INFLUENCE OF INFORMATION COMMUNICATION AND TECHNOLOGY ON STUDENTS' PERFORMANCE IN LANDFORMING PROCESSES IN SECONDARY SCHOOLS IN LAMU COUNTY, KENYA

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DECLARATION

This research thesis is my original work and it has not been submitted for the award of any degree or diploma in any other institution. No part of the proposal should be reproduced without the authority of the author and/or Kenyatta University.

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DEDICATION

This work is dedicated to Mr. Peter Njenga my hubby, my father Mr. John Wainaina, my mother Hannah Wangeci and my in-laws Mr. Francis Njenga and Naomi Waithera for their unfaltering moral and emotional support throughout the path to fulfilling this academic achievement.

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ABBREVIATIONS AND ACRONYMS

CIDP	County Integrated Development Plan
GIS	Geographic Information System
GOK	Government of Kenya
ICT	Information Communication and Technology
I.T	Information Technology
ITU	International Telecommunication Union
NACOSTI	National Commission for Science, Technology and Innovation
SPSS	Statistical Package for Social Sciences
UNESCO	United Nations Educational, Scientific and Cultural Organization

ABSTRACT

Research has shown that use of ICT has improved education through creating a learner-centered environment and enhancing the teaching and learning process. It also supports effective, creative, motivated, collaborative, and self-directed learning, while helping to build basic skills. This study looked into how ICT affects students' performance in learning about land forming processes in secondary schools. The main goals were: first, to identify ICT resources employed in teaching and learning land forming processes; second, to ideentify factors that influence the choice of ICT tools used; third, to examine how well ICT resources help students understand the content; and finally, to outline the challenges faced when integrating ICT in teaching these topics. The study was based on Diffusion of Innovation theory put forward by Roger's (2003) . Data was gathered through questionnaires, observation checklists, and interviews with key informants. The information collected was analyzed using SPSS software for both numerical (quantitative) and descriptive (qualitative) data. Quantitative data was analyzed through descriptive and inferential statistics. The results showed that schools have different ICT tools to teach land forming processes. These include computers together with internet, video platforms like YouTube, and offline programs such as Word and PowerPoint. However, teachers as well as students in Lamu County never used these tools often, with time being one of the main limiting factors. Other factors that affected ICT use included teachers' attitudes toward using these tools, irregularly using ICT, and limited access to important resources like internet or computer labs. Major challenges mentioned include time limitations, limited access to ICT resources, students' low ICT skills, and teachers not having enough knowledge or training. The study concluded that although many schools have ICT tools, most teachers are not making full use of them due to various challenges. Therefore, schools should find ways to build and promote a strong ICT culture as recommended by reasearcher.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The fourth blueprint of the United Nations' Sustainable Development Goals also shortened as SDG 4, advocates for quality education as being a fundamental need for every individual across the globe. UNICEF (2000) approach the definition of quality education by encompassing critical aspects such as learners' access to adequate resources and facilities, relevant curricula, and materials that make it possible for the learners' to acquire basic numeracy and literal skills for positive participation in the society. It includes the use of learner-centered instructional methods that promote learning and minimize disparities (UNICEF, 2000). According to a UNESCO report (2011), educators should adopt instructional approaches.

Yelland (2001) presents a school of thought that holds that the traditional method of teaching fails in preparing learners for today's advanced job market. The job market of today requires a wide use of technology to achieve success in diverse functions. As such, incorporating technology, as part of the present teaching approaches is an inevitable undertaking that learning institutions cannot avoid. Vhanabatte and Kamble (2014) explain that in this digital age of information, technology continues to influence all aspects of human life. Its contribution is felt in the way people gain knowledge, pass information from one point to another, and how people carry out their duties and even how they live (Vhanabatte & Kamble, 2014). Not only is technology fast-paced in its growth, but it is also opening new possibilities both for human and economic development globally. It has become a tool for enhancing educational opportunities,

creating jobs, increasing productivity and raising per capita earnings (Vhanabatte & Kamble, 2014).

Because of its indispensable place in modern society, Information Communication Technology used into the Geography curriculum and its associated lesson delivery methods are vital to producing ICT literate and competitive learners who can function effectively in various spheres and workplaces in the 21st century. Modern workplaces rely heavily on technologies like computer systems, software applications, and the internet. Introducing students to these tools through education helps them capture skills recommended for future careers (Grimus, 2000; Bingimlas, 2009). This helps them to integrate easily into the present globalized tech-savvy job market.

Information and communication technology (ICT) can promote quality education through fostering learner-centered environment, quality teaching-learning processes and strategies, effectual, creative, motivated, collaborative, interdisciplinary, evaluative, and self-directed learning as well as the enrichment of basic skills (Saravanakumar, 2018; Kapur, 2019; Amutha, 2020). It is increasingly evident that ICT tools usage in learning process is essential for improving educational outcomes. Furthermore, duty-bearers must ensure that ICT facilities that can enhance the instructional delivery including tools such as tutor software and computer sets are available and accessible in schools. These provisions including virtual classrooms can promote the adoption of blended learning modules where possible.

In essence, ICT encompasses any tool, product or service that helps to obtain process, manipulate, store, transmit, or retrieve information electronically. As such, dealing with

the data occurs digitally. Various ICT tools support the communication and information needs, that is, the internet, computers, monitors, video-sharing platforms like YouTube, video conferencing applications, email systems, and learning management platforms such as Moodle (Straub, 2015). Additionally, computer-based educational resources, including animations (Hawkins, Barbour, & Graham, 2012). In one way or another, it is typically that in most cases these instruments often work in combination with one another if a given desired outcome is intended. The objective of such a combination is usually to broaden the level of professional use and enhance user experience, which in turn increases the learners' academic performance and perception of worth (Owen, Mustian, & Liles, 2000). Furthermore combining the different ICT tools help bridge the shortcomings of each (Tinio, 2003).

Guzman and Nussbaum (2017) identifies one of the role s of using ICT as that of creation of a conducive and transformative learning environment that is in itself constructive. Therefore, ICT allows students to access knowledge through collaborative classroom practices. Bransford et al. (2000) explain that ICT can contribute immensely to the educational process in several ways. Firstly, an ICT-blended teaching process has the potential to expand knowledge to students. Secondly, outcome of a positive experience while learning is most likely that the students will experience positive academic outcomes. Thirdly, the fact that the ICT-blended delivery method can be achieved remotely, reducing the pressure of having to carry out a face-to-face instruction process which in turn can benefit students with special needs who may be experiencing challenges in attending in-person classrooms (Bransford et al., 2000).

Increased use of ICT enhances student learning quality, especially when changing from content-based to competency-based curricula and from teacher-led to student-centered approaches (Yusuf, Adeoye, & Festus, 2013). According to Watson (2016), ICT use in geography education offers access to a wealth of information. UNESCO (2007) report indicates that by using ICT, students both acquire knowledge in the various subject areas and also learn how to develop new knowledge.

On the backdrop of this understanding and the associated benefits, several countries have directed their efforts towards supporting the adoption and embrace of ICT as an education instructional tool. UNESCO (2000) conducted a review to classify countries based ICT development in education. Elements of the classification touched on aspects such as the presence of notable efforts towards the formulation of national policies that foster ICT used in education and the presence of national policies and master plans put in place to promote ICT usage in education.

From the research, developed countries like US, Japan, United Kingdom, Norway, and Singapore have put in place strong systems for using ICT in teaching. These systems cover areas like teacher training, curriculum development, not forgeting student assessment (Aoki et al., 2007). For example, in Japan, the government involvement in developing the education system in the country is reflected by how the learners have been equipped with skills befitting the technology era of the modern world. This has had a significant impact on promoting the lifelong successes experienced through its adoption in education sector. (Morris- Suzuki & Rimmer, 2003).

ICT used as an instruction delivery tool in the developed countries has not only enhanced the quality of the education system but has also empowered the learners with expanded access to educational opportunities as well as digital literacy skills (Mugambi, 2015). The government of the United Kingdom (UK) has established successful government training initiatives by application of ICT in various sectors like education. Soby and Egeberg (2009) point out that about 71% and 70% of primary and secondary schools have a high level of teacher access to high-quality computers and associated accessories. As a result, teachers do ICT integrated lessons. The emphasis put in utilization of ICT even in higher education (colleges and universities) has been a significant part of UK government policy in education (Soby & Egeberg, 2009).

In the USA, the government has continued to promote the rapid adoption of newer and better education delivery technologies as a way of not only advancing the country's workforce but also achieving an academically empowered citizenry at a fraction of the cost typical of the traditional teaching method (UNESCO, 2000). The American government has not only fostered the advancement of the national information infrastructure but has also increased personal computers for schools also in workplace to enhance online learning opportunities. These have further advanced telecommunication and networking technologies that have sped the extent of information access in the education process (UNESCO, 2000).

In the Netherlands, government policy gears toward the optimal usage of ICT through innovative learning (Coskun & Kinnienet, 2010). Endless efforts towards it, has made the Dutch schools to have increased use of digital learning environments. The

Norwegian government have created an independent agency to implement the government ICT policy (Soby & Egerberg, 2009).

Singh (2013) did a study on Geographic Information Systems (GIS) in teaching geography in Malaysia. The study found that the primary barrier to GIS implementation was inadequate training as weel as readiness apply GIS. Similarly, Garyfallidou and Ioannidis (2014) researched on ICT role in geography and concluded that computers can effectively bring positive change in communication and collaboration skills.

A study in Saudi Arabia on the effectiveness of blended learning revealed how ICT integration positively impacted school environment. (Alzahrani, 2017). Alzahrani (2017) explains that although schools in Saudi Arabia had adequate ICT equipment, the instructors were not equipped with skills needed. Notably, even in Saudi Arabia, the traditional instructional method was still dominant (Alzahrani, 2017).

In developing nations, particularly in Africa, the education system is usually guided by strictly established frames that grant little to no room for flexibility even for the instructors who may wish to modify the curriculum or even advance or employ their practical ICT knowledge (Aoki et al., 2007). As such, the teachers end up being unprepared for any changes that technology impresses on education sector. Modern technological resources in Africa is in its infancy stage. According to a World Bank institute survey, a research done on African Universities concerning the state of ICT infrastructure showed that it is very expensive, inadequate and poorly managed (Jimoh et al., 2020).

Onasanya, Shehu, Ogunlade, and Adefuye (2011) conducted a study in Nigeria on teachers' knowledge and their utilization of ICT and its effectiveness in the education process and revealed revealed that it was very low. Again, there was a marked difference in gender of science teachers in relation to the utilization of ICTs wher males did better than the female teachers (Onasanya et al., 2011). Jimoh et al. (2020) explain that with this realization noting the significance of ICT to public administration, Nigerian governments of Lagos and Osun States have endeared their efforts in inproving education curriculum in secondary schools. The schools plagued with poor instructional methods, negative learners' and tutors' attitudes, inadequate ICT facilities in school, and an absence of equity in accessing quality education (Jimoh et al., 2020). Kihoza et al. (2016) conducted a case study in Tanzania with the intent of evaluating the opportunities and setbacks experienced when introducing ICT in the classroom. Researchers said teachers were less competent and lowly adopted ICT during lessons. Furthermore, scholars found out that the support provided in schools was inefficient. This was demonstrated by poor ICT infrastructures and lack of enthusiasm among the instructors in employing ICT in their instructional process.

In Kenya, focusing on Ministry of Education's policy in Chapter 7 of Sessional Paper No. 1 o f 2005 highlights the need to include IT in the education system (GOK, 2005). Using ICT in education helps bring modern tools into teaching and learning. Also, the government, introduced Kenya National ICT Policy in January 2006. This policy focused on improving access to reliable and efficient ICT services, showing the government's dedication to using ICT effectively in education (ICT Policy, 2006).

The policy advocates for the adoption of ICT in schools. However, the 2006 ICT Policy and Strategy for Education and Training highlighted that ICT usage in Kenya's education system was still low in comparison to developed countries. Notably, in the paper, government pointed out that most developed countries integrated ICT since 80s, which was not the case in Kenya (ICT Policy, 2006**).** In essence, even after more than two decades of widespread adoption of ICT as an instructional tool in developed countries, developing countries like Kenya were still lagging. The 2006 Kenya National ICT policy and strategy for education and training not only provides the framework for ICT used in education but also guides the evaluation progress.

The Ministry of Higher Education, Science, and Technology reports that few secondary school teachers are skilled in using ICT. Even among those who have some ICT skills, many have not had enough training, which makes it hard to apply technology well in class. (GOK, 2010). Ayere et al. (2010) point out that although many Kenyan high schools have computers and other ICT tools, internet access is still a big problem. Schools that do have internet often get it thanks to help from companies and donors, while the government's support is very limited. The lack of telecommunication infrastructure and internet connectivity has also significantly hindered efforts to establish ICT facilities in primary schools, particularly in rural areas (Ayere et al., 2010).

According to Wanjala (2016) use of ICT as an instructional tool among secondary school teachers found that insufficient technical support, limited access to resources, low self-confidence, limited ICT literacy were key factors contributing to the underuse of ICT in teaching. Another study conducted in Kenya demonstrated that ICT facilities

were inadequate in most schools with the little that was present also experiencing minimal usage (Kamau, 2012). In addition, where such facilities were available albeit in limited supply, the learners mostly used these for entertainment purposes in the absence of their teachers than for academic purposes (Kamau, 2012). Furthermore, the fact that teachers were also not trained to use ICT in content delivery, incorporating these tools is quite challenging.

In Mwala sub-county, a study on how ICT affects teaching and learning Geography in public secondary schools outlined these challenges: poor ICT infrastructure, insufficient skills and limited training, poor technical support not forgeting budget problems (Musyoki, 2016). Another study in Nyamira North Sub-County looked at the difficulties teachers face when incooperating ICT in Geography and realized that schools lacked necessary tools and resources for ICT use (Omwoki & Enock, 2017). The research also showed there was little support from teachers, school leaders, and curriculum planners for using ICT in teaching.

