EXAMINING THE USE OF ICT IN ENHANCING THE ACADEMIC PERFORMANCE OF LEARNERS WITH HEARING IMPAIRMENT IN LIRA CITY

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DECLARATION

This thesis is my original work and has never been presented for a degree in any other university.

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APROVAL

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LIST OF ACRONYMS

CRPD	Convention on the Rights of Persons with Disabilities
ESSP	Education and Sports Sector Strategic Plan
GoU	Government of Uganda
HI	Hearing impairment
HTML	Hypertext Markup Language
ICT	Information Communication Technology
ITU	International Telecommunications Union
MBs	Mobile Bundles
MoE	Ministry of Education
MoIC	Ministry of Information Communication
MoICT & NG	Ministry of ICT and National Guidance
PDF	Portable Document Format
PWDs	People with Disabilities
RCT	Randomized Controlled Trial
SDG	Sustainable Development Goals
SEN	Special Education Needs
UCC	Uganda Communication Commission
UK	United Kingdom
UN	Unite Nations
UNESCO	United Nations Educational Scientific and Cultural Organization
WHO	World |Health Organization
WSIS	World Summit of the Information Society

ABSTRACT

The purpose of the study was to examine whether using ICT in teaching can enhance the academic performance of learners with hearing impairment (HI) in Nancy comprehensive school for the Deaf. The researcher adopted the following specific objectives: To examine what ICT equipment were used when teaching learners with HI in Nancy comprehensive school for the Deaf; To establish teachers' knowledge in exploring ICT equipment in teaching learners with HI in Nancy Comprehensive school for the deaf; To examine the benefit of using ICT in teaching learners with HI in Nancy comprehensive school for the Deaf; To identify challenges faced by teachers of Nancy Comprehensive school for the Deaf in using ICT in the process of teaching learners with HI. To achieve the objectives, the researcher adopted a qualitative research approach to describe and explain participant's narratives in their natural setting, which enabled the researcher to understand the true picture of the participants as they speak words. The findings revealed that there were some few ICT gadgets in the school. Teachers and leaners also had some little knowledge of ICT and knew about the various forms of equipment used in teaching leaners with HI. In addition, the study found out that ICT has simplified the teaching and retention capability of learners with HI and performance improved. Several challenges such as gadgets being too expensive, power fluctuation, some teachers not able to use the gadget as well as internet bundles being too expensive. Therefore, the study recommends that government strengthen the existing policies that will facilitate the easy teaching of leaners with HI using ICT. For example, not taxing internet bundles to schools that teach HI learners. Providing them with new gadgets, software and training them how to use them.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

The chapter brought an overview on what the intention of the researcher was which were to examine the use of Information and Communication Technology (ICT) in enhancing the academic performance of learners with Hearing Impairment (HI). It covers the background, statement of problem, purpose, objectives, research questions, scope, significance, and theoretical framework of the study.

1.1 Background to the study

According to (Choi et al., 2002) ICT refers to an updating of conventional information technology which includes the fast merging of technologies such as computers, telecommunication, and broadcasting technologies, as well as communicative and networking capacity of modern-day information technologies. Therefore, the term ICT is seen as an umbrella term for a range of technological applications which include computer hardware and software, digital broadcast technologies, telecommunications technologies such as mobile phones, as well as electronic information resources which also include World Wide Web and CDRoms. ICT; with its multifunction ability can be a technology that can support learners with hearing impairment (HI) in enhancing their academic performance.

Hearing Impairment (HI) here; refers to a diminished ability to hear sounds like other people do (Nordqvist, 2015). Deafness refers to inability to understand speech through hearing even if the volume is intensified. Profound deafness then means, that person cannot hear at all and such persons are unable to detect sound, even at the highest volume possible.

Globally, it is estimated that, close to 466 million people have at least some forms of hearing loss and 34 million of these are children, which constitute to about 5% of the population.

Approximately, 90% live in low- and middle-income countries of which Uganda falls (WHO, 2020). A number of them have no access to educational opportunities to complete even primary education; assumed to be because of their learning difficulties. Therefore, ICT is seen as a remedy and essential in all education and training sectors to support learners with HI (European Agency, 2014).

It is important particularly to support learners with HI from exclusion in educational opportunities. Hearing loss continues to negatively impact on their daily learning experience (Baker, 2006). Therefore, some kind of specialized services is required for them to benefit from educational services. That explain why ICT is seen as a remedy by other researchers like; The Uganda Journal of Education (2020) who intimated that ICT use improved academic performance and increased engagement for learners with HI in Uganda schools because it gives them up-to-date information, user-friendly and create a conducive learning environment and that has made learners with HI gained from a variety of ICT. For example, CD-ROM, multimedia and other gadget like computers, smartphones, computer tablets, smart board and projectors give them access to various information immediately than is usually possible which give support in their academic performance. ICT also has the ability to reduce discrimination which is a major hindrance in the education of learners with HI.

At the beginning of the 21st century, ICT infiltrated all aspects of life and its dominance brought in the need for people to acquire required skills in ICT. That made countries for example United Kingdom (Livingstone, 2012) to bring in ICT into their education systems to support their learners to improve on the quality of education. In Singapore, inside the eGov Master Plan 2013, a five-year plan from the Ministry of Information and Communications (MoIC), Infocom Development Authority of Singapore, Temasek Foundation, Singapore and Swiss Development Corporation. Their first Education ICT

Master Plan was to invest in ICT to improve the quality of education and to in-cooperate ICT in learning to prepare learners to succeed in the speedily digital world, and to enable them acquire knowledge that can help them produce ICT skills that can support them in their education and in the world of work.

Subsequently, a number of international policies were made to support the use of ICT with emphasis on people with disabilities and ICT, and one of the most important policy adapted for persons with disability is the UNESCO's Inclusive Education Policy (2019) which emphasizes the use of ICT to support learners with disabilities including those with HI. The policy states; 'ICT can enhance the learning experience for students with disabilities including those with HI by providing access to multimedia resources with captions, subtitles and sign language interpretation, communication tools such as video conferencing and instant messaging, assistive technologies like speech-text software which support learning and communication' 'member states should develop and implement policies to ensure ICT accessibility in education by providing training for teachers on using ICT to support learners with HI, ensure that educational content is available in accessible format including sign language. Convention on the Rights of Persons with Disabilities (CRPD) (UN, 2006). Article 9 of the CRPD empower persons with disabilities to live independently and participate fully in all aspects of life education inclusive. Article 24(3) 'State parties shall ensure that persons with Disabilities including those with HI have access to sign language interpretation and captioning to facilitate learning and communication'. It mandates states parties to act appropriately to ensure that persons with HI have access to ICT on an equal basis with others. SDG 4: also supported that ICT plays a major role in seeing that inclusive, equitable quality education and promotion of lifelong learning for all is realized just like (Bhatti, et al. 2021) also intimated and (UNESCO, 2 011) article 8 which highlights sign language interpretation and support through video conferencing, assistive technologies such

as screen readers, speech-to-text software and hearing aids among others. The Uganda Communication Commission (UCC) Policy (2019) mandate all educational institutions to provide accessible ICT facilities for learners with disabilities including those with HI. The ICT equipment and software used in education are accessible and compatible with assistive technologies. The Education and Sports Sector Strategic Plan (ESSP) 2017-2025 emphasizes the use of ICT to improve education outcomes including for those with HI and highlight the need for accessible digital content and resources and ICT-based assistive technologies to support learning. The National ICT Policy (2019) promote the use of ICT in education to improve learning outcomes for all learners including those with HI and ensure ICT infrastructure and services are accessible and affordable for all educational institutions.

These policies were made to ensure the provision of tailor-made ICT equipment for learners with HI which support them with easy and equal access to information, educational resources and learning materials. Various communication tools like video conferencing, instant messaging and email that facilitates communication between the learners and the teachers. The use of multimedia resources like video, animations and graphics support learners with HI understand complex concepts and ideas with ease. Some of them also includes technologies such as screen readers, speech to text software, hearing aids and sign language recognition systems which facilitates communication between sign language user and non-sign language user. All these helped to support learners with HI in their learning process and in terns enhance their academic performance.

Immediately, developed countries shows the significant importance of using ICT in supporting SEN, this is because ICT provides special educational services with suitable support services, (Freedman, 2011), Bhutan Education Blueprint, 2014-2024). These

services include easy access to learning resources that caters for individual learning styles and encourage learners with HI to participate during the learning process. Before the introduction of ICT in the education system, the UN report on the Right to Education for Persons with Disabilities (2013) indicated that, learners with HI faced significant challenges before the introduction of ICT in schools. These included; low academic achievement particularly in language and mathematics, limited access to educational resources such as lectures, discussions and audio-text equipment, heavy relaying on sign language interpreters which could lead to delays, misunderstandings and limited access to educational content.

Introduction of ICT into education system has significantly caused change in the academic performance of learners with HI. For example; According to the UN report 'ICTs and Persons with Disabilities' (2018); after the introduction of ICT in schools, learners with HI where ICT helped them to better understand and engaged with educational content, leading to improved academic performance. Through access to information, ICT provide learners with HI with equal access to educational resources such as e-books, online lectures and multimedia materials which enhance their academic performance. ICT support learners with HI to increase their participation in class, ask questions and engaged in discussion and also make access to educational content easier with captions, subtitles and sign language interpretation which eventually enhance performance. National Technical Institute for the Deaf (NTID) in the USA provides accessible ICT resources and training to improve access to information and provide access to educational resources such as e-boobs, online lectures and multimedia materials with captions, subtitles and sign language interpretation which has helped in enhancing the academic performance of HI learners.

Regionally and locally In African countries today, mainly sub-Saharan have also picked up ICT use to support learners with HI to achieve their educational aspiration. For instance,

Tanzania then made training of teachers in ICT took precedence where many teachers were enrolled (Andersson et al., 2014) and Barakabitze, 2014). These training gives teachers more knowledge on how to support learners with HI to enhance their performance using ICT.

In South Africa, learners with smartphones are able to access the internet and exchange ideas with friends, and that has help them to learn from one another and improve on their performance (Osman et al., (2010), Glova, et al., 2015). The practicality of smartphones allows students to engage actively in their learning and offer them the opportunity to communicate anytime and anywhere and to access all the educational resources they need. To achieve the goal, ICT services should be made available, accessible, efficient, reliable and affordable to learners with HI, (Kenya MoEST, 2005), Africa Report 2007).

