INTEGRATION OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN TEACHING AND LEARNING GEOGRAPHICAL INTERNAL LAND-FORMING PROCESSES IN SECONDARY SCHOOLS IN THARAKA-NITHI COUNTY, KENYA

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DECLARATION

This thesis is my original work and has not been presented for a degree in any other University. The thesis has been complemented by referenced sources duly acknowledged. Where text, data, graphics, pictures or tables have been borrowed from other sources, including the internet, they have been specifically accredited and references cited using the current APA system and in accordance with the anti-plagiarism regulations.

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DEDICATION

This thesis is dedicated to my late father Stanley Mbaka Nkari who rested in the process of my study, my mother Edith Muthoni Mbaka and my siblings Mercy Gakii Mbaka and Dennis Mutwiri Mbaka for their inspiration and support that saw the successful completion of this study.

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ABSTRACT

Integration of ICTs is a new development in the recent past all over the world. It has been embraced in most fields and education is not an exception. In education, the integration of ICTs is being encouraged with the aim of preparing the learners for life in the 21st century. The study has thus been prompted by the tremendous advancements in technology and its demands by both teachers and learners to fit in the 21st century. In Kenya, there are policies on the use of ICTs in the teaching and learning of various subjects, and Geography is not an exception. Geography is a discipline that informs a lot about the world. The main goal of this research was to explore the extent of integrating ICTs in the teaching and learning of Geographical Internal Land-Forming Processes in public high schools in Chuka Sub-County, Tharaka Nithi County. The study's specific objectives were:(i) To identify the types of ICTs used in the teaching and learning of Geographical Internal Land-Forming Processes, (ii) To establish factors influencing the integration of ICTs in the teaching and learning of Geographical Internal Land-Forming Processes, (iii) To examine the extent to which specific ICTs are being used in the teaching and learning of Internal Land-Forming Processes and (iv) To investigate the challenges experienced by both teachers and students when integrating ICTs in the teaching and learning of Internal Land-Forming Processes. The study was carried out in Chuka Sub-County, Tharaka-Nithi County. The theory adopted was that of Everett Rogers diffusion of innovations. The research employed a descriptive research approach. The study's target population was 41 public secondary schools. Stratified random sampling was used to categorise schools into 4 strata; National, Extra-County, County and Sub-County schools. From the sampled schools, 8 Principals, 8 HoDs, 8 Geography teachers and 128 form two Geography learners were further sampled as respondents. Data was collected using questionnaires, interview schedules and observation checklists. The research conducted a pilot study to assess the reliability of the research instruments. A validity test was also conducted on the tools. The data collected was analyzed using SPSS, version 20. Descriptive statistics in the form of frequencies, percentages, mean and standard deviations was gathered from the analysis and presented in the form of tables. The key findings showed that television, radio, internet enabled mobile phones, and the internet were the main types of ICTs available in most schools. It was also found that teacher, student, school and both school and national ICT policy were the factors influencing the integration of ICTs in the teaching and learning of Geographical Internal Land-Forming Processes. Besides, the extent to which ICTs are adopted within the schools to facilitate teaching and learning in the county was low. The conclusion was that teachers should strive to integrate the available ICTs into their teaching. The study recommendations were that teachers and students should be encouraged to integrate available ICTs, need for accessibility of the ICTs, need for technical support, need for periodic training for effective ICT integration in curriculum. It was expected that the findings together with recommendations would benefit policy makers and practitioners in Kenyan education system. The education stake holders together can make ICT pedagogies, methods and strategies fully integrated in the educational processes in secondary education for quality outcomes.

ACRONYMS AND ABBREVIATIONS

CCSSO	Council of Chief State School Officers
DOI	Diffusion of Innovations
EFA	Education for All
GIS	Geographic Information Systems
HOD	Head of a Department
ICT	Information and Communication Technology
IICD	International Institute for Communication and Development
ISTE	International Society for Technology in Education
KESSP	Kenya Education Sector Support Program
KCSE	Kenya Certificate of Secondary Education
KICD	Kenya Institute of Curriculum Development
KNEC	Kenya National Examinations Council
MOE	Ministry of Education
MDG	Millennium Development Goal
NEPAD	New Partnership for Africa's Development
QASO	Quality Assurance and Standards Officer
STIC	School Technology Innovation Centre
TQ	Total Quality
TQM	Total Quality Management
TSC	Teachers Service Commission
UNESCO	United Nations Educational, Scientific and Cultural Organization

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Information Communication Technologies are critical in education and they offer diverse opportunities and experiences to teachers and learners (Wijayasundara, 2020). The study adds that these technologies transform the future learning processes alongside the social environment. According to Joseph (2023), ICT are diverse technological tools and resources utilized in communicating, creating, disseminating, storing and managing information. Eddahby et al. (2021), pointed out that ICTs are becoming more and more important instruments for knowledge dissemination, particularly as an avenue of inspiration that inevitably affects multidisciplinary competence. Many developed countries utilize technological tools to develop new ideas in classrooms by providing enabling and valuable environments. ICT implementation is the method of utilizing any of its tools including e-learning capabilities, in the facilitation of teaching and learning. Aktaruzzaman (2011) pointed out that in the early 1990s, ISTE developed standards describing technological literacy for teacher education.

Eddahby et al. (2021) pointed out that with the advent of the Internet, ICT is used globally. The research added that ICT implementation has been done in various sectors, such as education, and is utilized in teaching, learning, and other managerial and administrative related activities – what is commonly identified as electronic learning (e- learning). Globally, there is enormous investment in use of ICTs in education. Today, ICT facilitates both the delivery of learning instructions and the process itself. It promotes international synergy, networking, learning and professional development. There are various ICT

options for teaching and learning: namely; videoconferencing through multimedia delivery on websites, audio devices, audiovisual devices and motion, and still pictures, that can be utilized in meeting the challenges teachers deal with today (Jung, 2005).

Developed countries such as USA are at advanced levels of ICT integration in their classrooms, while developing countries are trying to borrow a leaf from them. Around forty percent of Italian classroom instructors use ICT for lesson planning and classroom presentations, according to Faggiano & Fesano (2008), but a higher percentage—more than 60%—utilize the internet to conduct subject-specific research. The study asserts that if teachers believe in the benefits of ICTs, they would recognize the need for effectively integrating ICTs in teaching activities. Europe has witnessed confidence among teachers use of ICT and its beneficial effect on students' learning (Schoolnet, 2013). The Malaysia smart school initiative, locally known as "Sekolah Bestari" began in 1999 with an objective of promoting the National Philosophy of Education. This was the 7th transformation in the Malaysian Education Blueprint of 2013-2025 that paints the sector's objective in utilizing ICT so as to improve quality learning all through Malaysia. It presents itself as an avenue for the MoE to develop a tech-literate and critical thinking human resource (Ghavifekr & Mohammed, 2015). It also serves as a stir to attain the country's Vision 2020, which seeks to position it as a leader in ICT globally. According to Abas (2009), this enables creativity among nations together with competition due to globalization.

In the start of 1990s, GIS have widely been immensely embraced in secondary school Geography education. The United Kingdom example for started use of GIS in the teaching of Geography in the year 1990. Netherlands implemented GIS use in 2003 (Bednarz,

2004). Turkey implemented GIS use in 2005 (Korevaar, 2005). In the US, the Council of Chief State School Officers (CCSSO) surveyed 41 states in relation to geographic education and recommended that CCSSO should engage in formulating new Geography curricula. The study further opined that gathering together geographers, geographic resources, and educators in workshops at different levels was the way to improving geographic instruction (Haas, 2009).

Developing nations are also striving to integrate ICTs in their curriculum. In Lesotho, 3 key implementations prompted growth of ICT in the field of education that include the School Net, Microsoft STIC and NEPAD e-Schools. In 2007, the country's MoE and Training initiated a collaboration with Microsoft that sought to develop STIC. This centre was developed in order to enhance education through support processes and pedagogy. The research argued that as of 2016, 266,000 instructors in Morocco were trained in use of ICT 85% of schools have a basic multimedia environment, and 80% of digital resources meet program requirements. In order to fulfill Sustainable Development Goal 4, which calls for high-quality education, the Zambian government recognized the importance of ICTs and introduced them into the classroom as tools to improve the method of instruction and learning (MTC, 2006). Assuring inclusive, equitable, and high-quality education and enhancing openings for sustainable inclusive learning are the main objectives of the fourth sustainable development goal, or the educational goal. ICTs are essential to the education sector's ability to achieve this goal (Yadav, 2013; Chirwa et al 2021). In Uganda, ICT use in education lags behind (Nhamo, Nhemachena, & Nhamo, 2020). The National Bureau of Statistics states that as of 2015, there were 4,753 high schools in Tanzania, 3,692 of which were public and 1,061 were private. There are still

many obstacles that prevent ICT from being used effectively in teaching and learning, such as a shortage of ICT devices and power issues.

Kenya has considered measures to foster the embracing of ICT in the sector of education. In 2004, ICT Trust Fund was established for ICT equipment for schools. It was to facilitate a public-private partnership, that is, to initiate and avail ICT resources to all beneficiaries in the country. In 2005 the Ministry established the Kenya Education Sector Support Program (KESSP) which presented the use of ICT education process in Kenyan learning institutions. The year 2006 saw a National ICT policy being established which was to ensure affordable ICT services to Kenyans. The rise of IT on the country's agenda, alongside the implementation of ICT regulations by different governmental arms, identified the "Convergence of Core Technologies and E. Governance" as the mechanism for continuous growth and globalization of education (Kessy *et al*., 2006).

Geography is a science dealing with the study of the interrelationship of the human and natural phenomenon on the earth's surface. Geography is important to the learners as it facilitates goodrelationships with other nations of the world, it is a career subject, and it instils the need to conserve the environment to the learners. Moreover, Geography collaborates with NGOs and other relevant agencies in promoting research and securing vocational employment for the citizens. According to KICD (2006), Geography fills the students with knowledge of high educational value including additional subjects. Physical Geography topics such as the Weather and Climate, Internal- Land Forming Processes, Mass Wasting, Weathering, Action of rivers, to mention but a few, are better taught and learnt when ICTs are integrated. Secondary schoolstudents tend to shy away from taking

Geography hence low enrolment (Kimathi, 2014). According to Krower (2006), improving performance requires a significant step forward during the use of ICT in the teaching of subjects like Geography.

Anyango (2019) demonstrated that integrating ICT into Geography education enhances the learning process through simulation of various geographical concepts. This could be due to perception of some topics as being too complex to understand. Internal Land Forming Processes is one of the topics that can be made more teacher and learner friendly by implementing ICTs in its teaching and learning. This integrating is crucial for enhancing educational outcomes. ICTs facilitate teaching and learning processes, create conducive learning environments, and enhances development of creative thinking and self-confidence among learners. Incorporating ICTs, such as mobile phones and the internet, into curriculum, improves the quality of education delivery and prepares graduates for the contemporary job market. Integrating ICTs in teaching internal land forming processes not only modernizes education but also improves student engagement and learning outcomes. ICTs enhance the understanding of land-forming processes by providing tools for visualization, analysis, and communication.

Besides, the KICD has designed a new system of education known as the Competency Based Curriculum, which the MOE came up with in 2017. Among its core competencies is digital literacy. Digital literacy equips the learners with skills which facilitate effective fitting in the information age. It is necessary to rightly embrace ICTs in the delivery and consumption of Geographical Internal- Land Forming Processes to immensely uplift Geography education status and how geographical resources are used. Digital literacy

equips the learners with skills which facilitate effective fitting in the information age.

The KCSE results analysis in Table 1.1 shows the Overall County and Sub-County performance in Geography from the year 2016-2020.

Table 1.1 County and Sub-County KCSE performance in Geography 2016-2020

Year	Candidature	Maximum Score	Mean Score	
			County	Sub-County
2016	146,504	100	4.57	4.12
2017	156,057	100	5.76	5.66
2018	166,507	100	5.34	4.88
2019	179,843	100	5.75	5.66
2020	211,874	100	5.91	5.13

Source: County KNEC Office 2021

The county results depicted overall slightly below average performance in Geography. The same applied to sub county results. As advised in the KNEC 2020 national report, in-depth teaching of terms and concepts using ICTs would greatly improve performance at both levels.

1.2 Statement of the Problem

Kenya developed its ICT Policy in January 2006, where a portion of it outlines the aims and procedures associated with ICT and school curriculum. It spelled out that government would enhance the practicing with ICT in institutions of learning within its jurisdiction to enhancing the education standards (MIC, 2006). ICT has birthed value towards universal access to education-the SDGs and the Education for all principles developed by UNESCO.

It is generally argued that utilization of technologies in classrooms eases content understanding and mastery, improves learner's attitude, improves their interaction in the classroom, and also improves retention of the content learnt mostly for subjects such as Geography, that are practical oriented (Ngeze, 2017). Besides, further assertion from the study reveals that when teaching using ICTs, learners tend to concentrate more, are more alert and active during the lesson and the lesson tend to be interesting.

Integrating ICTs in teaching Internal Land Forming Processes not only modernizes education but also improves student engagement and learning outcomes. ICTs enhance the understanding of land-forming processes by providing tools for visualization, analysis, and communication.

If ICTs are not used for their intended purpose such as consumption of illicit internet content, learners curiosity that compromise the lesson when learners tend to explore the ICT device further rather than concentrating in the lesson, resulting to lagging behind in syllabus coverage and thus performance, the devices ceases to be useful in learning geographical concepts but more destructive thus teaching learning objective is not achieved.

Despite use of ICTs proving to be an impactful strategy of education and policies having been put in place, there is uncertainty of how ICTs are used in classrooms to teach internal land forming processes in ensuring ideas and concepts learnt are in line to current and ongoing advancements in technology. The doubts have to be looked upon if the topic Internal Land Forming Processes is to be considered relevant and useful to the learners in the current age.

A study was carried by Otieno Fredrick (2022) on agents powering use of ICTs in teaching Geography in Rachuonyo South Sub-County Kenya. Paul Ogembo (2024)

conducted a study the aim to esablish the extent of use ICT in Geography teaching and learning in public secondary schools in Kenya. Omoro Benjamin (2013) did a study with the aim to establish ICT categories available for Geography instruction in secondary schools in Rongo District, Kenya. There hasn't been any research done to demonstrate how much ICT integration is used in Chuka Sub-County, Tharaka-Nithi County, for classroom instruction of internal land formation processes.

The study thus sought to address the extent to which ICTs were integrated in government owned high schools within Chuka Sub-County, Tharaka Nithi County, Kenya.

1.3 The Purpose of the Study

The main goal of this research was to explore the integration of ICTs in the teaching, and learning of Geographical Internal Land Forming Processes, in public high schools in Chuka Sub-County, Tharaka Nithi County.

1.4 Specific Objectives of the Study

i. Identify the types of ICTs being used in teaching and learning of Internal-Land FormingProcesses.
ii. Establish factors influencing the integration of ICTs in the teaching and learning of Geographical Internal Land-Forming Processes.
iii. Examine the extent to which ICT tools are being used in teaching and learning of Internal Land-Forming Processes.
iv. Establish the challenges being experienced by both teachers and students, when integrating ICTs in teaching and learning Geographical Internal Land-Forming Processes.

1.5 Research Questions

i. What ICT tools have been utilized in the teaching and learning of Geographical Internal Land-Forming Processes?

ii. What key factors have facilitated the integration of ICTs in teaching and learning of Geographical Internal-Land Forming Processes?

iii. To what extent have ICT tools been incorporated in teaching and learning of Geographical Internal Land-Forming Processes?

iv. What challenges have been experienced by both students and teachers, in integrating ICTs in teaching and learning Geographical Internal Land-Forming Processes?

1.6 Significance of the Study

The policy makers will be informed of how ICTs are utilized in teaching geography. They will know the type of skill development workshops needed to enhance teachers' ICT competencies thus designing a curriculum that is ICT friendly.

Teachers of Geography will benefit as they will be aware of resources they can use In teaching. They will also be aware of the learners' perceptions towards ICT usage in classrooms. Thus which ICTs would motivate and arouse learners interest during lesson delivery.

School administrators will understand the factors hindering teachers from integrating ICTs in teaching Internal Land Forming Processes to create interest in learners towards Geography.

Other researchers will learn how teachers are integrating ICTs to improve the attitude of

students at secondary schools

The MOE will know the extent of effective ICTs integration and areas of improvement. The Ministry will further beware of challenges teachers face in integrating ICTs.

The students find usefulness of the study in their career choices, research opportunities, improved communication and information sharing. The results also helps them appreciate reducing their overdependence on their teachers, but instead rely on ICTs availed learning opportunities suchas e-learning.

1.7 Delimitations of the Study

The research was restricted to public high schools in Chuka Sub-County, Tharaka Nithi County. This study locale was chosen due to its rural-urban mixture thus its varying levels of ICT infrastructure in educational institutions. The results and recommendations drawn from this study hugely reflect the situation within this target county and might not be immediately relevant to other regions minus the consideration of rural context and infrastructure differences.

The study employed employ qualitative and quantitative methods that included questionnaires, interviews and observations. However, the research did not extend to experimental designs or longitudinal studies due to time and resource constraints.

The research targeted public high schools, thus excluding primary schools, tertiary institutions, and private schools. This delimitation sought to achieve a concentrated examination of ICT integration practices and challenges at the high school level within the public sector.

Besides, the key participators for the study were form two students of geography in high school, teachers, HoDs and head teachers within Chuka Sub-County. While the perspectives of policymakers who are MoE representatives was considered to provide context, the focus remained on those directly involved in the instructional processes.

1.8 Limitations of the Study

The availability and quality of ICT infrastructure varied hugely between schools within the study locale. Some institutions had proper ICT tools, while others had near none access to basic ICT tools. This variability affected the generalizability of the results and thus may results to an incomplete picture of the overall ICT integration within the study area.

The quick evolution of ICT tools implies that the study's findings may quickly be outdated. New technologies invented after the study period may change the landscape of ICT adoption in classrooms, which this paper does not account for.

The particular focus on Geographical Internal Land Forming Processes restricts the scope of the research. Therefore, the insights attained may necessarily be applicable in other areas of the geography curriculum or other disciplines.

