TEACHERS' INFORMATION COMMUNICATION TECHNOLOGY COMPETENCE IN CLASSROOM INSTRUCTION IN DAY SECONDARY SCHOOLS IN MURANG'A COUNTY, KENYA

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DECLARATION

I declare that this project is my original work and has not been presented in any other university/institution for consideration of any certification. This research project has been complemented by referenced sources duly acknowledged. Where text, data (including spoken words), graphics, pictures or tables have been borrowed from other sources, including the internet, these are specifically accredited and references cited using current APA system and in accordance with anti-plagiarism regulations.

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Kimotho Gibson Gikonyo Date

E55/CE/24023/2012

This project has been submitted with my approval as the university supervisor.

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DEDICATION

To the Mighty God for His grace and for granting me the wisdom and inspired me to accomplish this work. To my loving parents Gladys and my late father John who not only nurtured and educated me but were also the sole source of inspiration.

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ABBREVIATIONS AND ACRONYMS

ADB	-	Africa Development Bank
BoM	-	Board of Management
CEMASTEA	-	Center for Mathematics, Science and Technology Education
Dot Force	-	Digital Opportunity Task Force
EMIS	-	Education Management Information Systems
GoK	-	Government of Kenya
HoD	-	Head of Department
ICT	-	Information Communication Technology
ILO	-	International Labour Organization
KESSP	-	Kenya Education Sector Support Programme
KNEC	-	Kenya National Examination Council
MoEST	-	Ministry of Education, Science and Technology
NCST	-	National Council of Science and Technology
OECD	-	Organization for Economic Co-operation and Development
SPSS	-	Statistical Package for Social Sciences
UNESCO	-	United Nations Educational Scientific and Cultural Organization

ABSTRACT

Kenya started taking the path to ICT policies in the 2000s; educators should be on the forefront to implement the curriculum in schools and other learning institutions whose competence and attitudes on ICT influence learners' interests to bring a desired output and uplift the status of education in Kenya. Computers are now available in teacher training colleges, In spite of this development in teacher colleges little attention is given to equip the teachers to be with this knowledge yet they should be on the forefront to implement the curriculum in schools and other learning institutions. Their competence and attitudes on ICT will influence learners' interests to bring a desired output and uplift the status of education in the republic. Limited ICT use to facilitate learning in classroom is a trend that has elicited worries from researchers and experts in education. To address this problem, this study was aimed at establishing the competence of teachers to the use of ICT in classroom instruction in day secondary schools in Kahuro Sub-county. The specific objectives of the study comprised: To find out teachers' ICT competence in classroom instruction, to establish teachers' attitudes and perception towards ICT use in classroom instruction, to find out how ICT is used in day secondary schools and find out the challenges hindering the use of ICT in classroom instruction. The study adopted a descriptive survey design to assess teachers' ICT competence to adopt ICT in classroom instruction to provide quality education and make learning to be more learner-centred. The population for the study comprised all 423 teachers in18 day secondary schools in Kahuro Sub-county. The study targeted the headteachers, heads of departments and teachers drawn from the main departments which include Sciences, Languages, Technical subjects and humanities. Stratified sampling technique was used to group the schools according to divisions i.e. Wangu, Mugoiri and Murarandia Divisions. From each school, simple random sampling was used to select one headteacher, four HoDs and seven teachers. A total of 140 respondents from 12 schools were sampled for the study (this constituted 12 principals, 48 heads of departments and 80 teachers). Data for this research were collected using questionnaires and interview schedules and later analyzed by the use of SPSS. Descriptive statistics such as frequencies and percentages were used to describe the data. Tables and graphs were used for the purpose of presentations. The study established that ICT was used in the following way; typing of notes and examination, analyses of exam results. However, the study found that ICT was rarely used in classroom instruction despite the fact that most teachers had some basic knowledge in computers. The study found that 30% of the schools had invested in ICT resources though to a very low extent. The available facilities were only limited to use in management because they were inadequate to be shared by teachers as they teach. In addition, theft cases and inadequate funding were mentioned as factors hindering the availability of the ICT. The study recommended that the government should help to lay out ICT infrastructure in schools to facilitate the use of ICT in classroom instruction.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Information Communication Technology (ICT) is a component with requisite ability to bring about the much desired educational change and reform in the education arena. If well utilized, ICT can promote access to education and make it more relevant to satisfy the demands of the dynamic labour market. It is clear that the some conservative cultures and pedagogical practices in education are outdated. ICT comprises software, hardware and media for data collection and recording, mass data storage devices, broad-band and mobile networks, search engines, the electronic media for instance television and radio among other related services (UNDP, 2000). ICT has immense power to drive the world to a meaningful social and economic change (Kozma, 2005). As a result, many schools and other learning institutions worldwide have embraced the use of ICT to impart knowledge.

For the first time, some states in America such as California are helping teachers by using ICT to track how students are learning (OECD, 2001). The OECD carried out 107 case studies of schools using ICT in 22 OECD countries. The studies were focused on the organization of teaching and learning. One of the claims made in some of the studies was that the use of ICT helped shift performance monitoring to students themselves. As students used interactive modes of instruction, the software provided performance evaluation (OECD, 2001).

In another study, OECD discusses work by Voogt and Odenthal (1999), who proposed a series of emergent practices associated with the integration of ICT in education, which imply and invite radical change. The study revealed an emphasis

on skill development and cross disciplinary activity more in keeping with a real life, developed and accredited through formative and summative student assessment by a variety of means. Learners will accept more responsibility for their own learning and its assessment thus developing expertise in the process (OECD, 2001).

In the past ten years, chilean researchers assisted by the Ministry of Education, have also begun doing extensive analysis of chilean educational data on regular basis using the power of ICT. From the analysis, the most obvious policies that would stimulate use of ICT in teaching and learning is making ICT training part and parcel of the general educational preparation for high school students and those majoring in education in colleges so that they can get skills on rudimentary statistical analysis. By doing so, the younger generation of teachers would be highly trainable in using ICT to teach.

In Africa, many governments through ministries of education have also acknowledged the power of ICT and are now looking forward to provision and development of ICT infrastructure in learning institutions (Farell & Shafika, 2007). However, the countries border mainly on making computer studies or information technology as an examinable subject and integration of ICTs in teaching and learning (ibid). Boakye and Banini [2008] assessed the teachers use of ICT from schools in Africa which include Ghana, Mali, Benin and Cameroon aimed at establishing whether instructors took part in facilitating integration of ICT into education. It was reported that 71% of the respondents had never used ICT in teaching; only 10% used it in teaching. 44% reported that they had never used ICT in production of instructional materials only 49% had. A third of those who said yes used it quite often and two thirds indicated they used it rarely. The uses included in

Internet searches for content, designing teaching and learning materials as well as typing of lesson notes. Sixty per cent of the respondents reported to have acquired some knowledge on internet, while 71% of them are competent in using email. It was noted that 78% of the instructors trained themselves how to use computers on their own showing they had interest. Even though most instructors never used CT, they unanimously concluded that ICT had positive impacts on learners and were likely to encourage more participation and enhance retention.

In Kenya, ICT policies were first formulated in the 2000s (MoEST, 2006). Educators should be on the forefront to advocate and implement curriculum change in schools and other learning institutions since their competence and attitudes on ICT will influence learners' interests to bring a desired output and uplift the status of education in the Republic of Kenya (Hennesy at al., 2010). According to (Dede, 1998), ICT has the potential to usher in a new era into the education system. Dede argues that computers aids in providing:

- A more lively learning;
- Reduced mental exhaustion;
- Improved learning tailored to individuals; and
- Better coverage of abstract ideas and concepts.

E-learning creates a good platform for teachers and learners to create and disseminate knowledge and information faster, effectively and in a more professional way (Ong, Lai & Wang, 2004). It is de-motivating that most teacher training colleges do not emphasize ICT use as a way of preparing instructors to handle the challenge after graduation; this might be the reason why most instructors

are incapacitated in matters relating to ICT use in maintaining efficiency in education arena (Kinuthia, 2009).

To ensure that ICT use is accomplished in schools, instructors training and preparation is mandatory. Teacher readiness and professional development are paramount and vital for the success of learners, institutions and educational systems. The process of preparing learners should be gradual. In order to achieve good teaching practices, teacher-trainers need to be good and effective teachers as well as role models. This will enhance preparation and creation of digital literate instructors capable of utilizing ICT to facilitate learning (UNESCO, 2007). It is evident that any nation interested in wealth creation should invest in technology (Steketee, 2005).

Taylor and Hogenbirk (2001) observe that the speed at which change is taking place is so swift such that professionals risk finding them outdated in their own jobs if they don't train in ICT. Similarly, countries that won't observe flexibility in shifting to the new changes in ICT and technological advancement in education systems will lag behind. A large-scale study by school net in which 69 secondary schools responded found that only 46 per cent of the sampled schools had computers with availability of internet and facsimile rare in these schools (Kenya School Net, 2003). The findings also indicated that email had not been recognized as a tool for communication for teachers and students, only one school had a website while another two reported having networked all their computers to the internet. It further found that in these schools access to internet was severely limited and when available was only for administrative purposes. The study also found that almost 40% of schools had less than 10 computers which are inadequate for teaching and learning.

In response from the above `challenge, a strategic plan for ICT (e-government) has been developed in Kenya thus encouraging use of ICT in ministries, corporations, schools and other government agencies. The MoE therefore, requires stakeholders in education to partner with other organizations towards successful ICT use in education. Effective ICT utilization in secondary schools and government institutions will be beneficial in improving ICT literacy which may positively affect our economy (MoEST, 2005).

As a result of the rising digital age, it is prudent for teachers to embrace ICTs in their daily classroom teaching to keep education in tandem with the needs of the society which has adopted ICT as a way of life. With the growing of high influx of learners with mobile phones and access to internet reaching millions, coupled with use of ICT in other sectors of government e.g. registration of people and goods, collection of revenue, banking etc., there is clear evidence that there is use of ICT in all facets of life. To bridge the knowledge gap in our education system, the government should respond to equipping teachers and students in secondary schools with requisite knowledge and skills in ICT. It is the high time that Kenya should adopt the pedagogical change. John Dewey once said: "If we teach today's students as we taught yesterday's, we rob them of tomorrow."

1.2 Statement of the Problem

Our society has evolved tremendously and the evolution will continue with the development of ICT. The government through the Ministry of Education must respond to the change by endowing teachers and students with ICT skills as well as ensuring effective and efficient management of the institutions. Therefore, it is important to rethink and be proactive to ensure that the education sector does not lag

behind in responding to the change (Davis, 1996). Teacher training in ICT should be a prerequisite due to teachers' immense role in curriculum development.

Recently, there has been introduction of digital content in the curriculum as well as ICT infrastructure which is an attempt to digitize education. This is an indicator that Kenya is headed to the right direction; towards ensuring that education is taken to another level where teachers need to be competent in ICT use. However, eyebrows have been raised since the rate at which ICT is being adopted and utilized in secondary schools is very slow (Migwi, 2009). Though ICT has been introduced in secondary schools in large numbers, there is limited use to enhance learning in classroom yet it is evident that appropriate use of ICT in schools can transform teaching and learning (Harrison, 2002). To fill the knowledge gap, the researcher aimed at establishing teachers' competence in use of ICT in classroom instruction in day secondary schools in Kahuro Sub-county.

1.3 Purpose of the Study

The purpose of this study was to establish teachers' competence to use ICT in classroom instruction in day secondary schools in Kahuro Sub-county.

1.4 Objectives of the Study

The study was guided by the following objectives:

i. To establish teachers competence in ICT in classroom instruction in day secondary schools in Kahuro Sub-county.
ii. To find out teachers attitudes and perceptions towards use of ICT in classroom instructions in day secondary schools in Kahuro Sub-county.
iii. To find out how ICT is used in day secondary schools in Kahuro Sub-county.

iv. To find out the challenges facing teachers in the use of ICT in classroom instruction in Kahuro Sub-county.

1.5 Research Questions

The study was guided by the following research questions.

i. Are teachers' competent to use in classroom instruction ICT training in Kahuro Sub-county?

ii. How are teachers' attitudes and perceptions towards use of ICT in classroom instructions in Kahuro Sub-county?

iii. How is ICT used in day secondary schools in Kahuro Sub-county?

iv. Which are the challenges facing use of ICT in classroom instruction in Kahuro Sub-county?