These challenges in using ICT for geography instruction, particularly in teaching land-forming processes, which could greatly benefit from the engaging and informative visual graphics that technology offers, are similar to the issues faced in Lamu County. Lamu County is one of the most marginalized areas in Kenya, with very little development in ICT infrastructure and low usege of the few tools available. (ICT Authority, 2015). This includes limited use of ICT even in Geography lessons like land forming processes. Therefore, the study focused on reasons behind the low use of ICT in teaching and learning land forming processes in Geography in secondary schools in Lamu County.

1.2 Statement of the Problem

ICT is one primary factor for development in economic and technological terms in in the 21st century. It is also a great deal of Kenyan secondary school curriculum instruction as we ICT in the recent past has become the driving force in the education sector, beginning from the ministry, administration and also in teaching and learning that take place in classrooms. ICT help in monitoring both teachers and learners in their performance. In classroom, it helps teachers and also learners access large amount of information. Digital library enables the users to store and retrieve information hence making learning experiential and experimental.

However, the effective use of ICT may be hindered by lack of cooperation between the teachers, students, administration. If the teachers fail to monitor the students when using internet they may go to social pages like face book instead of learning. When the teacher is face booking and chatting during lesson the students end up losing focus and ignore the objectives of the lesson. Inadequate ICT facilities also will hinder effective use of ICT during lesson. ICT is sometimes misused when the teacher gives the students assignment to research instead of teaching them. Therefore, this study's aim is to investigate whether geography teachers in Lamu West Constituency are using ICT effectively when teaching land forming processes. It also looked into the factors that influence which ICT tools they choose and challenges experienced when using ICT in teaching thei topic.

1.3 Purpose of the Study

The primary objective of the study focued on extent to which ICT tools are utilized and their effectiveness in teaching land-forming processes in secondary schools in Lamu

County. This study aimed at identifying what types of ICT tools are available in schools and whether Form Two geography teachers use them in their lessons on land-forming processes. It also investigated on factors that influence the choice of ICT tools for teaching this topic. Additionally, the study sought to investigate how often ICT tools are utilized and the challenges affecting users when tackling land-forming processes.

1.4 Specific Objectives of the Study

The specific objectives of the study were:

i. Establish types of ICT tools used in teaching and learning land forming processes.

ii. Establish factors influencing the choice of ICT used in teaching and learning land forming processes.

iii. Investigate the extent to which the ICT tools in (i) above influence teaching and learning land forming processes.

iv. Establish the challenges experienced when using ICT in teaching and learning land forming processes.

1.5 Research Questions

i) What types of ICT tools are used in teaching and learning land forming processes?

ii) What factors influence the choice of ICT used in teaching and learning land forming processes?

iii) To what extent do the ICT tools in (i) above influence teaching and learning land forming processes?

iv) iv)What are the challenges encountered when using ICT in teaching and learning land forming processes?

1.6 Significance of the Study

This study will benefit school administrators make right decisions about adopting and using ICT in schools. Geography teachers will find the findings valuable, as they highlight the challenges encountered when using ICT to teach land-forming processes. The study will eneble the Ministry of Education (MOE) gain clearer understanding of the obstacles to ICT implementation and the necessary initiatives to address them, aiding planners and decision-makers in recognizing ICT's role in educational reform. Additionally, the study will add knowledge on the application of ICT in education and stimulate further research by suggesting areas for future studies on ICT use in schools.

1.7 Scope of the Study

This study was carried out in kenya, specifically in Lamu County among public secondary schools, an focused on focusing on the Lamu West constituency. The research was limited to selected schools within this constituency and concentrated on teaching land-forming processes. It specifically targeted Form Two geography students and the geography teachers who instruct them. Findings in this study can only be applied to Lamu West constituency and are not generalizable to all subjects, but rather to geography education specifically.

1.8 Limitations of the Study

Orodho in his research (Orodho 2017) says, Limitation of the study refers to constrains or drawback, both theoretical and practical, that the researcher may have little or no control over. The following are limitations of the study:

i) **Security:** Lamu County is generally known for insecurity due to Alshabaab attacks. The attacks are common on the roads, in the towns and along the ocean. The attacks done along the roads targets anyone/everyone. The researcher requested for security from the county commissioner.

ii) **Long distances:** the selected schools are located far away from each other. There are inadequate passenger vehicles to be used by the people in their daily transportations. The few vehicles available are expensive to hire. The researcher got money from the sponsors to cater for transport problems.

iii) **Poor roods:** The roads connecting the schools are very poor especially during rainy season. There are no vehicles to be used during rainy seasons, and the few that do, are very expensive. The researcher avoided doing the research during rainy season.

1.9 Assumptions of the Study

This study was based on assumptions lsted below:

i) That the respondents will be truthful to the research instruments employed to them.

ii) That the respondents will offer maximum cooperation to the researcher.

iii) That the ICT resources will be available and accessible for use.

1.10 Theoretical Framework

This study was directed by the theory of Diffusion of Innovations as propounded by on Roger's in the year 2003. According to this theory, there is a pattern, speed and reasons behind the spread of technology through cultures. Reseach on these was first carried

out by the French sociologist Gabriel Tarde in the year 1903. These studies look at the factors that affect how quickly and how likely an idea, a product, or a practice is accepted by people in a certain culture. In 2003, Rogers updated this idea into what is now known as Roger's Theory of Diffusion. This theory focuses on factors that deermine how new technology is accepted and adopted. The spread of IT including hardware, software, and services—is important for growth because it improves worker performance (Bollou, 2002). On the other hand Robinson (2009) adds that the theory also explains how products and behaviors change or 'reinvent' themselves over time to better fit the individuals need and those of the groups.

Adopting a new innovation involves five steps that everyone in a social group experiences. First is Knowledge, where a person learns about the innovation and understands how it works. Next is Persuasion, when the person develops a positive or negative opinion about the innovation. Then comes Decision, when the person chooses or decids to either accept or reject the idea or innovation. After that is Implementation, when the person starts using the innovation. Finally, there is Confirmation, where the person reviews and evaluates the results of their decision (Sahin, 2006). After assessing the results, the individual decides whether to fully adopt or do away with the innovation. The likelihood of adoption is influenced by factors like the relative advantage or compatibility, simplicity, trialability, and finally observability of the innovation. Despite widespread awareness of ICT innovations among educational stakeholders, poor implementation remains a global challenge. Roger's theory of diffusion of innovation is the most suitable framework for examining the application of ICT in teaching and learning land-forming processes in secondary schools in Kenya.

The graph below shows the rate of adoption of the new innovations as discussed by Rogers 2003.

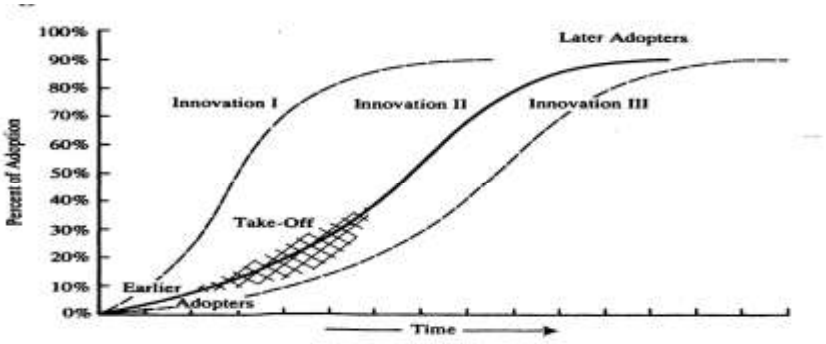

Figure 1. 1: Application of the diffusion of innovation's theory

Since adoption of ICT was done in education sector, the rate of usage has been increasing not only in teaching and learning but also in other areas, simply because it is compatible, simple and it has numerous advantages. Teaching and learning have become simpler and more engaging between teachers and their students since ICT was introduced in schools. It has been observed that those who use ICT (teachers and students) feel comfortable with it, as the number of people using ICT has been growing quickly.

1.11 Conceptual framework

The study will use the conceptual framework below.

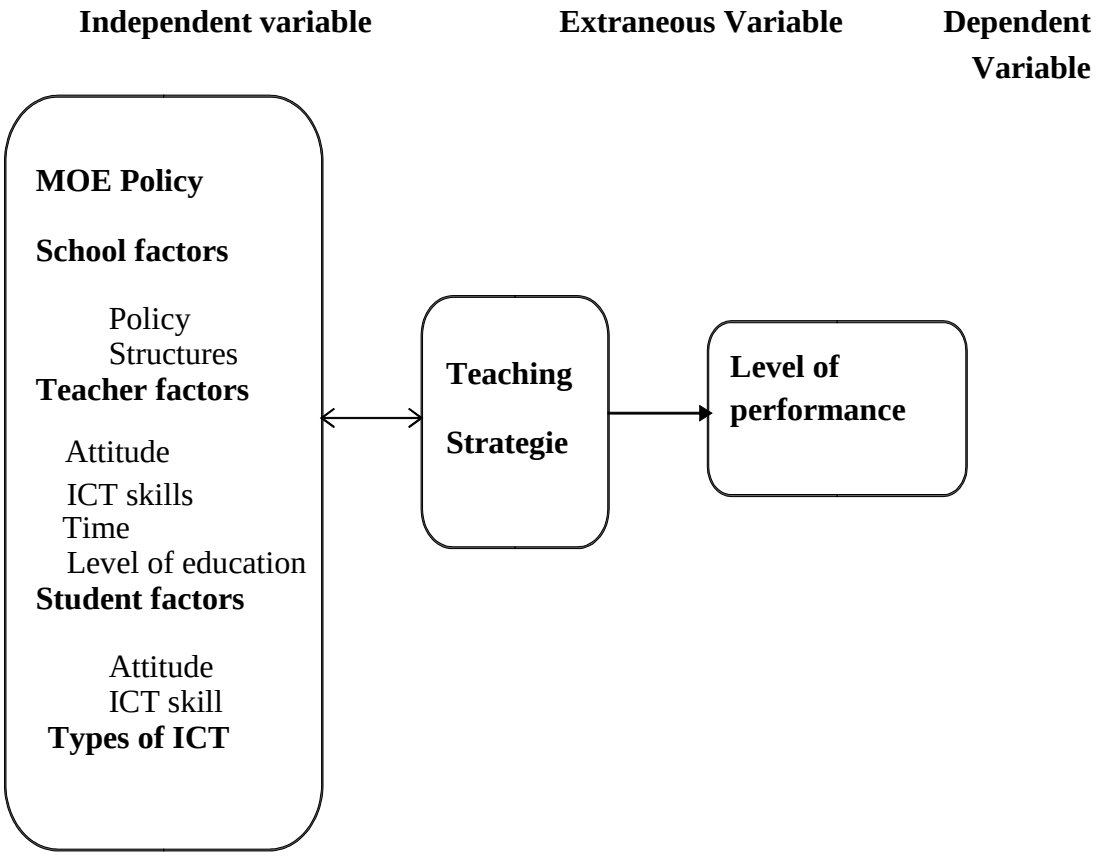

Figure 1.2: Conceptual Framework

According to Figure 1.2 above, there is relationship between variable as conceptualized by the researcher. The variables of this study are: Independent variable include: Ministry of Education's policy which guides teachers on usage of ICT in school. School factors include: availability of infrastructure like computer laboratory, conducive classes. Teacher's factors include, attitude of teachers towards use of ICT when teaching land forming processes, availability of ICT skills which determine if the teacher will integrate ICT when teaching or not, availability of time for preparation of ICT integrated lesson and the level of education of the teacher. Student's factors

include: student's attitude towards use of ICT when learning land forming processes and whether or not they have ICT skills. Finally, types of ICT tools available in school for example, computer, internet, photographs, and You-tube among others. Extraneous variable include teaching strategies that the teacher chooses depending on the content to be taught. The teaching strategy chosen determines which ICT tools will be used.

1.12 Operational Definition of Terms

ICT: Stands for information and communications technology, is the infrastructure and components that enable modern computing.

Land Forming Processes: Refers to the movement of the crustal rocks caused by forces originating and operating in the interior of the earth known as tectonic forces.

Attitude: A predisposition or a tendency that determines negative or positive response towards a certain idea, object, person, or situation.

Competence: this is individual's abilities, commitments, knowledge, and skills that guides one to work effectively.

Infrastructure: The basic, underlying framework or features of a system or organization.

Computer: Refer to ICT tool that helps in data to storage,process and can also enable communication when connected to network.

Geography: Is a subject in school curriculam under the department of humanity.

Teaching: Is when the person with information/knowledge Transfers it to another person with limited or no information directly or indirectly.

Inadequate: Not enough or insufficient in term of quality and Quantity

Sought: Attempt or desired to obtain or achieve something.

Factors: Things that affect something positively or negatively.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter covers the review of literature based on the application of ICT in teaching and learning land forming processes. The chapter is divided into the following subsections: the types of ICT tools used, factors that influence the choice of ICT tools used, and challenges that teachers and students face when using ICT in the teaching and learning process. This chapter focuses on other researchers' work that has been done before especially the most recent ones which are closely related to this study. This creates awareness to the reader of the current information of the problem area, narrows the problem and identic the existing gaps.

2.2 The Types of ICT Tools Used in Teaching and Learning and the Extent of their Use

There are different types of ICT tools employed in class, including teaching land-forming processes. Primarily, the ones found to be very relevant and beneficial in teaching physical geographical features include the Computer, Internet, and YouTube (Burn, Cutter, & Harrington, 2004; Houfsonen, Kan, Kaanrinta, & Rehunen 2004; Erdem 2008; Okarbiniski, 2010; Al-Enezi 2013; Cemalettin, 2015).

2.2.1 Computer

Computer is one of ICT tools frequently used in teaching and learning process. Research shows that computer usage has been advancing from learning computer packages to teaching and learning through the computer (Volmsn, 2005). Mikre (2012)

in his study shows that ICT skilled teachers , specifically those able to use a computer, embrace ICT usage by having positive attitude when teaching.

