far as ICT integration.					
Maintenance fee for ICT materials that is software and hardware is high.					
The government lays high and unnecessary tax on ICT materials.					

6. Briefly give reasons supporting your response in 5 above.

i. …….

ii. ……

iii. ……....

iv. ……

SECTION C: Administrative support on ICT Integration

7. Have you received ICT-related training covering the following topics as a part of administration support? (Select all that apply with an *(tick)*

College administration	
Using subject specific software	
Use of tablets, laptops and phones as resources	
Finding and using materials from internet	
Planning lessons that integrate ICT	
Presentation of exam in ICT platform	
Marking, computing and analysing exam through ICT	

8. College administration provides the required ICT materials in integration and implementation finances regularly and sufficiently.

[ ] Yes [ ] No [ ] occasionally [ ] Not sure

9. Please rate how administrators help in ICT training under the following aspects of support using a scale where (5) Very true (4) True (3) At times (2) No sure (1) Not true

Statement	1	2	3	4	5
Technical support is offered by administrators whenever needed					
Tutors receives timely managerial support from college administration					
Management has been increasing funding yearly to improve efficiency in ICT integration					

SECTION D: Skills Development in ICT Integration

10. How do you rate your ICT skills development as a tutor or administrator? Use a scale where 1= Poor; 2= Fair; 3=Good; 4= Very Good; 5=Excellent

Statement	1	2	3	4	5
ICT basic knowledge and competence					
Expertise and experience					
Technology and familiarization					

11. How do you rate the use the following ICT tools in your teaching? (Please tick (√) the box)

Tool/facility	seldom	sometimes	Often	Very often
Computer				
Digital video camera				
Data projectors				
Television				
Printer				
Interactive whiteboard				
Scanner				

12. Rate the use the following applications in your teaching? (Please tick √ the box)

Tool/facility	seldom	sometimes	Often	Very often
Microsoft word				
Microsoft PowerPoint				
Microsoft Excel				
Digital video editing				
Internet				
Computer Aided design				
Email				

11. All tutors have a positive attitude and a positive view towards integration of ICT trainings. [ ] Yes [ ] No [ ] At times

SECTION E: Infrastructural facilities

12. How do you rate the following ICT tools and facilities in your college?

Use a scale where 1= Poor; 2= Fair; 3=Good; 4= Very Good; 5=Excellent

Tool/facility	1	2	3	4	5
Desktop computers, laptops and tablets					
Application software					
Projectors					
Computer lab					
Printers					
Multimedia facilities example radio, television, digital cameras					
College web, Wi-Fi and net worked computers					

13. If you do have the following facilities, approximately, how many?

Desktop computers	
laptops	
projectors	
Computer labs	
radios	
televisions	
printers	

14. What is the main source of electricity /power in your college?

[ ] Electricity [ ] Electricity & Generator [ ] Generator [ ] Solar

15. How can you rate power supply and its influence ICT diffusion in the college?

[ ] Good [ ] Average [ ] poor

16. How can you rate ICT security in terms of theft, virus and hacking in your college?

[ ] Good [ ] Average [ ] poor

SECTION F: ICT Policy

16. A) Does the college have policy in ICT?

Yes [ ] No [ ]

b) If yes in (a) above, how can you rate teacher trainers involved in preparation of the policy? [ ] Very Good [ ] Good [ ] Average [ ] poor [ ] Very poor

c) In your opinion how is the policy guide towards integration of ICT?

[ ] Good [ ] Average [ ] poor

17. in your opinion to what extent ICT policies influences ICT integration in TTCs?

[ ] Large extent [ ] Average extent [ ] Low extent

Thanks for your respond

Appendix III: Interview Schedule for Administrators

The purpose of this interview is to find out factors influencing integration of ICT in learning. All information provided will be highly confidential.

Bio-data- Please use tick to.

1. Indicate your gender:

Male [ ] Female [ ]

2. Indicate your age:

a) 21 - 30 years [ ] (b) 31-40 years [ ]

c) 41 - 50 years [ ] (d) Over 50 years [ ]

3. Do individual teacher trainers have access to computers? _____

4. If yes in (3) above, how many hours a week would an individual teacher trainers have to work using computer?

…….

5. If no (4) above, why don't the teacher trainers have access to a computer?

……..

6. Do you have internet connectivity in the college? _____

7. If yes in (6) above, how many hours a week would an individual teacher trainer have to internet? _____

8. If no in (6) above, why don't the teacher trainers have access to internet?

……

9. Averagely what is the level of expertise of the teacher trainers in use of ICT equipment?

.....

10. What are some of the tasks the individual teacher trainers use computers for?

i. ……

ii. ……

iii. ……

11. Has there been any form of ICT training for the teacher trainers in the last three years?

_____

12. If yes in (11) above, how many times? _____

13. If no in (12) above, please give a reason(s)

i. ……

ii. ……..

14. Apart from computers, which other ICT equipment do the teacher trainers use in the learning process?

i. ……

ii. …….

iii. ……

15. Are there any challenges of integrating ICT in learning?

……..

16. List these challenges of integrating ICT in learning?

i. ……

ii. ……

iii. ……..

17. Does your office face any administrative challenges on integration of ICT in teaching?

_____

18. If yes in (18) above, please list them.

i. …….

ii. ……

iii. ……...

19. In your opinion what are some of the policy interventions that can be put in place to increase the usage of ICT in process of teaching and learning?

i. ……

ii. ……..

iii. …….

20. Generally, how can college teacher trainers overcome the current factors influencing the usage of ICT in teaching and learning?

i. …….

ii. ……

iii. ……

21. What measures have you put into place to ensure there is enough ICT security?

i. ……..

ii. ……

iii. ……

Appendix IV: Students' Questionnaire.