1.6 Significance of the Study

The significance of this study is guided by Laudon and Laudon(1998) who in their studies indicated that automation by application of ICT assists employees in performing their jobs more efficiently and speeds up the performance of existing tasks. Therefore, this study is important since it will help to convince teachers and other stakeholders to adopt ICT as a means of improving efficiency in our education system. It will also advocate for paradigm shift in the education sector and eliminate bottlenecks that derail curriculum changes.

The study will also inform the already promulgated policies in education on the extent to which ICT has been used in the teaching and learning in schools, policy makers can review their policies to ensure effective use of ICT in the teaching and learning in secondary schools. The study will help to achieve transformation in

education since it reviews literature on topical issues in education which if well-addressed will raise the quality of education in Kenya.

Furthermore, the study will be of importance to the planners and managers in education since they will get to know how ICT can be applied to improve learning in schools. The findings of this study will also help to provide feasible solutions to some of the challenges facing the education sector in Kenya and other developing world.

1.7 Limitations and Delimitations of the Study

The limitation of the study was that it was only carried out in day secondary schools in Kahuro Sub-county. This left out the boarding institutions; hence the findings may not be generalized to the status of the use of ICT in classroom instruction of all secondary schools in Kenya. Thus by carrying out the study in day schools, the findings of the study was only subject to day secondary schools in the Sub-county.

The study was delimited to selected public secondary schools in Kahuro Sub-county. Out of the 18 day secondary schools in Kahuro Sub-county, the study was carried out in 12 schools. This helped the researcher to minimize the time spent on data collection and the finances to be used.

1.8 Assumptions of the Study

The study assumed that the day secondary schools in KahuroSub-county use ICT in teaching and learning. It is, therefore, upon this assumption that this study was aimed at establishing the status of the use of ICT in teaching and learning in day secondary schools within the Sub-county.

1.9 Theoretical Framework

This study adopted connectivism theory by Stephen Downes and George Siemens. The theory tries to explain how internet technologies have created new opportunities for people to learn and share information across the World Wide Web and among them. The theoretical framework also provides insights into the knowledge, competences and attitudes required for one to flourish in these dynamic times; it further acknowledges that technology alters our brains in a positive way. The concept behind this theory challenges educationists and other stakeholders who have taken so long to recognize both the impact and the environmental changes. Therefore, in this era, it is prudent for teachers to embrace ICT in their daily classroom teaching to keep education in tandem with the needs of the society which has adopted ICT as a way of life. It is implicit that ICT is an agent of change to economic development industrial growth, generation of knowledge and social change globally.

1.10 Conceptual Framework of the Study

The research was based on the relationship between availability of ICT infrastructure, teachers ICT competence, attitudes towards use of ICT and leadership which have an influence on teachers' preparedness. Figure 1.1 shows the conceptual model, which comprises the independent variables and their impact on ICT use. ICT use is dependent on: availability of ICT infrastructure, visionary and effective leadership, ICT competent teachers and positive attitude on the use of ICT.

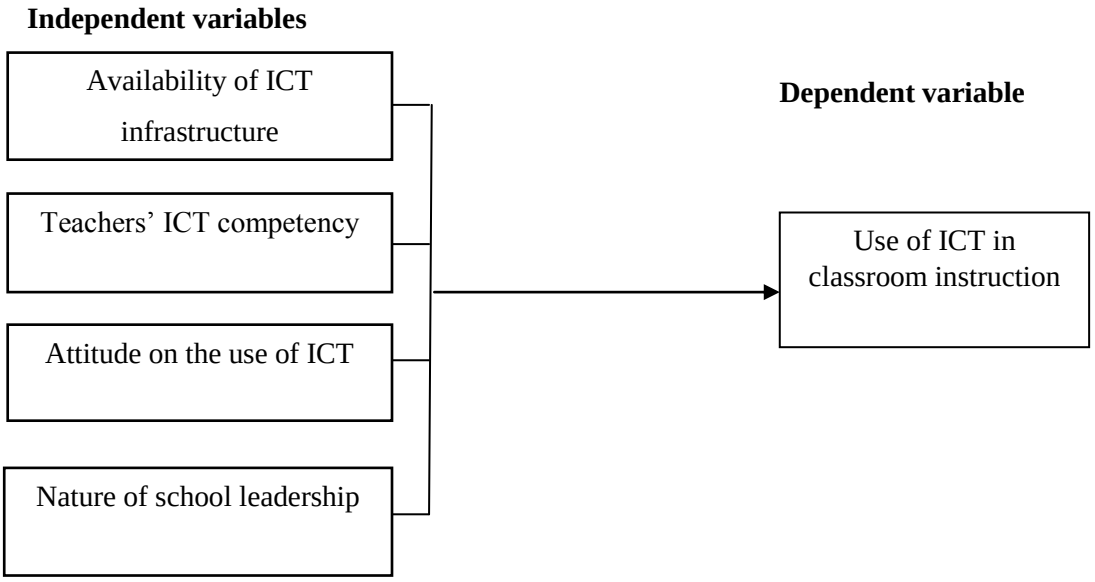

Figure 1.1: Conceptual framework of use on ICT in classroom instruction
Source: Researcher, 2017

1.11 Operational Definitions of Terms

Classroom instruction – The act of teaching or furnishing somebody with information or knowledge.

Competence – Having sufficient skill, knowledge, ability or qualification.

Computer literacy – Refers to one's cognizance and capability to use computers and related technology efficiently.

Drudgery – Tedious, menial and exhausting work.

ICT- Information Communication Technology.

Innovation-The act of introducing something new in customs, rites, behaviors and manners.

Learning -Is acquiring or attempt to acquire knowledge or an ability, behaviors, attitudes skills and values.

Training – Is the process of imparting knowledge to a person so as to meet a desired goal or outcome.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

The present research was based on micro level study in educational technology. Studies at this micro level are relatively few; the reason is that ICT in education is somehow a new innovation. Literature for this study is reviewed under four key thematic areas that include ICT competence among instructors in day secondary schools, teachers' attitudes and perceptions on importance and use of ICT in secondary schools, review on use of ICT in Kenyan secondary schools and challenges facing use of ICT in secondary schools.

2.2.1 ICT Competence among Teachers in Secondary Schools

To achieve the much desired reforms and change in our schools teachers need to train and utilize ICT in school. School managers and leaders must also acquaint themselves and get focused towards its implementation. Otherwise the policies that have been formulated by the MoE may not be realized (Higgins & Moseley, 2011). It is the high time that investment in ICT should be seen as a need but not an additional cost. The government must now focus on planning how teachers will be trained in ICT and ensure that schools have the capacity to offer up-to-date knowledge in ICT.

Researchers have identified a major challenge in many developing countries on matters touching on utilization of ICT in schools. There is a shortage of skilled staff, and in case they exist, they are IT experts with no training and experience in education. Though educators are an important component with a major role in

adoption and utilization of ICT at school level, they face challenges as some of them lack adequate knowledge and skills. Schools also face a challenge of inadequate ICT teachers and IT professionals that are not comfortable in schools and are looking for greener pastures in the private sector where they can get better remuneration and hence job satisfaction. This trend poses a threat to schools and the government since the most competent personnel is not likely to working such environment with a better alternative somewhere.

Research by Kandiri (2012) shows that, the number of qualified ICT teachers in Kenya technical and secondary schools is low as compared to those in other sectors. Out of 2250 ICT graduates who qualified from colleges and universities in 2010, 60% were employed as ICT experts in industries while 40% were hired as ICT instructors in learning institutions in Kenya. Among the instructors, 21% were in colleges and 79% were in secondary schools. The scenario portrays that most ICT graduates prefer careers in industrial sector rather than working in educational institutions where the pay is not lucrative.

Another study done in Kenya by Ministry of Higher Education, Science and Technology on ICT acceptance and utilization in secondary schools reveal that among the 232 instructors sampled, the biggest number (57%) indicated that they had a certificate in basic computer skills, 73% of them got training through on job training and 43% were trained by private computer colleges (MoEST, 2010).

On ICT training in Kenya secondary schools, it has been found that 55% of the instructors do not receive any training at all in ICT use during their teacher training before employment. But, it was found that 51% of the teachers had motivation to

train in ICT in the last three years they have been teaching, Ayere, Odera and Agak (2010). That is a clear gesture that there is need to review the curriculum in teachers training colleges in Kenya to address the inadequacy of the skill in the teaching service.

Hennessy (2010) found that most of software used train teachers on elementary computer skills instead of focusing on integration of technology in classroom instruction. The proposition is emphasized by Andoh, (2012) when he argues that teacher training colleges tend to overemphasize on teaching about ICT rather than how to use ICT to facilitate meaningful learning.

It is now clear that teacher training colleges are doing very little to accept the challenge and change their pedagogical approaches as concluded by Andoh (2012). It is, therefore, in order for the government through Kenya Institute of Curriculum Development (KICD) to initiate the changes through curriculum review. Otherwise, if nothing is done, then achievement of vision 2030 remains a mirage.

Inadequate training of teacher trainees in ICT is common in both developing and developed countries. This can be said to be why teachers do not practically use ICT. Teacher training colleges must rethink on teacher training with an objective to provide a platform to practise using technology before they are employed across the country. It is possible for instructors to adopt and use ICT in class teaching if teacher training offered them enough time and space to learn, practise, socialize, and assist each other in matters relating to technology. According to Higgins and Moseley (2011), teachers' limited knowledge on reasons for ICT use has continued to jeopardize implementation of ICT in schools.

It has been noted that internet connectivity is still improving in schools with the efforts of mobile network providers like Safaricom and Airtel and students are also curious of using computers for learning though they aren't available for every learner. Most teachers especially the youth have access to computers which they use to access educational content that is up-to-date. The research attempted to explain why teachers use ICT. Teachers' use of computers enhances their skills in typing and record keeping.

Saitoti (2007) argues that in order to improve a literacy level which is one of the Millennium Development Goals (MDGs), we must introduce and invest in ICT .He advocates for introduction of ICT syllabus in all secondary schools. It is unfortunate that five years since then we still have teachers perceiving ICT use as important but are not prioritizing its implementation.

This suggests that school administrators should lobby and mobilize the school community, NGOs, development partners, local leaders, other stakeholders' and well-wishers to contribute funds towards the development of ICT infrastructure. Universities and tertiary institutions should also introduce ICT training programmes that are relevant to teachers' needs. Training is critical to cultivate a cultural change from conservatism to progressivism and prepare the workforce to handle challenges that come with change. In addition, training in ICT will prepare competent professionals to develop relevant applications, maintain and support systems. Moreover, timely preparation and formulation of feasible policies will enable citizens to accept and understand that change is gradual and inevitable.

The International Labor Organization (ILO, 2001) notes that, countries with the requisite skills are likely to be competitive and more favoured destinations for global investors and entrepreneurs. Similarly, countries that will integrate ICT in teaching and learning are likely to have improved quality and relevance in education that meets the demands of the dynamic world. Devoid of such skills, it would be difficult to produce globally competitive graduates. Teachers in Kenya need to be prepared towards reduction of illiteracy in ICT since it currently remains a major challenge not only in Kenya but also in most countries in the developing world.

In the secondary school context, teachers and students need the first one since the second option can be pursued by those students who need to specialize in areas of ICT. However, teachers in Kenya have received very little or no training in ICT and therefore, they are too rigid to utilize ICT. Hannafin and Savenye (1993) cite possible reasons for this rigidity: lack of good will and support from the administration, doubt about the effectiveness of ICT in the learning process, complexity to learn the technology and how to use it in teaching and learning, and how to control digital curious learners and restrict them only to meaningful learning using ICT. These are all challenges that must be addressed by teaching ICT integration to teachers in teacher training colleges before employing then and exposing those already in-service teachers to training programmes. This will ensure educators are adequately prepared to take the advantages of ICT.

A study by School Net found that use of ICT in schools to facilitate learning was rare. ICT was mainly used for administrative purposes. Additionally, email was not actually used for socialization by students, teachers and other staff. The study concludes that infrastructural development and teachers' knowledge and skills are

key determinants (Venezky & Davis, 2002). For tremendous change in learning and teaching practice, teachers have to be much more prepared, determined and focused. An additional material, financial and technical support is needed to make ICT a vehicle for the desired transformation in our education system. According to Annan (2001), ICT deployment in education can improve access to education and deliver desirable results, it can enhance methodology shift from traditional way where knowledge is passed from the teacher to a learner without any room for critical analysis on the part of the learner. Use of ICT to produce ICT-literate graduates and a competent, dynamic workforce is also in line with the human capital theory of education. Hawkins (2002) stated that workers must be ready to acquire new skills. Increasing the skills of the workforce has the ability to benefit the economy as a whole and raise individual earnings and make them more competitive.