Uganda National ICT Policy (2014-2019) made a declaration on persons with disabilities Women; and Youths with the aim that they can use ICT as an empowerment tool in their education and other daily activities. This was supported as follows; promoting ICT as an option occupation for all in the informal and formal educational system, enabling full and equal involvement of women, youth and persons with disabilities in creating the information society and implementing special ICT training programs for them. This has made them gain knowledge of using ICT in their education and enhancing their performance.

A study by the African Journal of Disability (2017) showed that ICT use improved academic performance and increased accessibility for HI learners in Kenya and Uganda. Research by the Journal of Deaf Education (2018) showed that ICT- based instruction enhanced language skills and academic achievement for HI learners in South Africa. A study by the Journal of Special Education and Rehabilitation (2019) found that ICT assisted instruction improve reading comprehension and vocabulary skills for learners with HI in Nigeria. Research by

the Ugandan Journal of Education (2020) showed that ICT use improved academic performance and increased engagement for learners with HI in Uganda.

Using ICT with visual means such as videos, images, and text for example, I Communicator is one of the assistive tools for persons with HI. It facilitates independent communication for persons with HI and its works is to bring information in real time, for example speech to text and speech or text to video sign language for learners with HI (Mishra, Sharma & Tripathi, 2010). The content of this is used by learners with HI to obtain definitions and synonyms with the help of an inbuilt dictionary. In this, learners with HI gained an opportunity to do things the way they would find difficulties in doing it in the past through new technologies of ICT (Lersilp, 2019), Evans, 2020) and Kramarenko, et al., 2021). This is one of the ways learners with HI actively get involved in their education which results in enhancing their academic performance.

This is true because ICT has the potential to simplify what is difficult to explain in the traditional methods especially with different methods by combining images, videos, and other visual aid what we can simply term as multimedia and it aid in shortening the period of teaching (Evans, 2020).

The rapid growth and use of ICT currently has gone up, particularly during the COVID-19 pandemic, where learning takes place through zoom, Google meet and Google classroom (Diana, et al., 2021), García-Vita & Doña-Toledo, 2021). This has made learning more inclusive and accessible to all categories of learners across the world and those with HI.

In connected to global engagement in modifying digital inclusion in line with Sustainable Development Goals 2030, the Government of Uganda also showed commitment to develop the digital vision for Uganda (Gillwald, Mothobi et al; 2019). The vision provides a

framework that reacts to Vision 2040 which provides a unified ICT policy direction. It also makes provision for the Government's integrated policy and strategic framework that shows how ICT can enable the inclusion of HI and all Ugandan citizens in a digital world. The Constitution of the Republic of Uganda (1995) also qualifies, empower and provide equal opportunities to all citizens including persons with HI. That explain why government through the Ministry of Education and sports provided technological equipment to some urban schools as a starting point, The Republic of Uganda, (2012). This was published in the New Vision of March 2021, where the Ugandan government under her ministry of ICT shows government commitment to supporting ICT usage in enhancing the academic performance of learners by distributing computers to most of the government-aided schools; therefore; making ICT an essential player in the educating learners with HI, and supporting the completion of their education cycle.

Despite all these effort by the Ugandan government in supporting the use of ICT in education of learners with HI, there still exist challenges ranging from inadequate ICT equipment and knowledge gap among teachers and learners. Since hearing is fundamental in learning and development of an individual, there is need to find an alternative approach where learners with HI can equally learn on an equal basis with others using ICT.

Like in Nancy Comprehensive school for the Deaf, Lira City, during their visit to the school and discovered that learners with HI were not academically performing well based on the mode of instruction being used, Computer Africa in 2012 supplied ICT equipment like computers, projectors and smart phones in trying to support the teachers and learners achievement in education. This equipment were being used in teaching learners with HI in support to improve in their participation and performance but, they still continue to academically perform poorly assumed to have resulted from challenges like fewer ICT

equipment/gadgets and lack of skills in using the gadgets by both the teachers and learners. To date, there is no clear documentation to shows that ICT is being practiced in Uganda for teaching learners with HI. Therefore, it is against this background that this research sought to examine whether the use of ICT can enhance the academic performance of learners with HI in Nancy Comprehensive School for the Deaf, Lira city.

1.2 Statement of the problem

Despite all the development in ICT policies, designs and frameworks, for example Convention on the Rights of Persons with Disabilities (CRPD) (UN, 2006) Article 9 enable persons with disabilities to live independently and have full participation in all aspects of life education inclusive. State parties are mandated to act appropriately while ensuring that persons with HI have access to ICT on an equal basis with others. SDG 4: also supported that ICT plays a major role in seeing to it that inclusive, equitable quality education and promotion of lifelong learning for all is realized just like (Bhatti, et al. 2021) also intimated and (UNESCO, 2 011) article 8 which highlights sign language interpretation and support through video conferencing, assistive technologies such as screen readers, speech to text software and hearing aids among others. Sustainable Development Goals 2030, the Government of Uganda also showed commitment to develop the digital vision for Uganda (Gillwald, Mothobi et al; 2019). The vision provides a framework that reacts to Vision 2040 which provides a unified ICT policy direction for all. It also makes provision for the Government's integrated policy and strategic framework that shows how ICT can enable the inclusion of HI and all Ugandan citizens in a digital world.

These policies were formulated to implement ICT in education sector for learners with HI at different levels locally, nationally and internationally. Nevertheless, learners with HI in many nations world over are still challenged with under-performance academically at all

levels of their academic cycle either resulting from inappropriate use or inadequate ICT equipment. For example, close to nine in every ten individuals have no ICT equipment and internet access in Africa and Asia-Pacific (According to the International Telecommunications Union (2017) report.

In Uganda, ICT services encounter challenges such as inadequate ICT organization, extreme prices of equipment, inadequate electricity supply, expensive data, skills of the teachers, and general lack of resources to meet the needs still exist (Glen Farrell, (2007). There is no clear study carried out in Uganda that talk about integrating ICT in teaching learners with HI and yet these learners continued to perform poorly. In the same way, there is no clear support by the government of Uganda giving ICT equipment to any schools for the deaf and that may be the same challenge in Nancy comprehensive school for the deaf in Lira City where learners with HI continues to academically perform poorly. The statistics from UNEB for UCE performance for Nancy Comprehensive School for the Deaf from 2019 to 2021 shows a decline in performance as shown in table below.

Table 1: Showing performance from 2019- 2021

2019					
DIV 1	DIV 2	DIV 3	DIV4	DIV 7	DIV U
00	00	01	03	02	00
2020					
00	00	00	04	02	00
2021					
00	00	00	01	03	00

The above table shows a significant decline in academic performance and this can be attributed to various factors including lack of government support over the years which calls for an intervention. Therefore, it is against this premise that the researcher sought to examine

the use of ICT in enhancing the academic performance of learners with HI in Nancy comprehensive school for the Deaf, Lira city.

1.3 Theoretical Framework

Theoretical framework looked at the theories that were used as a model on how ICT were used in the process of teaching. The theory that supported this study was the network society theory. This concept was introduced in 1990s by a Spanish sociologist Manuel Castells who describe the merger of social organization and economic structure with the advent of digital technology particularly the internet. The theory emphasizes on the importance of networks as a fundamental structure of modern society which are made up of interconnected nodes and links, allowing for rapid communication, collaboration and exchange of information (Manuel 1990). It emphasizes the vital role played by new technologies in connecting, creating and distributing information in the network system (Tjoa, et al., 2016) and Cavas et al., 2009).

The theory is relevant to the study in that, it has made information and educational resources more accessible to learners with HI, communication has been made easier using video conferencing, instant messaging, connecting learners with HI to others whom they can share experiences, providing support and sense of belonging, enabling learners with HI access tailored educational content and resources and also visual, auditory and tactile approaches that cater for different learning styles and needs.

Network society has been criticized for its potential risks of too much relying on it for Deaf education that can lead to decline in critical thinking and loss of traditional skills, lead to a fragmentation of society and decline in public discourse, the assumption that technology automatically improves education for learners with HI may not be true, the social and cultural context of deaf education can be distorted. They highlighted the importance of

human interaction and sign language, impact of technology on education and identity and needs for critical evaluation (Dirik et al 2020).

Much as the theory has been criticized, it is more applicable to the study in that; it provide access to digital resources such as e-books, online tutorials, and educational videos with captions or sign language interpretation, help in sharing of experiences and collaboration on academic project. It incorporates visual, auditory and tactile materials to cater for different learning styles, access tools such as speech to text software to facilitate learning and provide teachers with training and resources to effectively integrate network technologies to support learners with HI. Those who participated in network system used computers, smartphones, computer tablets and other gadgets to create and acquire educational knowledge, share and circulate information (Castells, 2007), and Siemens, 2004).

ICT in this setup is essential because it inspire learners with HI to be more creative and to stimulate their thinking. This enables them to see real life situation and helping them to find solution to what really challenged them. In an educational situation, technologies where pictures, text and video are used, learners with HI get familiar to situations and understand things the way they would find it difficult in an ordinary way of teaching. The theory therefore necessitates teachers to embrace the use of ICT to match the 21st-century new technology for teaching. The researcher's choice for the theory based on the fact that learners with HI are assumed not to be performing academically well and the trend of teaching is changing rapidly towards technology using ICT and yet learners with HI continues to perform poorly.

According to Plomp et al., 1996) stresses about three main aims to differentiate uses of ICT in learning as follows; It can be used as an object of study, career, and medium for teaching and learning. ICT once used correctly has the ability to deliver the rightful information,

motivate learners, increase their participation and can enhance the academic performance of learners with HI.

1.4 Purpose of the Study

The purpose of the study was to examine whether using ICT in teaching can enhance the academic performance of learners with HI in Nancy comprehensive school for the deaf, Lira city.

1.4.1 Specific Objectives of the study

The objectives of the study were as follows;

1. To examine what ICT equipment were being used when teaching learners with HI in Nancy comprehensive school for the Deaf, Lira city.
2. To establish teachers' knowledge in exploring ICT equipment in their teaching process in Nancy Comprehensive school for the deaf in Lira City.
3. To examine the benefit of using ICT in teaching learners with HI in Nancy comprehensive school for the Deaf.
4. To identify challenges faced by teachers of Nancy comprehensive school for the Deaf in using ICT for teaching learners with HI.

1.4.2 Research questions

This study was led by the subsequent study questions;

1. What ICT equipment were being used for teaching learners with HI in Nancy comprehensive school for the Deaf, Lira city?
2. To what extent were teacher's knowledge in exploring ICT equipment in their teaching process in Nancy comprehensive school for the deaf in Lira city?
3. What were the benefits of using ICT for teaching learners with HI in Nancy comprehensive school for the Deaf, Lira City?