1.9 The Assumptions of the Study

The study assumed that;

i. Cooperation by the participants would be there so as they gave true and correct information .
ii. Teachers and students had some knowledge on integration of ICTs
iii. Teachers bear the duty of making learners develop interest in technological

transformation, enhance technical skills in ICT and be ushered towards ICT implementation.

1.10 Theoretical Framework

This research was founded on Everett Roger's theory of Diffusion of Innovations (2003). The theory centers on the conditions that influence the increase or decrease of fresh concepts, products or practice among persons of a particular cultural system. The fresh concepts in this study were the ICTs, conditions that influenced adoption were the factors that influence ICTs integration and the challenges while the increase or decrease of fresh concepts is the extents of ICTs use in the teaching and learning of Internal Land-Forming Processes.

Rogers's further pointed out that this theory bears four aspects: (i) Innovation that points to a concept or object which is viewed to be fresh by a person; (ii) A communication line that acts as the way through which the communication pass between people; (iii) Time refers to the cumulative period needed to implement the process, (iv) This system is explained as a conglomeration of units entangled withthe agenda of solving a problem so as to accomplish attain an objective. This theory also illustrates that every person of a school system encounters their own innovative decision that is summed up in a 5-steps process: Knowledge, persuasion, resolution, implementation and confirmation. Those who adopt are grouped into five groups that include those who innovate, those who adopt as soon as the innovation emerges, the many who adopt on realizing that some are already using the innovation, the majority that adopt later after coming to terms that it is worthwhile to use it and the last group that still lag behind into the adoption.

Within the framework of this research, innovation pertains to the application of ICTs in

the instruction and acquisition of Geographical Internal Land- Forming Processes. This covers a range of digital resources and tools that improve the learning process, including computers, interactive whiteboards, projectors, educational software, and internet resources. Adoption of this innovation is heavily influenced by its features such as trialability, ability to observe, complexity, how compatible it is, and its advantage.

This study will examine the ICT tools, factors, challenges and extent of adoption influencing the integration of ICTs, in teaching Geographical Internal Land-Forming Processes in public high schools in Chuka Sub-County, Tharaka Nithi County. The study will use Rogers' Diffusion of Innovations theory. Comprehending these dynamics will facilitate the identification of ideas to augment ICT adoption, thereby elevating the caliber of geography education in the area.

1.11 Conceptual Framework

Figure1.1 below shows the conceptual framework that guides the study:

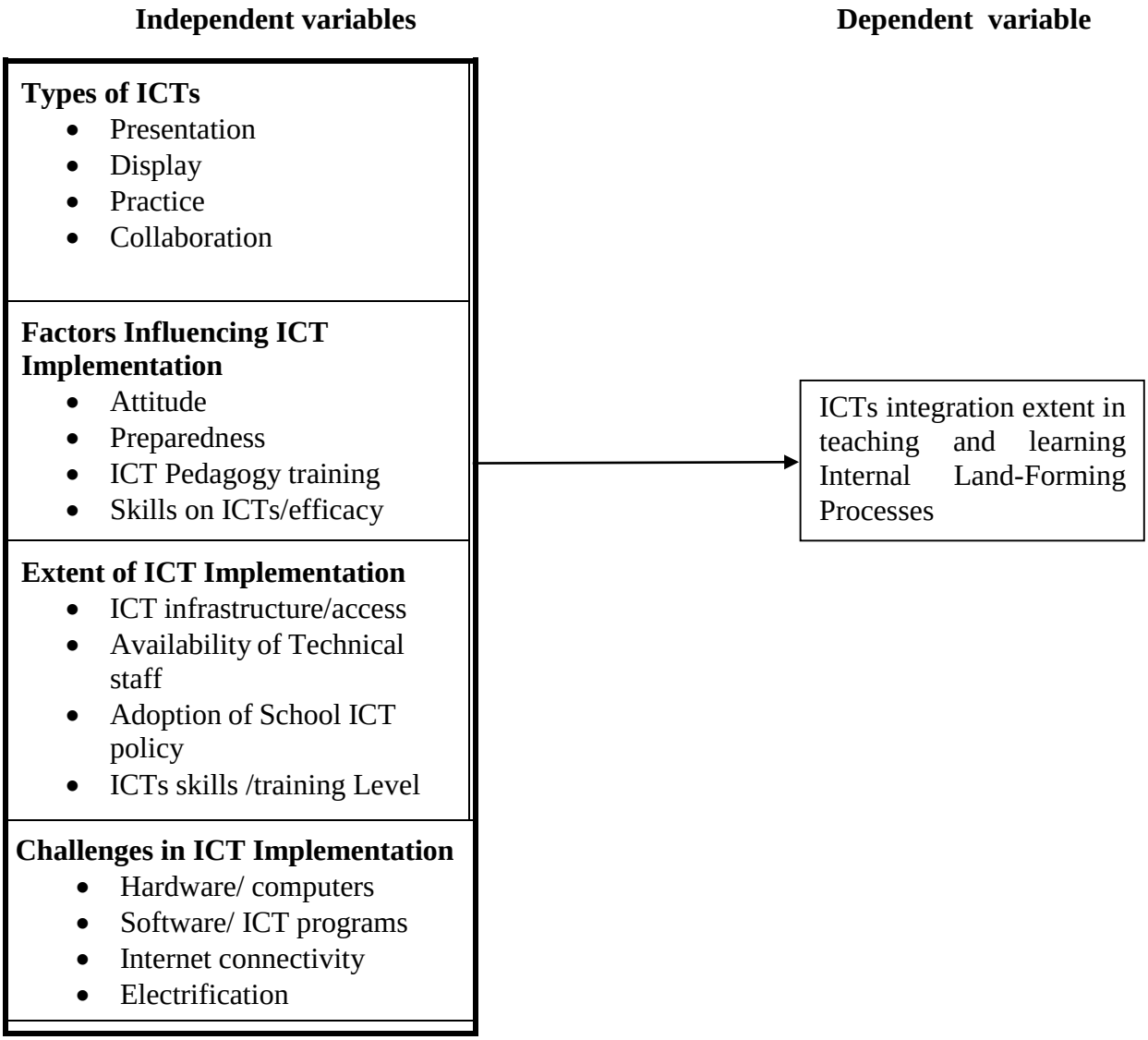

Figure 1.1: Conceptual Framework

Integrating ICTs in teaching and learning of Internal Land-Forming Processes in high schools is impacted by different variables. The independent variables include: Types of ICT used thatwill be measured using parameters such as presentation, drill and practice and interaction; Teachers and students' factors that will be assessed by attitude, preparedness, their commitment in integration of ICT, and teacher ICT competencies. The third independent variable is School factors, which will be evaluated by assessing aspects such as ICT infrastructure, that depend on users' skills and knowledge, technical staff who ensure efficiency in the performance of ICT, sufficient support by technicians and computer experts to assist unearth technical hindrances for the teachers and the students, so as to manage time and teachers' ICT skills which also assist in efficient interaction of ICTs. The fourth independent variable was set as ICT policies that influence various aspects of ICT in schools.

1.12 Operational Definition of Terms

Digital literacy: A person's capacity to establish, assess, generate and pass clear informationby way of writing or other communication mediums.

Diffusion: spread of an idea within the social sytem

E-Learning: is learning conducted through an electronic media

Internal Land Forming Process: A Geography topic that explain the processes that occur in the interior of the earth such as faulting, folding, vulcanicity and earthquakes and their significances

Integration: Utilization of ICTs to introduce, reinforce, supplement and extend teaching andlearning skills.

Learning: is construction of knowledge.

Physical Geography: is that branch of geography that focuses on natural science that encompasses the study of processes and patterns within the natural environment.

Teaching: Activities relating to educating or instructing learners which are aimed at imparting knowledge or skill.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This section reviewed existing literature relevant to the current research. The chapter specifically reviewed ICTs types, used in teaching and learning Internal Land Forming Processes, and ways in which teachers, students, and school factors, together with national ICT policy, influence how ICTs are used in teaching and learning Internal Land-Forming Processes; it also discusses the extent to of utilization of the ICTs in instruction plus the difficulties encountered in doing so.

2.2 Review of Study Objectives

The section reviews the study variables in relation to teaching and learning of Internal Land-Forming Processes. The information was then summarized and presented as below;

2.2.1 Types of ICTs Used in Teaching and Learning of Internal Land Forming Processes

Education is undergoing through a major change process, in relation to inventions in technology and teaching methods, learning organizations are being offered to a chance to work towards benefitting students (Joseph. 2023. The study pointed-out the below ICT components as critically important for the teaching of Geography. These include, computers, mobile phones, audio devices such as radios and bluetooth speakers, internet, audio visual devices such as the television, weather focus devices and magnetic compasses. Williams (2003) explained ICT implementation as being the way of utilizing any ICT components in facilitating teaching and learning. ICT refers to tools utilized in

developing, storing, retrieving, and disseminating information using different media (Gourja & Tridane, 2015).

Sasankar (2020) argued that ICTs entail the internet, broadcasting technologies (radio and television), computer and telephony. They can be utilized in education in enhancing efficiency. Older ICT tools that include telephone, radio and television have long been utilized as tools for instruction. Radio and television are deployed in open and distance learning. Print still stands as the best in term of effectiveness, accessibility. It is widely used to deliver in advanced and advancing economies. With enhanced utilization of ICTs for instruction, several new instruction methods are on rise. E-learning entails knowledge sharing at all instructional levels, that use networks of information that include the Internet, intranet (LAN) or extranet (WAN) to teach, to interact and to facilitate.

For a wide range of subjects, there are numerous kinds of software for learning readily accessible, both free of charge and for business authoring system, reference software, desktop publishing, drill & practise software, tutorial software, educational games, speed reading software, simulation software, spelling software, vocabulary software, special needs software and maths problem solving software (Yambo, 2012). Demirci (2009) asserted that blended learning points to representations which capture long ago classroom undertaking with computer assisted learning capabilities. Technological tools bear the potential of enhancing access to and increasing the importance and standard of education. ICTscan be utilized to avail educational opportunities to persons who have earlier had no interaction with education, that includes scattered and rural populations, persons traditionally delinked from education as a result of cultural or social issues, people with disabilities as well as the elderly. There are five of utilization of technology levels in

education which entail their usage to present, demonstrate, drill and practice, to interact and to collaborate (Nuts, 2018). To present and demonstrate, are the most integral of the five. Print, audio, audio visuals, use of computer and internet are commonly used for the two.

Drill and practice use all range of technologies except for technologies that entails usage of videos. Interconnection of computers including usage of Internet are ICTs that enhances learning where there is interaction and collaboration (Yambo, 2012). The research further asserts that Radio and television were greatly utilized as learning tools from the 1920s and the 1950s, respectively. Three overall methodologies exist in relation to utilization of the audio radio and audio visual television in teaching and learning (Perraton & Creed, 2002) that include face to face teaching, institutional broadcasting and education programming through community, nation-wide and international broadcasts. Richmond (2002) asserts that learning with technology implies the manner in which the technology may be the method of learning through a curriculum. The study further asserted that it involved use of systems that are specific to a curriculum. Others entail visualizations and graphical representation of abstract ideas, musical compositions, utilization of online information online that encapsulate encyclopedia and interactive maps and atlases.

IBE (2004) argued that for learning institutions to be competitive in-service delivery, quality training is critical to strategic follow-up and educational survival. The unending transformations in teaching methods and the requirement for unique, diversified and projected solutions to the learning institutions conditions require a more detailed

technique to the sector of education (KIE, 2009). ICT implementation is now a world-wide matter and as opined by Persaud (2006), implementing ICT into learning calls for a complete shift, where fresh ideas anchor new types of knowledge. This type of change further demands for Geography teacherswho are able to adopt with changes in technology in classes. Hence, there is a call to enhance ICT literacy. A study done by Yambo (2012) identified that learning tool is critical in that all learning institutions need to plan to have the tools in use for teachers and students in order to achieve better performance. Souls (2005) assert that the secondary school teachers' key role in enhancing results is to avail accurate teaching methods. ICT literacy skills in the 21st centuryinvolve the use of digital platforms in reading and writing (Bunyi, 2006). However, Laari (2013) pointed out that most institutions in Kenya lack variety with reference to the types of ICTs implemented and further asserted that the learning institutions operate with only the basic ICT equipment.

2.2.2 Factors Influencing Integration of ICTs in the Teaching and Learning Internal Land-Forming Processes

Lai & Pratt (2004) pointed out 5-factors critical for correct implementation of ICT in schools: ICT resources and management and general education and institutional management. Based on the study, even-though ICT opportunities are basically availed by teachers, the efficacy in management of ICT is critical in vailing great ICT learning opportunities. The study added that the quality of ICT learning opportunities is directly proportional to the quality of ICT leadership offered. Wong & Li (2008) undertook a research on aspects that impact quality use of ICT in 8-schools within Hong Kong. It affirmed that leadership enhancement towards experimentation, coupled with teachers' devotion to student-centered learning, affected efficacy in ICT adoption.

Nangue (2011) argued that for effective ICT use in teaching, teachers ought to have basic ICT skills. A teacher's expertise growth has been pointed out as important in successful implementation of ICT in learning institutions (Ngeze, 2017). An assertion by UNESCO (2004) affirmed that it is critical for teachers to enhance their understanding in ICT integration. McFarlane (Joseph, 2023) previously argued that teachers who are not at peace with computers, and who do not have a picture of how they can be utilized to improve learning, do not utilize them. The study also indicated that teachers must be allowed time and offered support in improving their comprehension and in implementing fresh knowledge to their teaching. Despite the quick expansion in technology, there is still a huge populous that has stayed personally uncomfortable with computers. Due to this discomfort, persons have rather a skewed perspective of personal computer and the capabilities they bear. There is a high probability of teachers to reject the initial use of ICTs in instruction due to some reasons (Omwenga,2003).

The key reason for this resistance is unfamiliarity to technology (Jacob, 2023). This also applies to learners who are required to utilize the ICTs in learning (Muthoni, 2005). Study results point out that for learners to be able to embrace ICT usage, they are required to establish know-how in the use of computers. According to Khalid and Orucu (2022), the main reasons there is minimal appliance of computers in instructing are problems of technology together practical difficulties, such as inadequate understanding and confidence when using ICT tools, as well as unreliable hardware and software resources. On the other hand, Demirci (2009), asserted that instructors ought to gain higher comprehension on the utilization and impact of IT, in the need to affirm that subsequent generations are IT competent. According to Yusufu (2005) teachers exhibit high levels of

enthusiasm and right attitude in the adoption of ICT.

User traits, content traits, technological considerations and firm capacity as aspects affecting the utilization of in teaching (Khalid & Orucu, 2022). Teachers' adoption of technological tools is also influenced by institutional considerations and the take towards technology (Chen, 2008; Lim & Chai, 2008). Besides, Neyland (2011) argued that issues like organizational support alongsideintra-institutional aspects (teacher capability among others), impact implementing digital instruction in senior schools within Sydney. According to Jones (2004), a computer malfunction causes disruptions, and in the absence of technical support, there's a chance that the computer will be repaired irregularly, which will inhibit instructors usage of the resource when teaching. The resultant outcome is always that teachers get demoralized from utilizing computers as a result of scare of machine failure because no technical support is available. Korte and Husing(2007) established that learning institutions in Holland appreciate the criticality of technical assistance for teachers, that enhance the implementation of technology in teaching. And add that ICT facilitation in schools affect teachers in applying ICT in class hours efficiently, troubleshooting hardware and software challenges.

Based on the discussions by Ukwungwu (2004), the interaction of ICT in curriculums calls for ICT accommodative teachers who are further trained and bear expertise in computer operation, production and software development. The common teaching methods still take the front line in schools. Besides, Maina (2011) pointed out that a tutor's preparedness in using ICT in teaching, needs to always be factored in. For efficiency and effectiveness in using ICT, professional development must be undertaken. Identification of specific objectives within Geography curriculum in aid of learners

compel instructors to possess apt ICT skills, adequateand frequent use of ICT facilities, as well as accessibility to reliable technical support. Becta (2004) argued that several tutors who do not take into consideration ICT training, feel worriedabout using it with students who may be more knowledgeable. On the other hand, Sandholtz and Reilly (2004) opined that tutors' technological prowess are key influencers of ICT implementation, though they are not determinates for effectiveness in the utilization of ICT inclasses. They add that training programs that focus on computer pedagogical learning other than on technical aspects and effective assistance, help teachers in applying ICTs in teaching and learning.

Blease, D. and Cohen, L. (1990) argued that individual's effectiveness in utilizing the new technology is enhanced through familiarity. This is generally correct within a class setup, where issues such as simulations and multimedia will be utilized. The duo asserted that UK, enhanced the adoption ICT literacy among her populous, through legally engraving it into the 1988 Education Reform Act. Therefore, there is need to inquire if the Kenyan government ought to adopt the same path, so as to ease the integration process for both teacher and student. However, a lack of teachers who are experts in ICT is a challenge in the implementation (Kumar, 2008). He also indicated that schools where ICT is to be implemented well in learningand teaching, there is an initial call for all teachers to be effectively trained on the tools. Kumarfurther argued that many teachers are not ICT proficient and resist ICT focused changes. A majority of teachers take into consideration, the two key hindrances to utilizing technology in teaching, as including insufficient resources and lack of training (Pelgrum, 2001). Key factors on characteristics of the school bear critical impact, in affecting the utilization of ICT in schools. These consist of

having access to technological resources, receiving ICT training to improve skills, and having a school leadership team. (Keiyoro 2012). ICT reforms need consideration of aspects that include budgeting, staffing, resourcing and training. Otherconsiderations are such as establishing and managing ICT infrastructures (Afshari et al., 2008).

In order to register a complete adoption of ICT, there needs to be correct organization within an institution. This is as a result of the school being thought to avail the key ICT for utilization. An ICT adoption plan avails a complete architect in structure as well as methodologies that can policy of ICT in schools to become real (Afshari, 2009). Besides, Afshari et al. (2009) study revealed the existence of an association between the school leaders technological know-how and its impact. Besides, researchers have proved that different categories of leadership, including administrative and technology, determine the success in theutilization of ICT within schools (Anderson & Dexter, 2005).