To address the gap in teachers' skills in ICT, it is prudent to review teacher training curriculum to embrace ICT training in teacher training colleges and universities .In-service training of teachers through seminars and workshops should be embraced to ensure that the workforce is ready to implement ICT in teaching and learning. Instructional materials need to be prepared by curriculum developers so as to equip learners with ICT knowledge. Policy review on financing of schools is vital since most ICT materials are expensive to procure and maintain. Security also should be tightened to ensure safety of materials in schools prone to banditry attack.

2.2.2 Teachers' Attitudes and Perceptions on Importance and Use of ICT in Schools

There is a view that aspects of individual attitude and belief are the main factors influencing teacher's use of ICT (Kaino, 2004). This means that a teacher needs to

cultivate a positive attitude towards ICT use. Heppel at al., (2004), they noted that teachers must believe that the use of technology can effectively meet the teaching and learning objectives; they must have the confidence, ability and access to necessary resources to apply technology in their work. Therefore, if teachers perceive the use of ICT in teaching and learning positively, it is easy to come to its successful implementation (Keengwe & Onchwari, 2011).

Another review by Simonson (2008) shows a connection between teachers' competence, perception and attitudes and adoption of ICT. The more competent teachers were in ICT, the more likely they were to use it in classroom. Therefore cultivation of good attitude, relevant and timely training will impart a good culture of ICT integration. This is affirmed by Huang and Liaw, (2008) in a study that shows teachers competence, attitudes and perceptions have an impact on their adoption and acceptance of the usefulness of ICT in providing desirable learning outcomes. Furthermore, a study by EU School Net in six European Union countries which involved teachers' use of Acer net books found that ICT aroused interest, facilitated individualized learning and helped to make learning a continuous process which went beyond school day. Woodrow, (2002) suggests that in order to ensure transformation of our educational practices then teachers need to be flexible.

Administrators, managers and leaders who perceive ICT use positively are determined and support the use of ICT in spite of the challenges that come with it. Le Baron and Collier (2001) observe that; until the arrival of the digital age, ICT implementation was not emphasized. Very little resources were committed to acquire ICT infrastructure and equip the workforce with ICT knowledge.

Principals are instrumental in creating goals and objectives that guide the sponsors and the school community towards achieving instructional goals and objectives. Through mobilization of funds and resources, ICT use will become a reality. This is noted by (Gurr, 2010) that principals who are focused, creative, innovative and inspirational help to pass the same qualities to his /her staff. Flexibility and willingness to learn use of ICT should not only be emphasized by the principals but also to the other members of staff. The principal has the capacity to provide of up-to-date ICT infrastructure to encourage faster and effective communication. They should network with stakeholders, schools alumni and well-wishers who are willing to support implementation of ICT in their schools. Parents should also be sensitized on the positive impacts of ICT to improve active learning since it is likely to elicit interest making them participants in implementing ICT. Provision of modern and elaborate ICT infrastructure is necessary for staff professional development where they are trained to use ICT while on the job.

Availability and access to up modern ICT resources will challenge and encourage educators to acquire knowledge and requisite skills in ICT. Grono (2010) noted that, schools have adopted a strategy of providing ICT materials before training the teachers. Unfortunately, very few principals have a computer in their office most can't afford since they have not even met the demand of classrooms and other basic facilities. The level of insecurity has also discouraged them from equipping the schools with ICT due to vandalism. Financial constraints even make it difficult to recruit skilled security personnel.

In addition, Ng (2008) in a survey of 80 secondary schools in Singapore, found that principals who were aggressive in identifying and creating a vision, steering the

schools towards achievement of common realistic goals, nurturing individualized support, motivating teachers and students towards academic excellence and supporting as well as strengthening school culture and traditions, influenced implementation of ICT in schools. Moreover, Afshari (2012) on a study comprising 30 school leaders in second cycle institution in Tehran shows a correlation between school leader's computer competence and attitudes towards adoption and utilization of ICT in schools. However, there is a gap that touches on teachers' reluctance to accept ICT as a way of creating efficiency in the education sector. It is also important that the government through the ministry of education focuses on cultivating positive attitude among the teachers in Kenya so as to enable them implement the change in schools. Wong and Li (2008) observe that teachers with interests, attitudes and competency in ICT are likely to be more dedicated and cooperative towards successful ICT implementation.

2.2.3 Use of ICT in Secondary Schools

ICT was emphasized in Kenya in January 2006 by proclamation of a National ICT policy which paved a way for use of ICT to enhance efficiency and accountability in its sectors. Kenya government is committed to increase access to basic education to all as one of the millennium development goals. Therefore, the government of Kenya is determined to use ICT and other resources to achieve the goal. Basic education has high social returns since it raises literacy levels, has the potential to reduce petty crime, improve sanitation and increase social awareness in areas of nutrition, environmental conservation and family planning. The policy is intended to enhance acquisition of both formal and informal education since ICT skills will enable the population to share knowledge and ideas in the social media which will

enable the country to thrive into a business community, entrench into a democratic state and also acquire the status of a knowledge economy.

The policy on use of ICT in education sector was affirmed in February 2010 by the announcement from the Kenya National Examinations Council; an institution responsible for administration of examinations in Kenya. A circular was sent to all education officers registering candidates for the 2010 (KCSE). In addition, the message also featured in the Standard Newspaper, as reported by Otieno (2010): "this year's KCSE candidates will be registered online on the Kenya National Examinations Council (KNEC) website, according to the new guidelines set out by the examinations council." The KNEC boss reported that candidates' registration was to be done using the internet platform. He advised schools not connected to the internet to visit cyber cafes or government institutions served with internet. It is also notable that the results are now available online where candidates, parents, guardians, schools and other stakeholders can access them.

Mucheru (2011) notes that, most citizens have shifted to mobile phones to do business and other daily activities. He therefore, urges educationists to consider moving the ICT way as an approach to deliver educational content to make sure that they remain relevant. He also projects more growth in provision of internet connectivity which will facilitate passage of information from one point to another.

Studies in Kenya and other countries have shown differences on the standards and use of ICT institutions. Makau and IDRC (1990), teachers in mathematics and the sciences were found to use computers more than other teachers. It was reported that during most of computer-assisted lessons, teachers lost control of the learners thus leaving them doing activities far away from the lesson objectives. In other cases,

learners perceived the interaction with the computers as formal and informal platforms as well as time for leisure and relaxation as opposed to serious learning. Learners would also carry their own data storage devices so as to watch videos, download music and get access to other prohibited materials. This is an indicator that the computer is ‘seen’ as a learning tool; more interesting and likely to be more beneficial than integration of the technology into the education system and curriculum.

The input of ICT in education has desirable outputs for instance in enhancing the quality of teaching and learning, improving productivity in research as well as generation of new knowledge and ideas among the teachers and learners. It is also an effective tool in management of human and physical resources as well as ensuring accountability and transparency in use of school funds (Kashorda et al., 2007). Despite that, developing countries face a number challenges in realizing the ICT power in transforming education since most developing countries have challenges in acquiring ICT materials.

Instructional management strategies are used to help teachers plan and assess what they will teach in their respective classroom or discipline. Lesson plans, grade books, attendance tracking, unit tests, progress reports, and report cards are instructional management strategies required by the teachers. The current process is primarily paper-based and, as a result, labour-intensive and error-prone. These teaching and assessment strategies are difficult for teachers to maintain and for principals to review. Request for new courses may be developed at the school level and implemented on a pilot basis for further review and approval. The introduction of information technology in schools has made enormous improvement and

efficiency in the way they are managed. According to Osin (1998), computers have been used in the management of data to simplify and enhance proper record keeping which is key in ensuring accountability.

According to World Bank (1999), computers have brought efficiency in schools by lessening teachers' workload; record keeping has been simplified since a teacher is able to make a follow-up and identify a learner and his or her trend in performance, this enables the teacher to give special attention to learners with special academic needs. It shows there is a gap in the way computers are utilized; more emphasis is given to carrying out administrative duties than using ICT to facilitate learning.

2.2.4 Challenges Facing Use of ICT in Secondary Schools

Several studies have revealed challenges that face teachers in their pursuit to utilize ICT in the teaching and learning activities. The challenges touched on: teachers themselves, teaching methods, institutions and the entire education system. They include: Teachers' low morale, lack of confidence and limited exposure to ICT facilities during training and while on job makes teachers naive about using ICT in classroom instructions; most teachers would hardly admit to the learners that they have limited knowledge in computer and computer related applications (Becta, 2004). Studies have also found the need for teachers to believe that individual attitude and belief are the main factors influencing use of ICT (Kaino, 2004).

In addition, teacher training curriculum does not adequately address the issue of ICT use in enhancing teaching and learning. Educators are not prepared to learn and use technology due to the increased time and effort needed to learn and use it during lesson preparation and content delivery. Though some have excellent ICT skills for

their own personal use they do not fully extend the knowledge to learners during the lesson since the requisite infrastructure is unavailable (Becta, 2004).

In the school context, teachers don't have access to high quality hardware and education software since most are expensive so they opt for cheap ones which can breakdown during the lesson hence causing which ICT experts consider as an obstacle to advanced development of ICT in education. Poor maintenance of computers is also a challenge because they are expensive to maintain. So, they are rendered ineffective and unreliable. Furthermore, some schools lack administrative support (Hannafin & Savenye, 1993).

Students and teachers can't access ICT resources any time since they are few and in some schools a teacher must book the ICT class in advance, internet connection may also be minimal as internal school network since the administrator needs to regulate its use to avoid paying high bills. In cases where modems are used daily, subscriptions can't sustain the internet demand. ICT equipment usually breakdown and fail to operate hence limiting their access.

ICT in many schools is not prioritized since ICT integration is not considered as part of the curriculum. Though some schools have developed ICT strategies, very little is being done to put the strategies into practice and little or no funding is channeled to ICT.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter presents research design, location of the study, the target population, the sampling procedures, the research instruments, piloting, reliability and validity of the research instruments, and procedures for collecting and analyzing data.

3.2 Research Design

A descriptive survey design was adopted to assess teachers' competence to adopt ICT in classroom instruction to provide quality education and make learning to be more learner-centred. Descriptive survey designs enables researchers collect data, summarize, present and interpret for the purpose of clarification (Orodho, 2010:36). The locale of the study was Kahuro Sub-county in Murang'a County in Kenya. It has three administrative divisions, namely; Murarandia, Mugoiri and Wangu. It is a typical rural region inhabited by small-scale farmers and peasants who characterize the low income earners. The selection of this location for the study was based on the reason that most day schools had received ICT materials to facilitate learning from donors and other organizations and therefore, there was need to find out whether teachers were competent to use those ICT materials. The researcher is also familiar with the locality since he has worked there for a number of years. This provided him an opportunity to conduct the study on teachers' ICT competence in classroom instruction with an environment and situation void of problems associated with strange research locations. Singleton (1993) states that, an ideal setting is where the researcher has interest in and can easily meet respondents enabling him to develop a good relationship.

3.3 Target Population

A population refers to a collection of individuals or institutions with one or more common traits of interest to the researcher (Cooper, 1996). The target population of this study comprised all the 18 day secondary schools in Kahuro District (MoEST, 2015); 18 headteachers; about 100 teachers and 22 heads of departments (HoDs) drawn from the main departments which include sciences, languages, technical subjects, humanities, games and guidance and counselling. The total population for the study was 140 subjects.

3.4 Sampling Procedure

Stratified sampling technique was used to group the schools according to divisions i.e., Wangu, Mugoiri and Murarandia divisions. Coopers and Schindler (2001) state that systematic stratified sampling is whereby the population is first divided into strata; study samples are then drawn from every stratum. By sampling from the strata, the researcher ensured that all the divisions in the area of study were represented in the sample size.

Divisions were the sampling units of the study, namely; Wangu Division, Mugoiri Division and Murarandia division. Wangu has 8 day secondary schools Mugoiri has 9 while Murarandia has 5 day secondary schools. From each division, simple random sampling technique was applied to proportionally select a sample of 12 schools on the basis of the following formula:

$$S = \frac{D}{K} x M$$

Where, S= number of sample from the division

D= number of schools in the division

K=total number of day secondary schools in Kahuro Sub-county, 2015

M=maximum number of schools studied

Source: Researcher

Approximate samples are calculated thus;

Wangu Division S=8/18×12≈5

Mugoiri Division S=7/18×12≈5

Murarandia Division S=5/18×12=3

From the foregoing, simple random sampling was used to select 5 schools from Wangu, 4 schools from Mugoiri and 3 from Murarandia giving a total of 12 schools. Simple random sampling was preferred because it enables the researcher to make inferences that are generalized to the entire population (Orodho, 2010). From each school, simple random sampling was used to select 1 headteacher, 4 HoDs and 4 teachers. A total of 140 respondents were, therefore, sampled for the proposed study. The table below summarizes the sampling procedure of the study.