4. What challenges were faced by teachers while using ICT for teaching learners with HI in Nancy comprehensive school for the Deaf, Lira City?

1.5 Scope of the study

The study scope included content, geography, participants, and time scope as aligned below.

1.5.1 Content scope

The study concentrated on examining the use of ICT in enhancing the academic performance of learners with HI in Nancy comprehensive school for the Deaf, Lira City. It concluded on the effective and efficient use of ICT among learners, and teachers.

1.5.2 Geographical scope

The study was conducted in one of the schools in northern Uganda called Nancy comprehensive school for the Deaf, Lira City. Lira City is situated in the northern part of Uganda about 340km from Kampala Capital City.

1.5.3 Area of Study

The research was carried out in Nancy comprehensive school for the Deaf, Lira City. The researcher's choice for the study area were motivated by; First, learners with HI in Nancy comprehensive school for the deaf were for a long time not performing well academically and something different needed to be done to support them. Secondly, the school happened to be the only deaf school found in Lira City and they were practicing the use of ICT in teaching learners with HI.

1.5.4 Time scope

The study covered a period of 5 months from April to September 2022.

1.6 Significance of the study

This research work was undertaken to examine whether the use of ICT in teaching learners with HI can enhance their academic performance. The result of this survey was hoped to support school administrators to incorporate ICT into their budgets. Should be a wakeup call to different stakeholders to appreciate the benefit of using ICT in teaching learners with HI. Can also be used as a tool for sensitization on the use of ICT in teaching learners with HI.

1.7 Definition of Terms

According to (Choi et al., 2002) ICT can be referred to as an updating of conventional information technology which encompasses the fast merging of technologies like telecommunication, computers and broadcasting technologies and also stressing the communicative and networking capacity of modern-day information technologies. Therefore, the term ICT is seen as an umbrella term for a series of technological applications such as digital broadcast technologies, computer hardware and software. It also includes telecommunications technologies like mobile phones, as well as electronic information resources including World Wide Web and CDRoms.

Hearing Impairment (HI) here is said to be a diminished ability to hear sounds like other people do (Nordqvist, 2015). Deafness then refers to inability to hear and understand speech through hearing even if the volume is increased. Profound deafness then means, that person cannot hear at all and such persons are unable to detect sound, even at the highest volume possible.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

The previous chapter gave a summary of the intention of the researcher in examining the use of ICT in enhancing the academic performance of learners with HI as supported by (Egaga, et al. 2015). This chapter gave assessment regarding the same intention but through a literature review. It starts with analyzing changes that has taken place in teaching in the 21st century, followed by a discussion of the different learning concepts on the use of ICT in teaching. The reviews were done alongside the objectives of the study. They included; examining what ICT equipment were being used when teaching learners with HI, establishing teacher's knowledge in using ICT equipment in the teaching process for learners with HI, to examining the benefit of using ICT in teaching learners with HI, and identifying challenges faced by teachers in using ICT in the process of teaching learners with HI. The chapter concluded by indicating the knowledge gaps in all four aspects.

2.1 The ICT equipment used when teaching learners with HI.

The contemporary society has significantly changed the way of delivering teaching in the 21st century (Pulkkinen et al., (2007). This change has been because ICT has infiltrated all aspects of life. The emergence and introduction of ICT in the education system is welcomed as a crucial effort for learners with HI in both separate and inclusive schools. ICT gadgets, mainly; smartphones, tabs, computers, and other ICT equipment that were put in place modify the life of learners with HI. It has increased their involvement and reduces social rejection by encouraging cooperative learning. That made countries for example United Kingdom (Livingstone, 2012) and others to bring ICT into the education systems with the aim to improve on the quality of education. For example, communicator is one of the assistive tools for persons with HI. It facilitates independent communication for persons

with HI and its works is to bring information in real time, for example speech or text to video and sign language then speech to text for learners with HI (Mishra, Sharma & Tripathi, 2010). In Britain, a combination of multimedia presentations for example video, and pictures give learners with HI a chance to benefit from ICT products (Becta, 2001). These ICT products include things like Co-Writer a software program that helps HI learners to predict and develop writing skills. Mind mapping software; sign now a type of dictionary with over 3,500 signs and a course type software program with over two hundred video clips of conversations.

The content of this is used by learners with HI to obtain definitions and synonyms with the help of an inbuilt dictionary. ICT provide more attractive, visually, stimulating and caters for individual learning styles. Whatever is not possible to attain in conventional teaching techniques, is achieved through new technologies of ICT (Lersilp, (2019), Baluku, &Kasujja, 2020).

According to Tuominen, et al, (2003); and Lei & Zhao; (2007), ICT can be used to influence and convey information through video, pictures and text. This statement may be true because; videos, pictures and text that are provided by devices such as computers, smartphones, computer tablets, computer-based assistive technology, and special software, help to ease involvement of learners with HI in learning. With the use of ICT, HI learners can gain from different types of ICT equipment which reduce discrimination and render them a number of opportunities in all aspect of life including their education. This is possible as ICT has a broad range of special software and hardware that can be used for communication, accessing and inputting message to and from the internet.

Computer technology has turn out to be an essential tool in the education system. It has brought new ways of teaching and also to equip learners to fit in the contemporary era

(Papaioannou et al., 2011) and Bingimlas, 2009). If this is properly integrated into the education system for learners with HI the assumption is that; their participation and academic performance may improve.

Despite the availability of ICT equipment to support learners with HI in other parts of the world, close to nine in every ten individuals in Africa and Asia-Pacific have no access to ICT equipment and internet (According to the International Telecommunications Union, 2017). This trend of event has posed a great challenge among teachers, especially in the implementation of ICT in teaching learners with HI. These challenges assumed to have come as a result of lack of ICT equipment and its associated component, poverty, lack of knowledge by teachers on the use of ICT, restricted rural electricity and regular power interruption are responsible for limited access to ICT in some secondary schools (Afshariet al, 2009).

These trends of event could be the same challenges facing Nancy comprehensive school for the deaf in Lira City of which the researcher intend to investigate.

2.2 Teacher's knowledge in exploring ICT equipment in teaching learners with HI.

The existence of various ICT resources has made learning more inclusive, cooperative and interesting for both the teachers and learners with HI where information is instantly arrived at. Handel et al., 2006) and Jegbefume, 2013) say, for schools to effectively meet the anticipated results, teachers must grasp the new technology as a learning tools which will support them in their teaching process. For examples computers, smartphones, projectors, computer tablets and smart boards. Adaptation and successful use of ICT in educational environment mostly depend on teachers attitudes toward technology use (Kluever et al, 1994) and (Albirini et al., 2006). Teachers are key stakeholders in the implementation of ICT to improving learning of those with HI and so they have to acquaint themselves with

the knowledge of ICT. Their mental attitude toward using ICT gadgets in teaching is one of the most important elements to achieve the crucial need of technology in the field of education (Kule, et al., 2021).

Basing on different principles for ICT acceptance in education, many countries have invested in ICT to develop their education systems to support learners with HI. In South Africa, they have two different approaches of encouraging teachers to use ICT. One of them is to produce the Professional Development Framework for Digital Learning (DBE, 2018), which supports teachers in using the appropriate method. The second approach is that; teachers are trained actively at different levels of competence in ICT as well-defined in the DBE, 2018). These has helped teachers more active in using ICT in their teaching.

It is also vital in that, teachers become activist for change, not only in utilization of technological innovations but also in designing them tailored to the needs of learners with HI. This claim may be true in that, skilling teachers and to deploy them to use and integrate ICT into pedagogy ('technology') is important in delivering the right content to the learners. The development of ICT has made people today to understand that education has to be integrated with ICT tools to modify teaching and learning which will interns improve on the performance of the learners with HI. This is supported by (Ayoung, et al., 2021), Ghaleb, 2014) who intimated, through ICT integrated teaching; teachers are able to access an assortment of the most current customized content for learners with HI. It also helps in improvement and curriculum modification that cater for the unique needs of learners with HI. To effectively meet these expected outcomes in schools, teachers are required to welcome the new technology of teaching tools, (Jegbefume et al., 2013). In Uganda, the Ministry of Education and Sports has been active over the period of 2005/06 as a result of much emphasis on ICT policy, (Asad, 2021), Farrell, (2007. As a result, over 300 teachers and 300 computers were trained and given out respectively to NEPAD e-schools and three

generators. With the consent of Uganda Telecommunication, software and upgrades for 6,000 desktop computers were secured and already in schools. Teachers were being inducted on how to incorporate ICT into the teaching and learning process in primary and secondary schools.

Much as there is an effort to train teachers in ICT usage, there is no documented evidence to show that teachers in schools for learners with HI were trained. This seems to be the same scenario in Nancy comprehensive school for the deaf in Lira city where teachers are using ICT for teaching learners with HI but seems they have not got proper training on that.

2.3 The benefit of using ICT in teaching learners with HI.

Over the years, a number of changes have taken place in education. Learning is migrating right from classroom talking to ICT aided teaching where resources for example video tutorials and e-books are used (Savvidis, (2016). Introducing ICT into the education system has been welcomed and seen as well-timed and a sign of hope for the education of learners with HI (Tuominen, et al., 2003), Zhao et al. (2007). It has brought in computers, smart phones, tablets and many other resources well designed for learners with HI and it has changed the way they learn compared to the traditional ways. In the same way, ICT renders powerful teaching and learning environment to learners with HI (Volman & Van Eck, 2001); De Corte et al., 2003). I Communicator is one of the assistive tools for persons with HI. It facilitates independent communication for persons with HI (Mishra, Sharma & Tripathi, 2010). It works is to bring in real time information, for example speech to text, speech to video sign language for learners with HI. It has also improved on their engagement, knowledge possession and retention, promote cooperation resulting to active and meaningful learning hence, enhanced performance.

ICT also help learners with HI to communicate using video, pictures, images in computers, smartphones and other assistive communication technology to access information and acquire the knowledge they need for their education. These happens because technologies have the potentials to facilitate students with HI to actively participate in learning and as a result, still enhance their performance. These happens because ICT support learners with HI to mastery and retain content. Another way to enhance the academic performance of learners with HI is through using computer which interpret text or spoken language into sign language (Hamburg & Bucksch, 2015). Its records voice during conversation and computer translates it to HI learner. Technology has the aspect of determining how students learning is to be conducted (Peterson & Hittie, 2003). It can also help teachers to appreciate the value of the contemporary world pattern with the capacity of how to teach learners with HI using ICT.