The presence of drafted strategically planned ICT usage does not necessarily offer an assurance on thedetailed utilization of ICT, or lack of ICT organization, primarily imply the absence of its adoption in a specific institution (Bryderup, 2002). An institution's leaderships bear a huge responsibility in affirming that they avail to schools the needed facilities such as the computer. Nonetheless, the leaders have to bear with a number of challenges such as undertaking the ICTpolicy implementation in the wake of insufficient resources and competing needs such as classrooms and furniture. Yusufu (2005) argued that many teachers lack adequate skill to completely utilize technological tools and other general software. Drent & Meelissen (2008) carried out a research on aspects that lead to innovatively utilizing ICT Netherlands instructors. The sample was 210 educators. According to this study, an educator's creative use of ICT is positively impacted by a

number of factors, including having used computers, an upbeat perspective regarding computers, student-oriented instructional methods, as well as private entrepreneurship. Demici (2009) identified that though problems like shortageof hardware and software are in play, teachers' correct attitudes in line with ICT is a crucial aspect impacting successful implementation of ICT in Geography lessons.

With Geography being a bridging subject KIE (2006:13), which is set to empower learners with knowledge and skills which bear massive value beyond Geography, it calls for ICT utilization to enhance it. Kessy et al. (2006) added that the growth of IT and the development of its related policies, is an item for sustained economic development. According to Krower (2006) arguments, the tutors assist the learners to be exposed to the quickly developing ICT utilization and fulfill an important general objective of comprehending Geography. This provides a logical and thorough scientific description of our world coupled with information acknowledgment (Ford, 2007).

2.2.3 Extent of usage of ICTs in teaching and learning Geographical Internal Land Forming Processes

The leaders of several countries have committed substantial global resources to ICT in education. For instance, the American government used $7 billion on K–12 and $6.1 billion on higher institutions of learning in 2017 (Nut, 2017), while the federal government of the United Kingdom spent over £3.5 billion on ICT for students between 2016 and 2018 (Nut, 2018). Despite such expenditures on professional growth, equipment, and technology to enhance education in various countries, Sasankar (2020) asserted that despite massive investments in education, there is little evidence of ICT adoption in schools. A number of surveys are undertaken to evaluate the aspects relating

to adoption of use of computers in instruction by teachers (Kanorio, 2015; Raja & Nagasubramani, 2018).

ICT for Education is one category ICT usage in education may be divided. The other category is ICT in Education. The later involves using all facets of technology to assist teachers, while using ICT for education seeks to build ICT specifically in schools (Gatotoh, Keiyoro & Gakuu, 2017). The study further reported on utilizing policy statements in the adoption of ICTs in schools in developed nation spear. He argued that the governments were committed to facilitating universal access to ICT infrastructure. In America, the policy document captured issues on availing enough computers for usage, and mandatory training of teachers to be computer literate through taking computer courses (Sasankar, 2020). The United Kingdom government has supplied every nursery school with an electronic whiteboard even (Miller *et al.*, 2005; as citedin Waller, 2007).

Jaway (2003) argued that developed economies benefit from adoption of high-level ICTs in their educational system while educational engagements in developing economies is majorly founded on learner-tutor physical interaction. The Education sector still depends on traditional methods and is hugely lagging under-developed with reference to the adoption of current technologies (Gikundi, 2016). Yildrim (2007), established that reaching technological facilities is efficient to tutors' pedagogical utilizing of ICT in classrooms. In UK, the state expenditure on ICT in education between 2008 and 2009 was £2.5bn (Nut, 2010). A massive investment in education bears unconvincing proof of ICT implementation and utilization in classrooms specifically in Turkey (Gulbahar, 2007).

Real-world educational experiences are presently not widely included in Kenyan as well as developing countries' curricula, more so in teaching Geography lessons, in the traditional classroom setting (Kinuthia, 2009). To a wide extent, Ngéno (2015) asserts that the classroom teachings is delinked from reality. This division of context has a negative effect on training, negatively impacting motivation of learners and especially Geography students. A study by Kidombo et al (2011) established that ICT usage in country high schools hugely relied on the schools' management, expertise training of the tutors, top leadership degree of technical competence and availability of ICT policy. Privately owned institutions were identified to haveICT policy, an aspect that was lacking among the public schools. Kombo (2013) on the other hand argued that even though the efforts and readiness of the Kenyan government to improve ICT as a means of instruction, extent of adoption of ICT has fallen short of expectation.

In this country, Computer Education was initially implemented in government owned high schools in 1996 to enable learners acquire computer literacy skills. The resolution by the government to initiate computers in public secondary schools was driven by two key educational decisions and policies. The initial one was in 1996 when the Ministry of Education announced that it had sought for funding from the UNESCO to finance the project and train secondary school teachers to train computers skills. The second key driver was when the Ministry of Education published a policy and curriculum guidelines in 1997, giving a node to the computer teaching in high schools and declared that the discipline would be examined in 1998 (Onduru, 2012).

The key goal of the objective was provision together with adoption of technological use in

instruction to avail sufficient opportunities for Kenyans to establish the critical skills, independent of the levels of education (both formal and non-formal), to take advantage of the IT benefits (Ministry of Education, 2019). The policy objectives for the education ministry towards embracing ICT entail the following: enhancing deployment, implementation and exploitation in the educational system to enhance access and delivery that effectively supports learning, from the primary level to the university; facilitate the modernizing the educational modalities with the aim enhance teaching standards throughout the school system, and expanding the availability of assets and infrastructure for training, education, and research; to align the entire educational framework with the science and technology instruction, aiming to quickening integration of these subjects into society and obtaining the critical mass required for human capital and an informed populace; to achieve universal basic education and raise the national standard for computer as well as basic reading and writing; and to guarantee a populace where all individuals are at minimum competently literate and productive.

Kidi (2012) identified that the Ministry of Education remained greatly involved towards enhancing the standards of education of secondary school. It argued the importance of integrating ICT into secondary school subjects. Several researches explored the influence of technological use in places of instructions from varying perspectives. A survey in the education sector 2014/2015 identified that more than 50% of high schools in the country needed working telephones, whereas 80% require to develop Local Area Networks so as to enhance communication critical in teaching. A specific framework required to be implemented by institutions intending to utilize ICT tools (Ayere et al., 2010). A study by Kiptalam et al (2017) identified a number concerning computer lessons are undertaken in

set labs, hence restricting adoption of IT in other subjects. They also identified that internet utilization stands elusive in these schools despite the costs. A research by NEPAD (2018) revealed that over 90% of learners in non-NEPAD schools lack access to internet.

A study by Maina (2018) focused on the implementation of ICT in instructing English subjectin high schools within Kirinyaga East, Kirinyaga County. The predictor variables measured were English language, teachers' preparedness, ICT integration by teachers, accessibility of available ICT facilities, usefulness of ICT integration on teachers and learners, and ICT technicians' role. The design employed was descriptive and the results proved that lackof installation of relevant educational software to facilitate the learning, low ICT integration, a number of ICT resources were unavailable to both teachers and students. Additionally, several schools did not have ICT technical support staff. It was also evidenced that these factors had hugely hindered dissemination of skills. Conversely, Kanorio (2015) conducted a study about usage of ICT for instruction in a Kenyan secondary learning institution. The study sampled both teachers and students using a case study design. The study evaluated the level of ICT literacy among teachers, their implementation motivation, the rationale for ICT intervention, and the educational impact. According to the study, implementing student-centered teaching strategies and utilizing ICT in the classroom improved the school's learning outcomes.

2.2.4 Challenges Experienced During ICTs Integration in the teaching and learning of Geographical Internal Land-Forming Processes

Integrating ICTs in the process of knowledge transfer on Internal Land Forming Process becomes successful, when all the factors at both the national and school levels exist and

are adequately available, and provided when required. Reviewed literature has showed the existence of various challenges. When comparing the developed countries with the developing ones, the usage of ICTs in instruction is much more limited in the developing economies, as a result of shortages of financial resources resulting to limited Internet access and poor infrastructure. Besides, there is also a restricted number of trained teachers and correct policies (Gulati, 2008). In many developing economies, there exists several challenges in implementing ICTs into the education system (Hennessy et al., 2010).

Insufficient ICT framework affects the availability of ICT services in Kenya (MIC, 2006). The report further adds that there were several hurdles relating to use and having accessibility to ICT throughout Kenya that entailed; poverty that restricted access to ICT facilities, and absence of reliable and cost-effective power supply. Based on the paper, high internet prices, high costs related to ICT tools, insufficient framework and assistance hamper the implementation of ICT in education. Policy makers ought to effectively plan on availability ofright rooms or establishments to contain the technology, cost-effective internet service to support e-learning, besides the presence of power and telephony (Kumar, 2008). This research sought to determine whether learning institutions had the needed set-up to implement ICTs in learning Internal Land Forming Processes. Determining the ICT framework's dependability in high schools was another goal of the study. Planning for infrastructure is just one aspect of considering the sustainability of ICT programmes; other considerations include specialists and knowledge bases (Ferrao & Thompson, 2012).

Becta (2004) argued that unavailability to ICT facilities, is not necessarily as a result of

shortage of the facilities but the outcome of one or several other aspects including uncoordinated resource structuring, low standard hardware, unfit software, or inaccessibility of the tools for teachers. A study by Gomes (2005) linking different subjects affirmed that insufficient preparation to utilization of technological instruction in class, as well as exposure to utilization in particular disciplines, are challenges facing implementation of to current technological tools in teaching. Among other challenges facing ICT implementation are; lack of technical support (Laronde, 2012). Keiyoro (2012) showed that 10.7% of the school sampled in the study had no power connectivity. Oloo (2009) in his study, most of the schools evaluated lacked internet connectivity. Kidombo *et al* (2012),found there are inadequate computers and a challenge to accessing of the internet. Availability of information and knowledge sets a key role in offering support to rural school development andliteracy with ICTs.

Khalid (2009) employed a meta-analysis approach in undertaking a research seeking to know the hurdles in usage of ICT in institutions of learning, and established that instructors strongly desired had a strong desire of embracing ICT in instruction, but are faced with major barriers such as minimal confidence in using ICT, incompetence and insufficient resources. However, this study was limited to learning institutions in Australia and was never specific to the field of Geography. Therefore, the findings may not necessarily reflect status in Kenya as a developing nation, and more specifically in teaching and learning of Land forming processes in Chuka Sub-County, Tharaka Nithi County.

ICT policies within the East African region started aligning at the onset of 2000s. Earlier, there was a rise in the uncontrolled implementation of ICTs, which called for nations to

give direction intheir utilization. The earliest ICT regulations included every aspect of the learning system and were quite extensive, according to the claims made by Farrell and Isaacs (2007). Nevertheless, Ang'ondi (2010) notes that the process of developing the regulations has proven to be laborious. On the other hand, a study by Ngeze (2017) demonstrated that the majority of Tanzanian learning institutions lack technological facilities, and that the student-to-computer ratio was extremely high in the institutions that did have it. The report also suggests that MoESTVT step up efforts to provide ICT instruction for teachers, install sufficient technological infrastructure in numerous schools, and establish a structure for putting the same into practice.

Additionally, Onwuagboke et al.. (2010) researched on integrating ICT in instruction in high school level. They utilized a descriptive study design and sampling was done in Owerri Educational Zone in Imo State, Nigeria and utilized Questionnaires. Several hurdles were pointed out including computer illiteracy among some of the tutors, insufficient ICT facilities and financial resources, unreliable electricity sources, and inadequate understanding of the use of internet. This study however only evaluated responses from teachers failing to assess the input from teachers. Besides, it may not reflect the state in the county of Chuka Sub-County, Tharaka Nithi, Kenya. Very few tutors are utilizing ICT tools (MoCT, 2003). This is hugely weighed on the fact that its limitations outnumber the advantages (Bingimlas, 2009). In this backdrop, this research is projected to describe teachers' attitude and limitations relating to the implementation of ICT in class.

2.2.5 National Policies on ICT Integration in Teaching and Learning

Education systems all over the world, including Kenya, are under duress to integrate

ICTs in learning areas. Kenya, as a nation, has insisted on the criticality of adopting ICTs in learning programs through the KESSP initiative. This is clearly so due to coming up with National ICT Strategy for Education and Training (MOE, 2005). This paper describes different issues relating to ICTs. Key sections in the document entail: ICT in educational policies, correspondence and network issues, digital aspects, new technologies, digital information, ICT implementation in educational researching and training. Generally, main objective seeks enhancing PPPs which bring together and avail ICT tools to government owned institutions and community owned resources centers in the country (ROK, 2006).

In an effort to remain abreast of the current changes, through the MoEST and MICT, the country has facilitated the implementation of ICT in institutions of learning. The policies include: ICT Policy of 2006, Sessional Paper one, 2005 and KESSP, 2005-2010 (Kidombo et al, 2012). The Kenyan government has implemented the plan with an objective of improving the standard of learning in order to improve student's engagement in the current knowledge-rich and informed society. A number of the state's plans are visualized within the vision-2030 that intends to transform curricula and rationalize equipping of tutors to develop a technology anchored supply schedule that facilitates learners with current ICT abilities. This shall change the syllabus and help attain the adoption of ICT knowledge in formal instruction (MOE, 2004).

Kenya developed its ICT policy in 2006 with the objective of becoming an ICT-anchored community, and its objective is to enhance the well-being of the natives by ensuring the availability, effectiveness, dependability, and cost-effectiveness of ICT services. The strategy describes the target, intentions and methods of implementing ICT

in learning. According to the National ICT Policy (2006), the state bears the responsibility and duty of enhancing the implementation and utilization of ICT in all places of learning in order to improve learning levels. It is segmented into various portions. They include: Broadcasting, IT, Postal services and Telecommunications with the portion focusing on IT describing the aim and plan of ICT and its utilization in learning.

The associated plan within ICT entails: online-learning that seeks to improve the advancement of online-learning resources, assist PPP programs in collecting resources so as to enable virtual learning activities, improve the growth of a consolidated virtual learning curriculum so as to enable education, improve the development of a countrywide ICT Centre of excellence, avail a cost-effective system in order to support the transfer of expertise and skill through virtual learning avenues, develop recognition of chances availed by ICT as an academic tool, support sharing of online-learning assets among schools and link supporting supplies with available ones. Generally, the aim is supporting PPPs whose responsibility is collecting as well as availing ICT materials to all government owned institutions among other centers of learning institutions in the country (ROK, 2006). Meoli (2007) affirmed that even though energy has been put by different partners in line with significance of technological tools for instruction, the ICT regulations Nationally are hugely in draft form. Very insignificant attempts are made to ensure that the policies are implemented in schools.

2.3 Empirical Review

Numerous academics have carried out investigations about the ICT incorporation in instruction. Apparently, most of these research have concentrated on the application of

ICTs in the social sciences, mathematics, fundamental science, and language education. These studies are also general, and therefore lack the thorough specific focus on the use of ICTsin training Internal Land Forming Processes. In addition, a majority of these studies have beendone in economies that are advanced in the integrating ICTs in their education, and have a goodbase of ICT infrastructure such as Australia and Malaysia. The findings therefore may not be reflective of the status in a developing economy such as Kenya, and in this case, Chuka Sub-County, Tharaka Nithi County. For instance, a study by Khalid (2009) was limited to learning institutions in Australia and was never specific to the field of Geography. The study looked into the extent embracing ICT tools in instruction together challenges thereupon. Employing a descriptive study approach, the research demonstrated how widely ICT use in education has been adopted by the nation's educational institutions. Though more specifically on teaching and learning of land formation processes in Chuka, the results could not accurately reflect Kenya's status as a developing country.

Onwuagboke and Ukegbu (2010) researched to adopting ICT in the learning process but limited this to teachers' experience at secondary school level. They utilized a descriptive study design. Sampling was done in Owerri Educational Zone - Imo State, Nigeria. Several constraints were identified including low ICT literacy amongteachers, insufficient ICT facilities and fund and unreliable power supply. This study howeveronly evaluated responses from teachers failing to assess the input from teachers. Besides, it may not reflect the state in the county of Chuka Sub-County, Tharaka Nithi, Kenya.

Besides, (Joseph, 2023) undertook a study that examined literature to find out what influences teachers' use of and integration of ICT into their instruction. This article

assessed personal, institutional and technological aspects which enhance their utilization of technology in learning. Among the challenges identified were the limited access to ICT, the curricula, the rigidity of traditional educational institutions, the instructors low confidence levels, inadequate instructional training, together with incapacity to use ICT effectively. This study was however limited to school in Ghana hence the application may not be relevant to the Kenyan scenario. In addition, failed to discuss other aspect around ICT adoption in school that encompass types of ICT adopted, and challenges in the adoption of these tools.

Conversely, Kanorio (2015) study on the ICT use in education at a Kenyan secondary school sampled both teachers and students using a case study design. The results, however, were restricted to a single school, thus they might not accurately reflect the actual state of ICT integration in the current research areaon Geographical Internal Land-Forming Processes instruction. In Kenya, it is still also not clear whether the policy on ICT integration in education, is being fully implemented in theclassrooms, and if it has, to what extent when teaching and learning the Internal Land Forming Processes topic in Geography. As a result, research relating to this subject matter is necessary for the complete adoption of ICTs in classrooms when teaching the Internal Land Forming Processes. Therefore, by examining the integration of ICT in the teaching and learning of Internal Land Formation processes in high schools within Tharaka-Nithi County aims to close this gap in knowledge.

Musimba (2019) conducted a study to find out how much ICT is used to teach public secondary schools Geography in Kakamega County's Matungu Sub-county. The findings were that while tutors should adopt a new perspective on novel concepts in order to

successfully incorporate them into the classroom, the government and other stakeholders must provide resources to support ICT integration. In this study, focus was on ICT integration status, type of ICT tools available plus their maintenance for integration, the impact of economic stimulus programs and the difficulties in integrating ICT into instruction Secondary-level geographical studies. The research sampled principals, teachers and students and was founded on the Technology Acceptance Model Theory. Questionnaires and interview schedules were utilised as data collection tools. This study was however restricted to Matungu area and failed to evaluate the challengesin integrating the ICTs in teaching Geography and the extent of their adoption.