Hare (2007) reported that in Ethiopia, computers and the internet are widely used as teaching tools in secondary schools and higher learning institutions. Using computers and the internet allows users to access latest information (Hare, 2007). Mikre (2011) added that computers in Ethiopia are used not only in schools but also in offices and homes, with the highest use seen in educational institutions. However, despite government efforts, there is still a problem with not having enough computers in learning institutions. While these studies looked at how ICT has influenced education, they did not focus on using ICT to teach land forming processes.

Using ICT in studing geography has had a strong impact, making the process much easier than it was before. Brunn et al. (2004) stated that use of computers in schools has fundamentally changed not just how we teach but what we teach including, space, places, natural features, and human landscape, which keep changing. The study discussed computers usage in geography in different areas but did not focus on ICT integration when teaching land forming processes.

2.2.2 Internet

Internet is a web or network that interconnects many people in the world who require to exchange, access, share and exchange information with other people. It enables people to access a lot of information faster, easily, safely, and with minimal cost (Yuzer 2006). The Internet has enabled scholars, researchers, and other people to access information for all disciplines. It provides up-to-date information. There is a global increase in usage

of the internet because people have learned the importance of the internet (Bevainis 2008). Internet is used at homes, schools, working places, cyber cafes, and in many more places.

Tulk (2008) researching in Turkey found that the internet is mainly used by people between the ages of 16-74 years. Another research pointed that the highest percentage of internet usage was found in educational institutions, for learning and research (Tokcan 2009). Geography teachers use the internet to access content on land forming processes, videos showing volcanicity, folding, and faulting process. Such information helps the teacher in teaching and learning processes (Erdem 2008).

Internet-enabled geography teachers to get up-to-date information since there are many physical, environmental, and social changes that take place in the world (Houfsonen et al., 2004). The Internet enables geography teachers to download photographs of features formed through volcanicity for example volcanoes. Geography teachers use the internet in-class and out of class.

Cemalettin (2015) explains that teachers use the internet to access scientific information on teaching strategies, teaching methods, and teaching techniques. Cemalettin (2015) study generally focused on how teachers use the internet but did not focus on how Geography teachers apply the scientific information accessed in teaching land forming processes. In some schools, the lack of strong internet connectivity hinders teachers from accessing the required information (Demirci 2008).

2.2.3 YouTube

YouTube is a common ICT tool that teachers, especially geography teachers, often use during teaching and learning. YouTube has broken geographical boundaries, making world a small village by uniting all YouTube users (Okarbiniski, 2010). Many learning institutions have established their own YouTube Channels, where teaching and learning take place. Teachers record their lessons and share them with students and other teachers as a video or through YouTube. The users access the lessons and can use them in or outside their classes (Shea & Sheree, 2011).

YouTube is said to be the best way of storing and retaining videos since there are private accounts that an individual can create (Trier 2007). According to Jones and Cutherii (2011), YouTube videos are very useful in the education process because they can be used in class for teaching, and by an individual for personal studies.

Al-Mansri (2014) in his study found out that the use of YouTube improves learners' performance. Geography teachers use YouTube to teach processes like volcanicity when teaching land-forming processes and as a result, the students record high academic achievement (Al-Enezi 2013). YouTube enables the users to review the videos many times without getting bored, hence improving their understanding (Rick & King, 2012).

2.3 Factors Influencing the Choice of ICT Used in Teaching and Learning

Jans and Awouters (2015) outlined a range of factors that affect ICT project implementation in the school. Several factors affect the choice of ICT tools, including those related to teachers, students, and the school itself (Jans & Awouters, 2015). A

closer look at these factors shows that things like ICT tools availability and accessibility, skills, attitude, and the amount of time available all play a role (Jans & Awouters, 2015).

2.3.1 Availability of ICT Tools in Schools.

For teachers to use ICT effectively when teaching land-forming processes, school administrations need to make sure ICT resources are available. Lewis (2010) discovered that use of ICT projects by teachers was hindered by limited number of computers and peripheral devices. Lange and Peter (2010) observed that in Canadian schools, the greatest challenge was inadequate ICT tools. likewise, ITU (2010) found that the lack of certain ICT tools limited how much teachers could use ICT. This issue may be caused by insufficient funding or poor handling of the equipment, which can lead to damage.

According to the South Africa's policymost schools lack computers. Palak and Walls (2012) recommend that the government develop strategies to ensure schools receive ICT resources. To achieve this, the government should work together with both public and private sectors to equipe schools so as to promote education. A 2009 study revealed that while many secondary schools have ICT resources, they are insufficient for both teachers and students (Afshari, Bakar, Launa, Samah, & Fooi, 2009). School administrations must provide the necessary hardware, software, and tools for better learning processes. (Tondeur, Velcke, & Van Braak, 2008).

2.3.2 Accessibility of ICT Tools by Teachers and Students

The effectiveness of ICT usage in schools largely depends on how accessible ICT tools are in schools (Plomp, Anderson, Law, & Quale, 2009). A study conducted in Turkey in 2008 showed that when teachers timely access ICT resources teaching becomes more

effective (Usluel, Askar & Has, 2008). The research found that the respondents had computers at their homes due to limited access to computers in school (Albirin. 2006). When teachers access ICT resources they integrate and adopt them, while limited access to ICT resources hinders their usage.

2.3.3. Teacher's Attitude towards Use of ICT

Attitude according to Cambridge dictionary refers to a feeling or opinion about someone or something. Teacher's perception determines whether to use or not use provided ICTs. A study by Mirzajani, Mahmud, Fauzi, and Wong (2016) explored teachers' acceptance and implementation. From the findings teachers' confidence and positive attitudes toward technology fastens their understanding of content and improve how they support students' learning and achievement.

Onwuabgoke and Ukegbu (2010) did a study based on how ICT is used in teaching and learning, focusing on high school teachers' experiences. Result indicated that although teachers were aware of the ICT resources available, they did not make effective use of them in their teaching. Several challenges were identified, including limited computer literacy among some teachers, insufficient ICT resources, lack of funding, unreliable power supply, and limited knowledge (Onwuabgoke & Ukegbu, 2010). The researchers recommended that teachers be motivated through workshops, seminars, and conferences to become ICT literate.

A study by Mbithi (2014) in Matungulu District, Machakos County, found that secondary schools were provided with technical facilities and e-learning materials. The study also looked into Geography teachers' knowledge together with their skills in

using computers. In a related study, Mwunda (2014) examined ICT integration in in Machakos County schools. The results showed that the integration of ICT in teaching and learning was still limited. The research pointed out that one key factor affecting ICT adoption was attitudes by teachers toward using technology in classroom.

2.4 Challenges Faced when Using ICT in Teaching and Learning

Tteaching Land forming processes encounters several challenges. Jans and Awouters (2015) outlined a various factors: physical and cultural, hindering the implementation of ICT projects in various schools. Likewise, geographical factors limiting usage included: country size, terrain, and communications. Finally, the demographic factors that hindered integrating of ICT tools included: population size, density, and dispersion.

2.4.1 Insufficient Technical and Administrative Support

Mirzajani, Mahmud, Fauzi, and Wong (2016) found in their study that othe major hindrance of the implementation of ICT is lack of technical support, along with other contributing factors. According to their research, the technical support given to the teachers is insufficient and this discourages teachers. Consequently, the school administration should increase the ICT tools needed in schools and provide strong and reliable technical support and in so doing they will motivate teachers.

Moses, Bakarb, Mahmud, Wong (2011) describes technical support as the professionals or experts with the capacity to provide the much needed assistance to teachers when using technology into teaching and learning. As such, these specialized skill personnel offer support such as access, use, and resolving of issues associated with software,

hardware, and network resources (Dexter, Anderson, & Ronnkvist 2002). These individuals provide internal or institutional helpdesks services as well as guidance on access of best ICT facilities within the education domain (Frost & Sullivan, 2006). Moses, Khambari, and Luan (2008) explain that when adequate technical support is provide the users get motivated within the instructional setup and as such, the ease of their adoption as teaching and learning instruments among teachers and learners.

Dexter et al. (2002) also support this position and posit that the presence of technical support enhances the user's confidence and assurance in the use of the tools considering the guidance they receive from the experts. Haslaman, Mumcu, and Usluel (2008) notably for the same reasons support the fundamental role and essentiality of technical support, guidance and services in application of technology in teaching and learning setup. Resta (2002) explains that lack of technical support may hinder attempts of integrating technology in the instructional and curriculum development process considering that difficulties in use of ICT tools may arise in its absence. As such, the availability of technical support is a requisite to overcoming such difficulties thus being very important to teachers.

To ensure that teachers integrate ICT tools in teaching land forming processes, the school administration should ensure that, there is strong technical support. Yilmaz's study found that many schools had computers and internet connections but lacked technical support. Limited technical support to users prevents effective usege of ICT. Teachers fear shame and discouragement in case of failure of ICT tools during the lesson hence poor ICT integration (Jones, 2014). insuffitient technical support in schools causes time wastage in preparation of an ICT integrated lesson (Becta. 2004).

When ICT tools fail during the lesson, immediate provision of technical help will solve the problem of time wastage. The availability of strong technical support in school gives teachers the confidence to integrate ICT tools when teaching land-forming processes.

Baylor and Ritchie (2002) define administrative support as the involvement of senior school leaders, such as principals and directors. Afshari et al. (2008) add that leaders who are skilled in ICT will encourage it. as they can offer perfect guidance and leadership in its application. This kind of support inspires teachers to adopt ICT in their lessons even as they provides them with reliable help when they face difficulties during implementation (Moses et al., 2008; Ali, Nor, Hamzah, & Alwi, 2009). Such administrators are also able to prioritize and setup a school budget for facilitating access in the schools (Baylor & Ritchie, 2002). Therefore, effective administrative support in ICT adoption in the instructional process is a significant aspect of schools' leadership that encourage teachers to continue using ICT in teaching and learning among instructors (Baylor & Ritchie, 2002; Samuel & Bakar, 2006; Ali et al., 2009; Bakar, Ayub, Luan, Tarmizi, 2010).

2.4.2 Inadequate ICT Tools/Facilities in Schools

The following ICT tools are needed to fully integrate ICT in education: computers, laptops, printers, projectors, internet service, radio, relevant software, television radio cassette, scanning machines, and handsets. Musyoki (2016) conducted a study on how ICT affects teaching and learning geography. It was done among public secondary schools in Mwala Sub-County, Kenya. The findings showed that the lack of sufficient ICT infrastructure limits the usege. Research showed that insufficient ICT resources at

schools have forced many teachers to put computers to use only at home (Albirin, 2006). According to the research, most of the schools lack sufficient ICT tools (Adeyemi & Olaleye, 2010). Most of the schools, which have computers, lack internet connectivity, which is very important. Inadequate ICT tools affects the effective utilization (Plomp et al., 2009). Computer laboratory is a vital facility in school, but which lack in most of the bhschools, where most schools have about three computers, which are stored, the big offices.

One of the key underlying shortcomings that has been associated with this inadequacy is insufficient funding to the schools (Ogbomo, 2011; Salam et al., 2018). A larger portion of the public schools' financial needs is footed by the exchequer (Pondiwa, El Nabahany, & Phiri, 2022). While students pay school fees to supplement what the government contributes to the schools, this is not usually enough even to meet the basic infrastructural needs for the school leave alone any ambition to modernize the schools into ICT-ready facilities. It is undoubtable that upgrading a school to a level where it is able to adopt functional ICT tools properly is a heavy-investment requiring task and most schools lacked the requisite financial support (Wakhu, 2013).

This is besides acquiring some of the basic ICT tools like computers. Firstly, some schools are located in very remote areas that that are not yet connected to the national grid or even off-grid networks and hence do not have access to electricity which is an important element of a reliably functional ICT setup. Secondly, the fact that these areas are located away from the mainstream technological network, they alsfdffdgo suffer the challenge of poor or absence of internet connectivity. As such, efforts towards establishing reliable connectivity with proximity to the schools may not be a fete that is

affordable to schools or ready to invest due to shortfalls in funding (Zindi & Ruparanganda, 2011; Biegon, 2017).

Apart from the requisite infrastructure, acquiring high-performance ICT tools including fast computers and high-speed internet require massive investments that a greater percentage if not all of the schools are not able to afford (Zindi & Ruparanganda, 2011; Biegon, 2017). In addition, proper use of ICT tools within schools require significant technical support including hiring of skilled ICT technicians and system administrators to manage and maintain the systems, the schools may still be financially crippled to fund such payrolls (Zindi & Ruparanganda, 2011).

2.4.3 Poor Infrastructure

ICT tools do not function alone in isolation and are only capable to be productive if they exist within a defined infrastructural system (Bariu, 2020). Electricity, internet accessibility tools and telecommunication masts, computer laboratories and networking systems are all part of the necessities that make ICT use in education work (Mulwa, Kyalo, Bowa, & Mboroki, 2011; Bariu, 2020). Without these, even if the schools would have computers donated by well-wishers, their use and especially their integration into teaching and learning would still be incapacitated. Undoubtedly, many schools in Kenya as are schools in other sub-Saharan countries still lack access to these basic ICT supporting infrastructures making it almost impossible to imagine adopting ICT as part of the instructional process can really work (Tilya, 2018; Mukuni, 2019). In addition, where such access may be possible, the certainty of these being to the required global

standards is still a mirage considering the high level investment required and the technical expertise associated with their installations.

Drent and Meelissen (2008) found specific infrastructural factors determinng implementation of ICT when teaching in schools. They include: one, schools' infrastructure; (e.g., costs implementing and maintaining computers) (Lu, Hou & Huang, 2010). Osuagwu and Prince (2016) confirm that there is poor information infrastructure that hinders ICT development and application in Nigeria. This is because, many schools have ICT tools but lack supporting infrastructure, which makes their use difficult.