ICT adoption in education has grown significantly of late, especially during COVID-19 pandemic time (Lawrence, et al., 2018) and Medina-García et al, 2021). This may be true because it has made teaching easier and larger sections of learners were reached. The government of Uganda came up with an ICT policy for learners with HI. This was done with hope that ICT allows them equal access to information and knowledge. The Ugandan government took up the development of an ICT for persons with disabilities policy to supply ICT equipment across the country (MoICT& NG).

However, much as there are a number of supports by the government in ICT sector with it numerous benefits in the education of learners with HI, a number of them still seems to be lagging behind in their academic performance resulting from inadequate ICT resources and equipment in their schools. Nancy comprehensive school for the deaf in Lira city in not exceptional, the learners seems to be performing poorly academically resulting from not

having enough ICT equipment in the school. The assumption is that, if ICT is used to teach learners with HI, their performance will improve.

2.4 Challenges faced by teachers while using ICT in the process of teaching learners with HI.

Introducing ICT into the education system has been welcomed and seen as well-timed and a sign of hope for the education of learners with HI (Tuominen, et al., 2003), Zhao et al. (2007). It has brought in computers, smart phones, tablets and many other resources well designed for learners with HI and it has changed the way they learn compared to the traditional ways. In contrary, introducing ICT in schools poses challenges to teachers for fear of change and inability to manipulate the new technologies of ICT for teaching learners with HI (Puspawati, &Juharoh, (2021). This may be true because most of them lack the relevant knowledge and ability on how to use ICT tools and equipment to boost their teaching. Some teachers prefer using traditional methods of teaching in their classroom citing inadequate ICT tools, inadequate training on ICT use and lack of readiness toward ICT integration and adoption into their teaching. Some teachers, for fear of not having the knowledge of ICT, have failed to adopt ICT into their teaching, (Mac Calum et al., (2014).

These challenges could be traced back to Africa and Asia-Pacific where, close to nine in every ten individuals have no access to ICT gadgets and internet (According to the International Telecommunications Union, 2017). These has resulted from lack of ICT equipment and its associated component, expensive equipment, internet cost, poverty, restricted rural electricity and regular power interruption are responsible for limited access to ICT in some secondary schools (Afshariet al, 2009).

These could be the same challenges facing Nancy comprehensive school for the deaf in Lira city where, some teachers also may not be having the necessary ICT knowledge and how to

incorporate it into their teaching. In addition, technical problems and lack of information on the importance of ICT in teaching and poor leadership at school level.

Despite the international, regional, national, and local development where ICT has provided learners with HI easy and equal access to information, educational resources and learning materials, various tools such as instant messaging video conferencing and email that facilitates communication between the learner and the teacher. Use of multimedia resources like video, animations and graphics which help learners with HI understand complex concepts and ideas with ease. These also includes technologies like screen readers, speech to text software, hearing aids, sign language recognition systems which facilitates communication between sign language user and the non-sign language user. All these were done to support learners with HI in their learning process and in terns to enhance their academic performance.

In all these, teachers are still going through challenges in integrating ICT in teaching learners with HI in their schools. Some of these challenges may include inadequate training for teachers, inadequate accessibility of ICT equipment and resources, lack of government involvement and support structure for ICT, also attitude barriers and limited financing. This has affected performance of learners with HI, not only at the international level but also regionally and locally, including those with HI in Nancy comprehensive school for the deaf Lira City where teachers lack appropriate ICT equipment and have limited knowledge in incorporating ICT in their teaching. It was hoped that if teachers knew how to use ICT in the process of teaching learners with HI, it would have enhanced the academic performance of learners with HI.

This therefore form the basis for which the researcher intended to examine the use of ICT in enhancing the academic performance of learners with HI in Nancy Comprehensive School for the Deaf, Lira City.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter covered research design, the target population, sampling procedures, data collection techniques, analysis, presentation and ethical considerations.

3.1 Research Design

A research design is the conceptual blueprint in which research is conducted or a plan in detail created to answer the research question to control variance (Akhtar, 2010) and Dulock, 1993). For this case phenomenon design were used because it allowed the researcher to collect information from a smaller number of respondents who were assumed to be having relevant information needed for the research (Black and Chapman, 1976). This design was preferred because it helped the researcher to arrive at a thorough understanding and obtain the intended information. This was done through interviewing the respondents. A qualitative research method was used in the description and explanation of the participants. The researcher used a natural setting, which enabled the researcher understand the true picture of participants as they spoke. In this study, teachers and learners gave the information related to how ICT can be used in teaching learners with HI.

3.2 Target population

The target population is the subsection of the population from which the sample is selected (Hu, 2014). For this case, the target population were 29 teachers and 140 learners respectively.

3.3 Sampling techniques

A sampling technique is a process followed when choosing respondents for a certain study (Kothari, 1999). Going by this definition, the study used purposive sampling method where

a researcher chose some specific group of people within the population to use for that particular study project (David. et al. (2005).

3.4 Sample size

Here, ten (10) respondents were sampled. Out of which, five (5) teachers from S.3 and S.4 were chosen purposely because they were the only ones who knows sign language and were using ICT for teaching those learners with HI. Five (5) learners from S.3 and S.4 were also chosen because they were the only learners with HI in those classes being taught using ICT as illustrated using the table below.

Table 2: Sample size distribution

Respondents	Population	Sample size
Teachers	29	5
Students	140	5

3.5 Data collection methods

The researcher employed interviews methods in data collection (Gill, Stewart, Treasure, et al, 2008).

3.5.1 Interview method

An interview is a one-on-one conversation between an interviewer and interviewee. It is an essential method of collecting information that pertains to spoken communication between the interviewer and the interviewee, Mathers et al. (1998). Therefore, interviews were used as the research instrument for this study.

Therefore, face-to-face interviews were conducted with five (5) teachers, and five (5) learners. Here, the researcher used some pre-formulated interview guides to ask the respondents. The interview was conducted in English.

3.6 Validity and Reliability

Validity means representing the truthfulness of findings or measure that represents the concept it claims to measure (Altheide & Johnson, 1994); and Punch, 1998). Meanwhile, reliability referred to the stability of findings or the degree to which a research instrument is capable to yield constant results after repeated trials (Altheide & Johnson, 1994). To establish the validity and reliability of the instrument, the interview guides were formulated with simple English questions and clear instructions which were quite appropriate to the level of the respondents. This was done after the approval for data collection from the supervisor.

Tool was piloted for its quality as pertain its validity and reliability against the research objectives. Three learners and three teachers were interviewed respectively. The instrument was able to collect the required information as per the study purpose. This is because their responses were corresponding to the questions being asked meaning; they were able to understand the language being used. The responses received helped the researcher to improve on the tool and the results of this build in confidence during the actual interviews with the respondents.

3.7 Data processing

The information collected were edited and errors corrected before the final report on the study was written.

3.8 Data analysis

Data analysis is the procedure used for examining, purifying, transforming and modeling information to detect useful information, suggest reason that support decision-making (Herrman, 2009). The information collected was analyzed using qualitative methods as follows;

3.8.1 Qualitative data analysis

The researcher adopted the qualitative content analysis to analyze data from interviews. Content analysis is a research method used to replicate that valid conclusions are made by quoting the direct quotations of the respondents and interpreting them with the researcher's own words and other textual material (Judde, and McCleland, (1999). For qualitative data analysis, the researcher used thematic analysis to analyze qualitative data where a broad theme was generated through interviews. This helped to give a deeper insight into the findings. It involved reading of all the responses given by the respondents to understand the meaning what has been communicated. The study was carried out with a detailed examination of the data, including exactly the words that were said by the respondents.

3.9 Presentation

Data presentation is defined as the process of using a number of graphical formats to represent the relationship between two or more data so that an informed decision can be made based on them, (Wikipedia https://www.vedantu.com/commerce/presentation-of-data, 2014). It includes; presentation and discussion of results as per research objectives such as; examining what ICT equipment were being used when teaching learners with HI, establishing teacher's knowledge in using ICT equipment in teaching learners with HI, examining the benefit of using ICT in teaching learners with HI and to identify challenges teachers face in using ICT in the process of teaching learners with HI. The presentation of the study findings was clearly illustrated in form of narrative since qualitative methods were used.

3.10 Ethical considerations

The researcher got an introductory letter from the department of graduate studies to avoid suspicion of the researcher from the respondents and the entire community. It indicated the

purpose of the study. The researcher as well showed maximum respect to the respondents by presenting to the respondents the introductory letter. The researcher further sought permission from the relevant authorities before any data collection commences and assured respondents of the confidentiality they deserve.

CHAPTER FOUR

PRESENTATION AND DISCUSSION OF RESULTS

4.1 Introduction

This chapter gives the summary of findings from the interviews that were conducted from the field. Teachers and students' views were summarized as pertain the use of ICT in enhancing the academic performance of learners with hearing impairment in Nancy school comprehensive school for the deaf, Lira City.

4.2 Interview schedule for teachers

Table 3: Number of years taken at the school as a teacher

Number of years spent at school	**Frequency**	**Percentage**
Between 1-5 years	2	40
Between 5-10 years	3	60
Total	5	100

Generally, teachers who were interview for this study 2 spend between 1-5 years and 3 spend between 5-10 years. In *Table 2* we represent the summaries for the filed summarizing the number of years spent at school by the teachers.

4.2.1 The teachers' level of qualification

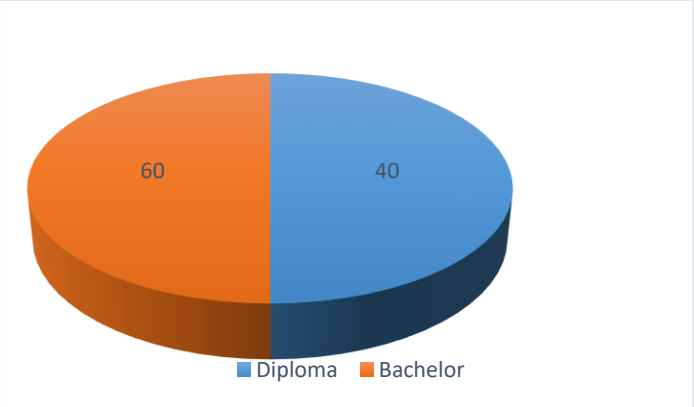

Figure 1: The chart showing the teachers' level of education

The teachers who were interviewed in this study; 40% had diploma and 60% had bachelors, which are the appropriate grade to teach in a secondary school as in *Figure 1* above.