Table 3.1: Sample for the study

Sampling unit	Variable	Population (N)	Sample (n)
Wangu Division	Headteachers	8	5
	HoDs	48	20
	Teachers	125	30
Mugoiri Division	Headteachers	9	5
	HoDs	47	20
	Teachers	112	25
Murarandia Division	Headteachers	5	3
	HoDs	30	12
	Teachers	69	20

Source: Researcher (2017)

3.5 Data Collection Instruments

Data for this research were collected using questionnaires Moully (1978) and Orodho (2009) note that the questionnaire approach is efficient in time usage, enables anonymity of the respondents to be preserved and ensures questions are up to standards. The questionnaire was prepared for the headteachers and teachers. The researcher considered it ideal because the respondents recorded and interpreted it individually. The questionnaires for the headteachers provided information on availability of ICT infrastructure, teacher skills in ICT, leaders' attitude on ICT use and challenges faced by the leaders to acquire ICT infrastructure. The interview schedule was used to collect data from the HoDs due to their characteristics that they can be used to capture information that would otherwise not be captured using questionnaires.

3.5.1 Questionnaire

This is an instrument used to collect data; it permits a measurement for or against a given perspective. It is capable of collecting a wide range of data very easily within a short duration. The tool enables one to justify the purpose of the research, give meaning and clarify any issue which may be unclear to the respondent (Orodho, 2004). Therefore, the researcher utilized the instrument to gather data from the principals in the sampled schools in Kahuro Sub-county. The instrument targeted the population since it is learned and minimizes the interpretation of the questions. The questionnaires were divided into different sections whereby each section addressed questions meant to achieve each of the specific objectives of the study.

3.5.2 Interview Schedules

Yin (2003) defines the interview as a face-to-face interaction that gives the interviewer a chance to get first-hand information from the respondents. The researcher used interview schedules to collect data from HoDs. Kerlinger (1973) observes that respondents are more willing to give verbal responses than in writing hence providing information more easily. The interview schedules were, therefore, prepared from the formulated questions of the study.

3.6 Piloting of Instruments

Piloting of the instruments was done at Mukumu Secondary School in Murarandia division; a day school that resembles the sample selected in the study but was not to be part of the sample for the study. The procedure used in pre-testing the questionnaire was similar to that used during the actual data collection. Questionnaires were administered to the headteacher and sampled teachers in the school. Pre-testing enabled the researchers identify any shortcoming present in the instruments of the study.

3.6.1 Content Validity

To measure validity of the instruments used in the study, a party of two specialists in the field of ICT for classroom instruction was requested to assess the instruments. They assessed the tool independently giving their feedback to the researcher. Their recommendations were incorporated in the questionnaires and Interview schedule.

3.6.2 Reliability of Instrument

This is a test of the extent to which a research instrument yields consistent data after repeated trials (Mugenda & Mugenda, 2003). Using the test-retest method, the

instrument was administered at Mukumu Secondary School twice to the same group mentioned above, with a time lapse of two weeks between the first and the second test, keeping all the initial conditions constant. The researcher used Pearson's product moment formula to calculate the correlation coefficient so as to find consistency of responses after administering the instrument for a number of times. A correlation coefficient of about 0.8 was higher to consider the instrument reliable for the study (Orodho, 2010:31).

3.7 Data Collection Procedure

Data collection procedure included the following: Obtaining a research permit from the National Commission for Science, Technology and Innovation (NACOSTI), visiting the headteachers of the sampled schools in advance before the actual time for data collection to seek permission to carry out research in schools, give a letter informing him about the nature of the study and co-operation being sought from the school, identifying the teachers to be included in the sample, make prior arrangements with the principal regarding identification of teachers to be included in the sample and allocating time for filling out questionnaires by the principals and teachers. The questionnaires were taken to the sampled principals and teachers to request them to fill and handover the filled-in questionnaires after one week; as the questionnaires were being filled by the above respondents, the researcher facilitated the interview schedule.

3.8 Data Analysis Plan

Raw data were cleaned to correct mistakes, coded to translate question responses into specific categories; coding was expected to organize and reduce data into manageable summaries. Quantitative data collected were analyzed, presented and

interpreted using both descriptive statistics while content analysis technique was used to analyze qualitative data collected using interview schedules. Statistical Package for Social Sciences (SPSS) package was used to analyze the quantitative data. Descriptive statistics such as mean, mode, standard deviation and graphical presentation and inferential statistics were also used to make generalizations.

3.9 Ethical Consideration

The researcher had to liaise with the principal so as to get permission to carry the research in the sampled schools. The arrangement was crucial to avoid impromptu visits into schools without a pre-visit to verify on the reason of the visit. Confidentiality of the data was maintained by ensuring that the data were used without referring to the actual names or institutions where data are got.

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter presents the findings of the study. The findings have been anchored on the study objectives and discussed to establish the implications and inferences. The purpose of this study was to establish teachers ICT competence in classroom instruction in day secondary school in Kahuro Sub-county. Specifically, the study explored the following specific objectives: To establish teacher ICT competence in classroom instruction, to assess teacher perceptions and attitudes on ICT use in the schools and to find out the challenges facing the use of ICT in teaching and learning. The analysis of data begins from describing the response rate, demographic information and then thematic analysis of the study objectives.

4.2 Response Rate

The study sampled 140 respondents. However, only 102 respondents participated and completed the study instruments. The response rate was as displayed in figure 4.1.

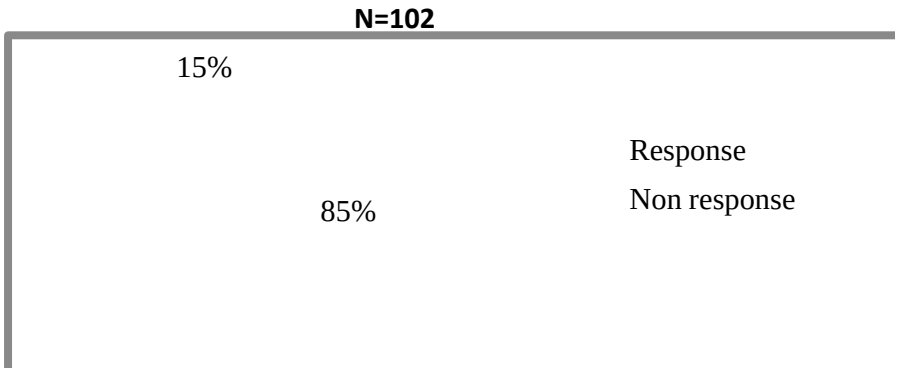

Figure 4.1: Response rate

Source: Researcher (2017)

Out of 140 sampled respondents for the study, 102 responded giving a response rate of 72.86%. The response rate was adequate to validate the findings of the study. Mugenda and Mugenda (2003) assert that a response rate of 70% is adequate to make inferences for the whole population.

4.3 Demographic and General Information of the Respondents

Some of the demographic information explored in this study includes: gender and age category. The study also explored the departments and years of experience of the teachers. The data were deemed necessary because potentiality influences the nature of responses provided by respondents.

4.3.1 Distribution of the Respondents by Gender

The respondents were asked to indicate their gender as shown in figure 4.2.

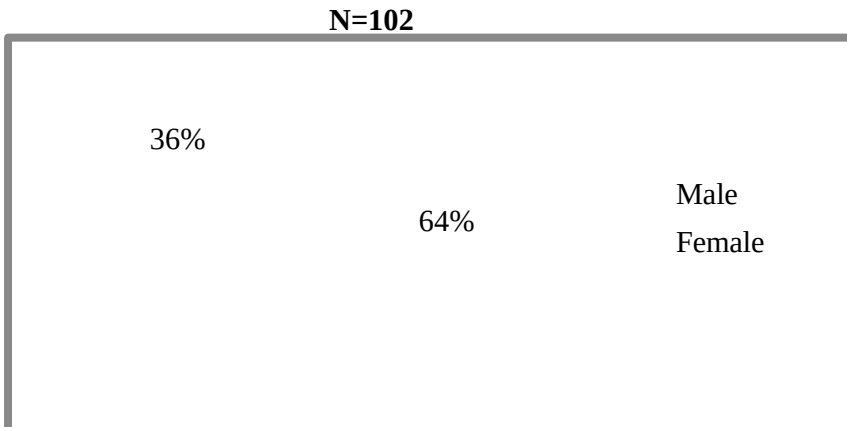

Figure 4.2: Distribution of the respondents by gender

Source: Researcher (2017)

The study found that 64% of the respondents were male while 36% were female, which implies that there are more males than females in the day secondary schools in Kahuro Sub-county.

4.3.2 Distribution of Respondents by Department

The teachers were asked to indicate their department. The findings of the study were as presented in figure 4.3.

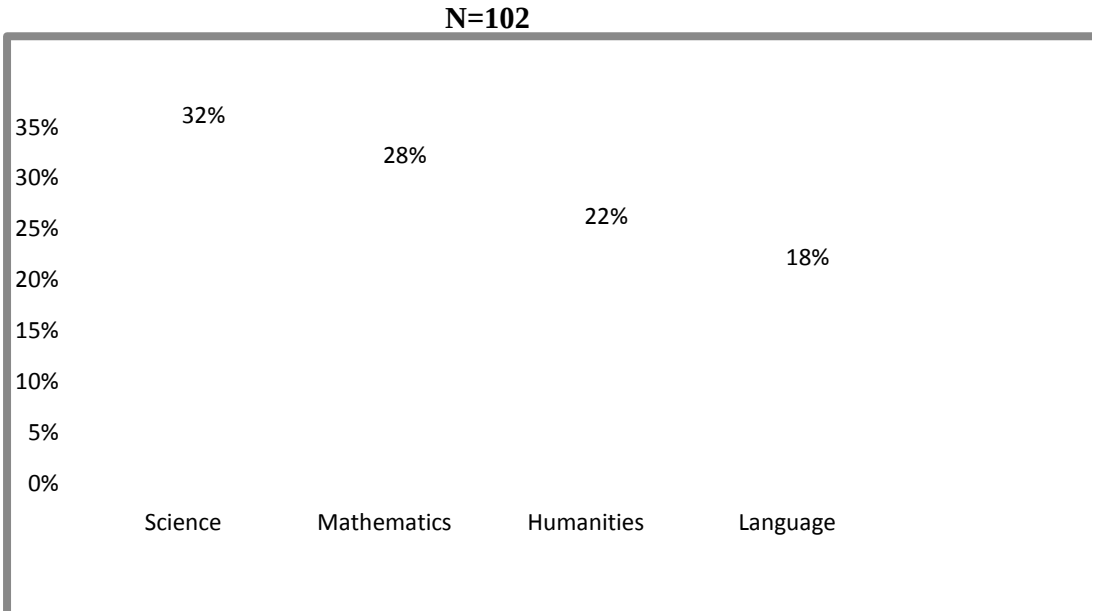

Figure 4.3: Distribution of teachers by department

Source: Researcher (2017)

According to the figure 4.3, it is evident that 32% of the respondents were from science department while 28% were from mathematics, humanities were 22% while language were 18%. This implies that the schools in Kahuro Sub-county had majority of teachers as science and mathematics teachers.

4.3.3 Distribution of the Respondents by Year of Service

The teachers were asked to indicate the period in which they had served as teachers. The response was as shown in figure 4.4.