2.4.4 Time factor

. Geography teachers require adequate time to prepare for an ICT integrated lesson. A study on teachers' workload revealed that teachers are always overloaded with many activities too. As a result, they lack time to prepare for ICT integrated lessons (Abuhmaid, 2011). Geography teachers require adequate time to prepare for ICT integrated lessons on Land forming processes. Another research showed that insbsnadequate time for teachers is caused by teacher workload (Samarawikrema & Stash, 2006).

2.4.5 Limited ICT Skills

Musyoki (2016) found that limited ICT skills can prevent effective use of ICT when teaching geography. Similarly, Ayere, Odera, and Agak (2010) studied e-learning in Kenyan high schools and concluded that most teachers didn’t get ICT training when pursueing their courses. In fact, 55% of the teachers surveyed confirmed they had no

such training. Additionally, another case by Kandiri (2012) focused accessibility and usability of ICT in Kenyan schools showed that out of 2,250 ICT graduantes from universities and colleges in 2010, 1,350 worked in industries as well as ICT service sectors. Therefore, only 900 taught ICT in educational institutions. This number is too low and disappointing. According to Miima, Ondigi, and Mavisi (2013), most teachers decides to continue using old approaches/methods of teaching in schools because of limited teacher competency, confidence, time, and insufficiently related ICT software. It is therefore recommended that teachers should be motivated through workshops, seminars, and conferences.

Baylor and Ritchie (2012) conducted a research on quantitative study that focused on factors facilitating teacher skill They discovered that when teachers get well trained during their tertiary learning, they embrace and integrate ICT in the class and this makes the learners to develop positive attitude toward use of ICT in learning.

2.4.6 Inadequate Confidence by the Teachers

Teachers' confidence when using ICT in teaching land forming processes is influenced by their ICT skills, attitude, and experience. The teacher's attitude influences his/ her confidence when using ICT tools. A negative attitude also a major hinderance (Mekheimer, 2011). Many schools have provided ICT resources, but few teachers have adequate ICT skills. Inadequate ICT skills in the utilization of ICT resources makes teachers lose confidence hence fail to integrate ICT when teaching land forming processes (Buabeng, 2012). Experienced teachers have a lot of content with them,

unlike the new teacher. Lack of experience makes the teacher to lose confidence and avoids ICT integration.

2.5 Existing Research Gaps in the Literature Reviewed

Literature review shows that using ICT greatly impacts teaching. Several related studies have been conducted on this topic. For example, Zenelaj (2013) studied how ICT affects teaching and learning geography in high schools in Albania. Lange and Peter (2010) discovered that limited tools ICT resources is a major challenge for using technology in Canadian schools. Research by Osuagwu and Prince (2016) confirmed that poor infrastructure limits the development and use of ICT in Nigeria. Ayub, Bakar, and Ismail (2015) investigated factors that affect attitude of teachers toward using ICT. These studies mainly delt on factors influencing choice of ICT tools, challenges faced during integration, and major ICT tools used in teaching geography in general. However, none of them specifically address the employed of ICT tools in teaching and learning land-forming processes.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The chapter describes the methodology used in the study. It covers the research design, study area, main variables, target population, sampling techniques and sample size, data collection tools, pilot study steps to ensure validity and reliability, data collection methods, data analysis procedures, as well as legal and ethical issues.

3.2 Research Design

The study was found suitable with descriptive survey design. Mathooko (2011) defines descriptive research as surveys and fact-finding inquiries and is suitable for studies examining existing conditions without manipulating variables. Descriptive survey perfectly suits this study because it allows collection of information based on what is currently happening, the results can be generalized to a larger population. Both qualitative method and quantitative approaches were embraced for this study. Qualitative data came from interviews and observation checklists, while quantitative data were gathered through questionnaires.

3.3 Location of the study

Research was done in Lamu County, which is located along northern coastline of Kenya. Lamu is the 5th county located at Kenya's coastal region. Lamu County shares borders with Tana River County to the southwest also bordering Garissa County to the north. To the northeast it boaders Republic of Somalia, and Indian Ocean to the south. It county has two constituencies and is sub divided into two livelihoods zones with

varying economic diversities which are distinct in terms of ecology, infrastructural network and population distribution (Lamu CIDP, 2013-2017). Lamu County has a population of 104, 539 people, and total area of 6,273 km2. In terms of religion, social economic and ethnicity, Lamu County is pluralistic in nature. Its major source of income is agriculture, business and tourism.

Academically, Lamu County has 23 secondary schools with 20 in Lamu West and three in Lamu East. Among the 20 schools in Lamu west, three of them are private schools. The main challenge in the county therefore is to provide adequate secondary schools with necessary facilities to absorb and provide quality education (Lamu CIDP, 2013-2017).

3.4 Variables

The independent variable for this study included: Ministry of Education, school policy, teacher factor, student factors and types of ICT tools which interacted with the extraneous variable that is, teaching strategies. And finally dependent variable was the level of ICT used in the teaching and learning of land forming processes.

3.4 Target Population

Population according to Orodho (2017), reffers to the group of individuals, events, or objects with a common characteristic. Target population is a large population that constituting of members of a spacific group that the researcher wish to study (Orodho (2016). Lamu County has 23 secondary schools with 20 in Lamu West and three in Lamu East. The target population for this study was Lamu west which has a total of 20 secondary schools. Among the 20 schools in Lamu west, three of them are private schools. This study only delt with public schools and excluded the private schools. This

is because private schools are endowed with adequate resources. The study focused on the form 2 classes in the targeted schools because internal land forming processes as a topic is taught in form two. The target population of this study is 15 secondary schools which were found to have ICT tools and are accessible. Among the 15 schools, 2 are national schools, 1 sub county school and 12 are county schools. The total number of form 2 geography teachers was 24 and the form two geography students are 1821. The number of heads of departments in all the targeted schools is 15. Therefore, the total target population is one thousand eight hundred and sixty (1860).

3.5 Sampling procedures and sample size

Sampling refferes to the process of selecting a sub-set of a population to represent the whole, allowing conclusions to be drawn about the larger group (Orodho, 2016). For the findings to be generalized to the broader population, appropriate sampling techniques and a representative sample size were employed (Kombo & Tromp, 2006).

3.5.1 Sampling procedures

Sampling procedures refers to the steps followed when selecting sample from a population. When selecting the samples both probability and non-probability procedures were employed. Samples were selected using probability and non-probability procedures. This is done to ensure that all observations will be given equal chances of selection. The study picked form two because land forming processes is taught at form 2. Purposive sampling was used to select Lamu west constituency because it has more schools with ICT resources as compared to Lamu East. Stratified sampling was used to come up with three strata which include national, extra county and county schools.

There are two national schools in Lamu county therefore, random sampling was done to choose one school out of the 2 national schools. The selected school was used in the study while the other one used as Pilot study. There is only one school under extra-county school and so the researcher did Purposive sampling. There are 14 count schools in Lamu west constituency, the researcher applied Random sampling when selecting 4 schools that were used in the study. Six schools were randomly selected out of the total of 17 schools, gives 35%. For the schools with more than one stream, random sampling was done to select the participants giving an enrolment of 810 form 2 students and 16 form two geography teachers and the 6 heads of department. For the selection of form two (2) geography students and form 2 geography teachers simple random sampling was done. The principal of the selected schools were used in the research.

3.5.2 Sample size

Sample refers to representation of the whole population. A sample of about 25% of the sample is suitable. The table 3.1 below represent the sample size for this study.

Table 3. 1: Sample size of the study in Lamu County, Kenya

Respondents	Students Enrollment	Sample	percentage	Geography teachers	percentage	principals	total
School A:							
Class N	57	14	25	1	100		
Class S	50	13	25	1	100	1	30
School B	35	9	25	1	100	1	11
County schools.							
School C	65	16	25	1	100		
Class K.	60	15	25	1	100	1	34
Class T.							
School D	55	14	25	1	100	1	16
School E.							
Class X	50	13	25	1	100		
Class Y	48	12	25	1	100	1	28
School F	50	15	25	1	100	1	17
TOTAL	470	121		9		6	136

Source: Ministry of Education, Lamu West Report 2022

The sample size as per table 3.1, consisted of 9 geography teachers. The study targeted 470 students from form 2 classes in all the 6 schools. Six principals in every school. The sample size for this study is a hundrend and thirty six(136).

3.6. Data Collection Instruments

The researcher developed 3 instruments that were employed in data collection process. The three instruments included: the questionnaires, the interview and the check list. The selected form two geography students were given questionnaires to fill while the other questionnaire were administered to form 2 geography teachers. Interviews were conducted to the principals of the selected schools. The observation checklist and the documentary were filled by the researcher. Qualitative data was categorized and

assigned codes as per the research objectives. Quantitative data collected was summarized to make it easy for the computer analysis which was accomplishe with the help of statistical package for social sciences (SPSS) version 21.0.

3.6.1 Questionnaires

Questionnaire is one of the instruments used in data collection, which allows measurement for or against a particular viewpoint (Orodho, 2016). Questionnaire is said to be the most appropriate instruments for collecting data in the field because it collects aequate data easily and within a short reasonable time (Konthari 2007). Questionnaire employed in this study containne both open and close-ended questions and this enhances capturing of more information from the respondents.

There were two questionnaires, one for the form 2 geography teachers (see appendices B) and another one for the form 2 geography students (See appendix C). Each questionnaire has 3 sections which include: section A, biographical data, Section B, ICT tools available and the extent of usage. Section C, challenges and the possible solutions to the challenges experienced.

3.6.2 Interview schedule

Interview is when questions are administered oraly by the researcher to the respondents with an aim of getting specific data (Orodho 2017). It can be administered one-to-one (physically) or online through email or telephone. Interview was preferred because it helps one to gain in detailed information, seek clarification and know when respondents are cheating. Interview was highly preferred because it allows multisensory channels and is also a flexible tool of collecting data.

The study developed interview guide (Appendix 4), which had only 3 questions. The interview was done to the principals who were purposively selected. The interview was done alongside audio recording especially to principals who allowed the recording.

3.6.3 Observation checklist

It is a list of items that the research wants to observe and ensure that those items/objects are available. It enables the research to observe how they are used and by who. The study used observation schedule (See Appendix 5), which was filled by the researcher through observation. The observation checklist contained 2 sections: section one focused on observation that the researcher made in the classroom, section two focused on observations that were done in the computer laboratory by the researcher. Observation schedule majored on whether ICT tools were provided, accessed and utilized or whether they were in good working condition. It provided information that may not be clearly collected through questionnaires and interview.

3.7 Pilot Study

The instruments were tested with ten (10) respondents from a public secondary school that was not part of the main study. This pilot helped identify and fix any errors or missing items to make sure that tools were valid and reliable.

3.7.1 Validity of the Instruments

This study focused on content validity, factorial validity, and face validity (Orodho, 2017). To make sure that questionnaires are valid, content validity was accomplished to examine readability, clarity and simplicity of its contents. Expert judgment, in this case the supervisor advise, was sought to check whether the questions were suitable and

representative. The supervisor also gave guidelines of corrections to be done in line with the study objectives (Orodho 2016). Face validity, focuses on relevance of the instrument to ensure that they are clear, precise and reasonable and to ensure that the questions are not ambiguous. (Oluwatayo, 2012). This assisted in improving and providing the important revision and modification of the research tool thereby improving validity. Pilot study enhanced validity of instruments. The study focused on content validity.

3.7.2 Reliability of the Instruments

Reliability is the ability of a research instrument in producing similar results when the measurement is repeated under the same conditions (Mugenda & Mugenda, 2003). A reliable instrument yields consistent outcomes across multiple trials, with minimal variation. The instrument was divided into two halves, and the results from both were compared. Since the differences was minimal, the instrument was deemed reliable.

To further check consistency of tool, Cronbach's alpha coefficient was found through calculations of data from the pilot study. This coefficient ranges between 0 and 1, where higher values show greater reliability. a value of 0.5 or higher is acceptable, but reliability improves as the value gets closer to 1 Mugenda and Mugenda (2003). For this study, a reliability coefficient of 0.6 was deemed appropriate.

3.8 Data Collection Procedure

The schools' management from specified schools were contacted first to give out permission for research to be done. Researcher explained the purpose of doing that study and convince them that the information provided will be handled with confidentiality.

3.8.1 Questionnaires

Questionnaire as a redearch instrument is commonly used in data collection. The data recieved is used to measurement for or against a particular viewpoint (Orodho 2016). The researchers randomly selected a sample of the students in form two. The researcher then took the selected students in a hall and divided them into two equal groups and then administered the questionnaires (Appendix 3) to them. The questionnaires were collected after 30 minutes. The researcher took the other questionnaires (Appendix 2) and administered them to the selected form two geography teachers. The researcher gave the respondents two weeks for filling in the questionnaires and later came and collected them.

3.8.2 Interview schedule

The researcher organized dates with the principals based on their programs. The researcher met them in the identified and agreed private places to interview them. The researcher had 3 major questions to ask and sought clarification where necessary. The interview took about 15 minutes for each respondent. Where the permission was granted, the researcher continued with the interview while recording, and when denied, the researcher continued without recording but taking notes.

3.8.3 Observation checklist

The researcher met the form 2 geography teachers and planed when to conduct class observation. The researcher used the observation schedule (Appendix 3) for data collection, through observation. Researcher attended the lessons as planed and filled tables during the lesson. After attending all the lessons in all the schools as planned, the researcher preserved the checklists for data analysis.

3.9. Data Analysis and Presentation

Collected data was then analyzed through Statistical Package for Social Sciences (SPSS) version 28.0. Data obtained from the questionnaires was edited, cleaned and categorized into common themes to represent meaningful data. Data analysis is the computation of measures which is done through searching for patterns of relationship that is found in a group of data (Konthari, 2010). Raw data delive from the field was cleaned, coded and keyed in the computer for analysis.