4.3 Examining what ICT equipment being used when teaching learner with HI in Nancy comprehensive school for the Deaf, Lira city.

4.3.1 In your view, what do you understand by ICT?

According to teachers views on the use of ICT;

> *"Is the use of information technology, is a type of information communication and integrated move from manual means of doing things to a digital way, and is an advanced way of sending information."*

> "*Information communication technology* is the us*e of technology in audio visual to deliver content which can be used in the teaching of student foe example Computers technology.*

The teachers' response to the meaning of ICT compared to the definition of ICT do not differ much from that of the ICT as defined by (Choi et al, 2011) as a wide variety of technologies used to create, disseminate, store and manage information in various forms including text, images, audio and videos. This include the internet, wireless network, cell phones and other communication mediums as well as software and hardware used for computing, data management and communication. This implies that teachers have good understanding of what ICT is.

4.3.2 Which ICT equipment do you have in school?

Below are the teachers' views about the available ICT equipment in schools for teaching learners with HI. The teachers agreed that the ICT equipment available in schools were;

> *"Some of the ICT equipment that is being used when teaching learners with HI include desktop computers, Smartphones, TVs, projector and some teachers had laptops among others".*

The respondent's views were asked of the types of ICT equipment available to support the learning of learners with HI at school. The gadgets listed above does not differ from the ICT equipment as stated by (Tuominen, et al., 2003) and Ghaviferkr et al., 2012) which includes Smart Phones, computers, television and projector as the once commonly used by learners with HI at the school. Subsequently through observation, the researcher was capable of confirming the availability of ICTs facilities as respondents mentioned. The findings signify that the administrative management recognizes the role played by ICTs in supporting learners with HI in their education. ICT equipment facilitate learners with HI to gain access to information and other learning materials.

4.3.3 How are you using that ICT equipment to facilitate your teaching?

The following are the respondent's views on the way's teachers are using ICT equipment to facilitate their teaching.

> *"For researching information that they are going to teach, use ICT as a teaching aid, searching for visual illustration for teaching HI learners, search for some action activities and put on projector for them to watch, use TV to watch stories in sign language, use smart phones to get new vocabularies in sign language and use resource person on ICT".*

The above responses show the various ways teachers use ICT equipment to facilitate the teaching of their children. With regard to how ICT were being used to support learning of students with HI, the results disclosed that there was some essential ICT equipment to support learners with HI to participate effectively in their learning. For example, ICT gadgets which support multiple functions, like writing, reading and watching practical movies. This was supported by (Ayoung, et al., 2021).

4.4 Establishing teacher's knowledge in exploring ICT equipment in teaching learners with HI

4.4.1 As a teacher, which areas of skills training did you attain in using ICT for teaching?

Below were the areas of skills that different teachers use.

> *"I learned computer hands on ….I learn introduction to computer, power point, typing documents in Microsoft word, projector use, internet and excel but I am also using my phone to learn other things of ICT.*

Using ICT in educational environment mostly count on the attitudes of teachers toward technology use (Asad, 2021), Albirini et al. 2006). However, the successful use, adoption and integrating ICT in classroom rely primarily on the attitudes of teachers toward the tools (Anđić, et al., 2021), (Lawrence, et al., 2018).

4.4.2 Apart from teaching and learning, what other activities do you use ICT for?

Other activities teachers use ICT for were found to be;

> *"Teachers use ICT equipment for teaching, making calls, texting messages and also searching information on WhatsApp, entertainment, games and they also use them for charting, playing music, typing exams and storing notes" Can also be used as a source of income if on type work for people, carry out research, watching news, reading news, searching for content of what am going to teach".*

ICT can help to support present teaching methods and learning experience for those with HI Savvidis, (2016), who contained that ICT can be used to extract video tutorials and e-books that can be used for teaching students with HI. ICT supports teachers in their lesson planning, and delivery. It also has the possibility to propel, modify student learning by addressing concerns like different ability levels and learning styles, including visual material for learners with HI. Our filed findings therefore do not differ much from what literature tells on the use of ICT in teaching learners with HI.

4.5 Examining the importance of using ICT in teaching learners with HI

4.5.1 If you compare using ICT in teaching with the traditional way of teaching, which one do you recommend in terms of participation and performance of learners with HI?

On this matter on the method of teaching between traditional and using ICT for teaching.

"Most teachers preferred using ICT because its best suits learners with hearing impairment".

This is because:

> *"ICT improves creativity, brings real information, makes learning interesting, save time, makes learning interactive, motivating and encourages participation. It also brings real situation, once the learners perceive the right information, they get the right ideas.*
>
> *They feel more eager to learn given the fact that the world is moving towards digital the information got using ICT constitutes facts finding" that has made a lot of stride in their performance compared to when we were using the traditional way of instruction.*

The above statements from teachers do not differ much from other researcher who said; Other ICT products like Co-Writer and a predictive software program helps learners with HI in developing writing skills (Lersilp, 2019), Baluku, &Kasujja, 2020) ICT help to support teaching methods and learning experience for those with HI Nyambane & Nzuki, (2014). When teaching is backed by creative use of technology learners with HI are motivated to participate in their learning with ease communicate and thereby improve their participation and performance (Kule, et al., 2021).

4.5.2 What have you noticed in terms of improvement in participation and performance as a result of teachers using ICT in teaching?

The teachers while using ICT in teaching learners with HI have discovered the following;

> *"There is great change because learners participate actively during lessons. They are motivated to attend classes. If you project, they understand better, this is because they see what is happening as they will be grasping the information. Improves mastery of content, bridge the gap of what you can't sign, brings learning real, and makes l earning interesting as learners participate fully. It also aids their memory*

and retention, makes learning learners centered with active participation form learners and high retention of information". Surely there is a great improvement in their performance as a result of using ICT.

An indicator from developed countries shows the importance of ICT in supporting SEN significantly in the recent past which is also supported by (García-Vita & Doña-Toledo et al. 2021). ICT could be an effective tool for learners with HI because it can be used to fulfill a number of purposes to help learners with HI improve in their participation and performance. That made countries like United Kingdom (UK) Livingstone, 2012) and others brought in ICT in their education systems.

Country for example Britain, a combination of multimedia presentations like video, image and pictures give learners with HI a chance to experiment various ways of bringing together video, images, vision and other ICT products (Becta, 2001). These ICT products may include things like Co-Writer a software program that helps deaf learners to predict and develop writing skills. Mind mapping software; sign now a type of dictionary with over 3,500 signs and a course type software program with over two hundred video clips of conversations. Similarly, teaching when backed by ICT improves communication among learners with HI and improves performance, (Lidström & Hemmingsson, 2014).

4.6 Identifying challenges faced by teachers while using ICT in the process of teaching learners with HI.

4.6.1 Are ICTs used across the curriculum or only employed in some subjects?

On this matter of ICT usage across the curriculum, most teachers contain that*;*

"ICT is used across all subjects if you want to get information…..Though some teachers said, they use ICT in the entire curriculum". "ICT is being used across all subjects though only teachers have access to ICT due to its limited availability".

Basing on what teachers have listed, it is also highlighted in Kenya National ICT policy adopted in 2006 to modify the livelihoods of Kenyans. The objective of this was meant to

improve quality of teaching using ICT at all levels of education and other institutions of learning and this was also supported by (Baluku, &.Kasujja, 2020). The scheme was to promote e-learning resources to support education at all levels by digitizing the curriculum. This is also in line with South African government to assists teachers in using the appropriate method and also training them in various levels of competence in ICT as defined in the DBE, (2018). The shift and the development of ICT has made people today to understand the need to integrate ICT tools in education to modify teaching and learning. This is in support by (Ghaleb, 2014); Hu & Yelland, 2017).

4.6.2 What are some of the challenges you noticed in the process of teachers using ICTs in teaching?

Below are some of the challenges highlighted by teachers when using ICT;

> *"Some of the challenges identified were lack of internet facilities, expensive data bundles, expensive gadgets and also lack of enough gadgets (like printers) to use, unstable network, software and hardware multifunction".*
>
> *"There is also lack of exposure, power (electricity) problems, no sockets in some classes,"*
>
> *"Some teachers use phones, but the phones have small surface area, existence of viruses that can corrupt information".*

The respondents had various views about the challenges noticed in the process of teachers using ICT in teaching students with HI in school. These do not vary much from the already existing literature for example (Puspawati, &Juharoh, 2021) who intimated the limited internet access, hardware and software multifunction, lack of skills among users, high purchasing cost of equipment, unreliable power supply among others.

4.6.3 What do you feel is left out concerning the use of ICT in education? Please, feel free to share.

The key concerns left out regarding the use of ICT in education for learners with HI.

More training needed on the use of ICT, high coast of data and unregulated information on social media. Government to subsidize the cost of data and control the information that flows in social media. Use of ICT should be encouraged in schools for leaners with HI. ICT should be encouraged because it helps teaching learners with HI. Teachers should also be taken through computer courses. Government should put a policy in computer use in schools especially in deaf schools. There is need to Sensitize the parents on the need to provide the deaf learners with ICT gadgets. Everyone should embrace ICT because teaching learners with HI is easier using ICT. Limited access to network connection, lack of technical support, lack of training, limited time and lack of teachers' competency.

The respondents identified a number of issues which they thought in their opinion were left out concerning ICT use in education as stated above. There seems to be no much divergence with other researchers (Castro Sánchez and Alemán, 2011). The implication is that the school should work hard and address the key issues that students raised and really thought that it had been left out.

4.7 Interview schedule for learners

Table 4: Demographic characteristics of students

Gender	Frequency	Percentage
Male	3	60
Female	2	40
Total	5	100

The above table shows gender spreading of the leaners who were interviewed in the study. The 3(60%) were males and 2(40%) were female.

4.8 Examining what ICT equipment being used when teaching learner with HI in Lira city.

4.8.1 In your own understanding what do you understand by ICT

Most of the learners interviewed in the study, associated ICT as;

"The use of Computer and technology" though some said, "Is *the technological study of information and communication and Information and communication technology".*

These do not differ so much as stated in New Delhi Ministry of Education MOE, (2008) which refers ICT to a varied set of goods, applications and services that are used to produce, store, process, distribute and exchange information.

