INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) AND ITS USE IN TEACHING STUDENTS WITH VISUAL IMPAIRMENT IN SECONDARY SCHOOLS IN KABALE MUNICIPALITY, UGANDA

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A DISSERTATION SUBMITTED TO THE DIRECTORATE OF RESEARCH AND GRADUATE TRAINING IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE MASTERS IN SPECIAL NEEDS EDUCATION OF KYAMBOGO UNIVERSITY

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DECLARATION

I, Flavia Niringiyimaana, hereby state that, this dissertation is entirely my own work and, that it contains no materials, which have been accepted for the award of other degrees in any institution.

Sign ..... Date .....

NIRINGIYIMAANA FLAVIA

APPROVAL

We, as university supervisors, confirm the work done by the candidate under our supervision.

Signed…… Date ……

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DEDICATION

I dedicate this dissertation to my beloved daughter Uwimbabazi Elizabeth who missed my love during my course of study.

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First, and foremost, I thank the Almighty Father creator of heaven and earth, for his sophisticated guidance and protection given to me during my studies.

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LIST OF ABBREVIATIONS

CRPD	Convention of Human Rights for Persons with Disabilities
GoU	Government of Uganda
ICT	Information and Communication Technology
RNIB	Royal National Institute of Blind
SDGs	Sustainable Development Goal
SwVI	Students with Visual Impairment
UBOS	Uganda Bureau of Statistics
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VI	Visual Impairment
WHO,	World Health Organisation
WIPO	World Intellectual Property Organization
WWW	World Wide Web

ABSTRACT

Technology has emerged rapidly as force which has been more widely accepted in almost every facet of life around the world, making it vital for teaching. There has been a gap between ICT as a subject and adapted ICT device as a method to improve teaching of all subjects and integrating it for SWVI. The purpose of this study was to examine factors that influence use of ICT in teaching SwVI in Kabale Municipality in South Western Uganda. The study investigated availability of ICT tools, teachers' competences in the teaching and the perception they have about use of teaching ICT to SWVI. The study adopted a qualitative approach and focused specifically on a case study design. Interviews were used as data collection methods. The target population for the study was composed of: teachers (N=30) and students (N=43). The study sample then comprised of teachers (N=5) and students (N=7). Data was analyzed qualitatively, basing on key themes and sub themes. Responses were categorized – where by those that were similar, and others that were unique were analysed accordingly. One of the key findings revealed that ICT tools used in Y Secondary School were of different types; some were of low-tech ICT and some were high-tech ICT. Other findings revealed that some teachers had basic informal and not specific ICT training in adapted technologies for teaching suitable for SwVI. Some other key findings showed that teachers were convinced that students were able to work with and use ICT independently, and thereby enjoying the benefit learning through the use of ICT. There were also findings that revealed some challenges faced, such as inadequacy in skills, facilities, and unstable electricity power source for running the devices. The study concluded that Y Secondary school had inadequate ICT devices for teaching SwVI; teachers were not skilled and knowledgeable enough in using ICT devices to teach SwVI. The study further concluded that ICT integration into teaching remained a challenge in secondary schools where SwVI studied. Basing on the findings and conclusions, the study provided recommendations, among other things, that Ministry of Education and Sports and other NGO's should equip secondary schools with adequate ICT tools. Another recommendation was that teachers ought to be trained and retrained at both pre-service and in-service levels on how to adapt and integrate ICT into teaching SwVI.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

The purpose of this research was to examine factors that influence use of Information and Communication Technology (ICT) in Teaching Students with Visual Impairment (SwVI) in Secondary Schools in Kabale Municipality. This section covers the background of the study, problem statement, purpose of the study, research objectives and research questions, scope of the study, significance of the study, definition of key terms, and finally the theoretical framework of the study.

1.1 Background to the Study

Globally, technology has advanced quickly and got widely incorporated thereby affecting almost every facet of daily life (Eligi & Mwantimwa, 2017). ICT has been used by educators all around the world to change approaches of teaching students with visual impairment (SwVI). According to Wu et al. (2018) and UNESCO (2010), ICT represents a diverse range of technological instruments employed for communication, generation of information, sharing, storage, and control. This range includes both software tools like internet connectivity, graphical user interfaces, JAWS, and NVDAs, among others, as well as hardware devices like desktop computers, laptops, handheld devices, mobile phones, and smartphones (Anjum et al., 2017). By adding virtual elements into contemporary learning contexts, ICT integration is transforming the educational environment. This also includes online tools created to help secondary school students with disabilities, such as those who are blind, learn more effectively.