3.9.1 Quantitative Data Analysis

Quantitative data was collected from the closed-ended questions in the questionnaire. The responses were pre-coded and entered into a computer for analysis. Descriptive statistics, such as mean, standard deviation, frequencies, and percentages, were used to summarize and interpret the results.

3.9.2 Qualitative Data Analysis

Qualitative data was attained through interviews and the use of an observation checklist. This data was analyzed thematically by identifying patterns, trends, and key insights relevant to the study objectives.

The researcher cleaned and categorized qualitative data and established themes and codes for the data. The researcher then entered the data in the computer in order to run descriptive statistics involving percentages, frequencies, mean an also standard deviation.

Descriptive data was presented in tables, figures, graphs and charts. For Objective One, which identify the types of ICT tools found, the researcher used frequency analysis.

Objective Two, focusing on factors influencing the choice of ICT tools, data was tallied. Objective Three, which examined how ICT tools influence teaching and learning, was analzed using tabulation. For Objective Four, investigating challenges experienced when integrating ICT tools in class, frequency analysis was applied.

3.10 Legal and Ethical Consideration

Researcher obtained an introductory letter from the School of Education and a research permit from the National Commission for Science, Technology and Innovation (NACOSTI) to formally seek permission from relevant authorities. Ethical standards were strictly adhered to during the data collection process. Participants were given information concerning purpose of the study and made it clear that it was voluntarily participation. Confidentiality and privacy were guaranteed, with all collected information securely stored and used solely for academic purposes related to this research.

CHAPTER FOUR

PRESENTATION, INTERPRETATION AND DISCUSSON OF FINDINGS

4.1 Introduction

This chapter provides a detailed analysis and interpretation of data collected during the fieldwork stage of the research. The data has been examined in line with the study's primary objectives. Specifically, the research aimed to: identify the ICT tools utilized in teaching and learning land-forming processes; explore the factors that determine the selection of these tools; investigate the extent to which the use of ICT tools affects the teaching and learning of land-forming processes; and examine the challenges encountered in the integration of ICT in this context.

Study was done in Lamu County and particularly, Lamu west constituency owing to it having more schools with ICT resources as compared to Lamu east among other counties, Lamu County was sampled as suitable for this study because of the dearth of research activities studies on integration of ICT in teaching and learning, particularly, on topic that is rather technical such as land forming processes. The respondents included samples of Geography teachers, students and the principals.

While extensive research focused on role of ICT in teaching and learning of various disciplines, most of them have tended to concentrate on Science subjects. This is despite the fact that the area of land forming processes in Geography reflects extensive unmet needs and thus untapped potential for teachers and schools in Kenya in general. Data presented in this chapter is organized into five themes factoring key research questions. These are:

a. ICT tools used in teaching and learning land forming processes
b. Factors influencing the choice of ICT used in teaching and learning land forming processes.
c. Extent of Influence of Available ICT tools on Teaching and learning land forming processes
d. Challenges in using ICT in teaching and learning land forming processes.
e. Suggested interventions to support the use of ICT in teaching and learning land forming processes

4.2 Demographic Characteristics of the Respondents

4.2.1 Gender of Student Respondents

Total sample of students was 76 boys and 45 girls translating to a percentage gender distribution of 62.3 and 37.2 percent respectively. This is represented in the figure below.

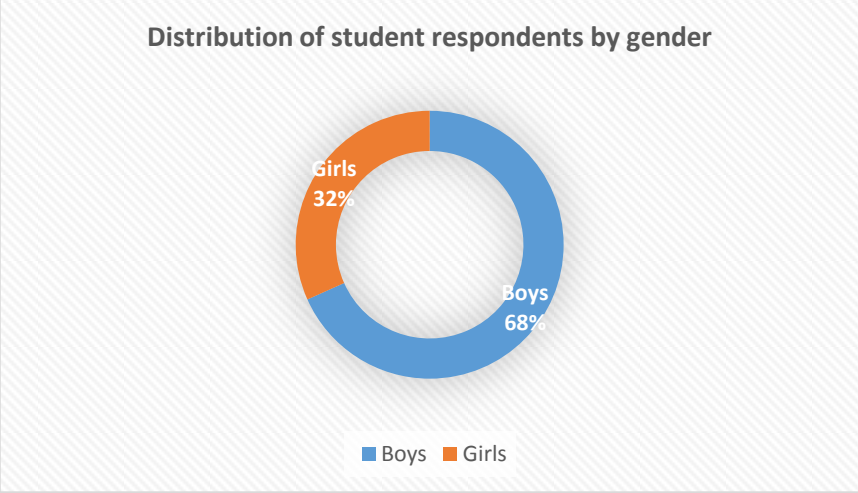

Figure 4.2: Responses by Gender

4.2.2 Age of Student Respondents

Age distribution of student indicates that the highest proportion of the students were aged 15 to 17 years and this category constituted 61.3 per cent while the age bracket of below 12 years had the least students sampled to participate in this study with 1.4 percent of the total number of student respondents. This is indicated on the figure below.

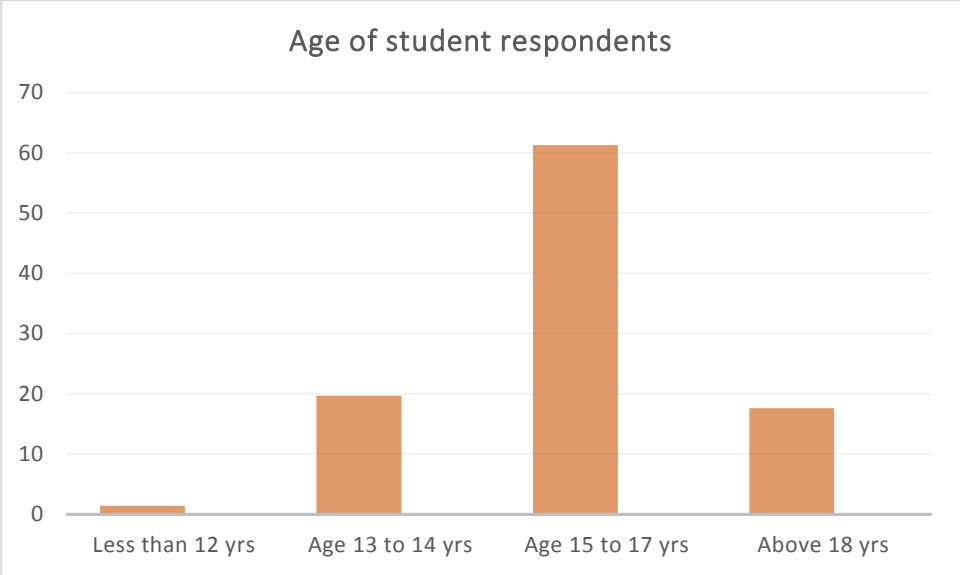

Figure 4.3: Respondents Age

4.2.3 Year of Student Admission in School

From the distribution of student respondents in terms of the year at which they joined their respective schools, it is notable that the majority of the students (70.4%) joined their respective schools in the first year of their studies. Those who joined their schools in the second and third years were the minorities and constituted 19.0 and 10.6 per cent respectively. This distribution is indicated in the figure below.

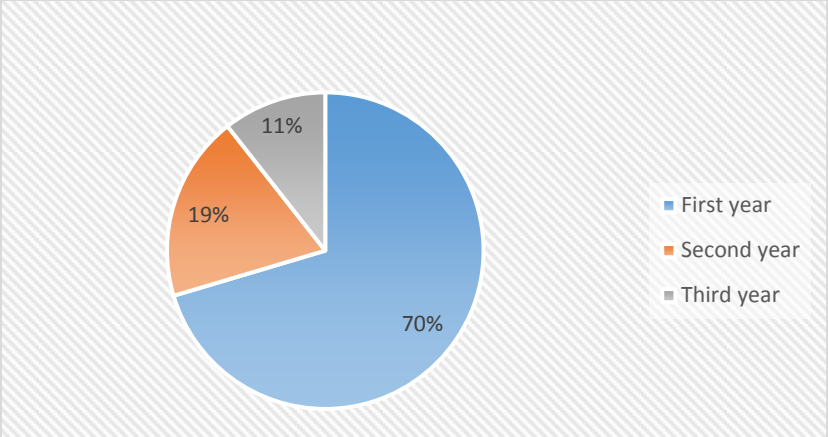

Figure 4.4: Students' Year of Admission

4.2.4 Distribution of sampled schools by Type of School

Different types of schools were sampled for participation in this study. The table below indicated schools involved in this study and their numbers.

Table 4.1: Type of Schools Sampled

Type of School	Frequency	Percentage
County	4	66.7
Extra County	1	16.1
National	1	16.2
	6	100

4.3 Types of ICT Tools used in teaching and learning land forming processes

Objective number one sought to identify ICT tools available in the sampled schools when dealing land forming processes. Due to the central role played by availability of ICT tools, it was good to have a picture of th available tools in the different schools and in what proportions. Data on the aspect of ICT tools was collected from six (6) out of

the fifteen sampled schools. It focused on availability of computers, internet, projector and YouTube as these are key in teaching and learning land forming processes.

4.3.1 Computers as a tool for teaching and learning

It was sought through two documents, thus; document analysis schedule and an observation checklist. The findings from these two instruments were corroborated to establish the true situation on the ground. For instance, if the document analysis tool indicated that a given school had five computers that are in a working condition, in a corresponding exercise of administering an observation checklist, the researcher sought to observe the five computers and confirm that they are in a good working condition. There were some few laptops owned by teachers in the sampled schools. For both the desktops and laptops, they all had the necessary basic software and packages including Word Processor, Spreadsheet, PowerPoint and Excel

But despite having these computers, some were observably inaccessible to the students for use. And in general, the few available computers in the visited schools were observed to be inadequate. These findings indicated in table 4.2 below.

Table 4.2: Number of computers in the schools

School	Computer Availability		Computer Accessibility		Comment
	YES	NO	YES	NO	
School A	45 (40.17%)	0	25 (44.64%)	20 (35.71%)	Inadequate
School B	16 (14.29%)	0	7 (12.5%)	9 (16.07%)	Inadequate
School C	30 (26.78%)	0	15 (26.79%)	15 (26.79%)	Inadequate
School D	6 (5.36%)	0	2 (3.57%)	4 (7.14%)	Inadequate
School E	5 (4.46%)	0	2 (3.57%)	3 (5.35%)	Inadequate
School F	10 (8.92%)	0	5 (8.92%)	5 (8.92%)	Inadequate
Total	**112**		**56**	**56**	

According to this table, all the schools had computers, only that they differed in numbers. Despite having computers, a good number of them were not accessible to both teachers and learners. School A had the highest percentage of the number of the computers with 40.17%, followed by school C with 26.78% then school B with 14.29%, the school F with 8.92% then school D with 5.36% and lastly school E with 4.46%. The researcher noticed that there was a problem in accessing these computers, both teachers and learner. The percentage of computers accessed by teachers and learners was as follows: school A had 44.64%, school C had 26.79%, school B had 12.5%, school F had 8.92% while school D and E had 2.357%.

Despite school A and C having larger number of computers, the accessible computers were not enough because the two schools had large number of students. During the study, the researcher noticed that some computers were installed in the offices and not in the computer lab, and its only teachers who could access them. School D, E, and F had no computer laboratory. School D and E had 3 computers installed in the store

where both teachers and students could access but the rest were installed in various offices where only teachers could access them. This shows that, there was limited access of the computers by teachers and learners which lead to less usage of computer when learning land forming processes due to shortage of number of computer in those schools.

A research done in Turkey by Jawad (2020) states that both teachers and learners were positively influenced by use of computer when leaning, especially geography. According to his research, shortage of computers in school, causes congestion if student on one computer and this discourages learners.

A similar research was done by Mikre (2011) I Ethiopia, showed that most of the schools had limited number of computers that were in good condition and accessible to teachers and learners. In that study, the researcher noted that most of the computers were mishandled and broken. As a result, this lead to limited usage hence poor performance in schools. The result of the above case was similar to this research, therefore, the researcher noted that indeed, there was limited usage of computers for both student and teachers in the sampled schools and this led to poor performance.

4.3.2 Internet as a tool for teaching and learning

Second aspect of ICT tools was internet. The researcher aimed to determine the availability of internet access and the quality of its connectivity. The following table 4.3 shows the findings on this aspect.

Table 4.3: Internet availability and accessibility in the schools

School	Internet Availability		Internet Accessibility		Comment
	YES	NO	YES	NO	
School A	2 (33.33%)	0	2 (40%)		Inadequate
School B	2(33.33%)	0	1 (20%)		Inadequate
School C	1(16.67%)	0	1 (20%)		Inadequate
School D	0	0	0		No internet
School E	0	0	0		No internet
School F	1(16.67%)		1 (20%)		Inadequate

From the table above, it can be deduced that four schools had internet connectivity with the following percentages: school A (33.33%), B (33.33%), C (16.67%) and school F with 16.67%. In the four schools, the teachers and students were very happy about it, but they complained that it was always weak, hence time wastage. As a result, some teachers opted to use their own data for the same. On the other hand, school D and E had no internet connectivity due to lack of electricity in the school. The schools remember had computers and therefore they depended on school generator for them to function. These two schools (D and E) which had no internet, the researcher during interview noted that, the respective teachers used their data to access notes, videos and photographs from internet to teach land forming processes.

A research done in America by Fiona (2023) states that internet is a positive resource that has the ability to transform schools by improving teaching and learning methods. It states that weak internet affects learning since there is time wastage. Most of the teachers in schools with poor internet connectivity decides to avoid an internet integrated lesson and this affects both teachers and learners. Another research was done by Cemalettin (2015) showed that internet enables users to access adequate notes faster, easier and at minimal cost. It also states that internet enables users to access latest

information. Use of internet when teaching geography help teachers and learners to access note, photographs and videos showing hoe folding, faulting and volcanicity processes take places.