2.4 Chapter Summary

The literature affirmed that ICT points to tools utilized in the creating, storing, retrieving, and disseminating information using different media (Gourja & Tridane, 2015). The study pointed-out the below ICT components as critically important for the teaching of Geography. These include, computers, mobile phones, audio devices such as radios and bluetooth speakers, internet, audio visual devices such as the television, weather focus devices and magnetic compasses (MIC, 2006). On the other hand, the study identified a number of factors that are critical for successful implementation of ICTs that included availability of the technological resources, management efficacy of ICT, the quality of ICT learning opportunities, teachers and student attitude towards ICT implementation, availability of ICT skills, level of knowledge in using ICT skills, confidence in working with ICT tools, reliability of software and hardware resources during teaching and policy environment around ICT utilization.

Regarding ICT adoption extents in schools, it was found that despite significant

investments in ICT infrastructure, tools, and trainings for improvement of education in multiple economies, minimal indications of ICT adoption and utilization in instruction is evident according to Gulbahar (2007). The research in Kenya showed that the majority of secondary schools teach computer studies as a subject with minimal application of ICT in other disciplines (Raja & Nagasubramani, 2018). Reviewed literature has showed the existence of various challenges such as restricted internet access, inadequate infrastructure, a shortage of trained teachers, a lack of appropriate policies and high internet prices among others (Gulati, 2008; Khalid, 2009; Bingimlas, 2009).

Many educators have carried out investigations about the incorporation of ICT in instruction. However, thorough specific focus on the use of ICTsin training Internal Land-Forming Processes is lacking. In addition, a majority of these studies have beendone in economies that are advanced in the integrating ICTs in their education, and have a good base of ICT infrastructure such as Australia and Malaysia. The findings therefore may not be reflective of the status in a developing economy such as Kenya and in this case, Chuka Sub-County, Tharaka NithiCounty. Besides, none of the studies to the study's knowledge was restricted to learning and teaching Geography, and more specifically the land forming processes. However, none of the studies attempted to make a connection between the aspects evaluated in this study—that is, the kinds of ICTs used, the factors that influence ICT integration, the degree to which ICTs are used in schools, and the difficulties associated thereof. This study aims to close this gap.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

Included in this chapter are the research design, study variables, study location, target population, sampling techniques and sample size, reliability and validity testing, data collection methods, data analysis, and logistical and ethical considerations.

3.2 Research Design

A descriptive study design served as the foundation for the research. This is a one-time study that presents data or conclusions gathered from the participants. It was determined that a descriptive design would be most effective in accomplishing the objectives of this qualitative study, which sought to pinpoint traits, trends, and classifications as seen in the discipline (Creswell, 2015). Because the study reported the data as acquired and the questions remained focused on the goals of the investigation, the methodology was thus pertinent to the research.

3.3 Variables

A variable, points to a measurable trait that takes varied values among the subject. It is therefore a logical manner used to express a specific attribute in a subject (Mugenda & Mugenda, 2008). An independent variable is one which is manipulated so as to determine its influence on another. An intervening variable explains the causal links between the other variables (Kothari,2005).

The predictor variables of the research were set as;

i) The types of ICTs used.

ii) Teachers and students' factors influencing integration of ICTs.

iii) School factors influencing integration of ICTs.

iv) National policies on ICT integration in education.

The dependent variable was: extent of ICTs integration in teaching and learningof Internal Land Forming Processes.

3.4 Study Locale

Since the students can more easily connect what they are learning using ICTs to their surroundings, Chuka Sub-County, which is a part of Tharaka Nithi County, is a better fit for the study topic. It is located at the foothills of Mount Kenya and has volcanic soils. A feasibility study was done to determine how well the schools' ICT infrastructure was functioning, and this information helped determine the research area choice. About thirteen schools had good ICT infrastructure as the district sub-county administration disclosed.

3.5 Target Population

The target population means the cumulative units or items in any investigation (Sidhu, 2009). In all, 1433 targeted respondents were selected from 41 public secondary schools, including 41 heads of department, 68 geography instructors, 1285 form two geography students, 4 education officers, and 41 school principals. Since Form Two students in Kenyan secondary school programmes are typically exposed to more intricate and in-depth topics related to Geography, such as Geographical Internal Land-Forming Processes, the research focused on this particular student population.

Thus, this phase establishes the groundwork for complex geographic ideas that will be expanded upon in the years to come. Therefore, focusing on Form Two students,

guarantees that the research touches on the moment when students come across important geographical content, that can be enhanced by ICT integration. In general, the study aims to provide an extensive overview of ICT integration in Chuka Sub-County, Tharaka Nithi County public high schools through involving these diverse groups.

3.6 Sampling Procedures and Sample Size

Pandey and Pandey (2015), describes a sample to be subset of the population from which a reference aims to draw conclusions. On the other hand, sampling is viewed as the process of identifying fewer elements from significant big unit, so as to justify a result ,moreso an event in terms of the greater group and make conclusions about the population (Kumar 2011). Sampling reduces the time and resources that are involved when studying an entire population.

3.6.1 Sampling Procedures

The process used to create a sample can affect its quality (Orodho, 2009). Using a stratified random sample approach, the study divided the population into four strata: National Schools, County Schools, Sub-County Schools, and Extra County Schools. The study focused on 41 public secondary schools. Following random sampling approach to identify the particular schools, convenient sampling was used to identify the sample elements, which included principals, heads of department, geography instructors, and QASO. Conversely, the students of Geography in form two were the ones chosen using a straightforward random sampling technique.

3.6.2 Sample Size

For small populations, Mugenda & Mugenda (1999) advised using a population sample size of 20–30%. A 10% sample is appropriate for a survey involving a sizable population,

the report continues. A 20% sample size calculation from a tiny target total of 41 schools based on the reasons made by Mugenda & Mugenda was used. Consequently, the sample consisted of eight of the forty-one public secondary schools in the target area. There were four classifications for these educational institutions: sub-county, county, national, and extra-county. Eight categories were chosen at random. It was convenient to sample 8 principals, 8 heads of department, and 8 geography teachers from these 8 schools. Convenient sampling was also used in the study to identify the 1 QASO.

Besides, 128 Geography learners were randomly sampled from the larger population of 1,285 form two Geography students in the targeted schools. This represented a proportion of 10%. The sample size was advised by the arguments by Mugenda and Mugenda (1999). Table 3.1 shows a summary of the above information.

Table 3.1 Sampling Grid

Item	No. in sub county	Category	Count	Selected sample	% of Sample to Total Count
QASO	1	n/a	1	1	25%
Principals'	41	National Extra	1	1	12.5%
		countyCounty	8	1	12.5%
		Sub-county	9	2	25.0%
		Total	23	4	50.0%
			41	**8**	**100%**
HOD's	41	National Extra	1	1	12.5%
		county County	8	1	12.5%
		Sub-county	9	2	25.0%
		Total	23	4	50.0%
			41	**8**	**100%**
Geography teachers'	68	National Extra	7	1	12.5%
		county County	13	1	12.5%
		Sub-county	17	2	25.0%
		Total	31	4	50.0%
			68	**8**	**100%**
Students'	1285	National Extra	65	6	5%
		countyCounty	210	21	16%
		Sub-county	330	33	26%
		Total	680	68	53%
			1285	**128**	**100%**

Source: Field Data

3.7 Data Collection instruments

Checklists for observations, scheduled interviews, and use of questionnaires were techniques used to gather data.

3.7.1 Questionnaires

Data was gathered through 3 types of self-administered questionnaires constructed by the study. The questionnaire was specifically designed to address research objectives. They included questionnaires for heads of department, questionnaire for Geography teachers and questionnaire for form two students. The questionnaires were presented in four sub-sections, as per the research objectives (See appendix 1B, 1C and 1D).

3.7.2 Face to Face Interview

Gradner (2010) pointed that an interview is a 2-person verbal questioning started by the person conducting the interview in an effort to gather relevant data for research. This targeted the principals and the QASO. Through probing, aspects questioned were covered. The interview schedules were used for reference because certain questions might not have been raised or might have been added to bring up different points. The researcher, in-person, undertook the interview with the heads of schools to obtain detailed information as pertains degree to which ICs are used at classroom level. There was a visit to the education office by the researcher on a scheduled date to interview the education officer. (See Appendix IE for the principals and 1F for the QASO.)

3.7.3 Observation Checklist

Kombo and Tromp (2006) state that by use of observation as a method, one can describe the occurrences under study while adopting the perspective of an onlooker. The study's checklist was used to confirm that the ICT tools were available, adequate, in good condition, and being used. Refer to appendix 1G.

3.8 Piloting

The objective of piloting was to prior test the instrument of research for reliability as well as to equip research logistics to the researcher. The study conducted a pilot study at Iruma Girls High School, and Kajiunduthi Boys High School that are both public secondary schools within Tharaka Nithi County, though located outside Chuka Sub-County as the study area. The schools were well equipped with ICTs.

3.8.1 Validity of Research Instruments

The study undertook comprehensive approach to validity testing seeking to show the

reality entailing ICT integration, and avail valuable insights for educators, policymakers, and researchers. The research undertook both construct and content validity tests. Pandey and Pandey (2015) asserted that the degree to which an evaluation accurately reflects a particular theoretical concept or characteristic is known as construct validity, whereas content validity points how much a test measures the aim intended. Content together with construct validity was achieved through development of instruments based on the theoretical framework, guiding the research, research questions and the research objectives of the study. In his investigation of utilization of ICTs in secondary school to instruct and learn, Jacob De' (2023) employed this approach to research.

3.8.2 Reliability of the Research Instruments

When an instrument gives rise to consistent findings over a period is identified as being reliable (Pandey & Pandey, 2015). The pilot test was administered to 2 HoDs, 4 geography teachers and 16 geography students at Iruma Girls High School, and Kajiunduthi Boys High School. The split-half test method of testing reliability as described by Danner (2016) was used. The returned questionnaires were split into two equal part, each separately assigned numbers that were odd and the other even. The reliability coefficient α was calculated using spearman correlation. The results for the students was $\alpha = 0.77$, $\alpha = 0.89$ for the Geography teachers, and $\alpha = 0.93$ for the heads of department. Based on the decision rule of accepting reliability coefficients of above 0.7 as opined by Pandey and Pandey, the study concluded that the instruments were reliable, and thus credibility of the findings.

3.9 Data Collection Procedures

The study required the issuance of the NACOSTI permit before embarking on data

collection. After which, the Director of Education of Chuka Sub-County, Tharaka Nithi County was notified before embarking on the research. The study got an introductory letter to operate in the area. On the material day, the researcher visited the sampled schools, created rapport with the respondents and explained to them their expected roles in the research.

3.9.1 Questionnaires

The study targeted the student, HoDs and teachers with this instrument. For the departmental heads and geography teachers, a convenient time to distribute the self-administered surveys was determined. These respondents were given them a week for filling the questionnaires. The study assigned one of the research assistants to collect them, and they were handed over on the day of students' questionnaire administration. For the student's questionnaire, the Geography teachers agreed on convenient day and time to avoid interferencewith the school program. On the material day, the study agreed with one Geography teacher to organize the form two Geography students in a quiet hall. Once settled, the questionnaires were handed over to them. When they were through with filling, the research assistants with the help of the Geography teachers strategically positioned themselves to ensure a high return.

3.9.2 Face to face Interview

The research team visited every school in the sample and requested authority to undertake the study. The research coordinated and decided upon a convenient day and time for conducting the exercise in consultation with the QASO and the principals. On the material days, they got a quiet place to sit, where the study introduced herself to them and inquired whether they were comfortable with the interview being tape recorded.

Where the respondents were not comfortable with recording, the study opted to write down the responses. On completion, the study gave an opportunity for the respondents to ask questions.

3.9.3 Observation Checklist

An observation checklist, developed as part of the study, was utilised to confirm several aspects of the subject matter, such as the kind of geography ICT tools that were available, their state, and the frequency of use reported by the teachers. With the assistance of the computer laboratory technician and one Geography teacher, the study was circulated in the school computer laboratory, Geography resource rooms, and the classrooms, where the observation sheet were filled. The study ascertained the availability, condition and usage of ICTs. On agreeing with the Geography teachers, the researcher was physically present during certain Geography lessons to ascertain the availability and usage of ICTs. However, the researcher observed that some of the available ICTs were not being utilised, got curious and wanted to know why teachers were not using the available ICTs.

3.10 Data Analysis Techniques

The Version of SPSS used to carry out analysis was 20. Data was collected using primary means that included questionnaires, observation and interviews. The data collected through questionnaires was first coded, before it was captured with the SPSS software for analysis. On the other hand, data regarding the different kinds of equipment used in the classroom for Geography was obtained through observation and questionnaire. The themes were established and coded and put in the computer. Both data was run descriptively in frequencies, percentages, mean and standard deviation. Descriptive statistics analysed raw data that entailed standard deviations, percentages and means and

frequencies, in line with the goal of the research. The information was displayed in bar graphs and in prose-form.

3.11 Logistical and Ethical Considerations

With limited budget, a lot of logistical considerations were undertaken. The study trained two locally identified researchers from Chuka Sub-County, Tharaka Nithi who were deployed during data collection, to drop and pick the questionnaires. The study was also devoted to ensuring that aspects relating to confidentiality, honesty from respondents, and risks were well considered. So as to ensure confidentiality, respondents were shielded via non-disclosure of their particulars and from persons who have conflicting interests with the respondents (DiCicco-Bloom & Crabtree,2006).

To reduce the risk of resistance while increasing honesty, when filling the questionnaires,a number of considerations were put in place. For instance, with the respondents not having the desire to disclose their identities, a lot of consideration was put in place to assure anonymity of the research respondents. To achieve this, it was not necessary for the responders to provide their names while filling the questionnaire. The study also used the introduction letter from KU and the study permit from NACOSTI to the heads of schools. These letters were then used to secure consent from the schools for the administration to allow students involvement in the study. The study significance was also communicated to the respondents. Respondents were not coerced to participate as an informed consent was sought from them. The collected information was held and kept confidential for the objective of this study only.

CHAPTER FOUR

REPORTING OF FINDINGS, INTERPRETATION AND DISCUSSION

4.1 Introduction

The section summarized the findings of collected data, analysis and results thereof. There was submission of the findings discussions. This section presents the findings based on the study's objectives. Frequency distributions, percentages, mean and standard deviations were used in summarizing findings which were then presented in charts, graphs and tables.

4.2 Response Rate

The study distributed 144 questionnaires to targeted respondents that were HoDs (8), teachers (8) and form two students (128). However, 95 students participated in the study. Besides, the study also managed to interview 6 principals out of the targeted number of 8 principals, and an education quality assurance officer. The results were as shown in table 4.1 below.

Table 4.1: Response Rate

Respondents	Response Rate (%)
Heads of departments	100.0
Teachers	100.0
Students	74.5

Source: Field Data

The HoDs and teachers response rate was100% from the questionnaire and only 74.5% from the students. These rates were admissible according to the argument by Mugenda and Mugenda (2012), who argued that a response rate of less than 50% is considered inadequate between 50% and 60% adequate; while above 70% very adequate.

4.3 Objective 1: Identify the Types of ICTs Being Used in Teaching and Learning of Internal Land Forming Processes

This data was taken from questionnaires availed to the HoDs, teachers of geography and students, through interviews undertaken from the principals and the QASO, and through observation. Quantitative data analysis was by use of SPSS. Presentation was through means and standard deviation. The decision criterion based on the mean was such that: 1-1.4 = Strongly Agree; 1.5-2.4 = Agree; 2.5-3.4 = Disagree; > 3.5= Strongly Disagree. Decision criterion on the standard deviation was such that, a value of less than 1 implied a less variation in the responses, and vice-versa. On the other hand, the qualitative data was interpreted then presented in summary.

4.3.1 Geography Teachers' Response on Types of ICTs Integrated

On ICTs types used responses were captured using the scale the 1=Strongly Agree, 2=Agree, 3=Disagree, 4=Strongly Disagree and the results presented in table 4.2 below.

Table 4.2: Geography Teachers' Response on Types of ICTs Integrated

Aspects	SA	A	D	SD	Mean	Std. Dev
The school has a computer laboratory that is well equipped with internet enabled computers.	1(12.5)	3(37.5)	2(25.0)	2(25.0)	2.63	1.06
The school has a television used for Learning	2(25.0)	3(37.5)	2(25.0)	1(12.5)	2.25	1.04
The school has a radio used for learning	3(37.5)	3(37.5)	1(12.5)	1(12.5)	2.00	1.07
The school has a projector	1(12.5)	1(12.5)	3(37.5)	3(37.5)	3.00	1.07
The Geography teachers are provided with laptops	0(0.0)	1(12.5)	5(62.5)	2(25.0)	3.13	0.64
The school has smart boards	2(25.0)	0(0.0)	3(37.5)	3(37.5)	2.88	1.25
The school has ICT software	1(12.5)	1(12.5)	5(62.5)	1(12.5)	2.75	0.89

Source: Field Data; **n=8**

In response to the statement of the schools having a computer laboratory well equipped with internet enabled computers, 1(12.5%) of the respondents strongly agreed, 3(37.5%) agreed, while 2(25%) strongly disagreed and disagreed respectively. The mean and the sd (2.63, 1.06) indicates that most respondents did not agree with the schools computer laboratories as being equipped with internet enabled computers.

Among the 8 respondents, 2(25.0%) strongly agreed, 3(37.5%) agreed, 2(12.5%) disagreed while only 1(12.5%) strongly disagreed w. The mean and the sd (2.25, 1.04) shows that most respondents were in agreement.

As for the radio, the results revealed that the schools had a radio being used for learning, 3(37.5%) strongly agreed, 3(37.5%) agreed while 1(1.25%) strongly disagreed and 1(1.25%) disagreed. The mean and the sd (2.00, 1.17) shows

that most members agreed.

On whether schools have a projector, 1(1.25%) of the respondents strongly agreed,

1(1.25%) agreed while 3(37.5%) strongly disagreed and 3(37.5%) disagreed. The mean and the sd (3.00, 1.07) shows that mostmembers disagreed.

As to whether Geography teachers are provided with laptops, 1(12.5%) agreed, 5(62.5%) strongly disagreed while 2(25%) disagreed. The mean and the sd (3.13, 0.64) shows disagreement. On whether schools had smart boards, 2(25%) of the respondents strongly agreed, none agreed while 3(37.5%) strongly disagreed and the same number also disagreed. The mean and the sd (2.88,1.25) shows disagreement.