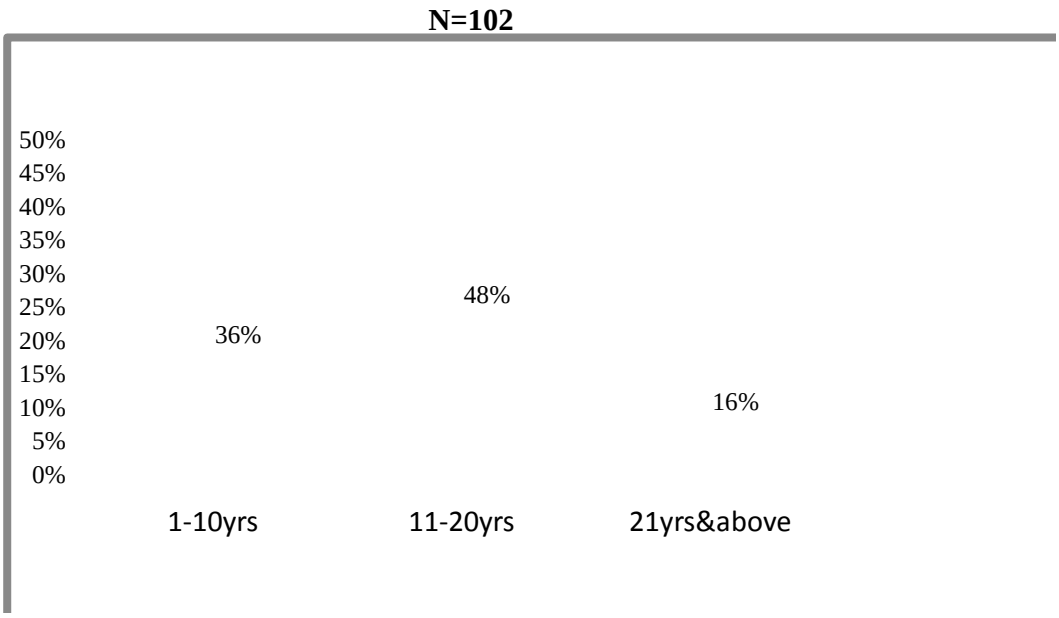

Figure 4.4: Distribution of teachers by year of service

Source: Researcher (2017)

From the response of the respondents, it can be deduced that 36% had served as teachers for 1-10 years while 48% of the respondents had served as teachers for a period between 11-20 years and only 16% had served for a period above 21 years. The findings affirm Higgins and Moseley, (2011) who found that teachers' limited knowledge on ICT has continued to jeopardize implementation in schools.

4.4 Availability of Computers in Schools

The respondents were asked to indicate whether they had computers in their schools and were further asked to mention the level of adequacy of the available of computers. The following were their responses.

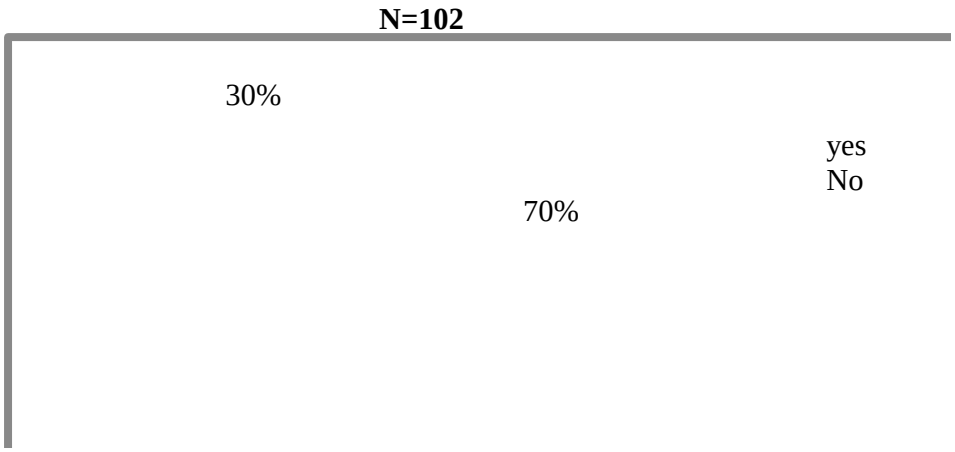

Figure 4.5: Availability of computers in schools

Source: Researcher (2017)

From the findings above, it can be said that most schools had computers as indicated by 70% of the respondents as presented in the figure 4.5. Those who mentioned that they had computers in their schools (30%), mentioned that they were inadequate for use in teaching and learning since they were used in management. The findings concur with Osin (1998), who stated that computers have been used in management of data to simplify and enhance proper record keeping. This has helped to improve efficiency and accountability in management of resources in schools so as to achieve the desired meaningful outcome and improve service delivery.

4.4.1 Use of Computers in day Secondary Schools

The respondents were asked to indicate how they used computers in schools. The findings were as presented in table 4.1.

Table 4.1: Duties performed using computers

Duties	F	%
Keeping students records	41	40
Typing letters	102	100
Memos and examination	92	90
Analysis of exam data	31	30

Source: Researcher, (2016)

All the respondents (100%) mentioned that they used computers to type letters, 90% used computers to create memos and examination. It was evident that 40% of the teachers used computers to keep students records while 30% used them to analyze examination results. This is in line with World Bank (1999), computers have brought efficiency in schools by lessening teachers' workload; record keeping has been simplified since a teacher is able to make a follow-up and identify a learner and his or her trend in performance this enables the teacher to give special attention to learners with special academic needs. This shows there is a gap in the way computers are utilized; more emphasis is given to carrying out administrative duties than using ICT to facilitate learning.

4.4.2 Availability of Internet in the Schools

The respondents were asked to indicate whether they had internet connections in their schools or not. Their responses are presented in figure 4.6.

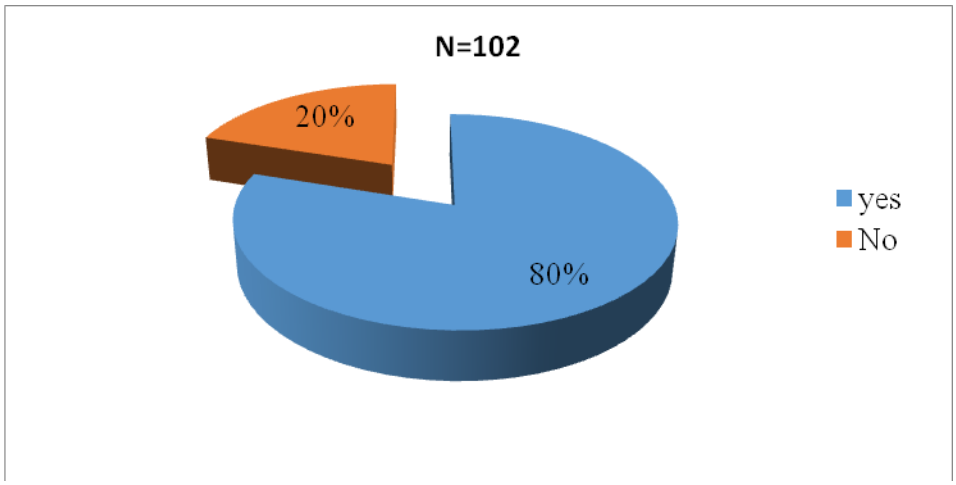

Figure 4.6: Availability of internet in the schools

Source: Researcher (2017)

The study found that most of schools (80%) had internet connection while 20% didn't have; an indicator that internet connectivity is low in most schools. This is affirmed by a large-scale study by Kenyan School Net in which 69 secondary schools responded found that only 46 per cent of the sampled schools had computers with availability of internet and facsimile rare in these schools (Kenya School Net, 2003). The findings also indicated that email had not been recognized as a tool for communication.

4.4.3 Computer Literacy among Principals

The respondents were asked to indicate whether they were computer literate or not. The findings were presented in figure 4.7.

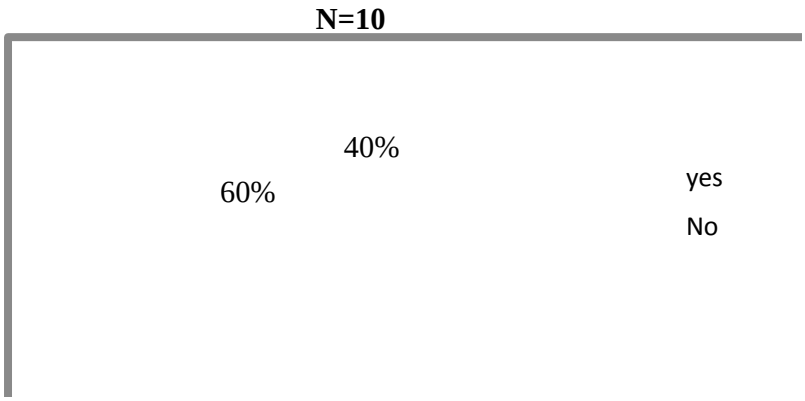

Figure 4.7: Computer Literacy among Principals

Source: Researcher (2017)

From the above figure 4.7 it is evident that most of the principals (60%) are computer illiterate with only a portion of 40% being computer literate. This implies that many schools are headed by headteachers who are computer illiterate yet principals are instrumental towards driving the school towards any desirable change. These findings concur with Afshari (2012) on a study comprising 30 school leaders in second cycle institution in Tehran which shows a correlation between school leader's computer competence and attitudes towards adoption and utilization of ICT in schools.

4.5 Computer Literacy in Teachers

The teachers in several departments were asked to indicate whether they were computer literate or not .Their responses were as follows.

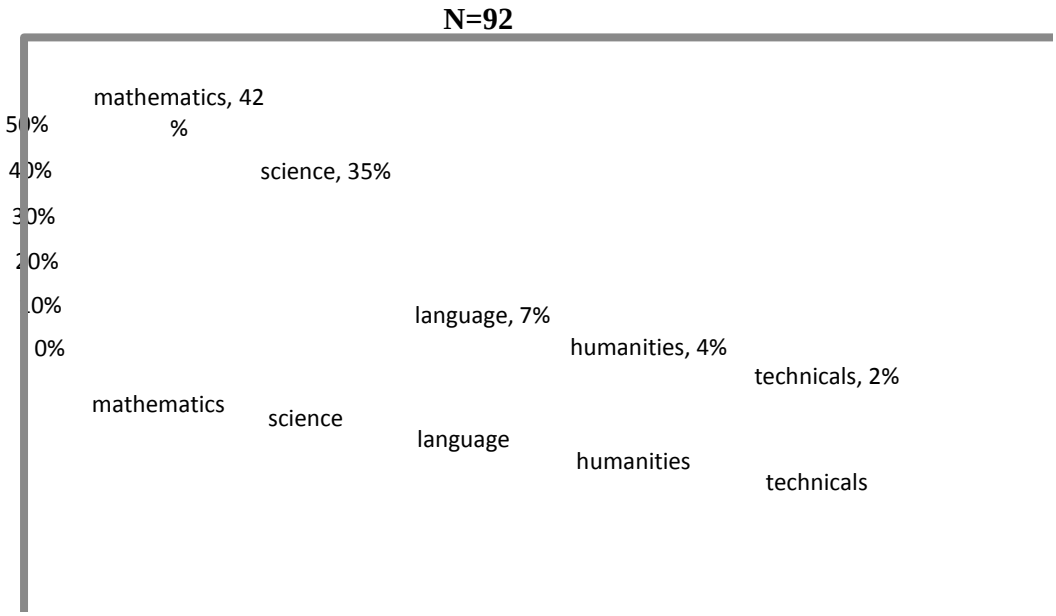

Figure 4.8: Computer literacy among teachers in respective departments
Source: Researcher (2017)

The study found that teachers in Mathematics and Science departments were more knowledgeable in ICT with 42% and 35% respectively as compared to teachers in language, humanities and technical departments. Research by Kandiri (2012), shows that, the number of qualified ICT teachers in Kenyan technical and secondary schools is low as compared to those in other sectors. Out of 2250 ICT graduates who qualified from colleges and universities in 2010, 60% were employed as ICT experts in industries while 40% were hired as ICT instructors in learning institutions in Kenya.

4.5.1 Computer Literacy

Teachers who indicated that they were computer literate were asked to mention their areas of computer literacy and the results are as shown in table 4.2 below.

Table 4.2: Computer literacy

Package	F	%
Ms word	69	75
Ms Excel	37	40
Power point	32	35
Internet	64	70

Source, researcher (2016)

The researcher found that 75% of the teachers had basic knowledge in Ms Word while 35% indicated that they had knowledge in Microsoft Excel. Moreover, a large proportion (70%) indicated having knowledge of internet. However, the researcher learned that most of the teachers could only operate mobile internet. Moreover, Hennessy (2010) found that most of software used train teachers on elementary computer skills instead of focusing on integration of technology in classroom instruction. The proposition is emphasized by Andoh, (2012) when he argues that teacher training colleges tend to overemphasize on teaching about ICT rather than how to use ICT to facilitate meaningful learning.

4.5.2 Source of the ICT Skills

The researcher further sought information on where the teachers got the skills in ICT and they gave the responses as presented in figure 4.9.