This research agrees with other researches done by other scholars that internet helps the learners to understand the content better especially when they read up-to-date notes, study the photographs of the features formed and watch the videos of the whole processes taking place. And this is what was limited in the schools under this study. Hence disadvantaging the teachers and the learners. Therefore the school administration need to be keen on payment of internet and make it available to the teachers and learners to help improve the performance in geography.

4.3.3 Projector as tool for teaching and learning

The other tool was projector. When dealing with projector, You Tube and internet are very important for they enable teachers and learners to download notes, videos and photographs that they use when teaching and learning land forming processes. In a situation where the computers are less or in accessible, the projector is the best alternative. This is because in a situation like the one that prevails in the sampled schools, where there are less computers or laptops, the few available could be situated in an ICT lab where, together with a projector, they can be used to serve the whole class during land forming processes lessons. The table 4.4 below therefore shows the findings on the aspect of availability and accessibility of a projector in the sampled schools.

Table 4.4: Availability and accessibility to Projectors

School	Projector Availability		Projector Accessibility		Comment
	Yes	No	Yes	No	
School A	3 (27.27%)	0	2 (50%)	1 (14.29%)	Inadequate
School B	2 (18.18%)	0	1 (25%)	1 (14.29%)	Inadequate
School C	3 (27.27%)	0	1 (25%)	2 (28.57%)	Inadequate
School D	1 (9.09%)	0	0	1 (14.29%)	Inadequate
School E	1 (9.09%)	0	0	1 (14.29%)	Inadequate
School F	1 (9.09%)	0	0	1 (14.29%)	Inadequate

Findings indicate that all the sampled schools had projectors with school A and C leading with 27.27% followed by school B with 18.18% and school D, E and F with 9.09%. Unfortunate, it is only in half of the sampled schools that the projectors were accessible. For schools D, E, and F, projector were not accessible to both teachers and learners because they were not in good working condition. The researcher prompted to know why they were not working and noticed that for school D, it was mishandled by the students and the cable was damaged. For school E, the researcher was told that the failure was as a result of electrical fault while for school F, it has never been used because no teacher has skills to operate it and so it was kept in the store. For schools A and B, their inaccessible projectors are safely stored to be used during special meetings of the school.

A research done by Cemalettin (2015) showed that teachers who use internet and projectors when teaching geography, records high performance because the videos and photographs projected for the learners makes them concentrate and understand better. Further, the study showed that the mental picture created to the learner makes them

remember easily. This study concurs with the Cemalettin's, that projector enables the learner to concentrate during the lesson, understand better and hence improves the performance. In relation to these, the researcher encouraged the teachers to use projector when teaching land forming processes and to talk to the administration to repair the broken projectors.

4.3.4 YouTube as a tool for teaching and learning

Another important tool used was YouTube. Once installed in the computers or laptops, with the help of the internet the teacher or the learner is able to download notes, videos and photographs. Researcher ascertained that computers and laptops had YouTube App installed. The researcher probed to know whether the teachers and learners knew how to use it, and with help of the questionnaire and the interview the researcher was satisfied that both knew how to use it perfectly. According to the student's responses on use of YouTube, 40.1% said they don't use the YouTube for learning. On the other hand, 25.4% of students said they use YouTube. The researcher sought to understand how the 25.4% of the students use YouTube and most students stated that they use the teacher's phone or their parents' phones when they go home. This was because of the poor internet connectivity.

This study is similler to that of Jones and Cutherii (2011) which shows that learning through YouTube videos help the learner to understand better and easily remember the content. This is because YouTube videos have real photos of the features formed and has voice that explain the processes taking place and this make makes learning more effective. The study also agrees with the research done by Chenail (2011) that shows

that the projected notes, video or photograph can be reused and this enables the learners to understand well. This finally improves learner's performance, (Al-Mansri 2014). Therefore, users should make use of the YouTube so as to access up-to-date notes, videos and photographs that will help in teaching and learning land forming processes hence improving performance.

The researcher encouraged the school administration to enhance strong internet connection so as to enable teachers and learners to use YouTube freely without interruptions. Researcher encouraged teachers to control the computers so as to make sure that the students don't use internet to get in to wrong site. The researcher also encouraged the teachers and learners to down load the videos, photographs and notes so that they can be re-used even without internet and this will improve the performance of the students.

4.3 Factors Influencing the Choice of ICT Tools used in teaching and learning land forming processes

Rresearcher investigated factors influencing choice of ICT tools used when tackling land forming processes. The students responded to questions on a 4-point leikert scale. Table 4.5 below summarizes students' responses from the students' questionnaire**.**

Table 4.5: Factors influencing the choice of ICT tools

Statement (Factor)	SA (%)	A (%)	D (%)	SD (%)
Use of ICT makes my work easier	14.1	75.4	4.9	5.6
I use computer when learning	5.6	23.9	39.4	31.0
I use internet to access the up-to-date information/content	3.5	23.2	18.3	54.9
I use internet to download photographs that I use when learning land forming processes.	5.6	23.2	12.7	58.5
I use email to send the assignments to my teacher	4.2	16.9	18.3	60.6
The school has strong internet connection	4.2	31.0	49.3	15.5
Computer laboratory is always accessible to students	6.3	16.4	33.8	43.0
There is adequate time for students to use ICT tools in the laboratory	1.4	34.5	38.6	25.4
All ICT tools are always available for teachers and learners	4.2	28.9	50.0	16.9
I am well equipped with ICT skills	2.8	30.0	29.6	37.6
There is strong internet connectivity in school all the time	8.5	23.2	34.5	33.8
Failure of ICT tools does not affect my studies	7.0	24.6	47.9	19.7
Students research the assignments using computer and internet	2.8	38.7	19.0	39.4
Students use YouTube to get up to date notes	25.4	19.7	14.8	40.1

From the responses of the students as indicated in the table above, the following factors were derived. The factors were discussed under the following sub-headings.

4.3.1 Perceptions of convenience in the use of ICT tools for teaching and learning

When users finf it easier to use they are more likely to use them in their activities. The findings showed that 89.5% agreed that ICT simplifies their work, which motivates both students and teachers to use these tools. Mwunda (2014) also emphasized that teachers' perceptions of ICT use are important because they positively affect teaching and learning. His research conquers with the findings of this study. Those with negative

views tend to use ICT less, leading to poorer performance, while those with positive views enjoy using ICT, which improves performance. Similarly, Mirzajani, Mahmud, Fauzi, and Wong (2016) agree that teachers' attitudes towards ICT affect how much they use it in the classroom. However, in the schools studied in Lamu County, some teachers saw integrating ICT as a burden and time-consuming, which contributed to poor performance. Therefore, the researcher recommends the users to change their attitudeand embrace ICT in teaching and learning land-forming processes, as this will help improve student outcomes.

4.3.2 The culture of using computers in learning activities

The use of computers in learning activities including accessing up to-date information or even downloading photographs for Geography lessons (and land forming processes in particular) was seen as a factor that influences the choice. According to findings, teachers 29.3% reported to be using computers compared to 70.7% who do not use it leading to a culture devoid. The lack of culture of using ICT tools such as internet and computers is reflected in the fact that only a minority of students, 21.1% reported to be using email to, for instance, send assignment to their teachers. The same trend is seen where majority of the students disagree with the idea that they research their assignments using computers and internet.

This research agrees with another research that was done by Onwuabgoke and Ukegbu (2010) that shows, teachers have an idea of existence of computers and other ICT tools found in schools but they really utilize them. Other than the culture there are more reasons leading to o use of ICT resources, like: when users lack the ICT skill, when

there in limited time for preparation or when the ICT tools available are not in good working conditions. Therefore, failure to use computer among other ICT tools leads to poor performance in geography, specifically land forming processes. The researcher however, encourages teachers and learners to develop the culture of using computer and other related ICT tools when teaching land forming processes in order to improve the performance.

4.3.3 Availability of internet connectivity

Many of the schools were not using ICT tools to teach land forming processes. Responses indicated that majority of students; 64.8% did not agreed that their schools had strong internet connections. Accordingly, poor internet connectivity discourage usage.

According to Bairu (2020), ICT tools cannot work in isolation and so, even if the school has so many computers they cannot access up-to-date notes, video and photographs without the internet. Teaching geography does not purely depend on books and charts, but also on videos that are accessed through YouTube with the help of the internet. Therefore, failure or lack of internet in the sampled schools affect teaching and learning process , especially land forming process, because it requires the learners to read notes and watch the videos to see how these processes are taking place (Mukuni 2019). The researcher therefore encourages the school administration to provide strong internet connection in schools for teachers and learners to utilize internet when teaching and learning land forming processes.

4.3.4 Existence of a computer laboratory in school

Presence of a computer laboratory in the school encourages usage, thus motivating leaners as they gain new information. Indeed, having a computer laboratory makes it possible to use the few available computers in the school for teaching and learning, especially if a school has a projector that can be used to project content from one computer to the whole class. Beyond having a computer laboratory, the laboratory should be accessible by the teachers and learners. Findings indicate that proportion of students who reported access to a computer laboratory; 49.3% and that of students disagreeing having access 50.7% are almost at par. Despite half of the student respondents reporting access to the laboratory, a majority; 60.4% disagreed that there is adequate time for them (students) to use ICT tool in the laboratory.

The research done by Milwa, Kyalo, Bowa & Mboroki, (2021) indicates that, Most of the ICT tools cannot work alone, instead they depend on each other for them to function effectively. This is enhanced by presence of computer lab, where all ICT tools are stored and easily accessed when teaching and learning, Accessibility of computer laboratory to both teachers and learners, improves personal study and research hence improving performance. For the boarding schools, the researcher encouraged the school administration to ensure that the computer lab is opened for more hours during preps, so as to enhance personal studies for the learners. The researcher also encourages the school administration to establish computer laboratory in their schools to make teaching and learning of land forming processes effective.

4.3.5 Possession of ICT skills (computer literacy) by students and teachers

If teachers are well equipped with ICT skills or are computer literate for that matter, they will have a head start and a motivation to use the ICT skills. The reverse is true for teachers and students who lack any computer knowledge and skills. Findings indicate that most students (61.3%) disagreed that all geography teachers are ICT literate. In contrast, a simple majority of student respondents; 52.8% agreed that they are well equipped with ICT skills. It can therefore be observed that non-use of ICT by Geography teachers results from limited ICT skills rather than lack of the same skills on the part of the students. Nonetheless, given that even the students who claim to have the ICT skills are almost half of the students, it would appear that both teachers and stusents are in need of ICT skills for them to effectively use ICT tools in their dailt activities.

This study agrees with another study conducted by Musyoki (2016) that indicated that, limited ICT skills can greatly hinder use of ICT in class. It hinders geography teachers from using ICT when teaching land forming process, hence poor performance. Another research done in Turkey by Jawad (2020) agrees with this study that, an ICT trained teacher will always have confidence while using them. The researcher encourages the school administration to provide skills to both teachers and learners by organizing training for them. This will help them to gain confidence to integrate ICT when teaching and learning land forming processes.

4.3.6 Availability of ICT tools to teachers and learners

Availability of ICT tools increases the chances of using utilization. Findings indicate that 66.9% of student responces disagreed that all ICT tools are always available for

teachers and learners and that a further 71.8% disagreed that their schools have adequate ICT tools. At the same time, a majority of student respondents; 57.0% disagreed that there is strong internet connectivity in school all the time.

This study conquers with Wakhu (2013) that the ICT tools need to be made available for both teachers and learners. This will always give humble time for the teachers and learners to prepare for the lesson and to do personal study. The researcher encourages the teachers in collaboration with the school administration to make sure that both teachers and learners access the ICT tools. This will enhance personal studies/research hence improving performance.

4.3.7 Quality of ICT tools

Quality of ICT tools in school is, in some way, related to their use or non-use for that matter. Indeed, failure of such tools lowers the possibility of utilizing them possibly, for fear of their (tools) failure during the lesson. Findings on this factor indicate that majority of student; 67.6% disagreed with the fact that failure of ICT tools does not affect their studies. In other words, the students have a general feeling that failure of ICT tools affect their studies and, possibly, in a negative manner.

This study agrees with Bairu (2020) that the quality of ICT tools chosen determines the utility. Poor/low quality tools fails during the lesson hence time wastage. On the other hand poorly connected internet causes delays and this make the teacher and learner to avoid them (Neyland, 2011). The researcher encourages the school administration to increase the number of ICT tools like computers and projectors among others so as to

avoid congestion and to increase rate of usage. This can be done by repairing the broken once and buying some more.

4.4 Extent of Influence of Available ICT tools on Teaching and learning land forming processes.

The study sought explanation on the extent of utility of ICT tools in their teaching and learning of land forming processes. The extent of influence was captured via the frequency of usage of the stated tools in the first objective. The software used in teaching land forming processes by the teachers and number of days in a week and minutes set for ICT lessons while teaching were also established to assess extent of influence of the tools used in teaching land forming processes. Teachers indicated the tools they use when teaching in class. Results are shown in the following figure 4.4.