As pertains ICT software, 1(12.5%) of the respondents both strongly agreed and same number agreed while 5(62.5%) strongly disagreed and 1(12.5%) disagreed. The mean and the sd (2.75,0.89) shows that most of the respondents disagreed. The findings therefore indicated that television and radio were the most available ICTs.

4.3.2 Students Response on Types of ICTs Integrated

Table 4.3 is a summary on types of ICTs being used with respondents being students. The responses were captured using the scale the 1=Strongly Agree, 2=Agree, 3=Disagree, 4=Strongly Disagree.

Table 4.3: Response by Students' on Types of ICTs Integrated

Aspects	SA	A	D	SD	Mean	Std. Dev
The school has a computer laboratory that is well equipped with internet enabled computers.	7(7.4)	16(1.8)	53(55.8)	19(20.0)	2.88	0.89
The school has a television used for learning	15(15.8)	52(54.7)	15(15.8)	13(13.7)	2.27	0.88
The school has a radio used for learning	22(23.2)	57(60.0)	10(10.5)	6(6.3)	2.00	0.77
The school has a projector	3(3.2)	13(13.7)	53(55.8)	26(27.4)	3.07	0.69
The geography teachers are provided with laptops	2(2.1)	4(4.2)	70(73.7)	19(20.0)	3.12	0.51
The school has smart boards	4(4.2)	22(23.2)	52(54.7)	17(17.9)	2.86	0.73
The school has ICT software	6(6.3)	21(22.1)	49(51.6)	19(20.0)	2.85	0.79

Source: Field Data; n=95

In response to the statement that the school has computer laboratories with internet enabled computers, 7(7.4%) of the respondents strongly agreed, 16(16.8%) agreed, 53(55.8%) stronglydisagreed while 19(20.0%). The mean and the sd (2.88, 0.89) showed majority did not agree.

Pertaining whether there is a television for learning, out of the 95 respondents, 15(15.8%) strongly agreed, 52(54.7%) agreed, 15(15.8%) disagreed while only 13(13.7%) strongly disagreed depicting most agreed television being used to learn (mean 2.27, sd 0.88).

On the use of the radio for learning, 22(23.2%) of the respondents strongly agreed, 57(60.0%) agreed, 10(10.53%) strongly disagreed while 6(6.3%) disagreed. The mean and the Sd (2.00, 0.77) shows majority agreed. As whether the school has aprojector,

3(3.2%) of the respondents strongly agreed, 13(13.7%) agreed, 53(55.8%) strongly disagreed while 26(27.4%) disagreed. The mean and sd (3.07, 0.69) depicted disagreement. The statement as to whether Geography teachers are provided with laptops, 2(2.1%) strongly agreed, 4(4.2%) agreed, 70(73.7%)disagreed while 19(20.0%) disagreed strongly. The mean and the sd (3.12, 0.51) shows majority did not agree.

On schools having smart boards, 4(4.2%) strongly agreed, 22(23.6%) agreed, 52(54.7%) strongly disagreed while 17(17.9%) disagreed. The mean and the sd (2.86, 0.73) indicated that the majority of responders disagreed with the assertion. Pertaining the school having ICT software, 6(6.3%) of the respondents strongly agreed, 21(22.1%) agreed, 49(51.6%) strongly disagreed while 19(20.0%) disagreed. The mean and the sd (2.85, 0.79) indicated that the majority of responders disagreed with the assertion.

4.3.3 HoDs' Response on Types of ICTs Integrated

The HODs Response on the listed types of ICTs being used in teaching and learning of Internal Land Forming Processes was sought and their responses were captured using the scale; 1for agreeing strongly, 2 for Agree, 3 for Disagree, 4 disagreeing strongly a presented in table 4.4.

Table 4.4: HoDs' Response on Types of ICTs Integrated

Aspects	SA	A	D	SD	Mean	Std. Dev
The school has a computer laboratory that is well equipped with internet enabled computers.	1(12.5)	1(12.5)	1(12.5)	5(62.5)	3.25	1.16
The school has a television used for Learning	2(25.0)	2(25.0)	3(37.5)	1(12.5)	2.38	1.06
The school has a radio used for Learning	2(25.0)	3(37.5)	2(25.0)	1(12.5)	2.25	1.04
The school has a projector	1(12.5)	1(12.5)	3(37.5)	3(37.5)	2.88	1.13
The teachers are provided with Laptops	1(12.5)	1(12.5)	1(12.5)	5(62.5)	3.25	1.16
The school has smart boards	1(12.5)	2(25.0)	3(37.5)	2(25.0)	2.75	1.04
The school has ICT software	1(12.5)	2(25.0)	3(37.5)	2(25.0)	2.75	1.04
Teachers have internet enabled mobile phones	7(87.5)	1(12.5)	0(0.0)	0(0.0)	1.13	0.35

Source: Field Data; **n=8**

Findings indicated (1,12.5%) agreed strongly and the same number strongly disagreed with schools having laboratories well equipped with internet enabled computers. However, 5(62.5%) disagreed. The mean and the sd (3.25, 1.16) depicted disagreement.

As pertains the school having a television for learning, 2(25%) agreed strongly and the same number agreed. 3(37.5%) strongly disagreed while 1(12.5%) disagreed. The mean and the sd (2.38, 1.06) were an indication of agreement with the assertion.

On radio being used for learning, 2(25%) agreed strongly, 3(37.5%) agreed, 2(25%) strongly disagreed while 1(12.5%) disagreed. Mean and the sd (2.25, 1.04) indicated agreement with the assertion.

As pertains owning a projector, 1(12.5%) agreed strongly and agreed respectively while 3(37.5%) stronglydisagreed and disagreed respectively. The mean and the sd (2.88, 1.13) indicated disagreement by the responders.

As to whether Geography teachers are provided with the laptops, 1(12.5%) of the respondents both agreed strongly, agreed and disagreed strongly, while, 5(62.5%) disagreed. The mean and the sd (3.25, 1.16) indicated disagreement by most responders.

As to whether the school has smart boards, 1(12.5%) agreed strongly, (2,25%) agreed, (3,37.5%) disagreed strongly while 2(25%) disagreed. The mean and the sd (2.75,1.04) indicated that the majority of responders disagreed with the assertion.

On schools having ICT software, 1(12.5%) agreed strongly, 2(25%) agreed, 3(37.5%) strongly disagreed while 2(25%) disagreed. The mean and the sd (2.75, 1.04) indicated that the majority of responders disagreed with the assertion.

On whether the teachers had internet enabled mobile phones, 7(87.5%) agreed strongly, and 1(12.5%) did agree. The mean and the sd (1.13,0.35) indicated that the responders agreed with the assertion. The results demonstrated that every respondent's opinions were in agreement.

In response to theopen-ended questions in the questionnaires concerning other ICT types used, students pointed out use of compact discs, flash discs and white boards. The teachers pointed out the use of modems, graphics, compact discs, flash discs, ipads and mobile phones that they used for saving of downloaded video clips for later use in the classrooms. The HODs listed compact discs, flash discs, modems and use of graphics.

Furthermore, the study observed that all the schools within the county had at least a computer with some sort of internet enablement, including modems and Wi-Fi. Other ICTs devices that were common in nearly all the schools were televisions and radios. On the other hand, the HoDs, principals and teachers rely heavily on their internet enabled phones, where they download video clips for later use, or use You-tube video clips

directlyto effectively teach and facilitate learning of the Internal Land Forming Processes.

The study also observed that in 3 schools, 3 teachers taught the processes of crustal earth movements, folding, faulting and volcanicity and their resultant features using videos. It was observed that 2 teacher used compact discs and played the video via the television while 1 used her laptops using YouTube downloaded videos. 1n 2 schools, 2 teachers projected videos on the formation of the Rift Valley and occurrence of the earthquake. In 2 schools, teachers usedpictures that denoted the folding process, a few resultant features of folding such as escarpments, depressions and ridges and valleys. Other pictures included those relating to faulting, types of faults, Block Mountains and the formation of the rift valley.

In 3 schools where ICTs was integrated, the learners were interested and concentrated more. When teachers paused videos for explanations, learners asked questions, which indicated active participation and interaction. This observation agreed with the conclusions of Souls (2005) who asserted that utilizing visual teaching methods enhance participation of learners. In addition, Coxet al. (2010) also found out that when ICT was used, it made lessons more interesting, more enjoyable, fun, and diverse and improved presentation. In 1 school where the teacher did not integrate ICTs, the study was interested to know the reason. The teacher pointed out unpreparedness in terms of skills.

However, it was observed that in all schools, most of the computers were mainly used for administrative purposes. They were in the principal's and bursar's offices, thus, teachers accessto them was not guaranteed. The internet service was mainly through the modems or teachers own purchased internet bundles. Only 2 schools had the Wi-Fi service

installed. Further, the existing documents in schools showed different types of ICTs acquired by the schools from various sources. The study however established that the availability and accessibility varied from school to school. Such included computers and projectors.

Jacob (2023), argued that globally, ICT materials necessary for geographical teaching include scientific calculators, computers, mobile phones, audio devices such as radios and blue-tooth speakers, internet, audio visual devices such as the television, projectors and magnetic compasses. On the other hand, Yambo (2012) posited that learning resources are viewed to be significant, even in developing regions such as Africa. As a result, to promote greater quality and enhanced performance, each educational institution should make an effort to implement them for the benefit of both instructors and students. Besides, the results affirmed the arguments by Laari (2013) who pointed out that most institutions in Kenya lack variety, with reference to the types of ICTs Integrated, and further asserted that the learning institutions operate with only the basic ICT equipment.

ICT equipment such as well-equipped and internet enabled computer laboratory, projectors, laptops for the teachers and smart boardsare unavailable in most of the schools within the county. Such sentiments were also raised by Kanorio (2015) who argued that while developed economies are benefitting from the implementation of ICTs in their educational system, while developing economies still base their student-teacher interaction on a face-to-face engagement.

It was clear that most ICT equipment for instructing Internal Land-Forming Process were not available. Where present, their accessibility remained a challenge, and some were not

in a good state, hence, they could not be utilized.

4.4 Objective 2: Establish Factors Influencing the Integration of ICTs in the Teaching and Learning of Geographical Internal Land Forming Processes.

Questionnaires administered to the HoDs, geography teachers and students collected this data, interviews undertaken with the principals and the QASO and through observation. SPSS analysed the quantitative data. Presentation was through means together with standard deviation. The decision criterion based on the mean was such that: 1-1.4 for Agreeing Strongly; 1.5-2.4 for Agreeing; 2.5-3.4 for Disagreeing; > 3.5 for Disagreeing Strongly. Decision criterion on the standard deviation was such that a value of less than 1 implied a less variation in the responses and vice-versa. On the other hand, the qualitative data was interpreted then presented in summary.

4.4.1 Geography Teachers' Response on Factors Influencing the Integration of ICTs

Teachers' responses on factors are as discussed below. The scale used was 1 for Agreeing strongly, 2 for Agreeing, 3 for Disagreeing, and 4 for Strongly Disagreeing.

Table 4.5: Geography Teachers' Response on Factors Influencing the Integration ofICT

Aspects	SA	A	D	SD	Mean	Std. Dev
Geography teachers are aware of some of the ICTs used in the teaching and learning of Geographical Internal Land Forming-Processes in schools.	3(37.5)	2(25.0)	2(25.0)	1(12.5)	2.13	1.13
Geography teachers and have basic ICT skills on Internal Land-Forming Processes in school.	2(25.0)	4(50.0)	1(12.5)	1(12.5)	2.13	0.99
Geography teachers confidently using ICTs in instructing o f Geographical Internal Land-Forming Processes in schools.	1(12.5)	5(62.5)	1(12.5)	1(12.5)	2.25	0.89
The attitude of geography teachers is positive towards ICTs in Geographical Internal Land Forming Processes in schools.	4(50.0)	2(25.0)	1(12.5)	1(12.5)	1.88	1.13
Geography teachers are willing to Integrate ICTs in PhysicalGeography learning.	4(50.0)	2(25.0)	1(12.5)	1(12.5)	1.88	1.13
Geography teachers lack technical and and face financial problems usage of ICTs integration in education	2(25.0)	3(37.5)	2(25.0)	1(12.5)	2.25	1.04

Source: Field Data; n=8

The response on the Geography teachers being aware of the ICTs showed that, 3(37.5%) agreeing strongly, 2(25%) agreeing, while 2(25%) disagreed and 1(2.5%) disagreeing strongly. The mean and the sd, (2.13,1.13) depicted awareness by a great number.

As pertains Geography teachers having basic ICT skills, 2(25%) of the respondents strongly agreed, 4(50%) were in agreement, 1(12.5%) did not agree and the same number disagreed strongly. From mean and sd (2.13,0.99), it was clear that most Geography

teachers have basic ICT skills.

On whether Geography teachers are confident when using ICTs, 1(12.5%) of the respondents strongly agreed, 5(62.5%) agreed while 1(12.5%) did not agree and the same number disagreed strongly respectively. A mean and sd (2.25,0.89) demonstrated that those who responded approved of the assertion.

On teachers having a positive attitude of ICTs integration, 4(50%) of the respondents strongly agreed, 2(25%) agreed, 1(12.5%) disagreed and strongly disagreedrespectively. The mean and the sd (1.88, 1.13) indicated that the majority of responders agreed with the assertion.

As pertaining to teachers' willingness to integrate ICTs, 4(50%) of the respondents strongly agreed, 2(25%) agreed while those that disagreed were1(12.5%) and those who disagreed were the same number. The mean and sd (1.88, 1.33) showed agreement by most responders.

On Geography teachers lacking support in finances and technical issues, 2(25%) of the respondents agreed strongly, 3(37.5%) were found to agreed, 2(25%) were found to while 1(12.5%) disagreed strongly. A mean and sd (2.25, 1.04) depicted agreemen with the assertion.

4.4.2 Geography Students' Response on Factors Influencing the Integration of ICTs

The participants were requested to provide their thoughts on certain aspects relating to factors that influencing use in Geographical Internal Land-Forming Processes in their schools. The responses were captured on a scale of 1 for Strongly Agree, 2 for Agreeing, 3 for Disagreeing, and 4 for Strongly Disagreeing. The summary is as presented below:

Table 4.6: Students' Response on Factors Influencing the Integration of ICTs

Aspects	SA	A	D	SD	Mean	Std.Dev
Geography students are aware of some of the ICTs used in the learning of Internal Land Forming Processes in schools.	17(17.9)	49(51.6)	21(22.1)	8(8.4)	2.21	0.89
Geography students have basic ICT skills in Internal Land-Forming Processes in school.	34(35.8)	52(54.7)	6(6.3)	3(3.2)	1.77	0.63
Geography students are confident when using ICTs in the learning of Internal Land Forming Processes in schools.	7(7.4)	20(21.1)	55(57.9)	13(13.7)	2.78	0.78

Source: Field Data; **n=95**

The response on the Geography students being aware of the ICTs showed that, 17(17.9%) agreed strongly, 49(51.6%) were in agreement, 21(22.1%) did not agree while 8(8.4%) disagreed strongly. A mean and sd, (2.21, 0.89) indicated agreement with the assertion.

As pertaining to Geography students having basic ICT skills on the use of ICTs, 34(35.8%) agreed, 52(54.7%) agreed, 6(6.3%) did not agree while 3(3.2%) strongly disagreed. The mean and the sd (1.77, 0.88) showed agreement by a majority with the assertion.

Pertaining Geography students confidence when using ICTs, 7(7.4%) agreed strongly, 20(21.1%) did agree, 55(57.9%) disagreed while 13(13.7%) strongly disagreed. The mean and the sd (2.78, 0.77) showed disagreement by responders on this factor.

4.4.3 HoDs' Response on Factors Influencing the Integration of ICTs

The HODs responses are as discussed in table 4.7 below. These responses were captured using the scale the 1 for Strongly Agree, 2 for Agreeing, 3 for Disagreeing and 4 for Strongly Disagreeing.

Table 4.7: HoDs' Response on Factors Influencing the Integration of ICTs

Aspects	SA	A	D	SD	Mean	Std. Dev
Geography teachers are aware of some of the ICTs used in the teaching and learning of Geographical Internal Land FormingProcesses in schools.	3(37.5)	3(37.5)	1(12.5)	1(12.5)	2.00	1.07
Geography teachers have basic ICT skills on the utilization of ICTs in teaching of Internal Land Forming Processes in school.	4(50.0)	2(25.0)	1(12.5)	1(12.5)	1.88	1.13
Geography teachers are competent in utilizing ICTs in teaching Internal Land Forming Processes in schools.	1(12.5)	5(62.5)	1(12.5)	1(12.5)	2.25	0.89
Geography teachers are confident when utilizing ICTs in the teaching of Internal Land Forming Processes in schools.	1(12.5)	5(62.5)	2(25.0)	0(0.0)	2.13	0.64
Geography teachers are positive towards integrating ICTs when instructing Internal Land Forming Processes in schools.	2(25.0)	4(50.0)	1(12.5)	1(12.5)	2.13	0.99

Source: Field Data; **n=8**

3(37.5%) of the responders both agreed and the same number strongly agreed with Geography teachers being aware of some of the ICTs for instructing Geographical Internal Land Forming Processes, while 1(12.5%) did not agreed and the same number disagreed strongly. A mean and sd, (2.00, 1.07) meant that most respondents agreed with the statement.

Pertaining teachers having basic ICT skills on the use of ICTs 4(50%) of the respondents strongly agreed, with 2(25%) agreeing while 1(12.5%) did not agreed and the same number disagreed strongly. A mean and the sd (1.88, 1.13) was an indication of agreement of the same.

On whether Geography teachers are competent in using ICTs 1(12.5%) agreed, while 5(62.5%) agreed strongly, and 1(12.5%) both disagreed and disagreed strongly. A mean and sd (2.25, 0.89) was an indication of agreement with the assertion. As pertains Geography teachers being confident when using ICTs, (1,12.5%) of the respondents agreed, (5,62.5%) agreed while (2,25%) strongly disagreed. The mean and the sd, (2.13,0.64) are an indication of agreement with the assertion.

As whether Geography teachers have a positive attitude of integrating ICTs, 2(25%) of the respondents strongly agreed, 4(50%) agreed, while 1(12.5%) did not agree and the same number disagreed strongly. The mean and the sd (2.13, 0.99) depicted agreement with the same.