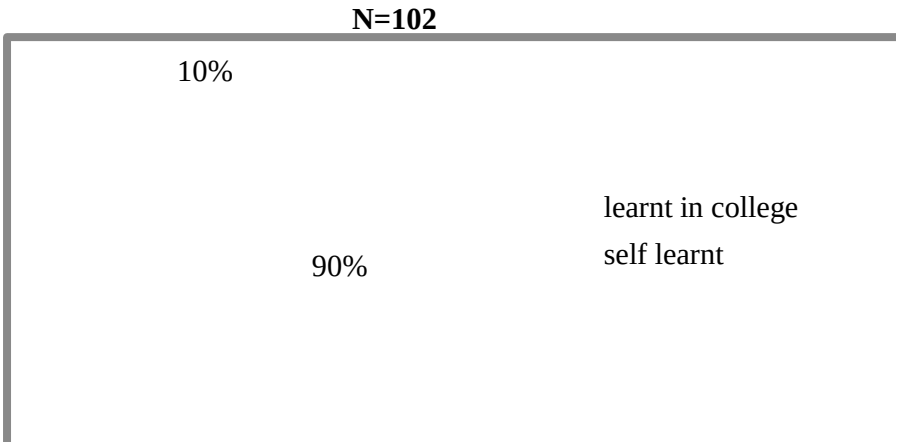

Figure 4.9: Source of the ICT skills
Source: Researcher (2017)

From the figure 4.9, it is evident that 90% of the respondents had taken computer packages in computer colleges while 10% had their own personal computers, which they used to enhance their computer knowledge. The proposition affirms another study done in Kenya by Ministry of Higher Education, Science and Technology on ICT acceptance and utilization in secondary schools reveal that among the 232 instructors sampled, the biggest number (57%) indicated that they had a certificate in basic computer skills, 73% of them got training through on job training and 43% were trained by private computer colleges (MoEST, 2010).

4.5.3 Investment in ICT Resources

The principals were asked to indicate whether they invest in ICT resources to be used in the management of schools and classroom instructions. Their responses are given in figure 4.10.

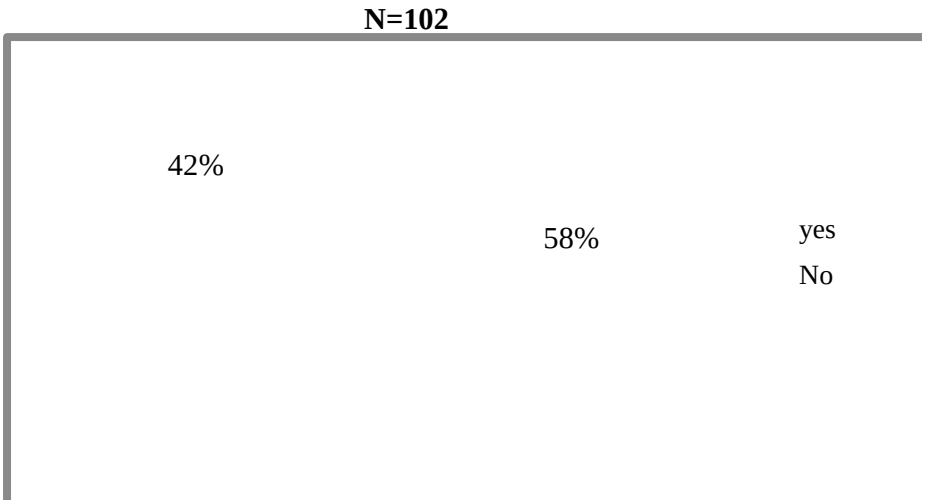

Figure 4.10: Investment in ICT resources

Source: Researcher (2017)

From the figure 4.10, 58% indicated that they had invested in ICT resources while 42% indicated that they did not invest in ICT resources. This is an indication that schools are determined to ensure the availability of ICT related resources which are required for the effective management of schools as well as classroom instruction. Saitoti (2007) argues that in order to improve literacy level which is one of the Sustainable Development Goals (SDGs), we must introduce and invest in ICT. He advocates for introduction of ICT syllabus in all secondary schools.

4.5.4 ICT Resources Available in School

The respondents were further asked to indicate the ICT resources they had in their schools. The results are presented in table 4.3.

Table 4.3: ICT Resources available in school

ICT Resource	Frequency	Percentage
Dvds / Dvd Player	8	80
Mass Storage Devices	4	40
Smartphones	6	60
Cameras	2	20
Laptops/computers	1	10
Printers and photocopiers	9	90

Source: Research data

According to the table 4.3, it's clear that there were more printers and photocopiers at 90% and least of laptops taking on a proportion of 10%. That is an indicator that computers were less likely to be used in classroom instruction.

4.5.5 Use of ICT Among the HoDs

In an interview with the heads of department they were asked to mention areas in which they use ICT to perform their duties. Figure 4.11.

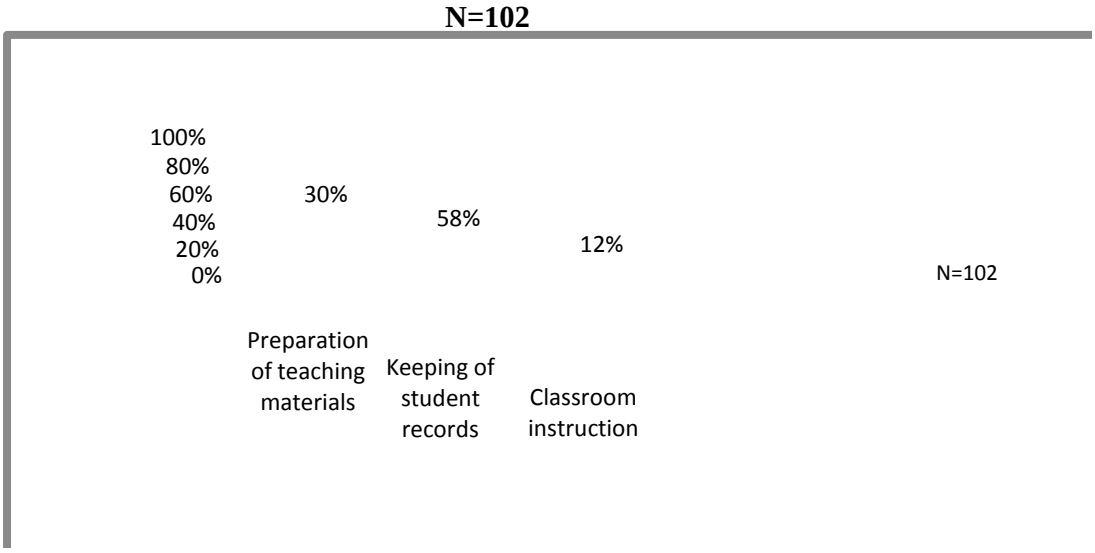

Figure 4.11: Use of ICT among the HoDs

Source: Researcher (2017)

From the responses of the respondents, it is clear that ICT is mostly used on keeping of student records at 58% and is used less on classroom instruction as shown in fig 4.11. Additionally, a study by School Net (2015) found that use of ICT in schools to facilitate learning was rare. ICT was mainly used for administrative purposes. In addition, email was not actually used for socialization by students, teachers and other staff.

4.5.6 Frequency of ICT Use

The HoDs who mentioned that they use ICT materials were asked to indicate the frequency of use of ICT in classroom instruction and their feedback was as shown in figure 4.12.

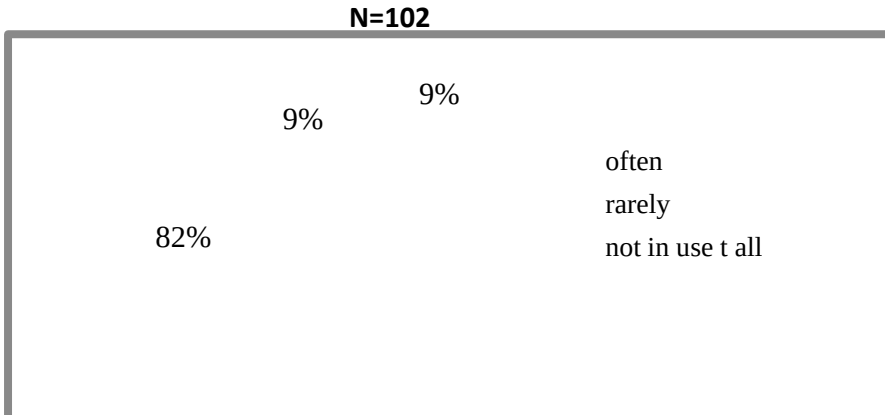

Figure 4.12: Frequency of ICT use in classroom instruction
Source: Researcher (2017)

The study found that 18% of the HoDs used ICT which had equal portion of respondents using it either often or rarely while 82% indicated that they were not using ICT at all. From the findings of the study it can be said that some of the schools which had ICT materials did not use them in teaching and learning purposes. This happens despite a World Bank (1999) report showing that computers have

brought efficiency in schools by lessening teachers' workload; record keeping has been simplified since a teacher is able to make a follow-up and identify a learner and his or her trend in performance. This enables the teacher to give special attention to learners with special academic needs.

4.5.7 ICT Use in Teaching of Mathematics

To establish the areas where ICT is used in mathematics, the teachers were asked to indicate whether they used ICT in different topics they teach. the findings are presented in figure 4.13.

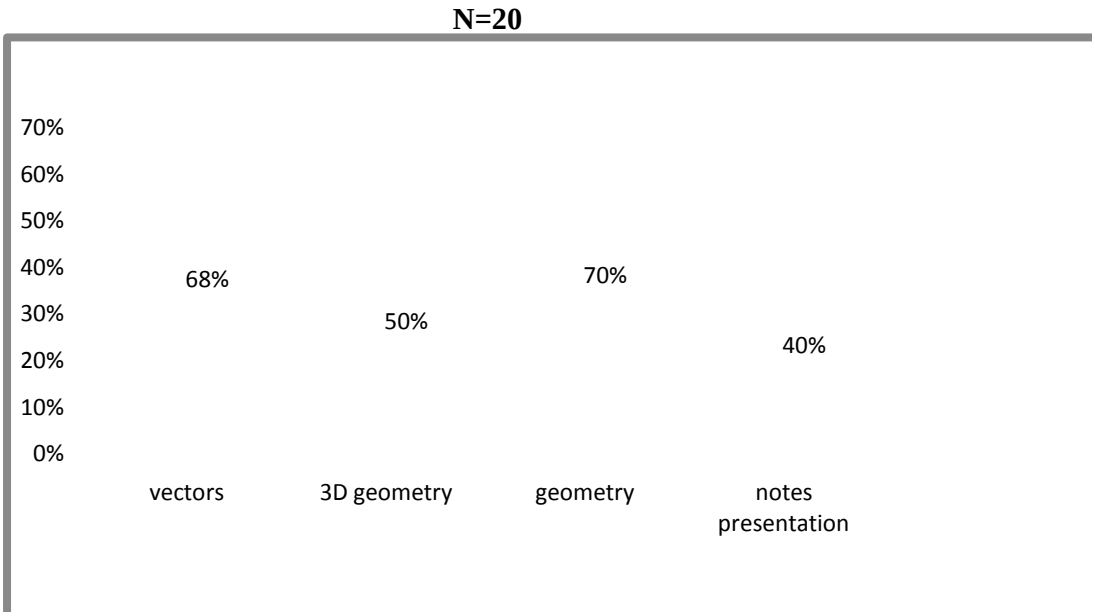

Figure 4.13: ICT use in teaching of mathematics

Source: Researcher (2017)

The study found that 68% of the respondents used ICT to teach vectors, 50% indicated that ICT can be used in teaching three dimension geometry, 70% indicated that ICT can be used to teach geometry while 40% also indicated that they used ICT in presenting notes to students instead of using chalk walls. Makau and IDRC (1990), teachers in mathematics and sciences were found to use computers more

than other teachers. It was reported that during most of computer-assisted lessons, teachers lost control of the learners thus leaving them doing activities far away from the lesson objectives. Table 4.4 presents the results.