4.4.1 Frequency of use of ICT tools

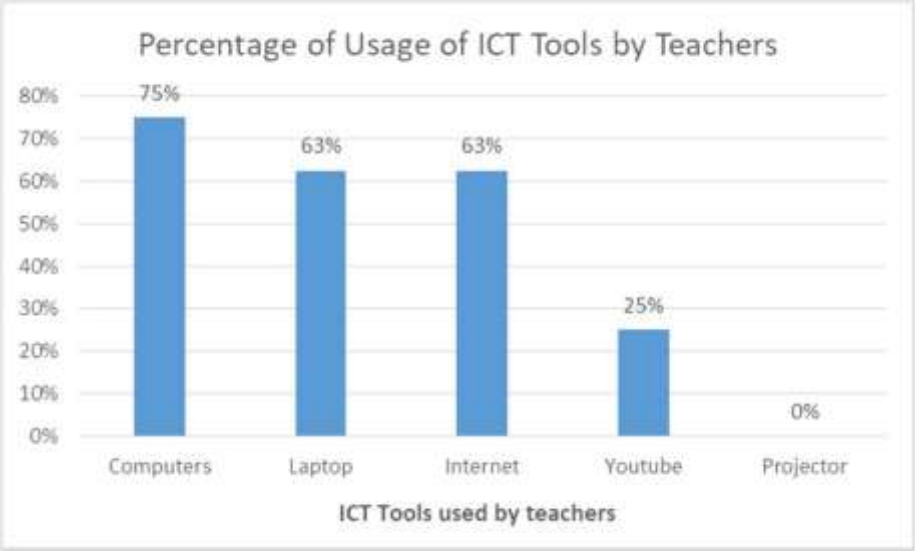

Figure 4.5: Frequency of Use of ICT Tools

From figure 4.4, it was established that 75% of teachers said that ICT tool they commonly use is the desktop computer while 63% confirmed to use laptops and internet while the use of YouTube by the teachers was at 25%. Notably, use of the projector was not employed by teachers when teaching land forming processes at all. According to these findings, the desktop computers were used extensively by the teachers probably because they were the most readily available tools as compared to othes.

These studies concurs with another study by Meelissen (2010) that, computer is the most commonly used in most of the schools because it is much accessible and does not require much skills to operate as compared to projector. As for YouTube videos, teachers used it in showing examples of land forming processes were also employed by the teachers as visual learning aids. This shows that the teachers preferred using videos in teaching land forming processes as it aided in giving the learners a visual understanding of the land forming processes.

4.4.2 Frequency of Software used in teaching land forming processes

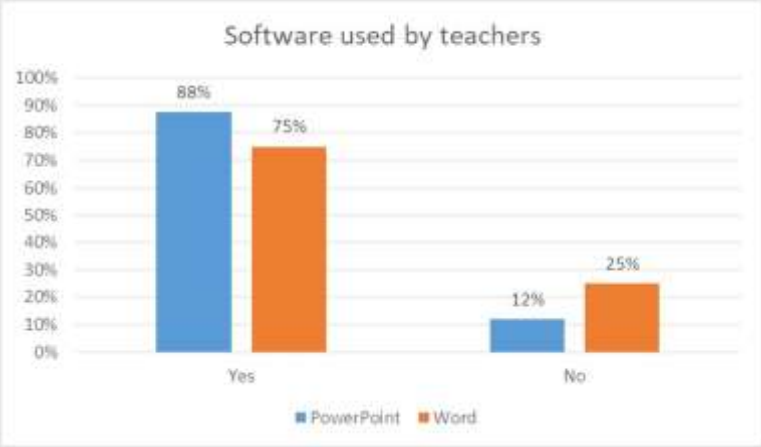

Figure 4.6: Frequency of use of software in teaching

From the figure above, While 88% of the teachers indicated using Microsoft Word to prepare notes for teaching land forming processes, only 25% confessed they use of PowerPoint when teaching. It shows that teachers relied heavily on presentations Use of ICT, mainly, on presentations, is supported by findings as presented in figure 4.6 below, describes frequency of use.

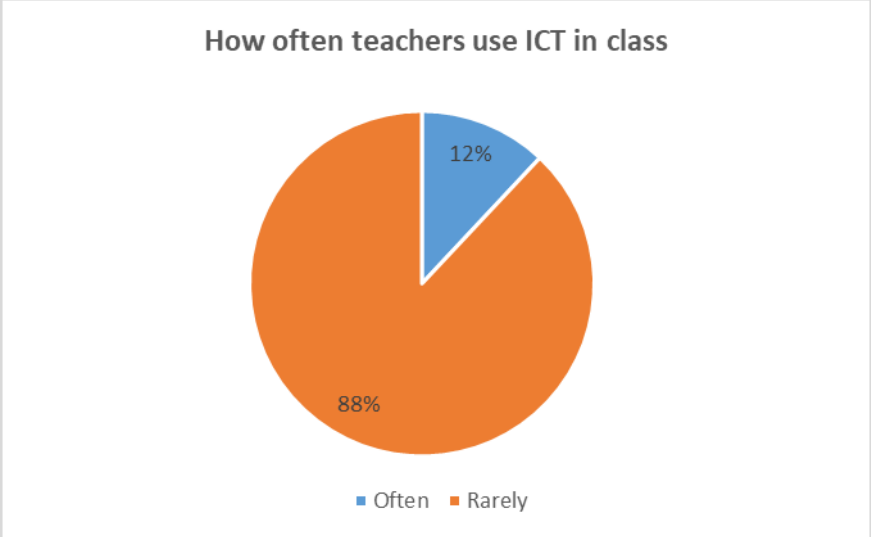

Figure 4.7: Frequency of use of ICT Tools in class

From the figure 4.6, majority (88%) of teachers never use ICT tools when teaching land forming processes while only 12% employ use of ICT tools. This echoes the observation for this study on access to ICT tools which indicated that teachers rarely integrate ICT tools when teaching and learning land forming process. It also agrees with another study by Osuagwu and Prince (2016) that the usage of ICT n class s only effective only f the user has access to the computer lab, has adequate ICT skills and whether he/she has adequate time for preparation. The study also sought to understand how many days in a week the teachers used ICT in teaching land forming processes.

4.4.3. Frequency of use of ICT tools in a week

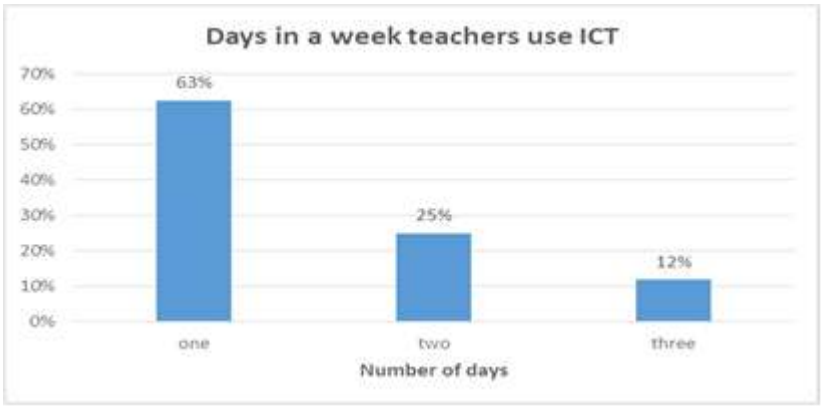

Figure 4.8: How often ICT tools are used in teaching

According to figure 4.7, the majority of teachers (63%) indicated they only use ICT tools for one day and 25% use ICT tools for two days in a week while only 12% of the teachers use ICT tools for at least three days in a week when teaching and learning of land forming processes. Teachers also indicated the amount of time in minutes they spent per day using ICT tools. Most teachers (67%) stated that they only use the ICT tools for 10 to 20min in a given day, 11% use 20 to 40min per day using ICT tools, while 22% use ICT tools for at least 40 to 60min as per figure 4.8.

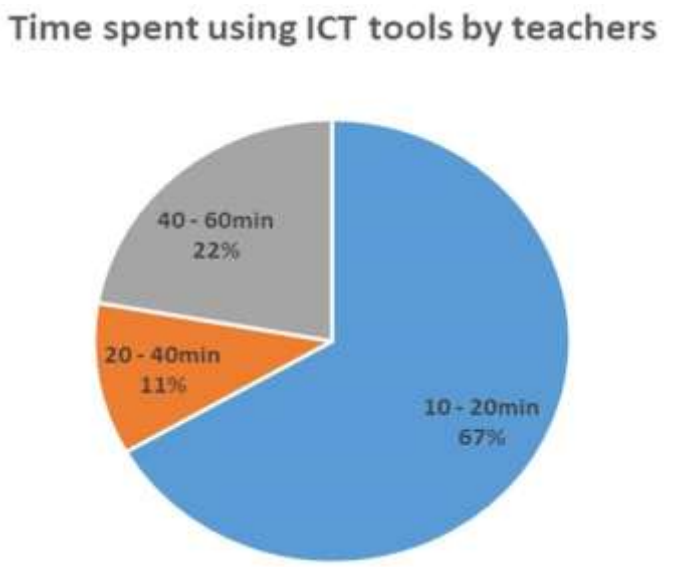

Figure 4.9: Amount of time spent by teachers using ICT tools per day

This shows that teachers fail to frequently use ICT tools in schools as most of them rarely use them for more than one day in a week and for a maximum of 10 – 20min per day. This indicates that the level of utilization is very low.

Generally, the picture that is painted here is that of some schools having some ICT tools such as desktop computers but most of them not having such tools while others had them but broken down hence not in use. Some of the teachers in those schools had personal laptops which they were using partly for teaching. However, despite this relatively higher level of access to such ICT tools, there was found to be low level of utilization of these tools for teaching land forming processes. For instance, many of the teachers who used the desktops and laptops indicated that they mainly used Microsoft Word and Microsoft Power point. This means that they basically used them for typing notes and, at best, preparing slides for presentation during rendition of lessons. The

teachers fail to take advantage of the availability of these tools and to fully utilize them for teaching. For instance, very few of the teachers use YouTube as an ICT tool that can really help them effectively enhance their lessons on land forming processes despite its strengths in teaching and learning such a topic. And even when they use such ICT tools, the frequency of usage is rather low with the majority using them only once a week and for less than half the duration of a lesson. (Neyland, 2011 and Abuhmad, 2011). The researcher wish that all teachers go for training so as to minimize amount of times used in preparation of an ICT integrated lesson. The teachers are also requested to create more time for use of ICT during their lessons.

4.5 Challenges faced in using ICT in Teaching and Learning land forming process.

Major challenges outlined were solicited from the teachers as well as the students of Geography. Table 4.9 highlights a summary of some of the challenges cited and a brief description of the same is discussed below.

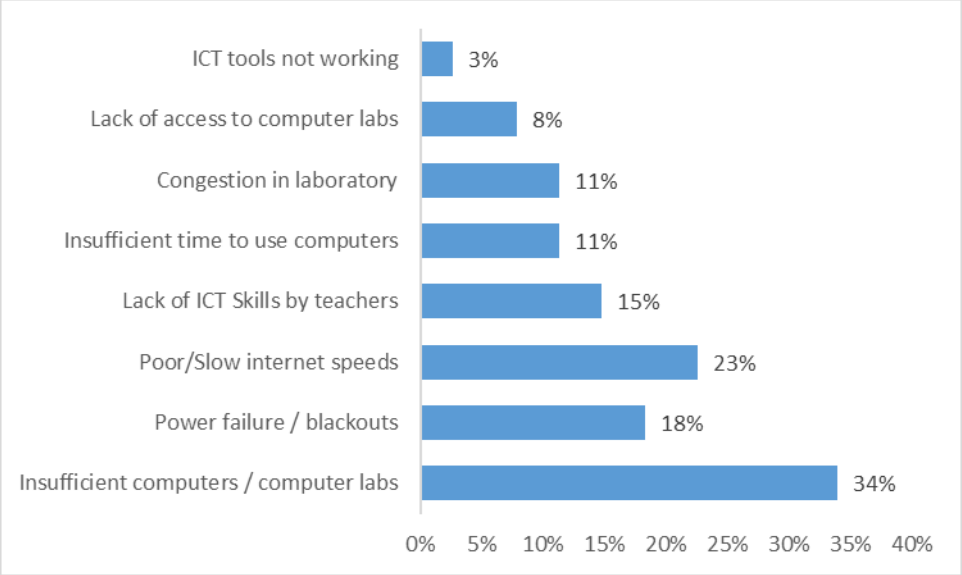

Figure 4.10: Summary of challenges experienced

4.5.1 Inadequate Computers and Computer labs for teaching and learning

Challenge of computer inadequacy was experienced in nearly all schools visited. Here, computers include desktops and laptops. In all the schools visited, teachers complained that even if they were to teach land forming processes using ICT, the schools did not have enough computers for teaching geography.

Every schools should have a computer labs with all the relevant ICT facilities to enable users to access and utilize ICT appropriately. Computer labs house a number of computers or even a few of them but with other alternative ways of using the few available computers to the benefit of a larger number of students. Teachers who were contacted maintained that some of the respective schools did not have a computer laboratories, and those that had the lab, it was not always accessible.

4.5.2 Breakdown of ICT Tools resulting in time wastage

Failure of ICT tools has been cited as the greatest challenge affecting geography teachers especially during lessons on land forming processes. The ICT tools that fail often were the internet, projectors and, sometimes, computers. The failure of the ICT tools causes time wastage especially if it happens during the lesson, which disappoints most of the teachers and students and make them avoid an ICT integrated lesson.

4.5.4 Consistent poor internet connectivity

Most of the schools complained about poor internet connectivity. This resulted in what students taking geography described as slow internet speed or simply, internet failure. Such a low internet speed makes it inconvenient for use during lessons. In such cases,

affected schools did not have alternative ways of strengthening the connectivity hence negatively affecting usage.

4.5.5 Power Failure or blackouts

Visited schools reported occasional power outages during learning hours making it difficult to conveniently use ICT tools. In some cases, students reported lack of electricity in the school altogether. This causes the teachers and learners to focus on textbooks only and this hinders them from accessing the up-to-date content. Therefore, school administration is encouraged to ensure that the electricity is well connected.

4.5.6 Inadequate ICT skills on the part of the students

According to teachers, particularly one who participated in the study, there is a challenge of the students lacking the requisite basic ICT skills. This challenge was reported both by the teachers as well as students. In other words, if teachers insist on teaching the students who lack these skills, teachers were afraid, learning would not effectively take place. This therefore makes the teachers avoif ICT integrated lessons.

4.5.7 Inadequate skilled teachers in the use of ICT tools in teaching and learning

Few students, complained about limited number of teachers with ICT skill. Limited skills challenges use of ICT when learning land forming processes.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the research findings, conclusions, recommendations for policy decisions and further research.