All respondents agreed they were aware of some of the ICTs used in teaching Internal Land Forming Process and of having some basic ICT skills in ICT integration. Despite being aware of and having some basic computer skills in this digital era, learners felt they were not confident and effective in integration of ICTs. More exposure would improve and boost their confidence levels and effectiveness.

The teachers agreed that they were confident and had positive attitude in integrating ICTs and thiswas confirmed by the HODs. The HODs affirmed that the teachers were confident, had positive attitude and also competent in ICTs integration. These results point out that most teacher and student factors were in place in most schools. If the school and government factor-in support for Geography teachers, both technical and financial, the integration levels would improve significantly.

Interview results from 6 principals and 1 education officer on their opinion towards the

factors influencing integration of ICTs, pointed out several aspects affecting use of ICTs in instructing Internal Land-Forming Processes. For instance, one principal stated that teacher preparedness and willingness, schools' infrastructures, and government policy were some factors that greatly implicating use of ICTs in most of their schools. Another highlighted willingness of teachers in embracing ICTs in schools would greatly impact the ICT integration process. In support of this assertions, another noted that teachers attitude towards the integration of ICTs is a critical factor to be considered.

On the other hand, the education officer asserted that although some ICTs were available, in schools, their integration levels is low as the school ICT policy is just a rubber stamp on paper and not being strictly adhered to. He further said that if all the education stakeholders embraced the ICT policy in schools, then schools would produce citizens with 21st-century skills. Another principal added that students' ICT competency to a degree impacts the integration process.

Affirming these findings, Nangue (2011) pointed out the need for students mostly within the developing economies to possess basic ICT skills.The findings were also affirmed by Balanskat, Blamire & Kefalla (2007) who pointed out the factors influencing ICT integration as teacher, school and/or system levels. Demici (2009) undertook a research on tutors' Response towards the utilization of GIS in Turkey. Data was collected via means of questionnaire. The research indicated that though challenges that included, insufficient hardware and software, tutors' rightful response to GIS was influential use of GIS into geographical classes. However, Kidombo et al. (2012) affirmed that the competence hence confidence in the utilization of ICT in learning in Kenya is on the

increase.

Students in Chuka Sub-County, Tharaka Nithi County were not confident and thus not effective when integrating ICTs. More exposure to the ICTs was necessary. It was evident from the results of the research that most of the teacher factors were in place. However, the student's factors such as preparedness and the schools' factors such as technical support needed to be improved. There was also the need to lay more emphasis on implementation of the National ICT policy.

4.5 Objective 3: Examine the Extent to which ICT Tools are Being used in Teaching and Learning of Internal Land Forming Processes.

The data on this was gathered by use of HoDs, Geography teachers and students questionnaires, interviewing principals and the QASO and through observation. The decision criterion based on the mean was such that: 1-1.4 for Strongly Agree; 1.5-2.4 for Agree; 2.5-3.4 for Disagree; and > 3.5 for Strongly Disagree. Decision criterion on the standard deviation was such that a value of less than 1 implied a less variation in the responses and vice-versa. On the other hand, the qualitative data was interpreted then presented in summary.

4.5.1 Geography Teachers' Response on Extent of Integration of ICTs

Teachers of Geography gave feedback on their opinion pertaining various aspects relating tothe extent of use of ICTs in their various schools as summarized below. Their responses were captured using the scale the 1for Strongly Agree, 2 for Agree, 3 for Disagree, and 4 for Strongly Disagree.

Table 4.8: Geography Teachers' Response on Extent of Using ICTs

Aspects	SA	A	D	SD	Mean	Std. Dev
The Geography teachers are utilizing all ICT that can be found for instructing Geographical Internal Land Forming Processes in schools.	1(12.5)	0(0.0)	3(37.5)	4(50.0)	3.38	0.74
Geography students are utilizing all the available ICT infrastructure in the teaching and learning of Geographical Internal Land Forming Processes in schools.	3(37.5)	2(25.0)	2(25.0)	1(12.5)	2.13	1.13
Teachers use computers to prepare power point presentations, written exams, reading emails and news.	3(37.5)	4(50.0)	1(12.5)	0(0.0)	1.75	0.71
Teachers often use additional materials from ICTs to explain the lessons	1(12.5)	2(25.0)	2(25.0)	3(37.5)	2.88	1.13
Teachers often recommend students to search some content using ICTs	1(12.5)	1(12.5)	3(37.5)	3(37.5)	3.00	1.07
There is great use of ICTs in instructing Geographical Internal Land-Forming Processes	0(0.0)	1(12.5)	4(50.0)	3(37.5)	3.25	0.71
The school has computer laboratory technician that assist the teachers and students when need arises when integrating ICTs	1(12.5)	4(50.0)	2(25.0)	1(12.5)	2.38	0.92
Geography teachers use audiovisuals in teaching on Internal Land Forming Processes	0(0.0)	1(12.5)	2(25.0)	5(37.5)	3.50	0.76

Source: Field Data; n=8

On the statements that the Geography teachers are utilizing all the available ICT infrastructure in the teaching and learning of Geographical Internal Land-Forming Processes in schools; 1(12.5%) of the respondents strongly agreed, 3(37.5%) disagreed while 4(50%) strongly disagreed. The mean and the sd (3.38, 0.74) meant that most responders did not agree with this.

As to if students of Geography are utilizing all the available ICT infrastructure 3(37.5%)

of the respondents agreed strongly, while 2(25%) agreed, 2(25%) did not agree and1(12.5%) disagreed strongly. A mean and the sd (2.13,1.13) portrayed agreement.

As pertains whether teachers use computers to prepare power-point presentations, written exams, reading emails and news 3(37.5%) agreed strongly, with 4(50%) agreeing while 1(12.5%) disagreed strongly. A mean and the sd (1.75,0.71) was an indication of agreement to the assertion.

On whether teachers often use additional materials from ICTs to explain the lessons, 3(37.5%) agreed strongly and a similar percentage also agreed, 2(25%) disagreed while none strongly disagreed. The mean and sd (1.9, 0.78) meant most respondents did not agree with the statement.

On whether teachers often recommend students to search some content using ICTs, 1(12.5%) agreed strongly and the same number agreed. 3(37.5%) did not agreed and the same number disagreed strongly. The mean and the sd (3.00,1.07) meant disagreement with the same. This implied that most of the available ICTs in the schools are under-utilized in teaching and learning Geography.

As whether ICTs there is great use of ICTs in instructing Geographical Internal Land-Forming Processes, 1(12.5%) of the respondents agreed, 4(50%) disagreed while 3(37.5%) strongly disagreed. The mean and the sd (3.25, 0.71) meant that most respondents were not in agreement with the statement. This meant that despite the availability of some ICTs, they were not greatly used. This was confirmed by the observation checklist.

On whether the school has computer laboratory technician that assist the teachers and students when need arises when integrating ICTs, 1(12.5%) of the respondents agreed strongly, moreso 4(50%) agreed, while 2(25%) disagreed and 1(12.5%) disagree strongly. The mean and the sd (2.38, 0.92) showed that most respondents agreed.

As to whether Geography teachers often use audiovisuals in teaching on Internal Land Forming Processes, 1(12.5%) of the respondents agreed, while 2(25%) did not agreed and5(62.5%) disagreed strongly. Amean and the sd (3.63, 0.52) showed that most respondents did not agree withthe statement. This meant that ICTs could be available but their usage was not guaranteed.

4.5.2 Students' Response on Extent of Integration of ICTs

The opinion of students was as summarized below. Their responses were captured using the scale used was 1 for Strongly Agree, 2 for Agree, 3 for Disagree and 4 for Strongly Disagree.

Table 4.9: Students' Response on Extent of Using ICTs

Aspects	SA	A	D	SD	Mean	Std. Dev
The Geography teachers are utilizing ICTs that can be found for instructing geographical Internal Land-Forming Processes inschools.	3(3.2)	13(13.7)	43(45.3)	36(37.9)	3.18	0.73
Geography students are utilizing all the available ICT infrastructure in learning of Internal Land Forming Processes in schools.	31(32.6)	49(51.6)	6(6.3)	9(9.5)	1.93	0.77
Teachers often recommend students to search some content using ICTs.	44(46.3)	28(29.5)	16(16.8)	7(7.4)	1.85	0.91
Geography students can easily access Internal Land Forming Processes in online information from the internet enabled computers	5(5.3)	5(5.3)	32(33.7)	53(55.8)	3.40	0.84
ICTs are greatly used in learning of Internal Land Forming Processes	5(5.3)	5(5.3)	33(34.7)	52(54.7)	3.39	0.83
The school has computer laboratory technician that assist the teachers and students when need arises when integrating ICTs	31(32.6)	35(36.8)	18(18.9)	11(11.6)	2.09	0.90
Geography teachers use audiovisuals in teaching on Internal Land Forming Processes	7(7.4)	7(7.4)	36(37.9)	45(47.4)	3.25	0.95

Source: Field Data; n=95

On the statement whether the Geography teachers are utilizing all the available ICT infrastructure ,3(3.2%) agreed strongly, while 13(13.7%) agreed, also 43(45.3%) did not agreed and 36(37.9%) strongly strongly . The mean and the sd (3.18, 0.73) meant that most responders disagreed with this assertion.

On Geography students utilizing all the available ICT infrastructure, 31(32.6%) strongly agreed, 49(51.6%) agreed, 6(6.3%) did not agree while 9(9.5%) disagreed strongly. The mean and the sd (1.93, 0.77) meant that most responders agreed with the point.

On whether teachers often recommend students to search some content using ICTs,

44(46.3%) strongly agreed, 28(29.5%) agreed, 16(16.8%) disagreed while 7(7.4%) strongly disagreed. The mean the sd (1.85, 0.91) indicated agreement with the point.

On ICTs being greatly used in the teaching and learning of Geographical Internal Land Forming Processes, 5(5.3%) of the respondents strongly agreed, 5(5.3%) agreed, 33(34.7%) disagreed while 52(54.7%) strongly disagreed. The mean and the sd (3.39, 0.83) meant that most responders did not agree with the point.

On whether a school has computer laboratory technician that assist the teachers and students when need arises when integrating ICTs, 31(32.6%) strongly agreed, 35(36.8%) agreed, 18(18.9%) disagreed, while 11(11.6%) strongly disagreed. The mean and the sd (2.09, 0.90) meant most respondents agreed with the statement.

On the statement, Geography teachers use audiovisuals in teaching on Internal Land Forming Processes, 7(7.4%) of the responders strongly agreed and the same number agreed while 36(37.9%) disagreed and 45(47.4%) strongly disagreed. The mean and the sd (3.25, 0.95) meant that most of the respondents did not agree with the statement.

4.5.3 HoDs' Response on Extent of Integration of ICTs

The HoDs responses to aspects relating to extent of use of ICTs in their various schools were as presented in table 4.10. Their responses were captured using the scale the 1for Strongly Agree, 2 for Agree, 3 for Disagree and 4 for Strongly Disagree.

Table 4.10: HoDs' Response on Extent of Using ICTs

Aspects	SA	A	D	SD	Mean	Std. Dev
The Geography teachers are utilizing all the available ICT infrastructure in the teaching of Internal Land Forming Processes in schools.	1(12.5)	0(0.0)	3(37.5)	4(50.0)	3.25	0.71
Geography students are utilizing ICT that can be found for instructing Internal Land Forming Processes in schools.	2(25.0)	3(37.5)	2(25.0)	1(12.5)	2.25	1.04
Teachers use computers to prepare PowerPoint presentations, written exams, reading emails and news	3(37.5)	4(50.0)	1(12.5)	0(0.0)	1.75	0.71
Geography teachers can easily access Internal Land Forming Processes in school's online information from the internet enabled computers.	1(12.5)	2(25.0)	2(25.0)	3(37.5)	2.88	1.13
Geography students can easily access Internal Land Forming Processes in online information from the internet enabledcomputers	1(12.5)	1(12.5)	3(37.5)	3(37.5)	3.00	1.07
Geography teachers can easily access Internal Land Forming Processes in school'sonline information from the internet enabledmobile phones	3(37.5)	3(37.5)	2(25.0)	0(0.0)	1.88	0.83
ICTs are greatly used in the teaching of Internal Land Forming Processes	0(0.0)	1(12.5)	4(50.0)	3(37.5)	3.25	0.71
The school has computer laboratory technician that assist the teachers and studentswhen need arises when integrating ICTs	1(12.5)	4(50.0)	2(25.0)	1(12.5)	2.38	0.92
Geography teachers use audiovisuals in teaching on Internal Land Forming Processes	0(0.0)	1(12.5)	2(25.0)	5(62.5)	3.50	0.76
ICTs have influenced the understanding ofideas and concepts by Geography teachers	3(37.5)	3(37.5)	1(12.5)	1(12.5)	2.00	1.07
ICTs have influenced the understanding ofideas and concepts by Geography students	1(12.5)	5(62.5)	2(25.0)	0(0.0)	2.13	0.64

Source: Field Data; **n=95**

The frequencies of the responses in table 4.10 revealed that, 1(12.5%) of the respondents strongly agreed, 3(37.5%) did not agree while 4(50%) disagreed strongly with the statement that the Geography teachers utilizing all the available ICT infrastructure in the teaching and learning of Geographical Internal Land Forming Processes in schools. The

mean and the sd (3.25, 0.71) meant that there was no agreement with the assertion.

As whether Geography students are utilizing all ICT that can be found for instructing Geographical Internal Land-Forming Processes in schools, 2(25%) of the respondents agreed strongly, while 3(37.5%) agreed, 2(25%) did not agreed and 1(12.5%) disagreed strongly. A mean and the sd (2.25, 1.04) showed agreement pertaining the assertion.

As to whether teachers use computers to prepare power point presentations, written exams, reading emails and news, 3(37.5%) agreed strongly, while 4(50%) agreed and 1(12.5%) strongly agreed. A mean and sd (1.75,0.71) showed agreement with the notion.

Pertaining teachers often using additional materials from ICTs to explain the lessons, 4(50.0%) of the respondents strongly agreed with the statement, 3(37.5%) agreed and (12.5%) did not agree. A mean and sd (1.6, 0.70) indicated that most respondents did not agree with the statement.

On whether teachers often recommend students to search some content using ICTs, 3(37.5%) agreed strongly and the same number agreed while 2(25%) agreed with the statement. The mean and sd (1.88, 0.83) meant that most respondents agreed with the statement.

On whether ICTs are greatly used in the teaching and learning of Geographical Internal Land Forming Processes, 1(12.5%) of the respondents agreed, 4(50%) disagreed while 3(37.5%) strongly disagreed. A mean and sd (3.25, 0.71) indicated disagreement with the notion.

On the statement the school has computer laboratory technician that assist the teachers and students when need arises when integrating ICTs, 1(12.5%) of the respondents agreed strongly, 4(50%) agreed, while 2(25%) did not agree and 1(12.5%) disagreed

strongly. A mean and the sd (2.38, 0.92) meant that most respondents agreed with the statement.

As pertains, Geography teachers use audiovisuals in teaching on Internal Land Forming Processes, 1(12.5%) of the respondents agreed, 2(25%) did not agree while 5(62.5%) disagreed strongly. A mean and the sd (3.50, 0.76) meant that most respondents did not agree with the statement.

Pertaining whether ICTs have influenced the understanding of ideas and concepts by Geography teachers, 3(37.5%) agreed strongly and the same number agreed.1 (12.5%) disagreed and the same number disagreed strongly. The mean and the sd (2.00, 1.07) meant agreement with the assertion.

On utilizing all ICTs available, teachers and HODs disagreed confirming that the ICTs could be available but not being fully utilized or utilized at all. However, all the respondents agreed that they utilized all the available ICTs because they followed the instructions given tothem by their teachers.

The respondents also agreed that Physical Geography programs were in place. Respondents disagreed of easy access to online information and this could be because in most schools, computers were mainly administrative hence their access was a challenge. Respondents disagreed that ICTs were greatly used and this confirmed the first statement of utilizing all the available ICTs. Respondents disagreed on using audiovisuals. This confirms that ICTs could be available but not utilized.

On probing why some available ICTs were not being utilized, one teacher from Ikuu Boys pointed out time as a challenge considering how wide the topic was. Another one from Chuka Boys pointed out lack of motivation by the school administration. All the

respondents agreed ICT usage greatly contributes to understanding of concepts.

Results of the interviews in relation to the extent of use of ICTs revealed that ICTs have not to a very great extent been used in Internal Land Forming Processes in the county's secondary schools. Affirming these findings, one of the respondents stated that educational delivery in Kenya, especially in the public sector, is solely based on student-teacher face-to-face contact. He noted that the education sector relies conventional teaching strategies. He also added that across the country, only the basic technologies in teaching and learning have been integrated, though to a very small extent.

Another asserted that ICTs determine understanding of lesson concepts. Another Principal pointed out the need to consider digital migration especially in education sector. Supporting these findings, the education officer stated that the extent of integration of ICTs is poor; hence, all educational stakeholders should support and embrace the ICT policy in schools. He further said that despite the challenge of availability of ICTs, schools should strive to integrate the available ICTs to some considerable extent.

In America ICT and among other developed economies, has been adopted greatly in schools such that one computer are is to ten students, which has greatly and also positively impacted the degree of utilization of ICTs among teachers, besides improving understanding among students through the learning process (Yildrim, 2007). These assertions were also supported by the arguments by Zhao and Cziko (2001) and Miller *et al.,* (2005) specifically pointed out the United Kingdom government that has supplied every nursery school with an electronic whiteboard, thus enhancing the learning and teaching processwithin its institutions.

In line with these findings, there is a lag in use of rising technologies in Kenyans

education sector (Kaweesa, 2002). ICTs in teaching and learning geographical Internal Land Forming Processes is yet to be fully met.

Objective 4: Investigate the Challenges in Integration of ICTs

Data pertaining this objective was collected through questionnaires, interviews and observation. Mean and standard deviation was used to present the data after analysis using SPSS software. The decision criterion based on the mean was such that: 1-1.4 for Strongly Agree; 1.5-2.4 for Agree; 2.5-3.4 for Disagree; and > 3.5 for Strongly Disagree. The decision criterion on the standard deviation was such that a value of less than 1 implied a less variation in the responses and vice-versa. On the other hand, the qualitative data was interpreted then presented in summary.