Table 4.4: Topics taught using ICT

Biology	**%**	**Chemistry**	**%**
Adaptation in plants and animals	76	Bonding and structure of atoms	64
Anatomy and physiology.	70	Haber process	56
Classification	46	Contact process	52
Nutrition	62	Refinery of crude oil.	52
Ecology	54	Fractional distillation	64

Source: Researcher (2017)

4.5.8 ICT Use in Teaching of Sciences

In an interview with teachers in science department, the researcher asked them to indicate areas that they used to teach ICT adaptation in plants and animals (76%), anatomy and physiology (70%), classification (46%), nutrition (62%) and ecology (54%). The findings concur with Makau and IDRC (1990), teachers in mathematics and the sciences were found to use computers more than other teachers. It was reported that during most of computer-assisted lessons, teachers lost control of the learners thus leaving them doing activities far away from the lesson objectives.

4.5.8.1 Use of ICT in Languages

The respondents were asked to indicate the whether they apply ICT in teaching language or not and their responses are as indicated in figure 4.14.

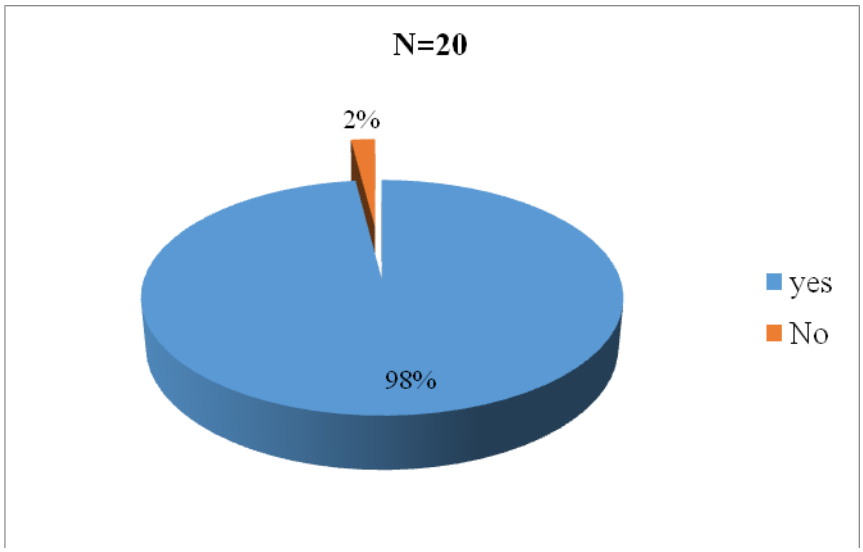

Figure 4.14: Use of ICT in languages

Source: Researcher (2017)

The researcher found that 98% of the respondents agreed that they use ICT in teaching and learning while 2% indicated that they did not use ICT for such purposes. The findings were as presented in figure 4.16. The adoption and use of ICT by some language teachers is explained by Huang and Liaw (2008) in a study that shows teachers' competence, attitudes and perceptions have an impact on their adoption and acceptance of the usefulness of ICT in providing desirable learning outcomes. Furthermore, a study by EU School Net in six European Union countries which involved teachers' use of Acer net books found that ICT aroused interest, facilitated individualized learning and helped to make learning a continuous process which went beyond school day.

4.5.8.2 Topics Taught using ICT in Languages

In this section interviewed 20 language teachers he sought to find information on areas where ICT is used in teaching and learning.

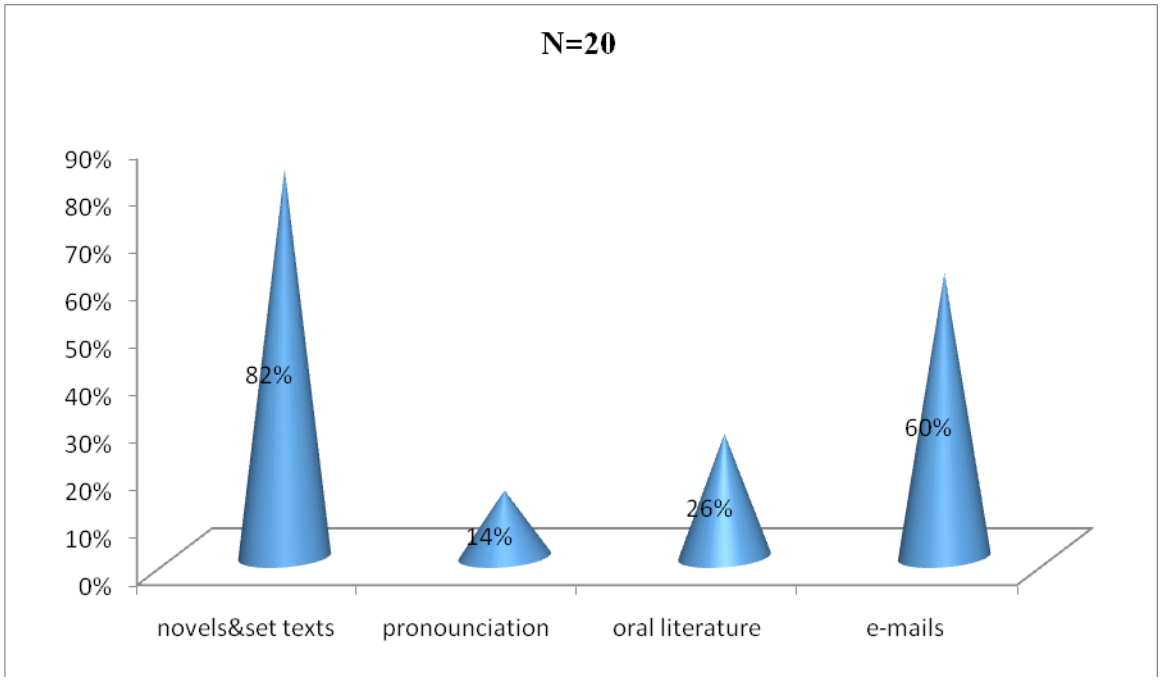

Figure 4.15: Topics taught using ICT in language

Source: Researcher (2017)

The study found that 82% of the respondents indicated that they use ICT to teach content in novel and other set texts, 14% indicated that they teach pronunciations using ICT materials, 26% indicated that ICT is used to teach oral literature for instance songs and dance performances. Table 4.5 presents results on ICT resources used in teaching and learning language.

Table 4.5: ICT resources used in teaching and learning of language

ICT resources	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Video clips	11	55	9	45
Smartphone/internet	6	30	14	70
Projector	5	24	15	76
Dvd	13	64	7	36

Source: Researcher (2017)

According to the respondents, 55% use smart phones and internet, 24% indicated that they used projector while 64% indicated that they used Dvds. ICT comprises software, hardware and media for data collection and recording, mass data storage devices, broad-band and mobile networks, search engines, the electronic media for instance television and radio among other related services (UNDP, 2000).

4.5.8.3 Use of ICT in Humanities

The researcher asked 24 teachers to indicate whether they used ICT in classroom teaching. Their responses are indicated in figure 4.16.

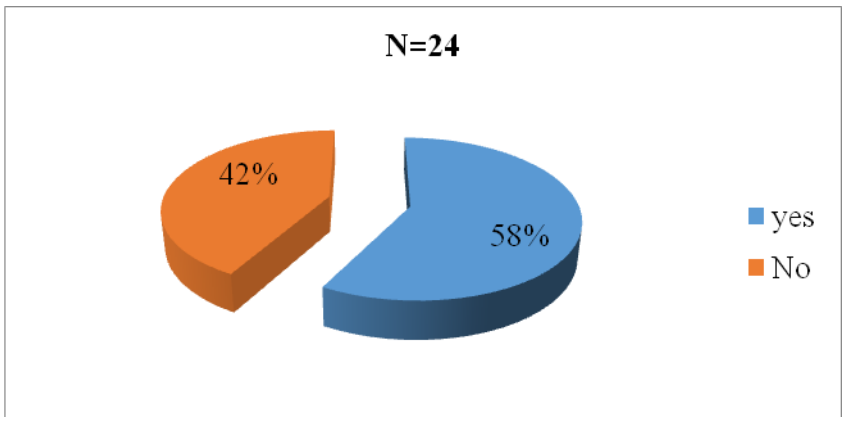

Figure 4.16: Use of ICT in humanities

Source: Researcher (2017)

The researcher according to the figure 4.16, found that 58% of the teachers used ICT while only 42% who did not use it. This implies that there is a small margin between those who use and who don't use ICT in class. This is well illustrated by Hannafin and Savenye (1993), who cite possible reasons for this rigidity: lack of goodwill and support from the administration and doubt about the effectiveness of ICT in the learning process.

Table 4.6: Topics taught using ICT

Humanities	History	Religion	Geography
Area of study	Evolution Slave Trade Arms of Government Democracy.	Configuration of Jesus crucifixion of Jesus and parables.	Mining Minerals and rocks Action of rivers Wildlife Tourism

Source: Researcher (2017)

4.5.8.4 ICT Resources Used in Teaching Humanities

The researcher asked the teachers to mention ICT resources used in teaching and they gave the feedback as presented in figure 4.17.

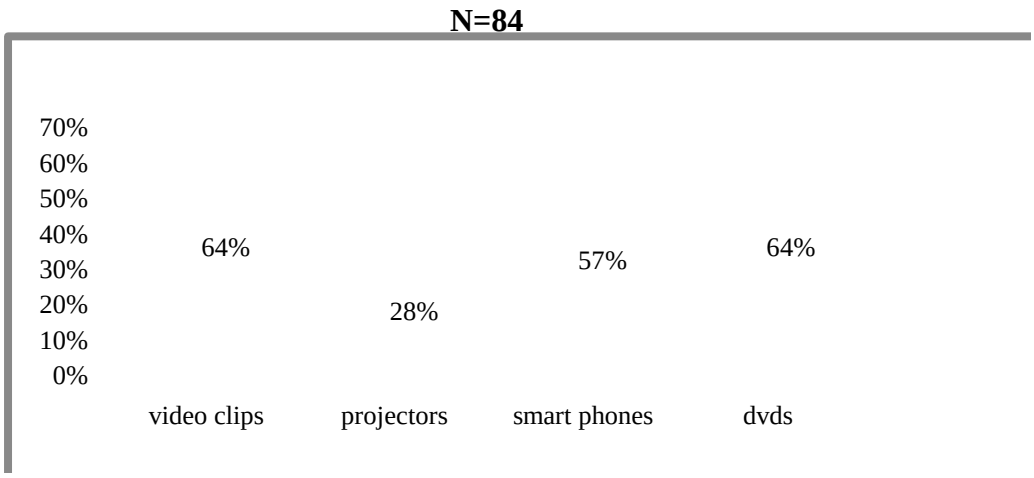

Figure 4.17: ICT resources used in teaching of humanities

Source: Researcher (2017)

The researcher found that 64% used video clips 28% used projectors while 57% reported that they used smart phones and internet. The findings of the study are presented in table 4.16.

4.5.8.5 Challenges in Use of ICT Materials in Classroom Instruction

The respondents were asked whether there were challenges that they faced in the use of ICT material in classroom instruction and their response is represented in figure 4.18.

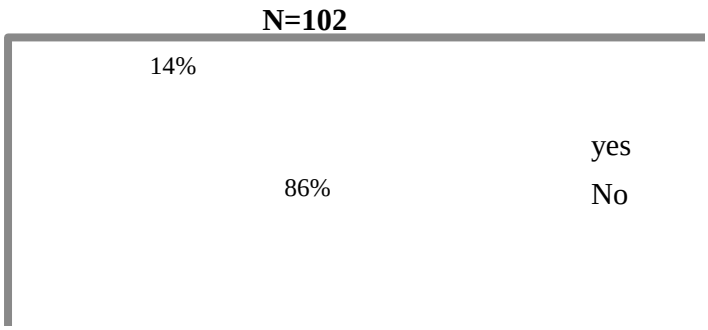

Figure 4.18: Challenges in use of ICT

Source: Researcher (2017)

Those who indicated that they often used ICT in classroom instruction were further required to explain the challenges they faced.