5.2 Summary of main findings of the study

First objective sought to outline types of ICT tools provided in schools. Findings indicated that main ICT tools found were computers (desktops) and laptops, internet and some projectors. However, in all the schools, these ICT tools were reported to be available but were less accessible and inadequate in supply. In other schools the ICT tools mentioned above were accessible but they were not in good working condition. While in other schools, the teachers were too busy to get adequate time for preparation of ICT integrated lesson.

Second objective was about factors determining choice of ICT. Descriptive analysis of frequencies and percentages indicated that these factors include; perceptions on tools, culture of using computers in learning activities, availability of internet connectivity, existence of computer laboratory in school, possession of ICT skills (computer literacy) by students and teachers, availability of adequate ICT and quality of ICT tools. It was however noted that these factors affect these schools at different levels in such a way that certain factors affect certain schools more than they affect others.

Third objective was to find out extent of influence of ICT tools on teaching and learning land forming processes. Findings indicated that many schools did not have a variety of

ICT tools. However, for those schools with accessibility of tools, the teachers have not full utilized them. Incidentally, while a good number uses computers, their use is limited to preparation of teaching content and presentation and not beyond this to the level of fully using the You tube facility to enhance their teaching.

The fourth objective examined challenges of using ICT when teaching and learning land forming proceses. Descriptive analysis of these factors revealed that they included inadequate computers, lack of computer laboratories, failure of Some ICT Tools, poor internet connectivity, power failure or blackouts, inadequate ICT skills for students, inadequate skilled teachers.

Finally, the researcher gave the following suggestions: training of teachers and students in their respective schools to acquire some basic skills in computer (ICT skills), mobilizing for more computers as well as computer laboratories, installation of alternative sources of power as well as standby power devices such as generators to address the frequent power outages and procuring the services of companies that provide more stable internet services.

5.3 Conclusions

The following conclusions have been drawn based from the findings.

To start with, it was noted that most schools never seem to have enough ICT tools which wcould be used for teaching and learning. The few that were available were either broken down, were in short supply or teachers had not developed a habit of using them. It was therefore concluded that schools in the sample do not seem to have

invested enough in ICT tools as most of them only had a few ICT tools. But even those that had some ICT tools were inadequate and in some cases, inaccessible to students.

Secondly, the choice of ICT tools to be used to teach geography (land forming processes) were determined by various factors. It means that in planning to use ICT tools, in teaching, schools must be guided by not just one factor, but a series of them. In essence, while there is a growing perception amongst teachers that it is convenient to use ICT in teaching, this positive perception is compromised by lack of culture of using computers, projectors and internet, poor internet connectivity in schools, lack of computer labs that could make it possible for students to access the required tool and finaly lack of require ICT skills amongst students and teachers.

Third objective focused on influence of available ICT tools. While some schools had few ICT tools not all of them were in good workin condition. As a result, most of teachers and students did not access these tools for learning purposesas expected. This led the researcher to the conclusion that while there are some good number of ICT tools, there is less influence their usage, a situation that was caused by different factors as discussed earlier. .

Fourth, researcher noticed that schools experience numerous challenges related to utilization of ICT tools. This lead to conclusion that while there is identifiable will to use ICT tools in teaching land forming processes, the endeavor has not been very successful due to the existence of these challenges and that the schools have not allocated adequate focus and resources to specifically address these challenges.. Accordingly, schools and teachers in particular must undertake to study and understand

these challenges and put in place strategies to overcome them, otherwise, they will undermine their efforts.

5.4 Recommendations

4.4.1 Interventions to support the use of ICT in teaching and learning land forming process.

The study intended to identify interventions that will support use of ICT when teaching and learning of Geography, land forming proceses. This question was posed to both the students and the teachers and some of the interventions included the following;

i) The major challenge affecting integration of ICT tools in teaching and learning of land forming processes was that of frequent power outages, it was suggested that schools should pursue the acquisition and installation of alternative sources of power (preferably solar or even standby generator) to address this problem.

ii) Another one of the challenges mentioned in the foregoing section was that of lack of ICT skills or simply, computer literacy. This challenge was cited both by the teachers and students. It was therefore suggested that the schools and any other (philanthropic) stakeholders should organize for trainings on basic computer skills for both students and teachers.

iii) Many of the sampled schools had a common challenge of inadequacy of the available computers. And even those that had some computers, besides being inadequate, they were inaccessible to the students. Accordingly, it was suggested that schools need to mobilize for more computers. This could be by way of approaching some willing stakeholders or setting up programs through which they

can raise computers for their schools. Schools should also mobilize for funds to put up computer labs in which these tools can be kept.

iv) limited computer skills was a great challenge too and can be approached by the government, through TSC deploying ICT teachers in schools to help develop these skills amongst learners and even their teachers.

The study provides recommendations related to policy and practice and recommendations for further research.

5.4.2 Policy Recommendations

i) As a matter of policy, the ministry of education should develop guidelines that would guide and support schools to have ICT tools and to put them into use, which use includes serving the student population and not just teachers alone.

ii) Schools must make a conscious effort to invest in ICT tools in their respective schools and also maintain these tools whenever they are broken down or are out of use. This includes encouraging these schools to have some facilities such as computer labs which can serve a wider population including the students.

iii) Education authorities must work towards having some sensitization forums for school managers on advantage of using ICT tools in their activities, in oder to tap on such stakeholders support in having such tools in schools and in use.

iv) The schools must find ways of encouraging the development of a culture of integrating ICT tools to users. Suggested methods include mainstreaming use of ICT in some strategic processes in school for example, teaching and learning processes, fee payment, processing of examinations and record keeping, among others.

5.4.3 Recommendations for Further Research

i). The research was conducted in a small confined area or study locale. But for there to be a culture of use of ICT tools, there is need for a wider adoption of such an idea. There is therefore need to carry out more research and in a wider area on the issue of how well this development of an ICT culture can be developed in the various schools.

ii) Further research could focus on the of use of culture and its role in the improvement of learning outcomes.

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APPENDICES

Appendix 1: INTRODUCTORY LETTER

Kenyatta University

P O BOX 43844-00100

Nairobi, Kenya

Dear respondents,

My name is Lucy N. Wainaina, a post graduate student from Kenyatta university department of communication and technology of Education. I am pursuing a degree of masters of education, area of specialization is geography. I am conducting a research on integration of ICT tools when teaching land forming processes in Lamu west constituency, Lamu County. Your school was chosen for this study among the other schools. I am humbly requesting you to sincerely and honestly take part in my research through filing in the questionnaire. Answer all the questions in the questionnaire by giving honest and accurate answers. Your responses will be treated with high confidentiality.

Yours faithfully,

Wainaina Lucy

……

Masters of education

Appendix 2: QUESTIONAIRE FOR GEOGRAPHY TEACHERS

The responses in this questionnaire are meant for research only, please respond to them with sincerity.

Instruction

i) Don't write your name on the provided questionnaire

ii) Give sincere responses only

iii) Put a tick (….) where necessary or fill in the gaps as instructed.

SECTION A: DEMONGRAPHIC INFORMATION

1. What is your sex?

   Male ☐ Female ☐

2. What is your age bracket?

   20-24 years ☐ 25-29 years ☐ 30-34 years ☐ 35-39 years ☐

3. What is your highest academic qualification?

   Dgreeee ☐

   Diploma ☐

   Others (specify)……..

4. How long have you taught in this school?

Below 5 years ☐ 5-9 years ☐ 10-14 years ☐ 15 years and above ☐

SECTION B: FACTORS INFLUENCINGTHE CHOICE OF ICT TOOLS IN TEACHING AND LEARNING LAND FORMING PROCESSES

Read the statements found in the table below and give accurate responses according to your opinions. Tick (√) the appropriate column.

KEY: SA- strongly Agree A- Agree D-Disagree SD-Strongly Disagree

Number	Factors	SA	A	D	SD
5.	Computer laboratory is always accessible				
6.	All teachers are ICT literate				
7.	Internet connectivity is always strong				
8.	There is adequate time for better preparetion of the ICT integrated lesson				
9.	The schools has adequate ICT tools for teachers and learners				
10.	All students are ICT literate				
11.	All ICT tools are always available for teachers and learners				

12. Which among these softwares/programs are in your school? (Tick appropriately).

Word Processor ☐ Power Point ☐ Spreadsheet ☐ Excel ☐
Others

_____

_____

_____

SECTION C: EXTENT TO WHICH ICT TOOLS ARE USED IN TEACHING LANDFORMING PROCESSES.

Tick correctly in the appropriate column.

KEY: SA- Strongly Agree A-Agree D- Disagree SD-Strongly Disagree

NO	STATEMENT	SA	A	D	SD
13.	ICT usage makes my work easier				
14.	I use internet to access the up-to-date information/content				
15.	I use you tube to get videos that I use when teaching				
16.	I use projector when to show videos and photographs when teaching				
17.	I use compute when teaching				
18.	I use internet to download photographs that I use when teaching.				
19.	I share notes and assignments to my students through email.				
20.	Availability of strong internet connection.				
21.	I always have adequate time to prepare for ICT integrated lessons. Challenges				
22.	Students use ICT tools to do research.				
23.	I use textbooks and notes from internet to teach				

24. list challenges you face when using ICT tools in teaching land forming processes?

a) ……..

b) ……..

c) ……..

d) ……..

e) ……

25. What are the possible solutions to the problem you stated above?

a) _____

b) _____

c) _____

d) _____

e) _____

Appendix 3: QUESTIONAIRE FOR GEOGRAPHY STUDENTS

The responses in this questionnaire are meant for research purposes only, please give sincere answers only.

INSTRUCTION

i) Don't write your name on the questionnaire. ii) This is not a test, so give sincere answers only. iii)

Put a tick (√) appropriately or fill the gap or blank spaces correctly.

SECTION 1: DEMOGRAPHIC INFORMATION

1. What is your sex?

   Male ☐ female ☐

2. What is your age?

   Less than 12 years ☐

   13-14 years ☐

   15-17 years ☐

   Above 18- years ☐

3. When did you join the school?

   First year ☐

   Second year

   Third year ☐

SECTION B: FACTORS INFLUENCINGTHE CHOICE OF ICT TOOLS IN TEACHING AND LEARNING LAND FORMING PROCESSES

Read the statements found in the table below and give accurate responses according to your opinions. Tick (√) appropriately.

KEY: SA- strongly Agree A- Agree D-Disagree SD-Strongly Disagree

Number	Factors	SA	A	D	SD
4.	Computer laboratory is always accessible				
5.	All students are ICT literate				
6.	Internet connectivity is always strong				
7.	There is adequate time for students to use ICT tools in school.				
8.	The schools has adequate ICT tools for teachers and learners				
9.	All students are ICT literate				
10.	All ICT tools are always available for teachers and learners				

11. Which among these software/programs are there in your school. (tick appropriately).

Word Processor ☐ Power Point ☐ Spreadsheet ☐ Excel ☐
Others

_____

_____

SECTION C: EXTENT TO WHICH ICT TOOLS ARE USED IN TEACHING LAND FORMING PROCESSES.

Tick correctly in the appropriate column.

KEY: SA- Strongly Agree A-Agree D- Disagree SD-Strongly Disagree

NO	STATEMENT	SA	A	D	SD
12.	Use of ICT makes my work easier				
13.	I use internet to access the up-to-date information/content				
14.	I use you tube to access videos that I use to learn.				
15.	Teacher uses projector to display videos and photographs when teaching				
16.	I use compute to do research.				
17.	Teacher use internet to download photographs used in teaching and learning.				
18.	I send my assignment to teacher through email.				
19.	Availability of strong internet connection makes research easy.				
20.	There is adequate time for students to utilizing ICT tools				
21.	Students use ICT tools to do academic activities.				
22.	I use textbooks and notes from internet to learn and to research.				

23. List down challenges you face when using ICT tools in teaching land forming processes?

a. ……

b. ……

c. ……

d. ……

e. ……

24. . What are possible solutions to the problem you stated above?

a. _____

b. _____

c. _____

d. _____

e. _____

Appendix 4: INTERVIEW GUIDE FOR THE HEAD OF DEPARTMENT

i. To what extend does your administration offer support to teachers in use of ICT in learning activities.

ii. To what extent do your teachers use ICT tools in teaching and learning process? Give your opinion.

iii. Are there challengesin your school that affect teachers and the learners experience when using ICT tools in teaching and learning? What are solutions to the problems?

Appendix 5: INTERVIEW GUIDE FOR THE COUNTY EDUCATION OFFICER.

i. What can you comment on government's policy (MOE Policy) that guides ICT integration in teaching and learning process.

ii. What is the extent of support that the government offers to schools in relation to ICT resources provition.

iii. Identify challenges encountered in Lamu County by students, teachers together with principals in the process of integrating ICT in schools.

Appendix 6: OBSERVATION CHECKLIST

a) Below is an observation checklist for class

List of ICT tools	**Frequency**	**comments**
Computer		
Laptop		
Printer		
Television		
Whiteboard		
Radio		
Projector		
Internet		
SOFTWARE		
Word processer		
Spreadsheet		
Power point		
Excel		

Comments……
……
……

b) Below is an observation checklist of computer laboratory.

List of ICT tools	**Frequency**	**comments**
Computer		
Laptop		
Printer		
Television		
Whiteboard		
Radio		
Projector		
Internet		
SOFTWARE		
Word processer		
Spreadsheet		
Power point		
Excel		

Comments……

……

……

Appendix 7: DOCUMENT ANALYSIS SCHEDULE

School serial number

_____

Below is a list of ICT tools mainly found in the school

Fill the table correctly

ICT TOOLS	AVAILABILITY		NUMBER		Accessibility	COMMENT
Computer	YES	NO	TOTAL	ACTIVE		
Laptop						
Printer						
Television						
Whiteboard						
Radio						
Projector						
Internet						
SOFTWARE						
Word processer						
Spreadsheet						
Power point						
Excel						

Appendix 8: Research Permit from NACOSTI

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **541026**

Date of Issue: **25/March/2020**

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