4.6.1 Geography Teachers' Response on Challenges in Integrating ICTs

The Geography Teachers were requested to give feedback on their opinion pertaining various aspects relating to challenges in the integration of ICTs at their institutional level. Their responses were analysed and presented in table 4.11 below. These responses were captured using the scale the 1 for Strongly Agree, 2 for Agree, 3 for Disagree and 4 for Strongly Disagree.

Table 4.11: Geography Teachers' Response on Challenges in Integrating ICTs

Aspects	SA	A	D	SD	Mean	Std. Dev
Inadequate ICT infrastructure derails provision of cost-effective ICT servicesin the school.	5(62.5)	3(37.5)	0(0.0)	0(0.0)	1.38	0.52
There is frequent power interruptions in the school.	2(25.0)	3(37.5)	2(25.0)	1(12.5)	2.25	1.04
The costs of internet provision are very high	1(12.5)	2(25.0)	3(37.5)	2(25.0)	2.75	1.04
The costs associated with ICT equipment are very high.	2(25.0)	4(50.0)	1(12.5)	1(12.5)	2.13	0.99
Geography teachers lack technical and financial assistance towards ICTs integration in education	3(37.5)	4(50.0)	1(12.5)	0(0.0)	1.75	0.71
Most Geography teachers lack basicICT skills and knowledge	0(0.0)	1(12.5)	3(37.5)	4(50.0)	3.38	0.74
Geography teachers have inadequate experience in using computers	1(12.5)	2(25.0)	4(50.0)	1(12.5)	2.63	0.92
Geography teachers lack coaching opportunities for the adoption of ICTs in the teaching of Internal Land Forming Processes	3(37.5)	4(50.0)	1(12.5)	0(0.0)	1.75	0.71
Poor maintenance is a major challenge faced in the schools.	2(25.0)	3(37.5)	2(25.0)	1(12.5)	2.25	1.04

Source: Field Data; **n=8**

Results in table 4.11 affirmed 5(62.5%) teachers agreed strongly while 3(37.5%) agreed with the statement of infrastructure that is not enough. A mean and sd (1.38, 0.52) meant most respondents agreed with the statement.

Pertaining limited rural electrification and frequent power disruptions in the school, 2(25%) of the respondents agreed strongly, there was 3(37.5%) that agreed, while 2(25%) did not agree while 1(12.5%) disagreed strongly. A mean and sd (2.25, 1.04) showed agreement with the assertion.

On internet connectivity costs being very high, 1(12.5%) teachers agreed strongly, there were 2(25%) that agreed, while 3(37.5%) disagreed and 2(25%) disagreed strongly. Mean and sd (2.75, 2.04) meant that most respondents disagreed with the statement. Pertaining the costs associated with ICT equipment a very high, 2(25%) of the respondents strongly agreed, 4(50%)agreed, while 1(12.5%) disagreed and the same number disagreed strongly respectively. Mean and sd (2.13, 1.04) showed agreement with the assertion. This was a confirmation of what teachers and HODs felt in objective two.

Pertaining Geography teachers having inadequate experience in using computers, 1(12.5%) of the respondents agreed strongly, as well as 2(25%) agreeing, while 4(50%) disagreed and 1(12.5%) disagreed strongly. The mean and the sd (2.63, 0.92) meant most members did not agree with the statement.

On Geography teachers lacking training opportunities ICT use in instructing Geographical Internal Land-Forming Processes, 3(37.5%) of the teachers agreed strongly, while 4(50%) agreed and 1(12.5%) disagreed. The mean and sd (1.75, 0.71) meant many teachers agreed with the notion.

Whether most teachers of Geography are lacking skills and knowledge on ICTs, 1(12.5%) of the teachers agreed, also 3(37.5%) did not agree while 4(50%) disagreed strongly. A mean and sd (3.38,0.74) meant most respondents disagreed with the statement.

On whether poor maintenance is a major challenge in the schools (2, 25%) of the respondents strongly agreed, 3(37.5%) agreed, 2(25%) disagreed while 1(12.5%) strongly disagreed. The mean and sd (2.25, 1.04) meant that most respondents agreed with the statement.

4.6.2 Students' Response on Challenges in Integrating ICTs

The students were requested to give feedback on their opinion pertaining various aspects relating to challenges in the integration of ICTs in their various schools. Their responses were captured using the scale the 1for Strongly Agree, 2 for Agree, 3 for Disagree and 4=Strongly Disagree and presentation was as the in table below.

Table 4.12: Students' Response on Challenges in Integrating ICTs

Aspects	SA	A	D	SD	Mean	Std.Dev
Inadequate ICT infrastructure has affected services offered by ICT in the school.	42(44.2)	44(46.3)	6(6.3)	3(3.2)	1.68	0.66
There are frequent power disruptions in the school.	15(15.8)	61(64.2)	14(14.7)	5(5.3)	2.09	0.71
Most Geography students lack basic ICT skills and knowledge	7(7.4)	7(7.4)	20(21.1)	61(64.2)	3.42	0.86
Time is a challenge when using ICTs for Geographical instruction	10(10.5)	14(14.7)	47(49.5)	24(25.3)	2.89	0.93

Source: Field Data; n=95

Pertaining inadequate ICT infrastructure in school 42(44.2%) of the students agreed strongly, also 44(46.3%) agreed, while 6(6.3%) disagreed and 3(3.2%) disagreed strongly. A mean and sd (1.68, 0.66) meant that most students agreed with the statement.

Pertaining frequent power disruptions in the schools, 15(15.8%) students agreed strongly as 61(64.2%) agreed, while 14(14.7%) disagreed and 5(5.3%) disagreed strongly. A mean and sd (2.09, 0.71) meant that most respondents agreed with the statement.

On the statement most Geography students lack ICT skills and knowledge, 7(7.4%) strongly agreed, 7(7.4%) agreed, 20(21.1%) disagreed while 61(64.2%) strongly disagreed. The mean and sd (3.42, 0.86) indicated that most respondents did not agree with the statement.

On there being inadequate time to integrate ICTs 10(10.5%) 0f respondents strongly agreed, 14(14.7%) agreed, 47(49.5%) did not agree while 24(25.3%) disagreed strongly. A mean and sd (2.89, 0.93) meant that most respondents disagreed with the statement. More so, if teachers prepared earlier and well for ICTs lessons, time constrains shouldn't be a factor.

4.6.3 HoDs' Response on Challenges in Integrating ICTs

The HoDs responses were captured using the scale the 1 for Strongly Agree, 2 for Agree, 3 for Disagree and 4 for Strongly Disagree.

Table 4.13: HoDs' Response on Challenges in Integrating ICTs

Aspects	SA	A	D	SD	Mean	Std.Dev
Inadequate ICT systems have restricted the availing of effective and cheap ICT services in the school.	5(62.5)	3(37.5)	0(0.0)	0(0.0)	1.38	0.52
There is constant power interruptions in the school.	2(25.0)	3(37.5)	2(25.0)	1(12.5)	2.25	1.04
The costs of internet provision are very high	0(0.0)	0(0.0)	2(25.0)	6(75.0)	3.75	0.46
The costs associated with ICT equipment are very high.	2(25.0)	4(50.0)	1(12.5)	1(12.5)	2.13	0.99
Geography teachers lack technical and financial support towards ICTs integration in education	0(0.0)	0(0.0)	1(12.5)	7(87.5)	3.88	0.35
Most Geography teachers lack ICTskills and knowledge	0(0.0)	1(12.5)	4(50.0)	3(37.5)	3.25	0.71
Geography teachers have inadequate experience in using computers	0(0.0)	1(12.5)	3(37.5)	4(50.0)	3.38	0.74
Geography teachers lack training opportunities for ICT use in Geographical Internal Land Forming Processes	3(37.5)	4(50.0)	1(12.5)	0(0.0)	1.75	0.71

Source: Field Data; **n=8**

the statement on inadequate ICT infrastructure affecting ICT services in schools showed

that 5(62.5%) of the teachers agreed strongly while the rest 3(37.5%) agreed. The mean and sd (1.38, 0.52) meant that most teachers were in agreement with this assertion.

Concerning unreliable and limited power supply, 2(25%) respondents strongly agreed, moreso 3(37.5%) agreed, 2(25%) did not agree while 1(12.5%) disagreed strongly. The mean and sd (2.25, 1.04) meant many teachers agreed with the assertion. Pertaining the costs of internet provision being very high, 2(25%) of the respondents disagreed while 6(75%) disagreed strongly . The mean and sd (3.75, 0.46) meant most respondents disagreed with the statement.

Pertaining costs associated to ICT equipment being very high 2(25%) of the teachers agreed strongly, while 4(50%) agree and 1(12.5%) disagreed and same number strongly disagreed. A mean and sd (2.13,0.99) meant that most respondents agreed with the statement. The mean and sd (3.88,0.35) meant that most respondents disagreed with the statement. This contradicted the teachers view. The HODs felt that the teachers should strive to financially support themselvestowards self-improvement and empowerment.

Pertaining Most Geography teachers lacking ICT skills and knowledge, 1(12.5%) of the respondents agreed, 4(50%) disagreed while 3(37.5%) strongly disagreed. The mean and sd (3.25, 0.71) meant that most respondents did not agree with the statement. This confirmed the statement in objective two where both teachers and HODs agreed that teachers have basic ICT skills.

On whether Geography teachers have inadequate experience in using computers, 1(12.5%) ofthe respondents agreed, 3(37.5%) disagreed while 4(50%) strongly disagreed. The mean and sd (3.38, 0.74) meant that most respondents disagreed with the statement.

As to whether Geography teachers have inadequate experience in integrating ICTs, 1(12.5%) of the respondents agreed, 3(37.5%) disagreed while 4(50%) strongly disagreed. The mean and sd (3.38, 0.74) meant that most respondents disagreed with the statement.

On whether Geography teachers lack training opportunities ICT use in Geographical Internal Land-Forming Processes, it was clear that 3(37.5%) of the teachers agreed strongly as 4(50%) agreed, while 1(12.5%) of the teachers disagreed. A mean and sd (1.75,0.71) meant that most respondents agreed. This confirmed the teachers view. The MOE should organize in-service training programs for the teachers.

On other challenges as asked in the open-ended questionnaire, the students pointed out limited access to ICTs. The teachers pointed out a lack of clear goal of incorporating technology into Geography pedagogy to support learning. Another concern in some schools was lack of ICT rooms which caused congestion and interruptions during teaching. Old ICTs were also a concern.

Responses to question in the questionnaire that were open ended pointed out the need to have alternatives to internet provision, need for ICT technical support and maintenance contracts in schools. The need for pedagogical support was noted. They also suggested need for laboratories that were specifically designed for ICTs installation and integration, to ease the congestion challenge. They suggested a need for new ICTs in the ICT laboratories.

From the interviews conducted a number of barriers similar to those affirmed by other respondents. The interviewees indicated the key challenges as lack of resources, lack of

sufficient ICT training among teachers and insufficient expertise in using ICT. For instance, one principal argued the main obstacles as inadequate resources and limited training opportunities.

The educational officer, giving his opinion on how the government was involved in solving these challenges, stated that both the central and devolved government of Chuka Sub-County, Tharaka Nithi County are continuously allocating resources to the education sector to bridge the gap of resource limitation in integrating ICT in secondary schools. He added that the Ministry of Education was organizing trainings in ICT to improve teachers' in terms of skill levels and confidence in utilizing ICTs. Additionally, to enhance the implementation of the ICT program throughout the county, most schools have been powered up through the rural electrification program, with the reliability of these power sources still being worked on.

It was observed that the internet connectivity was very unreliable. There were few computers in relation to possible users within each of these institutions. On average, a single computer was perceived to serve 15-20 students. As a result of these resource restriction, it was observed that most of the teachers preferred using their own laptops in schools. All the schools had computers. Compact disks, projectors, smart boards and internet enabled mobile phones were also observed to be so limited in number within these schools. The study observed a total of 42, 11, 14, 3, 4 and 18 compact disks, projectors, smart boards and internet enabled mobile phonesrespectively. The observation results also indicated that 5 schools did not have any compact disk, 1 lacked a projector, while only 4 and 3 schools had smart boards and graphics respectively. These results are summarized in appendix 1F.

In addition, all the schools had an internet connection, an internet enabled phone owned by teachers, and scientific calculators that were mostly owned by the students. Precisely most of these devices were present in national, extra county and county schools with most of the sub- county schools having utmost one or two, or at all lacking any of the items.

In other instances, it was observed that the devices were not in good working condition. The key reason cited forthis was a lack of sufficient resources to purchase or effectively service these items. On the other sides, televisions and radios were however rarely used for teaching and learning, since the timings in Geography programs mostly conflicted with those that run through these platforms.

In general, the study's results on challenges in the adoption of ICTs in tutoring land forming processes were supported, and equally contradicted those by Tella et al. (2007), who pointed out that deficiency in technical support, and teachers' low exposure in using ICT are the main aspects affecting teachers' readiness to and boldness in utilising ICT. Insufficient ICT infrastructure has affected the availing of cost-effective ICT services in the country (MIC, 2006). Several challenges exist that impact the access and utilization of ICT in Kenya that entail; poverty that curtails access to ICT tools, undependable electricity supply. Besides, high cost of internet services, costs related to ICT tools, insufficient infrastructure and support affect the utilization of ICT in the educational system. These results agreed with the assertions made by Khalid (2009), who ascertained that major barriers to ICT implementation in high schools include uncertainty of use, incompetence and insufficient resources.

The study therefore builds on the Everett Roger's theory of Diffusion of Innovations that

centers on the conditions that influence the increase or decrease of fresh concepts, products or practice among persons of a particular cultural system. The theory was useful in this study because it helped in enlightening on a number of aspects; the technological innovation and how it influences integration of technology in schools.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

Finding out extremes of ICTs usage in secondary schools in Chuka Sub-County, Tharaka Nithi County, to teach and learn about internal land formation processes was the main goal of the study. Wrapping it all and comments drawn from the data examined from preceding chapter are essentially in this part. The chapter is broken down into the following subsections: research findings summary, study conclusions, study recommendations, and ideas for additional research.

5.2 Summary of Findings

5.2.1 Identifying ICTs Types used in Teaching and Learning of Internal Land-Forming Processes

Concerning the different ICTs kinds utilized in the Internal Land-Formation processes, the research revealed that the County's schools had access to a variety of ICT resources. Such include internet enabled computers,internet enabled phones, televisions, radios, compact discs, projectors, laptops, tablets and smart boards. The findings further indicated thatall the schools within the county had at least a computer with some sort of internet enablement which include modems and Wi-Fi. Televisions and radios were common ICTs in many schools. On theother hand, a great number of the HoDs, principals and teachers relied heavily on their internet enabled phones where they searched any information needed to enrich their lessons, downloaded video clips for later use, or use of the You Tube video clips directly to effectively teach and facilitate learning of the Internal Land Forming Processes. Compact discs, projectorslaptops and tablets were also used though to a mild extent. Smart boards and were the least available in most of the

schools in the county. Besides, these ICT tools were least utilized in the few schools that they were available. The study also observed that a number of teachers used tablets in accessing information. Internet connectivity included modems and Wi-Fi installations. However, in general, the availability as well as accessibility on the ICTs kinds varied from school to school.

5.2.2 Establish Factors Influencing the Integration of ICTs

The findings about the factors impacting ICT integration validated several crucial elements that shaped the process of ICT take at secondary learning, particularly the context of instructing Geography land-formation processes. Factors such as teachers' knowledge of some ICTs utilised in teaching and learning Geographical Internal Land Forming Processes in schools, teachers' basic ICT skills, teachers' confidence and positive attitude when using ICTs, and teachers' willingness to incorporate ICTs in their teaching of geography are some examples of these factors. In addition, the interview results also pointed out several factors that affecting ICTs usage to learning as well as teaching Geography; sufficient resources availability for the institutions to purchase ICT equipment, sufficient expertise for the successful integration of ICT, students' s as well as teachers preparedness towards ICT usage in instructing internal Land Forming Processes, schools infrastructures and government policy. The results further indicated that teachers' preparedness was in place creating a platform for ICTs integration within schools in the County. However, the findings also demonstrated that students possess rudimentary ICT abilities and are aware of some of the ICTs utilised in their schools to teach Internal-Land Forming Processes. But it was clear that the pupils lacked efficacy and confidence when it came to using ICTs in the classroom. The findings revealed that there was need for more exposure among students about using ICTs for education, so as to improve the learners' attitude and boost their

confidence levels.

5.2.3 Examine the Extent to Which ICTs are integrated

Results on extent showed that Geography teachers and students are not utilizing all the available ICT infrastructure, in the teaching and learning of Geographical Internal-Land Forming Processes in their respective schools of Chuka Sub-County, Tharaka Nithi County. Generally, advanced ICTs such as smart boards are completely not used in most institutions. There were indications that teachers and students of Geography in the County cannot easily access online information on Internal Land-Forming Processes using internet enabled computers due to the unavailable sufficient computers at the schools, and lacking dependable internet connectivity. The findings also affirmed that Computer laboratory technicians were of great importance in institutions that had a bigger spectrum of ICTs.

The results on the interviews in relation to the extent of use of ICTs, also revealed that ICTs have to a very great extent not been integrated within the teaching and learning of Geographical Internal Land-Forming Processes in the County's high schools. The findings affirmed that the educational delivery in Kenya, and mostly in the public sector, is still solely based on student-teacher face-to-face contact despite ICT usage being accepted being main determinant in enhancing understanding lesson concepts, while teaching and learning. It was further observed that despite the availability of ICTs, most were not fully utilized or utilized at all in the teaching and learning. This meant ICT tools were not greatly utilized hence the extent of their implementation in learning and teaching geography land forming processes was still low.

5.2.4 Challenges Experienced in the Integration of ICTs

The findings confirmed several challenges relating to ICTs usage. These included low-quality ICT infrastructure that makes it difficult to provide effective and reasonably priced ICT services in schools, erratic power supplies that frequently cause power outages in the building, extremely high ICT equipment purchase and maintenance costs, uncertain financial and support from technical teams for geography teachers to maintain the integration of ICTs over the long term, and a dearth of opportunities for ICT integration training for geography teachers. The interviews results indicated the key challenges as being lack of resources, lack of sufficient ICT training among teachers, insufficient expertise in integrating ICTs and lack of rooms for ICTs integration.