4.8.2 Which type of ICT equipment does your school have?

According to students' responses, the most common ICT equipment available in the school are; "*Smartphones, computers, projector, desktops, and television".*

The above responses are in agreement with Bingimlas, (2009), Papaioannou and Charalambous, (2011) who clarify that ICT equipment and its attendant tools among others are computers, smart phones, radio, television, satellite and internet with their related tools.

4.8.3 How are teachers using ICT equipment to facilitate their teaching?

Students continued to explain how teachers are using ICT to facilitate their teaching as listed below;

> *"They use ICT for typing examinations, teaching, for research and searching for other information. They also use ICT for instruction purposes – for example computers as study aid and instruction gadget"*

Generally, most leaners mentioned that their teachers use ICT gadgets to search for information and as well as teaching aid in the class. This is also supported by (Ayoung, et al., 2021), Becta, (2001) who says, computers, tablets and other multimedia render students with HI with access to visual, pictures and images in real time possible.

4.9 Establishing Teacher's knowledge in exploring ICT equipment in teaching learners with HI

4.9.1 As a leaner, how do you rate teacher's knowledge in using ICT for teaching

These are some of the responses from the learners concerning teacher's knowledge on the use of ICT;

"Yes, they have the knowledge because they use the gadget to teach us, and some of them are experts in using the gadgets when teaching us" However, some students admitted that;

"*Some teachers do not have enough knowledge in using the gadgets"*

The above statement by students correlates with that Handel et al., 2006) and Jegbefume, 2013) who say, for schools to effectively meet the anticipated results, teachers must grasp the new technology as a learning tools which will support them in their teaching process. For examples computers, smartphones, projectors, computer tablets and smart boards. Adaptation and successful use of ICT in the educational environment mostly counts on the attitudes of teachers toward technology use (Kluever et al, 1994) and (Albirini et al., 2006).

4.9.2 Apart from teaching and learning, what other activities do your teachers use ICT for?

The following are the responses from the learners;

> *'The teachers use ICT for chatting, WhatsApp, making calls, playing music, sending messages, typing exams, storing notes. Some of them use ICT gadget for entertainment purposes.*

The responses is aligned with the findings of (Ayoung, et al., 2021), Ghaleb, 2014) who intimated, through ICT integrated teaching; teachers are able to access an assortment of the most current customized content for learners with HI. It also helps in improvement and curriculum modification to meet the unique needs of learners with HI.

4.10 Examining the importance of using ICT in teaching leaners with HI

4.10.1 If you compare using ICT in teaching with the traditional way of teaching, which one do you recommend in terms of participation and performance of learners with HI?

Most of the learners said that:

"I prefer using ICT".

This was because;

> "*ICT gives wide information, faster in searching for information, easy to use and saves time. You learn new things that the teacher may not reach. It is interesting and you understand easily. With ICT, there is no boredom. ICT gives us real information as it happens and easy for us to understand things. It also encourages learners to learn. It also brings things in a realistic form and aid our memory, it makes learning interesting, and learners participate, easy to use, saves time, give facts, bring real situations, and its user friendly".*

The information given above confirm that introducing ICT into the education system has been welcomed and seen as well-timed and a sign of hope for the education of learners with HI (Tuominen, et al., 2003), Zhao et al. (2007). It helps them by accelerating their involvement and participation, increased self-esteem and encourage socialization which in terns enhance their performance. ICT also help learners with HI to communicate using video, pictures, images in computers, smartphones and other assistive communication technology to access information and acquire the knowledge they need for their education.

4.10.2 What have you noticed in terms of improvement in participation and performance as a result of teacher using ICT in teaching

On the above issue, leaners said that ICT;

> *"Increases participation, brings deeper information, and as well as being interesting. It encourages us to participate in most activities and also improves our performance. ICT also support in memory retention in that there is realism in terms of learning aid than the tradition method*". *I can confirm that there is improvement in our academic than before.*

The above views do not differ from other researchers who said; ICT render a powerful teaching and learning environment to learners including those with HI Volman & Van Eck, (2001); De Corte et al. (2003). I Communicator is one of the assistive tools for persons with HI. It facilitates independent communication for persons HIMishra, Sharma & Tripathi, (2010). It works is to bring information in real-time. For example, speech to text and speech or text to video sign-language for learners with HI. Content of this can be used by learners with HI to obtain definitions and synonyms with the help of an inbuilt dictionary. Another way to assist learners with HI be educated and work, is through using computer which

interpret text or spoken language into sign language Hamburg & Bucksch, (2015). Its records voice during conversation and computer translates it to the deaf learner.

4.11 Identifying challenges faced by teachers in using ICT in the process of teaching learners with HI.

4.11.1 Are ICT used across a curriculum or they employed in some subjects?

To answer the above question, the respondents stated;

> *"ICTs are used across the curriculum in most of the subjects, Used in ICT lessons, used to search things from internet on a particular or all subjects. For example, in in Chemistry, it used for demonstration purposes through visualization of say chemistry apparatuses. Also, teachers use ICT to search for information from the online sources.*

According to them, through ICT integrated teaching, teachers are able to access an assortment of the most current content for special education. ICT are equipment that teachers use to aid their teaching. It also helps in improvement and curriculum modification to meet the unique needs of learners with HI as highlighted by Andersson, Nfuka, Sumra, Uimonen & Pain, (2014); Barakabitze, (2014).

4.11.2 What are some of the challenges you notice in teachers using ICT for teaching?

As learners, these were some of the challenges they noticed with teachers;

> *"Data and gadgets are expensive, unstable electricity for charging, poor network, lack of skills and expertise in using ICT gadgets. There are few computers and ICT equipment for them to use, there is also a challenge in power supply, and some teachers lack confidence and knowledge".*

The above findings do not differ so much with those of (Sang et al., 2009), Richardson, 2009) and Charles, et al. 2021). Teachers' educational beliefs have consequences in how they use ICT in their deliberation and ICT integration is still a challenge for many teachers this is because they lack training and practice.

4.11.3 What do you feel is left out concerning ICT in education, please feel free to share?

These were the learner's opinion concerning ICT in education;

These were some of the feelings student had regarding the use of ICT in education.

> *"Teachers should be trained in computers knowledge; number of computers be increased in the school. Allowing students to go with smartphones to minimize the problem of limited gadgets at schools. Bringing qualified teachers who know how to use computers. There should also be a computer library in the school where learners with hearing impairment can access information. More ICT equipment should be bought for learners with hearing impairment. There should be internet in the school given by the government like this school for the deaf. Some computers are old and slow, lack of specialized disabled ICT equipment, attitude towards people with disabilities and there should be ICT specialist in the school.*

The above findings don't differ much because this trend of event has posed a great challenge among teachers, especially in the implementation of ICT in teaching learners with HI resulting from lack of ICT equipment and its associated component. It has been revealed that poverty, restricted rural electricity and regular power interruption are responsible for limited access to ICT in some secondary schools (Afshariet al, 2009). These could be the same challenges facing Nancy comprehensive school for the deaf in Lira city.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS5.

5.1 Summary of Findings

This study was to examine the use of ICT in enhancing the academic performance of learners with HI in Nancy comprehensive school for the Deaf, Lira city. The findings are as stated in the subsequent paragraphs.

5.1.1 Examining what ICT equipment being used when teaching learner with HI in Lira city.

Under this objective, the findings highlight on ICT equipment being used in the school, as being desktop computers, smartphones, TVs, projector and some teachers use laptops.

The results disclosed that some ICTs equipment are available at school to support learners with HI for them to effectively participate in their learning. This was supported by (Ayoung, et al., 2021), who ascertains that the development of ICT has made people today to understand that education has to be integrated with ICT to modify teaching and learning. Therefore, it can be recommended that; government create a suitable ICT environment where schools can easily access ICT as this will enhance performance for learners with HI.

5.1.2 Establishing Teachers' knowledge in exploring ICT equipment in their teaching process in Nancy Comprehensive School for the deaf in Lira city.

The findings indicated that teachers have some ICT knowledge and they were using it for researching for information that they are going to teach, use it as a teaching aid, searching for visual illustration for teaching HI learners, search for educational action activities for them to watch, use TV and projectors to watch stories in sign language, use smart phones to get new vocabularies in sign language and use resource person on ICT. The knowledge was generated hands on training while others had a formal training on introduction to

computer, power point, typing documents in Microsoft word, projector use, and internet and excel but some use phone to learn other things of ICT.

This is in line with Savvidis, (2016), who contained that ICT can be used to extract video tutorials and e-books that can be used for teaching students with HI. Therefore, it can be recommended a conducive environment be created for sensitization, awareness and training as this will help them acquire the necessary skills, competences and knowledge on ICT usage.

5.1.3 The benefit of using ICT in teaching learners with HI.

The findings on examining the benefit of using ICT in teaching learners with HI, it revealed as explained; Most teachers preferred using ICT for teaching learners with hearing impairment because; ICT improves on creativity, brings real information, makes learning interesting, save time, makes learning interactive, motivating and encourages participation. It also brings real situation, once the learners perceive the right information, they get the right ideas and it makes learning learners centered. They feel more eager to learn and that has made a lot of stride in their performance compared to using the traditional way of instruction.

ICT render a powerful teaching and learning environment to learners including those with HI Volman & Van Eck, (2001); De Corte et al. (2003). I Communicator is one of the assistive tools for persons with HI. It facilitates independent communication for persons HI.

Therefore, schools should acquire a wide range of ICT as it comes with a lot of benefits to the learners and the school at large because it is evident that with ICT in schools, there are high learning performance levels.

5.1.4 The challenges faced by teachers in using ICT for teaching learners with HI.

On challenges faced by teachers in using ICT, much as ICT can support learners with HI in their education, there were a number of challenges identified ranging from ICT gadget and data being expensive, unstable network, few gadgets and lack of specialized gadgets for learners with HI. Others were unstable power supply and some teachers needs more training on ICT.

The findings do not differ so much with those of (Afshariet al, 2009) who revealed that poverty, restricted rural electricity and regular power interruption are responsible for limited access to ICT in some secondary schools. (Sang et al., 2009), Richardson, 2009) and Charles et al. 2021) who ascertain that teachers' educational beliefs have consequences in how they use ICT in their deliberation and ICT integration is still a challenge for many teachers this is because they lack training and practice.

5.2 Conclusion

Basing on the results of the study on availability of ICT equipment in the school, it can be concluded that there exists some ICT equipment like desktop computers, smartphones, TVs, projector and laptops in the school, but they were not enough for the learners.

On teachers' knowledge on using ICT in their teaching process, the findings indicated that; they had some knowledge in that area but it was not sufficient.