Visual impairment (VI) is a condition that denotes reduced visual functioning even when different measures including; refractive corrections, surgery, and any other medical intervention are considered (Naipala & Rampersad, 2018). In this study, the concept VI signifies reduced (bad) vision and lost vision (blindness) (Ediyanto, 2017). Blindness is described as total loss of vision, in which a person is unable to see or complete tasks routinely using sight, whereas low vision is defined as the presence of residual eyesight that a person can only infrequently utilize to perform tasks (CDC & WHO, 2022). Individuals with VI have a restricted ability to capture visual information (Ediyanto & Kawai, 2019). Students in these categories in schools require special support of various ICT technologies to function and be effective members of their communities, including schools (Royal National Institute of Blind [RNIB], 2021).

According to the World Health Organization (WHO), a significant segment of the worldwide populace, comprising approximately 1.3 billion people, is presently impacted by visual impairment (VI). Approximately 26.3 million people, mostly in the African continent, have varied degrees of visual impairment (WHO, 2018). About 20.4 million of these individuals have limited vision, and 5.9 million are completely blind (WHO, 2021). The situation is particularly bad in the context of Uganda, which is classified as a developing country in the global arena. According to statistical estimates, 14.4% of the population is disabled in some way, with 7.2% of those people having visual impairments being a sizable portion (UBOS, 2019). This demography continues to grapple with a constrained environment, striving to navigate the complexities of survival across diverse life domains, including education (Otyola et al., 2017).

Presently, in Uganda, there are ten secondary schools with units which have enrolled SwVI. Nine of these are affiliated to regular schools, while one is a special secondary school for SwVI. By 2017, enrolment of students with visual impairment in both government and private schools was 4,020, accounting for 46% of the total enrolment of students with disabilities compared to 3,783 (44.5%) in 2016, 3,709 (47.8%) in 2015; 3,982 (48%) in 2013; and 6,275 (48.3%) in 2010.

Basing on the above statistics, it indicates that there is a small number of students that are visually impaired in secondary schools in Uganda for many years while ICT laboratories have shown insignificant increase over the years.

Numerous national, multinational, and global activities have been hampered by the aforementioned predicament. On a positive note, the UN Sustainable Development Goal (SDG) 4 highlights the need for equitable and accessible high-quality education as well as the expansion of opportunities for lifelong learning for everyone. The SDG aspires to provide free access to comprehensive, and basic primary education and secondary education for all students with a focus on poor countries by the year 2030 (Fukuda-Parr, 2016).

The Convention on the Rights of PwD (2006) underscores in articles 3 and 4 the responsibility of countries to ensure accessible information for individuals with disabilities, including those with visual impairments. Article 9 of the same convention further mandates member states to implement suitable measures that guarantee equal access to information, communication, and electronic services for people with disabilities on equal basis with others (Pillay, 2014). Additionally, the UNCRPD, Article 21 (a) guarantees PwDsthe right to freedom of expression and opinion through access to public information in accessible

formats and technologies for different disabilities; and Article 24 provides that people with disabilities have the right to education (Pillay, 2014). Collectively, these provisions underscore the pivotal role of ICT in facilitating an inclusive and high-quality education for students who have special needs, especially those with visual impairment. Relatedly, Article 1 of the Marrakesh Treaty of 2013 mandates member states to organise literary and artistic works in textual or related visual forms, irrespective of their publication status, in alternative formats accessible to individuals with visual impairment or other print-related disabilities.

Article 25 (1) of the Republic of Uganda's 1995 Constitution provides that every individual possesses the entitlement to equitable educational opportunities and resources, with the overarching aim of fully realizing this entitlement. In agreement, the Disability Act of 2006 (Act 715), of Uganda notably encompassing Article 17 within its "Education of a Child with Disability" segment, reemphasizes the commitment to inclusive education for individuals with impairments. This article designates the Minister of Education with the responsibility to pinpoint schools or institutions in each region that are established to furnish the necessary materials and tools essential for the comprehensive engagement of individuals with disabilities in educational pursuits. The core principle of "Non-discrimination" in education (Klironomos, Antona, Basdekis, & Stephanidis, 2006) strengthens the fundamental notion that all individuals deserve equitable educational prospects, irrespective of socioeconomic status, ethnic background, lineage, or physical limitations. Within this context, visually impaired students hold the entitlement to a parallel education to that of their peers, alongside the privilege of accessing and utilizing

technologies akin to those employed in conventional education, particularly those rooted in the realm of ICT.