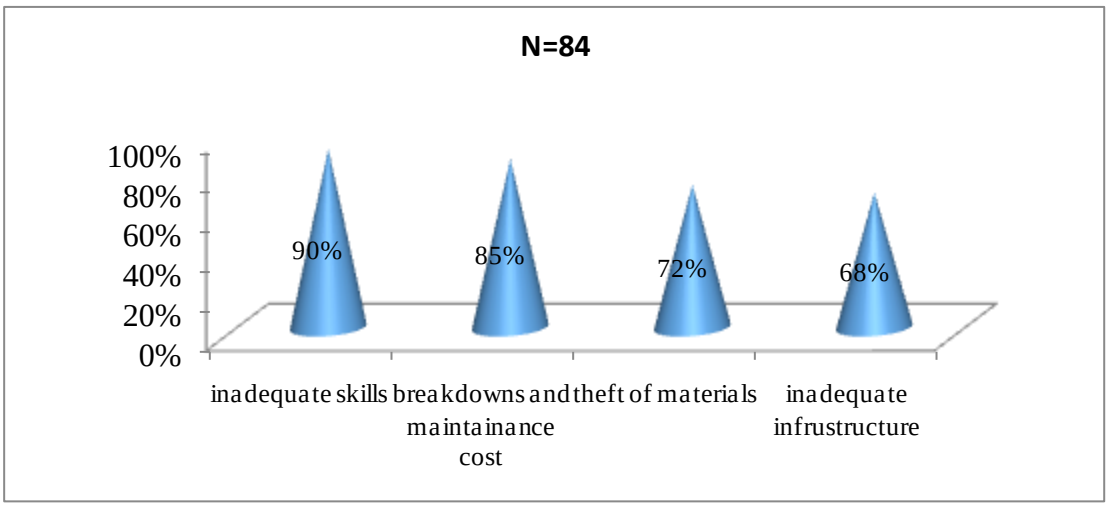

Figure 4.19: Challenges faced in use of ICT

Source: Researcher (2017)

According to figure 4.19, 90% of the respondents indicated that they had inadequate skills while 85% indicated that ICT materials were inadequate due to breakdown and high cost of maintenance and 72% also reported that theft of ICT material was also a challenge. According to Becta (2004), teachers low morale, lack of confidence and limited exposure to ICT facilities during training and while on job make teachers naive about using ICT in classroom instructions; most teachers would hardly admit to the learners that they have limited knowledge in computer and computer related applications.

4.6 Strategies for the Improvement of Teachers ICT Competence in Day Secondary School

The following were suggested strategies for the improvement of teachers competence in day secondary schools:

Resources for use of ICT should be made available in schools such as computers, projectors, laptops, cameras and printers .Promote the use of ICT in management of schools as well as teaching and learning. Another is to encourage the teaching and non-teaching staff to embrace the use of ICT. This will soften the resistance that come from the staff in matters related to changes that have come from introduction of modern technology.

It was further suggested that school should lay down infrastructure for the use of ICT in schools to allow the use of different ICT equipment e.g. internet connection. In addition, the government should set up some more funds to enable day schools which are less endowed with resources to acquire ICT resources.

Partnership with stakeholders, NGOS and other development partners e.g. AFDB and Word Bank should be encouraged since they play a major role in provision of necessary infrastructure. Therefore, heads of institutions should lobby to get sponsorship and any other assistance. It was finally suggested that training on the use of ICT in classroom instruction should be incorporated in teacher training colleges and university curriculum. This will play a pivotal role in imparting knowledge and skills for use of ICT in teaching and learning.

CHAPTER FIVE

SUMMARY OF FINDING CONCLUSION AND RECOMMENDATION

5.1 Introduction

The purpose of this study was to establish teachers ICT competence to use ICT in classroom instruction in Kahuro Sub-county. The study was guided by the following specific objectives; to establish teachers attitude and their perception on ICT facilities in day secondary schools in Kahuro Sub-county, to investigate the challenges faced by teachers as they use ICT in classroom instruction and suggest possible solution to determine if teachers actually use ICT in classroom instructions and to make more recommendations on ways of improving use of ICT in classroom instruction by using ICT.

5.2 Summary

This section presents summary of the findings of the study according to the objectives.

5.2.1 Level of Teachers ICT Training and Their Perception on ICT Adoption and Use in Schools

On the level of ICT training and perception on use of ICT in schools, the study found that 74% of the respondents indicated that they had already trained in computer literacy and they acquired basic computer knowledge and skills. Sixty-three per cent perceived the use of ICT in teaching and learning as interesting, arousing learners' retention ability and aiding in coverage of abstract ideas. This

concurs with (Kaino, 2004) who found that the need for teachers to believe that individual attitude and belief are the main factors influencing use of ICT.

ICT was used in the following way; typing of notes and examination, analyses of exam results However, the study found that ICT was rarely used in classroom instruction despite the fact that most teachers had some basic knowledge in computers. The study finally found that in schools where management often used ICT teachers were more likely to use ICT in classroom instruction. This is in line with Woodrow, (2002) who suggests that in order to ensure transformation of our education practices teachers need to be flexible

5.2.2 Availability of ICT Facilities in Day Secondary Schools

Regarding the availability of ICT facilities the study found, that 30% of the schools had invested in ICT resources though to a very low extent. The available facilities were only limited to use in management because they were not enough to be shared by teachers as they teach. In addition, theft cases, lack of administrative support and inadequate funding were mentioned as factors hindering the availability of the ICT. The findings agree with (Hannafin & Savenye, 1993) who argued that some schools lack administrative support.

5.2.3 Challenges Faced by Teachers as they Use ICT in Classroom Instructions

On the challenges faced by the teachers, the study found that 82% of the teachers reported that the skills they had were inadequate, 65% and there is shortage of the ICT learning materials. Ninety per cent indicated that infrastructure they required are too expensive to buy and maintain. Nine-two per cent of the teachers reported

that security was a concern as the ICT equipment are always stolen when installed. On whether teachers actually use ICT in classroom instruction, 80% reported that they rarely use ICT in classroom instruction since their knowledge is limited or ICT materials are unavailable. The findings are affirmed by World Bank (1999), that computers have brought efficiency in schools by lessening teachers' workload; record keeping has been simplified since a teacher is able to make a follow-up and identify a learner and his or her trend in performance, this enables the teacher to give special attention to learners with special academic needs. It shows there is a gap in the way computers are utilized; more emphasis is given to carrying out administrative duties than using ICT to facilitate learning.

5.3 Conclusion

From the findings, it can be concluded that ICT resources such as computers, projectors, smart phones, cameras and internet are rarely used in classroom instruction in Kahuro Sub-county.

It can also be concluded that headteachers were prepared for the use of ICT in management of schools even though they face numerous challenges which include: Inadequate funding, limited knowledge on use of ICT, security threats and inadequate infrastructural development.

The study finally concludes that ICT is used in classroom instruction in day secondary schools in Kahuro Sub-county though measures need to be put in place to support its full implementation.

5.4 Recommendations

i. The study recommended that the government through Ministry of Education should help to lay out ICT infrastructure in school to facilitate the use of ICT in classroom instruction. By use of ICT, infrastructure such as laying of fibre optic cable to provide internet, introduction of lessons in ICT in all schools and make it part of the subjects will help to promote acquisition of ICT skills in teachers and learners.

ii. The study further recommended that the government through the Ministry of Education should train all teachers on the use of ICT in classroom instruction and also include ICT training in teacher training curriculum. This will enhance technical skills in the use of ICT in classroom instruction.

iii. In addition, the school management which include secretaries, bursars and principals should take computer related courses to enhance their ICT knowledge and make it up-to-date, the reason behind is that if teachers are to embrace ICT in classroom instruction, the management should lead as an example.

5.5 Recommendation for Further Research

The study was carried out in day secondary schools in Kahuro District. The study focused on the use of ICT in the classroom instruction. The researcher, therefore, recommends that another study be done on the use of ICT in classroom instruction in day secondary schools in other districts which were not covered by this study.

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APPENDICES

APPENDIX I: Head teacher's questionnaire

Introduction

Thank you very much for accepting to fill this questionnaire. All your responses will be treated in utmost confidence and will be strictly used for academic study on teachers' competence in the use of ICT in classroom instruction in Kahuro District. No reference will be made to individuals or schools. Please tick (✓) where appropriate or fill in the required information on the spaces provided.

SECTION A: BACKGROUND INFORMATION

A-1. Bio data of the Head teacher

1. Your gender Male [ ] Female [ ]

2. Your age.....

3. Academic qualification

   M.Ed [ ] B.Ed [ ] Dip/Ed [ ]

   Other (specify).....

4. Are you computer literate?

   Yes [ ] No [ ]

   i. Do you have a computer in your office

      Yes [ ] No [ ]

   ii. How do you use the computer.....

   .....

   .....

5. What challenges are there in acquiring ICT materials.....

   .....

   .....

SECTION B:

B-1. INFORMATION ABOUT SCHOOL'S RESOURCES

i. What is the current total teaching force in your school

Male [ ] Female [ ] total.....

ii. Based on curriculum Based established (CBE) of your school, what is the shortage of teachers in your school.....

iii. How do you cope with the shortage

Combine classes [ ] use of volunteer teachers [ ]

Leave untaught [ ] use of ICT [ ]

iv. Other strategies (specify).....

.....

.....

B-2 INFORMATION ABOUT SCHOOL'S PHYSICAL RESOURCES

i. How equipped are the following facilities, if available?

FACULTY	**WELL**	**POORLY**	**UNEQUIPED**
i. Classrooms			
ii. Laboratory			
iii. Library			
iv. Dining hall			
v. Computer lab			

N.B

Well-equipped =all necessary equipment are available.

Poorly equipped=some equipment are available but most of the basic ones are lacking.

ii. How does the school cope with inadequate or poorly equipped infrastructure?

.....

.....

.....

iii. If there is a computer lab how many computers are there? .....

.....

.....

iv. Who funded the project? .....

.....

v. How do you use the computers? .....

.....

.....

APPENDIX II: Teachers questionnaire

Introduction

Thank you very much for accepting to fill this questionnaire. All your responses will be treated in utmost confidence and will be strictly used for academic study on teachers' competences to the use of ICT in classroom instruction in Kahuro District. No reference will be made to individuals or schools. Please tick (✓) where appropriate or fill in the required information on the spaces provided.

SECTION A: BACKGROUND INFORMATION

1. Please fill in the spaces below with your correct detail.
   i. Age .....
   ii. Gender .....
   iii. Department .....
   iv. Qualification .....
   v. Years of experience as a teacher .....

2. Are you computer literate?
   Yes [ ] No [ ]

3. Do you use ICT material when teaching?
   Yes [ ] No [ ]

4. What are the ICT teaching/ learning resources available in your school? .....
   .....
   .....
   .....

5. Which areas/topics do you teach using ICT? .....
   .....
   .....

6. List the ICT resources that are necessary for classroom instruction in your school but are either unavailable or inadequate .....
   .....

7. How long does it take you to receive your order from the administration after you make requisition
   i. Immediately
   ii. One week
   iii. More than one week
   iv. Never

8. In your opinion, in which ways do you find ICT materials useful in the classroom teaching.....

   .....

   .....

9. Please indicate the ICT materials and other learning resources that your school provided to enhance learning and their estimated prices.

ICT MATERIAL/ RESOURCES	**PRICE PER UNIT KSH)**

10. What are the challenges do you face in your endeavor to acquire ICT material?

    .....

    .....

11. How do you deal with the challenges?.....

    .....

    .....

12. In your opinion, do you find ICT material useful in teaching and learning?

    Yes [ ] No [ ]

    If yes how.....

13. How do the learners react to ICT materials once you use them in teaching and learning?.....

.....

FOCUS GROUP DISCUSSION INTERVIEW GUIDE

1. How many teachers are in your department?.....

.....

.....

2. How many use ICT in classroom instruction?.....

.....

.....

3. Why do you prefer using ICT in your department?.....

.....

.....

4. What strategies has the school put in place to enhance the use of ICT in teaching and learning?.....

.....

.....

5. What challenges do you face in the use ICT materials?.....

.....

.....

6. How do you cope with the challenges?.....

.....

.....

7. In your opinion, is provision of ICT materials for teaching and learning useful to learning and teaching.....

.....

.....

APPENDIX III: Research authorization from Kenyatta University

KENYATTA UNIVERSITY
GRADUATE SCHOOL

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

Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: E55/CE/24023/12

DATE: 26th June, 2015

The Permanent Secretary,
Ministry of Higher Education, Science & Technology,
P.O. Box 30040,
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION KIMOTHO GIBSON GIKONYO – REG. NO.E55/CE/24023/12

I write to introduce **Mr. Kimotho Gibson Gikonyo** who is a Postgraduate Student of this University. He is registered for M.Ed degree programme in the **Department of Educational Management Policy and Curriculum Studies.**

Mr. Gikonyo intends to conduct research for a M.Ed project proposal entitled, **"Teachers' ICT Competence in Classroom Instruction in Day Secondary Schools in Kahuro District, Murang'a County, Kenya."**

Any assistance given will be highly appreciated.

Yours faithfully,

for MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL

DNN/rwm

APPENDIX IV: Research authorization from NACOSTI

APPENDIX V: Research Permit