The findings on examining the benefit of using ICT in teaching learners with HI, it revealed as explained; Most teachers preferred using ICT for teaching learners with hearing impairment because; ICT improves on creativity, brings real information, makes learning interesting, save time, makes learning interactive, motivating and encourages participation. Once the learners perceive the right information, they get the right ideas and it makes

learning learners centered. That has made a lot of stride in their performance compared to using the traditional way of instruction.

On challenges faced by teachers in using ICT, much as ICT can support learners with HI in their education, there were a number of challenges identified ranging from ICT gadget and data being expensive, unstable network, few gadgets and lack of specialized gadgets for learners with HI. Others were unstable power supply and some teachers needs more training on ICT. As the study results suggest, there is need not only to provide learning opportunities to students with HI but also to provide customized ICT gadgets that can help in aiding their learning process.

5.3 Recommendations

Following conclusions as per the objectives:

The study has concluded on that; there exist some ICT equipment like desktop computers, smartphones, TVs, projector and laptops; I therefore recommend that the school needed more ICT equipment to aid learning.

Secondly, the study has concluded that; teachers have some knowledge of using ICT for researching for information that they are going to teach like; visual illustration, educational action activities, stories and vocabularies in sign language, and use resource person on ICT as well; I therefore recommend more training for teachers on the usage of ICT in teaching learners with HI.

Thirdly, the study has concluded that; most teachers preferred using ICT for teaching because; ICT improves on learner's creativity, brings real information, makes learning interesting, save time, makes learning interactive, motivating and encourages learner's participation. Once the learners perceive the right information, they get the right ideas and it makes learning learners centered. That has made a lot of stride in their performance

compared to using the traditional way of instruction; I therefore recommend that use of ICT should be encouraged for teaching learners with HI in schools and also school should have ICT lab where learners can have constant practice on the use of ICT.

Lastly, the study has concluded that; the challenges faced by teachers in using ICT ranged from ICT gadget and data being expensive, unstable network, few gadgets and lack of specialized gadgets for learners with HI. Others were unstable power supply and some teachers needs more training on ICT. As the study suggest; I therefore recommend that there is need to provide customized ICT gadgets that can help in aiding their learning process. There should be reduction in the coast of ICT gadgets, data and internet connectivity needed to be stabilized. The above recommendation is supported by (Andersson et al., 2014); Barakabitze, 2014); Ghaleb, 2014); and DBE, 2018).

On the side of government, a policy should be put that makes data free in schools for learners with HI so that they can access information with ease. They should also be in position to control the information flows on social media.

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APPENDICES

APPENDIX I: INTRODUCTORY LETTER

KYAMBOGO UNIVERSITY

P. O. BOX 1, KAMPALA
FACULTY OF SPECIAL NEEDS & REHABILITATION
Tel: 0414-286237/285001/2 Fax: 0414-220464
DEPARTMENT OF SPECIAL NEEDS STUDIES

24th August, 2022

The DEO/DIS/Head teacher/Teacher/Community/Opinion Leader/Church Leader
THE HEAD TEACHER
NANCY COMPREHENSIVE SCHOOL FOR THE DEAF

Dear Sir/Madam,

RE: INTRODUCTION OF RESEARCH STUDENT ON DATA COLLECTION

This is to introduce the bearer Rev/Dr/Sr/Mr/Mrs./Ms. OCHEN NIXSON PETER
Reg.No: 19/U/GMSN/18736/PD who is a bonafide student of Kyambogo University in the Faculty of Special Needs and Rehabilitation, Department of Special Needs Studies. As partial fulfillment of the requirement for the award of the Diploma/Degree/Masters, he/she is required to undertake a research on the approved area of study.

The purpose of this letter is to request you to allow him/her have access to information from your office, school or area of operation necessary for the study.

Kyambogo University will be grateful for any assistance rendered to the student.

Yours faithfully,

Dr. Okwaput Stackus
HEAD OF DEPARTMENT

APPENDIX II: REQUEST LETTER

KYAMBOGO UNIVERSITY
P. O. BOX 1 KAMPALA
Tel: 041-286237/285001 Fax: 041-220464
FACULTY OF SPECIAL NEEDS AND REHABILITATION

Department of Special Needs Studies

31st May 2022

Dear participant,

RE: REQUEST TO PARTICIPATE IN THE RESEARCH STUDY

I hereby write to you regarding the above request. I am a student of Kyambogo University pursuing a Master's degree in Special Needs Education, Department of Special Needs Studies. Currently, I am conducting a research study on **examining the use of ICT in enhancing the academic performance of learners with hearing impairment in Lira** and your school has been identified as an entity for data collection. The purpose of this letter is to humbly request for your support. The information that will be provided will be strictly used for academic purposes and treated with confidentiality.

I will be grateful for your support in the study.

Thank you

OCHEN NIXSON PETER

APPENDIX III: CONSENT FORM

KYAMBOGO UNIVERSITY
P. O. BOX 1 KAMPALA
Tel: 041-286237/285001 Fax: 041-220464
FACULTY OF SPECIAL NEEDS AND REHABILITATION

Department of Special Needs Studies

31st May 2022

Dear participant,

I am a student of Kyambogo University pursuing a master's degree in special needs education and I am conducting a research study on examining the use of ICT in enhancing the academic performance of learners with hearing impairment in Lira city. It is hoped that the result of the study will help the different stakeholders to find a better way to support learners with hearing impairment with the best ICT equipment to support their education for a better performance. They will to get to understand the various challenges they go through in their education.

You have been chosen as one of the participants to help inform the study through participating in the interviews that will focus on how ICT can enhance the academic performance of learners with hearing impairment. The interviews may last for 10-20 minutes.

The purpose of this letter is to request you to participate in the study and all information provided will be kept confidential and used for study purposes.

Thank you so much I appreciate your cooperation and support.

Yours sincerely

OCHEN NIXSON PETER

APPENDIX IV: INTERVIEW SCHEDULE FOR TEACHERS

Dear Respondent,

My name is **Ochen Nixson Peter.** I am a student from Kyambogo University, carrying out a study to "examine the use of ICT in enhancing the academic performance of learners with Hearing Impairment in Lira city" case study of Nancy comprehensive school for the Deaf, Lira city, northern Uganda. You have been chosen as a respondent because the information you will provide is very important for the success and completion of this project. The information provided will be treated with the utmost confidentiality and will be used for only academic purposes.

Please feel free and answer all the questions truthfully.

Biography

☐☐**Gender: Male Female**

Qualifications:

…….

Name of the school: …….

☐**The number of years in the school as a head teacher**

SECTION A: Examining what ICT equipment is being used when teaching learners with HI.

1. In your view, what do you understand by ICT?

   ……

   ……Which type of ICT equipment do you have in the school?

   ……

   ……How are you using that ICT equipment to facilitate your teaching?

   ……

SECTION B: Establishing teachers' knowledge in using ICT equipment in the process of teaching.

2. As a teacher, which areas of skills training did you attain in using ICT for teaching?

   .....

   .....

3. Apart from teaching and learning, what other activities do you use ICT for?

   ……

   …

SECTION C: Examining the importance of using ICT in teaching learners with HI.

4. (a) If you compare using ICT in teaching with the traditional way of teaching, which one do you recommend in terms of participation and performance of learners with HI?

   ……

   (b). Give reasons to support the choice of your answer.

   ……
   …

5. What have you noticed in terms of improvement in participation and performance as a result of using ICT in teaching?

   ……
   …

SECTION D: Analyzing challenges teachers face in using ICT in the process of teaching.

6. Are ICTs used across the curriculum or are they employed in some subjects?

   ……
   …

7. What are some of the challenges you noticed in the process of using ICTs in teaching learners with HI in your school?

   ……
   …

8. What do you feel is left out concerning the use of ICT in education? Please, feel free to share.

   ……
   …

THANK YOU

APPEN DIX V: INTERVIEW SCHEDULE FOR LEARNERS

Dear Respondent,

My name is **Ochen Nixson Peter.** I am a student from Kyambogo University, carrying out a study to "examine the use of ICT in enhancing the academic performance of learners with Hearing Impairment in Lira city" case study of Nancy comprehensive school for the Deaf, Lira city, northern Uganda. You have been chosen as a respondent because the information you will provide is very important for the success and completion of this project. The information provided will be treated with the utmost confidentiality and will be used for only academic purposes.

Please feel free and answer all the questions truthfully.

Biography

☐☐**Gender: Male Female**

Class……

……..

Name of the school: …….

☐**The number of years in the school as a head teacher**

SECTION A: Examining what ICT equipment is being used when teaching learners with HI.

1. In your view, what do you understand by ICT?

   ……
   …

2. Which type of ICT equipment do you have in your school?

   ……

3. How are teachers using that ICT equipment to facilitate their teaching?

   ……
   …

SECTION B: Establishing teachers' knowledge in using ICT equipment in the process of teaching.

4. As a learner, how do you rate teachers 'knowledge in using ICT for teaching?

   .....
   .....

5. Apart from teaching and learning, what other activities do your teachers use ICT for?

   ……

SECTION C: Examining the importance of using ICT in teaching learners with HI.

6. (a) If you compare using ICT in teaching with the traditional way of teaching, which one do you recommend in terms of participation and performance of learners with HI?

   ……..

   (b) Give reasons to support the choice of your answer.

   ……..

7. What have you noticed in terms of improvement in participation and performance as a result of teachers using ICT in teaching?

   ……

SECTION D: Analyzing challenges teachers face in using ICT in the process of teaching.