The purpose of this questionnaire is to find out factors influencing integration of ICT in learning. Please complete each section as instructed.

A. Bio data – Please use *tick* to:

1. Indicate your gender [ ] Male [ ] Female

2. Indicate your age (in years)

a) 20 - 30 years [ ] (b) 31-40 years [ ]

c) 41 - 50 years [ ] (d) Over 50 years [ ]

3. Indicate your level of education [ ] Certificate [ ] Diploma [ ] Bachelor's degree

Others (specify) _____

SECTION B: Cost of ICT training materials.

4. Training ICT helps teacher trainees to use computer in their teaching. Please rate how costly using a scale where 1= strongly disagree; 2= Disagree; 3= Not sure; 4=Agree; 5=strongly agree.

statement	1	2	3	4	5
Purchase price of ICT materials has been and is still high					
Installation cost is high as far as ICT integration.					
Maintenance fee for ICT materials that is software and hardware is high.					
The government lays high and unnecessary tax on ICT materials.					

5. Briefly give reasons supporting your response in 5 above.

i. ……

ii. ……

SECTION C: Administrative support on ICT Integration

6. Have you received ICT-related training covering the following topics as a part of administration support? (Select all that apply with an *(tick)*

Learning using subject software	
Use of tablets, laptops ,desktops and phones as resources	
Finding and using e- material	

7. Please rate how administrators help in ICT training under the following aspects of support using a scale where (5) Very true (4) True (3) At times (2) No sure (1) Not true .

Statement	1	2	3	4	5
Technical support is offered by administrators whenever needed					
Students receives timely managerial support from college administration					
Management has been increasing funding yearly to improve efficiency in ICT integration					

SECTION D: Skills Development in ICT Integration

8. How do you rate your ICT skills development?

Use a scale where 1=poor,2 Fair, 3=Good,4=v.goog,5=Excellent

statement	1	2	3	4	5
ICT basic knowledge and competence					
Expertise and experience					
Technology and familiarization					

9. All students have a positive attitude and a positive view towards integration of ICT trainings

[ ] Yes [ ] No [ ] At times

SECTION E: Infrastructural facilities

10. How do you rate the following ICT tools and facilities in your college?

Use a scale where one=poor, two=Fair, Three=Good, Four=V. Good, Five=Excellent

Tool/facility	1	2	3	4	5
Desktop computers, laptops and tablets					
Application software					
Projectors					
Computer lab					
Printers					
Multimedia facilities example radio, television, digital cameras					
College web, Wi-Fi and net worked computers					

Thanks for your respond.

Appendix V: Krejcie and Morgan Table

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	191	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	324	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

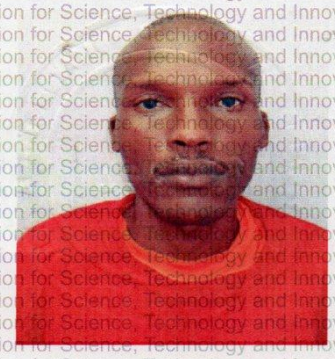
Note: “N” is population size

“S” is sample size

Appendix VI: NACOST Certificate

THIS IS TO CERTIFY THAT:
MR. BENSON MUTUNGA MUASA
of UNIVERSITY OF NAIROBI (UON),
37-1031 Kindaruma,has been permitted
to conduct research in *Kiambu , Kitui , Machakos Counties*

Permit No : NACOSTI/P/19/83517/30810
Date Of Issue : 7th June,2019
Fee Recieved :Ksh 1000



on the topic: *FACTORS INFLUENCING THE INTEGRATION OF INFORMATION COMMUNICATION TECHNOLOGY IN TRAINING TEACHERS IN PUBLIC TRAINING COLLEGES IN KENYA. A STUDY OF KITUI, MACHAKOS AND KILIMABOGO TEACHERS TRAINING COLLEGE.*

for the period ending:
6th June,2020

.....
Applicant's Signature

.....
Director General
National Commission for Science, Technology & Innovation

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014.

CONDITIONS

1. The License is valid for the proposed research, location and specified period.
2. The License and any rights thereunder are non-transferable.
3. The Licensee shall inform the County Governor before commencement of the research.
4. Excavation, filming and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
5. The License does not give authority to transfer research materials.
6. NACOSTI may monitor and evaluate the licensed research project.
7. The Licensee shall submit one hard copy and upload a soft copy of their final report within one year of completion of the research.
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National Commission for Science, Technology and innovation
P.O. Box 30623 - 00100, Nairobi, Kenya
TEL: 020 400 7000, 0713 788787, 0735 404245
Email: dg@nacosti.go.ke, registry@nacosti.go.ke
Website: www.nacosti.go.ke

REPUBLIC OF KENYA

NACOSTI

National Commission for Science, Technology and Innovation

RESEARCH LICENSE

Serial No.A 25194

CONDITIONS: see back page

Appendix VII: NACOST Letter

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone:+254-20-2213471,
2241349,3310571,2219420
Fax:+254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/19/83517/30810**

Date: **7th June, 2019.**

Benson Mutunga Muasa
University of Nairobi
P.O Box 30197-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Factors influencing the integration of Information Communication Technology in training teachers in Public Training Colleges in Kenya. A study of Kitui, Machakos and Kilimabogo Teachers' Training College."*** I am pleased to inform you that you have been authorized to undertake research in **Kiambu, Kitui and Machakos Counties** for the period ending **6th June, 2020.**

You are advised to report to **the County Commissioners, and the County Directors of Education, Kiambu, Kitui and Machakos Counties** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

BONFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:
The County Commissioner
Kiambu County.

The County Director of Education
Kiambu County.

The County Commissioner
Kitui County.

The County Director of Education
Kitui County.

The County Commissioner
Machakos County.

The County Director of Education
Machakos County.