Besides, the interviews conducted on the principals and the education officer, on challenges in the usage of ICTs in instructing land-forming processes correlated with those results from the analysis, with the questionnaires pointing out a number of barriers similar to those affirmed by the students, teachers and HoDs. The interviewees indicated the key challenges as; lack of resources, lack of sufficient ICT training among teachers and insufficient expertise in using ICT. Through observation, the study identified various challenges in relation to ICTs usage at school level. Such were unreliability on the internet sources. Besides, these schools suffered greatly from a few computers as per number of possible users within each of these institutions. On average, a single computer was perceived to serve 15-20 students.

5.3 Conclusions of the Study

A number of conclusions was made based on study results ;

i. On the ICTs used, it was concluded that all schools within county had at least a

computer with some sort of internet enablement from modems and Wi-Fi. The most common ICTs devices were televisions, radios and internet enabled phones. Other geographically skewed ICTs devices in the schools that were less utilized in teaching and learning land formation processes were observed to include compact disks, projectors and smart boards in some schools. Generally, most of the learning institutions operate with only the basic ICT equipment.

ii. The factors that affected the ICTs usage within theschools included preparedness of students as well as teachers to ICTs integration,financial resources for the schools to purchase ICT equipment, schools infrastructures andgovernment policy

iii. The research also concluded that schools are not utilizing all the available ICT infrastructure. Generally, these findings revealed that ICTs adoption within the learning facilities to facilitate teaching in the county still remains poor.

iv. A number of challenges identified included lack of adequate ICT infrastructure, unreliable power sources, very high costs associated with purchase and maintenance of ICT equipment, inadequate ICT rooms, inadequate finances as well as training.

5.4 Recommendations of the Study

Recommendations made as per the study results were;

5.4.1 Recommendations on ICTs Types

i. All schools within the county should invest on all the necessary ICTs so as to enhance the teaching and learning of Internal Land-Forming processes.

5.4.2 Recommendations on Factors Influencing the Integration of ICTs

i. ICT equipment should not only be made available but also accessible within these institutions.

ii. The government and other relevant education related bodies and stakeholders should develop digital media and distribute it to schools.

iii. Need to come up with technical support centres.

iv. The learning institutions and the central government ought to set aside sufficient finances for the schools to purchase all the necessary ICTs.

5.4.3 Recommendations on the Extent to Which ICTs are integrated

i. This paper recommends that Geography teachers and learners need encouragement in utilizing all the available ICT infrastructures, in the teaching and learning of Geographical Internal Land-Forming Processes in their schools. This should be implemented through availing and ensuring accessibility and dependability of these ICTs within the institutions.

5.4.4 Recommendations on Challenges Experienced in the Integration of ICTs

ii. The paper recommends the need to enhance the reliability of power sources within all schools in the county.

iii. Subsidies should also be offered so as to minimize the very high costs linked with purchase and maintenance of ICT equipment.

iv. Technical and financial support to Geography teachers in the County should be availed by the government and/or the institutions, so as to assure and ensure the long-term sustenance of ICTs integration processes.

v. Training opportunities towards the integration of ICTs should be periodically offered to the Geography teachers in Chuka Sub-County, Tharaka-Nithi County, through

seminars, workshops and conferences to ensure adequate skills and experiences among these teachers.

5.4.5 Recommendations on Further Studies

i. A study can be undertaken in relation ICTs usage on the topic of Minerals and rocks.

ii. A study can be done targeting private schools to assess the degree to which ICTs are employed in learning processes.

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APPENDICES

Appendix 1A: Participant Consent Form

My Name is Mbaka Lenity Karimi. I am pursuing Masters at Kenyatta University. The study I am conducting is on "Integration of Information and Communication Technologies in Teaching and Learning of Internal Land Forming Processes in Secondary Schools in Tharaka-Nithi County, Kenya". The information will be used by the Education ministry and other education stakeholders for improvement of the education qualityin Secondary Schools in Kenya.

Procedures to be followed

It shall be necessary for you to review the questionnaire that you will receive and answer them. Your participation in this research is voluntary.

Benefits

The study will be of use to you as it will open and broaden your scope on the ICTs influencein the ever-changing technological world.

Reward

Lunch will be provided for the participants.

Confidentiality

To ensure anonymity,do not indicate your name. Data will be used as intended and will be kept in a safe database at the Kenyatta University.

Contact Information

In case of any questions, problems or concerns feel free to contact the study before, during and after the research.

Email …… Telephone ……..

Any other concerns about your rights that have not been answered by the study can be directed to;

The Chairperson,

Kenyatta University Ethics Review Committee,P.O, Box 43844, 00100,

Nairobi.

Participant's Statement

I hereby agree willingly participate in the said exercise.

Participant's Name……..

Signature……..Date…….

Investigator's agreement

I have explained to the participant the process that should be followed in the study and the risks andbenefits.

Name of the researcher……..

Signature……Date……

Mbaka Lenity Karimi

Educational Communication and Technology DepartmentKenyatta University

Appendix 1B: Questionnaire for Heads of Department

This document will constitute of questions ranging from those asking general information about yourself to those asking about your knowledge and opinion regarding issues of ICTs integration in the teaching and learning of Geographical Internal Land Forming Processes.

Instructions

Do not disclose your identity.Answer all questions.

Section A:

Types of ICTs Used: Use the Key to tick where appropriate- 1 for SA-Strongly Agree, 2 for A- Agree, 3 for D-Disagree, 4 for SD-Strongly Disagree or Complete the given statement in the space provided.

Serial no.	Statement	SA	A	D	SD
1	There is a computer laboratory that is well equipped with internet enabled computers				
2	The school has a television				
3	The school has a radio				
4	The school has a projector				
5	The geography teachers are provided with Laptops				
6	The school has smart boards				
7	The school has ICT software				
8	Teachers have internet enabled mobile phones				

9) Are there any other types of ICTs used in teaching and learning of Internal Land FormingProcesses ?

…….

……..

Section B:

Teachers' factors and students' factors in integrating ICTs in the teaching and learning of Geographical Internal Land Forming Processes in schools. Use the scale: 1 for SA-Strongly Agree, 2 for A-Agree, 3 for D-Disagree, 4 for SD-Strongly Disagree.

Serial No.	Statement	SA	A	D	SD
10	Geography teachers are aware of some of the ICTs used in the teaching and learning of Geographical Internal Land Forming Processes in schools				
11	Geography teachers and have basic ICT skills on the use of ICTs in teaching and learning of Internal Land Forming Processes in school				
12	Geography teachers are competent in using ICTs in the teaching and learning of Geographical Internal Land Forming Processes in schools				
13	Geography teachers are confident when using ICTs in teaching and learning of Geographical InternalLand - Forming Processes in schools.				
14	Geography teachers have a positive attitude of integrating Internal Land- Forming Processes in schools.				

Section C:

Extent of the usage of ICTs in instructing Geographical Internal Land Forming Processes in schools. Use the scale: 1 for SA-Strongly Agree, 2 for A-Agree, 3 for D- Disagree and 4 for SD-Strongly Disagree.

Serial no	Statement	SA	A	D	SD
15	Teachers of Geography are utilizing all the available ICT infrastructure in the teaching and learning of Geographical Internal Land-Forming Processes in schools				
16	Geography students are utilizing all the available ICT infrastructure in the teaching and learning of Geographical Internal Land-Forming Processes in schools				
17	There is great use of ICTs when teaching Geographical Internal Land- Forming Processes				

18	The school has computer laboratory technician that assist the teachers and students when need arises when integrating ICTs				
19	Geography teachers use audiovisuals in teaching of Internal Land Forming Processes				

Section D:

Challenges experienced when integrating ICTs in the teaching and learning of Geographical Internal Land Forming Processes. Use the scale: 1 for SA-Strongly Agree, 2 for A-Agree, 3 forD- Disagree and 4 for SD-Strongly Disagree.

Serial no.	**Statement**	**SA**	**A**	**D**	**SD**
22	There is inadequate ICT infrastructure in the instotutions				
23	There is unreliable power supply				
24	The costs of internet provision is very high				
25	The costs associated with ICT equipment are very high.				
26	Finances for trainings are not easily availed				
27	Most geography teachers' lack ICT skills and knowledge				
28	Geography teachers have inadequate experience in using Computers				
29	Geography teachers lack training opportunities				

30) List other challenges faced when using ICTs for instructing Internal Land-Forming Processes

…….....

.....……

31) Which solutions would you suggest to solve the mentioned challenges?

……

Thank You

Appendix 1C: Questionnaire for Geography Teachers'
(Please put a tick in the box most appropriate to you, or complete the statement in thespace provided)
Section A:
Types of ICTs Used: Use the key to tick where appropriate- 1 for SA-Strongly Agree, 2 for A-Agree,3 for D-Disagree and 4 for SD-Strongly Disagree or Complete the statement in the space provided

Serial no.	Statement	SA	A	D	SD
1	There is a computer laboratory that is wellequipped with internet enabled computers				
2	The school has television used for learning purposes				
3	The school has a radio for radio lessons				
4	The school has a projector				
5	The Geography teacher is provided with a laptop				
6	The school has smart boards				
7	The school has ICT softwares				

8) Are there any other kinds ICT used in instructing of Internal Land-Forming Processes?

……

Section B:
Factors influencing incorporation of ICTs in instructing Geographical Internal Land-Forming Processes. Use the scale: 1 for SA-Strongly Agree, 2 for A-Agree, 3 for D-Disagree, and 4 for SD-Strongly Disagree.

Serial no.	Statement	SA	A	D	SD
9	There is awareness on some of ICTs by teachers of Geography for Geographical Internal Land-Forming Processes instruction				
10	Geography teachers have basic ICT skills Internal Land-FormingProcesses				
11	Geography teachers are competent using ICTs in the Geographical Internal-Land Forming Processes instruction				
12	Geography teachers are confident when using ICTs instructing Geographical Internal Land-Forming Processes				

13	Geography teachers have a positive attitude of integrating ICTs when teaching and learning of Geographical Internal Land Forming Processes				
14	Geography teachers are willing to integrate ICTs in Physical Geography learning				
15	There are inadequate finances for trainings				

Section C:

Extent of ICT usage. Use the scale: 1 for SA-Strongly Agree, 2 for A-Agree, 3 for D-Disagree and 4 for SD-Strongly Disagree.

Serial no.	**Statement**	**SA**	**A**	**D**	**SD**
16	Geography teachers utilize ICTs that can be found to instruct Geographical Internal Land-Forming Processes				
17	Geography students are utilizing that can be found to instruct GeographicalInternal Land-Forming Processes				
18	Teachers often recommend students to search some content using ICTs				
19	There is great use of ICTs for training Internal Land-Forming Processes				
20	The school has computer laboratory technician that assist the teachers and students when need arises when integrating ICTs				
21	Geography teachers often use audiovisuals that pertain Internal Land forming processes				

Section D:

Challenges faced. Use the scale: 1 for SA-Strongly Agree, 2 for A-Agree, 3 for D-Disagree, 4 forSD-Strongly Disagree

Serial no.	**Statement**	**SA**	**A**	**D**	**SD**
22	There is inadequate ICT infrastructure				
23	There unreliable power supply				
24	The costs of internet provision is very high				
25	The costs associated with ICT equipment are very high.				
26	There are inadequate finances as well as poor in technicality of ICTs				
27	Most geography teachers' lack ICT skills and knowledge				
28	Geography teachers have inadequate experience inusing computers				
29	Geography teachers lack training opportunities				
30	There is poor maintenances of ICTs				

31) What other shortcomings do you encounter using ICTs in school?

……

……

…….....

32) Which solutions would you suggest to solve the mentioned challenges?

……

……

……

Thank You

Appendix ID: Questionnaire for Students'
(Please put a tick in the box most appropriate to you, or complete the statement in thespace provided)
Section A:
Types of ICTs Used: Use the key to tick where appropriate, 1for SA-Strongly Agree, 2 for A-Agree,3 for D-Disagree, 4 for SD-Strongly Disagree or Complete statements in the space provided

Serial no.	**Statement**	**SA**	**A**	**D**	**S D**
1	a) There is a computer laboratory equipped withinternet enabled computers				
2	b) The school has a television used for learning purposes				
3	c)The school has a radio for radio lessons				
4	e) The school has a projector				
5	f) The Geography teachers are provided with laptops				
6	I)The school has smart boards				
7	j) The school has ICT software				

8) Are there any other types of ICT used during Geographical Internal Land-forming Processes teaching?

……
……
……

Section B:
Factors. Use the scale: 1 for SA-Strongly Agree, 2 for A-Agree, 3 for D-Disagree, 4 for SD-Strongly Disagree.

Serial no.	**Statement**	**SA**	**A**	**D**	**SD**
9	Geography students are aware of some of the ICTs usedin the learning of Internal Land Forming Processes				
10	The Geography students have basic ICT skills on the useof ICTs in the learning of Internal Land Forming Processes				
11	Geography students are confident when using ICTs in the learning of Internal Land Forming Processes				

Section C:

Extent. Use the scale: 1 for SA-Strongly Agree, 2 for A-Agree, 3 for D-Disagree and 4 for SD-Strongly Disagree.

Serial no.	**Statement**	**S**	**A**	**D**	**SD**
12	The Geography teachers are utilizing all ICTs that can be found for Geographical Internal Land-Forming Processes instruction				
13	Geography students are not utilizing all ICTs that can be found for Geographical Internal Land-Forming Processes instruction				
14	Teachers often recommend students to search some content using ICTs				
15	Geography students can easily access online information from the internet enabled computers				
16	There is great usage of ICTs when instructing Geographical Internal Land-Forming Processes				
17	The school has computer laboratory technician that assist the teachers and students when need arises when integratingICTs				
18	Geography teachers use audiovisuals that pertain Internal Land Forming Processes in school				

Section D:

Challenges. Use the scale: 1 for SA-Strongly Agree, 2 for A-Agree, 3 for D- Disagree, 4 for SD-Strongly Disagree.

Serial no.	**Statement**	**SA**	**A**	**D**	**SD**
18	There is inadequate ICT infrastructure in schools				
19	Occurrence of frequent power disruptions in the school				
20	Most Geography students lack ICT skills and knowledge				
21	There is inadequate time to integrate ICT when learning Geography				

22) What other challenges do you face when integrating ICTs in Geographical Internal Land-Forming Processes instruction?

……

……

23) What solutions would you suggest to solve the mentioned challenges?

……

……

Thank You

Appendix 1E: Interview Schedule for Principals

The following questions will guide the study during the interview schedule:

i. What is the opinion as the school administration about the use of ICTs in your school?

ii. In your opinion, how greatly have teachers used ICTs to deliver content?

iii. In your opinion, what are some of the threats faced by teachers andstudents when as they use ICTs in your school?

Appendix 1F: Interview Schedule for Quality Assurance Officer

i. What is your opinion about usage levels of ICTs in content delivery?

ii. What is your take on government support to ICT usage in schools?

iii. What challenges are teachers likely to experience when using ICTs in content delivery?

Appendix 1G: Observation Sheet

Type of ICT	School		Total ICTs Observed	Condition	Comments on the condition and usage
	With ICT	Without ICT			
Computers	8	Nil	254	Over 70% are in perfect condition	Computers are inadequate and are frequently in use.
Compact disks	7	1	44	Over 50% are in perfect condition	Compact disks are not often in use in the schools
Projectors	7	1	16	All in perfect condition	Projectors are not often in use in the schools
Internet service	8	Nil	0	Less than 25% is good condition	Most of the internet services are not reliable
Smart board	4	4	3	All in perfect condition	Schools with smart boards often use them
Internet enabled mobile phones	8	Nil	19	All in perfect condition	The phones were often in use
Scientific calculators	8	Nil	0	All in perfect condition	Owned by all students and areoften used
Graphics	4	4	0	Less than 40% is good condition	Not used frequently in most of the schools

Appendix 1H: Research Authorization

THIS IS TO CERTIFY THAT:
MS. LENITY KARIMI MBAKA
of KENYATTA UNIVERSITY, 20057-200
NAIROBI,has been permitted to conduct
research in *Tharaka-Nithi County*

on the topic: *INTEGRATING INFORMATION AND COMMUNICATION TECHNOLOGIES IN TEACHING AND LEARNING INTERNAL LAND FORMING PROCESSES IN SECONDARY SCHOOLS IN THARAKA-NITHI COUNTY,KENYA*

for the period ending:
14th January,2020

Permit No : NACOSTI/P/19/26864/27414
Date Of Issue : 15th January,2019
Fee Recieved :Ksh 1000

.....
Applicant's Signature

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

Appendix 1I: List of public Schools in Chuka sub-county

1. Kambandi Secondary School.
2. Kiamuriuki Secondary.
3. Kiereni Secondary.
4. Kirege Secondary.
5. Kiunguni Secondary.
6. Magenka Mixed day.
7. Mpukoni Secondary.
8. Ndagoni Girls Secondary.
9. Rubate Secondary.
10. Chuka Boys Secondary.
11. Chuka Girls Secondary.
12. Ikawa Secondary.
13. Ikuu girls Secondary.
14. Karamugi Girls Secondary.
15. Magumoni Girls Secondary.
16. Mukuuni High School.
17. Njuri High School.
18. Ikuu Boys Secondary.
19. Allamano Boys Secondary.
20. County Education Centre Secondary.
21. Furaha Girls Secondary.
22. Rubate Achievers Secondary.
23 Kiangondu secondary.
24. Kigogo Day Secondary.
25. Maabi Secondary.
26. Chief Petro Secondary.
27. lbiriga Secondary School.
28. Kagaani Mixed Secondary.
29. Kagumo Day Secondary.
30. Kamunguogo Secondary.
31. Kangoro Day Secondary.
32. Kanyuru Day Secondary.
33. Kathigiririni Secondary.
34. Kiamucii secondary.
35. Kibumbu Secondary.
36. Magumoni Day Secondary.
37. Mukuthuku Mixed day secondary.
38. Mutaaruni Secondary.
39. Mutuguni Secondary.
40. Ndagoni Secondary.
41. St. Paul's Njaina Mixed Secondary.