8. Are ICTs used across the curriculum or are they employed in some subjects?

   ……

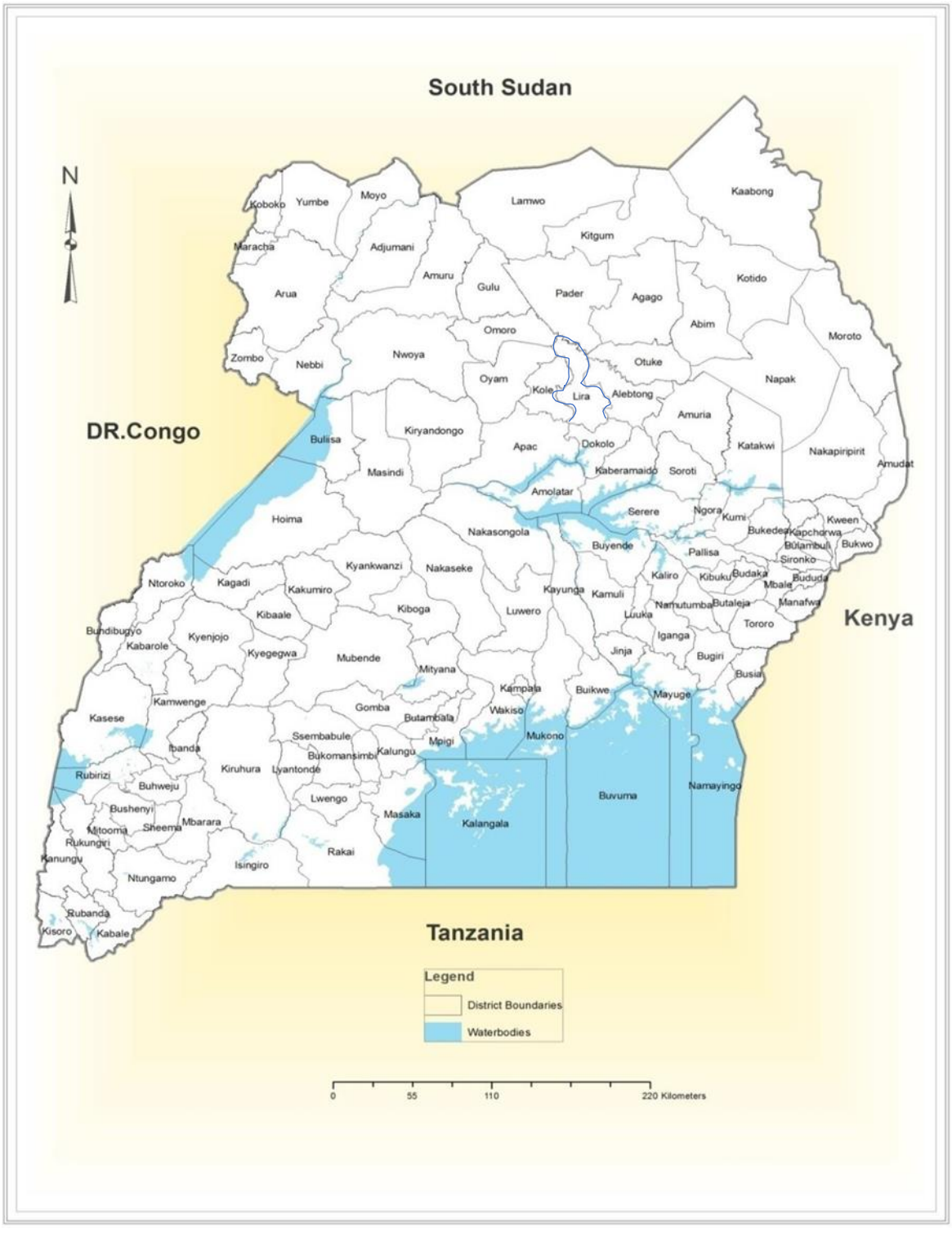
9. What are some of the challenges you noticed in the process of teachers using ICTs in teaching? ……

10. What do you feel is left out concerning the use of ICT in education? Please, feel free to share.

    ……

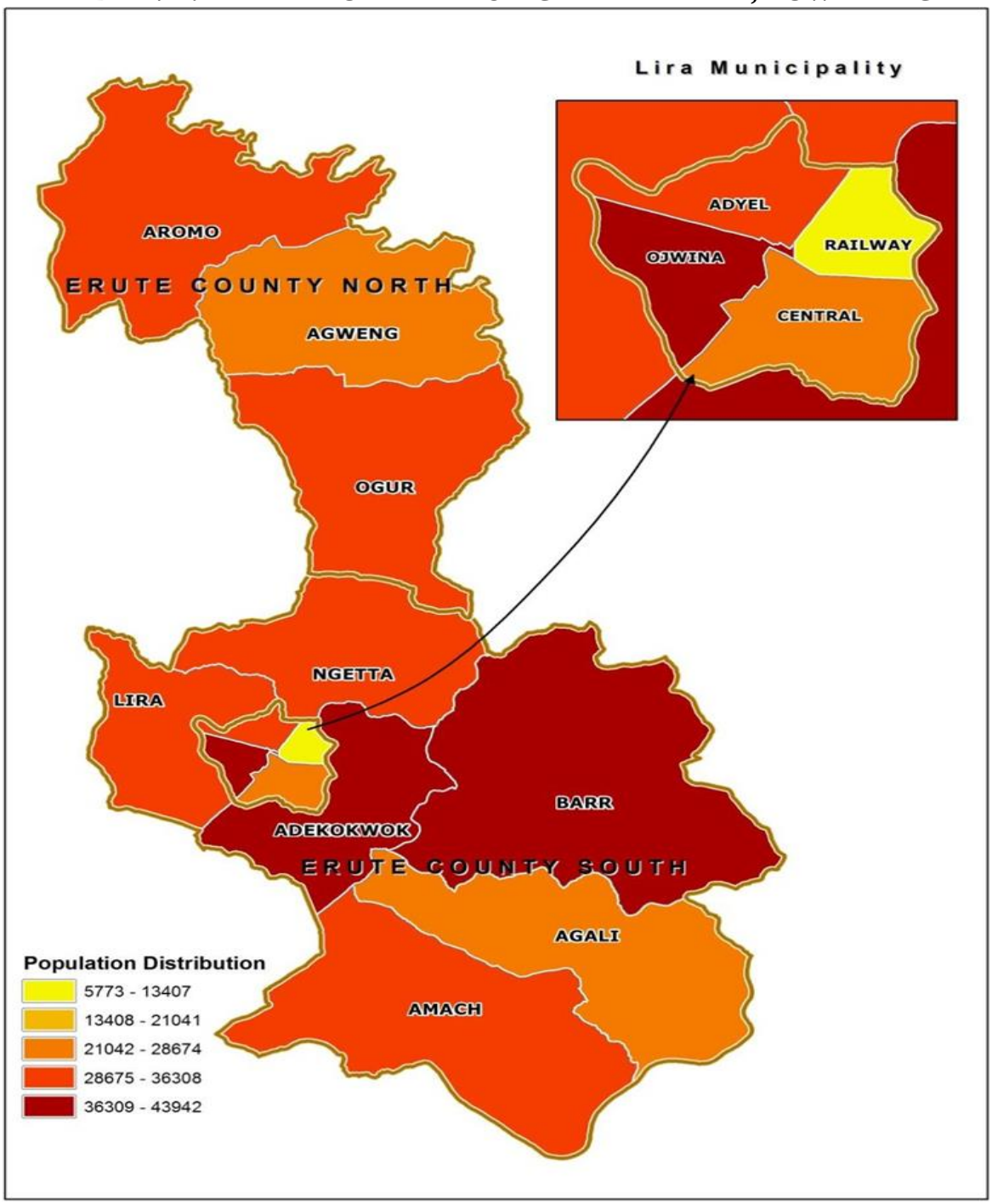
THANK YOU

APPENDIX VI: MAP OF UGANDA



Source: Adapted from (UBOS, 2017)

APPENDIX VII: THE MAP OF LIRA MUNICIPALITY THEN, NOW LIRA CITY



Source: Adapted from (UBOS, 2017)

APPENDIX VIII: A RESEARCH BUDGET ESTIMATE 2021/2022

Work Plan

From	To	Activity	Location	Resp. Person	Remark
07th .Jan. 2022	11th .Jan.2022	Submission of Research topic and approval	Kyambogo University	Student and Head of Department	Done
21st .Jan.2022	23rd .Jan.2022	Meeting the Supervisor for a discussion	Kyambogo University	Student and Supervisors	Done
4th.Feb. 2022	29th.Feb.2022	Writing up Chapter One, Two and Three	Library and Internet	A student	Done
1st.Mar. 2022	5th.Mar.2022	Meeting supervisor for a discussion on chapter One, Two and Three	At agreed Location	A student and Supervisors	Done
8th.Mar.2022	12ve.Mar.2022	Making correction	As the student's choice	A student	Done
15th.Mar.2022	19th.Mar.2022	Defending the proposal	Kyambogo University	A student and a team of Doctors and Supervisors	Done
20th.Mar.2022	30th.Mar.2022	Making corrections after defense	In the library	A student	Done
2nd.Apr.2022	15th.Apr.2022	Designing interview guide for data collection and approval	Kyambogo University	A student and the supervisors	Done
17th.Apr.2022	5th. May. 2022	Piloting (pre-testing) the tool (interview guide)	In Lira City	A student	Done
8th.Jun.2022	25th.Jul.2022	Data collection	Lira City	A student	Done
29nd.Jul.2022	10th .Aug.2022	Data Analysis and correction	In and out of Kyambogo University	A student and supervisors	Done
11th. Aug.2022	19th. Aug. 2022	Submission of report	Kyambogo University	To the faculty	Done

APPENDIX IX: A RESEARCH BUDGET ESTIMATE 2021/2022

Budget

ACTIVITY	ITEM	UNIT No:	UNIT COAST	AMOUNT	TOTAL
Submission of Research topic and approval	Transport	1	To and from 30,000@	30,000x2	60,000
Meeting the Supervisor for a discussion	Transport	2 people	30,000@	30,000x2	60,000
	Lunch	2	20,000@	20,000x2	40,000
Researching on Chapter One, Two and Three	MBs	10GB	4,500@	4,500x10	45,000
Meeting supervisors for a discussion on chapter One, Two and Three	Transport	3 people	20,000@	20,000x3	60,000
	Lunch	3	20,000@	20,000x3	60,000
Making correction	Lunch	1	20,000@	20,000x1	20,000
Presentation of proposal Chapter One, Two and Three	Transport	3	30,000@	30,000x3	90,000
	Lunch	3	10,000@	10,000x3	30,000
Making corrections after presentation	Lunch	1	10,000@	10,000x1	10,000
Designing interview guide for data collection and approval	Transport	3 people	20,000@	20,000x3	60,000
	Lunch	3	20,000@	20,000x3	60,000
Piloting (pre-testing) the tool (interview guide)	Printing	20 copies	500	500x20	10,000
	Transport to and from	1	30,000	30,000x2	60,000
	Lunch	1	20,000	20,000x1	20,000
	Transport to and from	1	30,000@	30,000x2	60,000

Data collection	Lunch for helpers	10	20,000@	20,000x10	200,000
Data Analysis and correction	Facilitation	1	250,000@	250,000x1	250,000
Submission of report	Printing	70 pages x 4copies	500@	500x70x4	140,000
	Binding	4 copies	10,000@	10,000x4	40,000