ICT has emerged as a potent catalyst for enhancing the seamlessness of instructional and learning procedures. As noted by Roony (2017), the assimilation of digital media has ushered in a significant transformation within the educational sphere. This shift has notably facilitated accessibility of educational resources for Persons with Visual Impairment (PwVI), thereby augmenting their grasp of subject matter. Consequently, this shift in paradigm has bolstered the effectiveness and efficiency of the educational journey. Advanced nations, exemplified by the USA, have embraced innovative pedagogical approaches, notably leveraging technologies like Power Point presentations to actively engage students within the classroom. This immersive strategy, expounded upon by Mahbubur (2017) and corroborated by the Office of Educational Technology [OET, 2017), empowers students to interact with pertinent websites, videos, and cinematic content, thus enriching their learning experience.

The incorporation of ICT into the Norwegian compulsory school system is crucial for ensuring comprehensive inclusion of students with disabilities, particularly those with VI (Soderstrom, 2017). The outcomes of Söderström's research underscore the significance of inclusive education aligned with Norwegian ICT policy, especially for students facing blindness or visual impairment. Thus, as outlined by The Delta Centre, (2013), ICT serves as a vital instrument for individuals, particularly those with visual impairments, to access fresh opportunities and avenues in the realm of education within the Norwegian context.

In India, the use of ICT technologies in teaching SwVI is a common practice that is changing the landscape of educational accessibility, despite ongoing hurdles (Abha, 2014). According to evidence from a research conducted by Senjam, (2019)in India, students in 23 schools for the blind in Delhi had access to and used various tools, including hardware and software, for writing, reading, communication, and mathematical performance (Senjam et al., 2020).

The 2020 Global Education Monitoring Report (GEM) affirms the increasing recognition that in South Africa, Ghana, Kenya, and Uganda ICT significantly contributes to improving the accessibility of education for these children. The GEM study investigates the education of students with disabilities, encompassing those with VI, throughout Sub-Saharan Africa. A notable issue highlighted in the report is the substantial expense associated with the tools utilized in these endeavours, leading to restricted accessibility and insufficient utilization of the designated ICT resources. In a related vein, the ICT4AD 2003 program was put into action in Ghana with the intention of addressing a number of goals, one of which was to ensure improved educational accessibility, particularly for those who were marginalized, such as those with disabilities (Government of Ghana, 2003).

The government has started projects targeted at promoting the incorporation of ICT in secondary schools in East Africa, particularly in Kenya. The formation of school broadcasting efforts is meant to make use of World Space Technology (WST) to offer curricular content to roughly 3000 secondary schools. Additionally, the Kenya Institute of Education (KIE) worked to digitize educational materials and provide computer resources to 142 schools by the year 2006 (Hennessy et al., 2010). Special attention was given to students with visual

impairments (SwLV) to use ICT tools. This encompasses providing training to individuals with visual impairments in effectively utilizing ICT devices such as electronic magnifiers, recording equipment, and electric lamps. These tools serve as instrumental aids, enabling learners to effectively access and actively engage in the teaching and learning process (Kiare, 2004; Assie, 2021).

Uganda is currently committed to eradicating biases and seclusion within its educational methodologies, actively participating in the framework of the CRPD that revolves around the concept of accessibility. By enacting its national ICT strategy in 2014, Uganda undertook a substantial pledge to enhance advancement and assimilation of ICT within its educational framework, ensuring equitable provision of comprehensive and superior education to its populace. Particularly noteworthy is Section (f) of Article 5.2.3 of the policy, which underscores the imperative for educational institutions to harness ICT in order to foster opportunities for individuals with disabilities. Both sections lay emphasis on the integration of ICT into the instructional and learning processes through curriculum assessment. Furthermore, Article 4.5.6 (f) encourages collaborative affiliations with corporations and Non-Governmental Organisations (NGOs) to facilitate provision of accessible resources aimed at heightening educational inclusivity (Government of Uganda [GoU], 2014).

In order to provide schools necessary ICT equipment, Ministry of Education and Sports (MoES) of Uganda currently works with a number of NGOs. ICT equipment for educational institutions is provided by Non-Government organizations such as Sense International, "Visual International Royal Holland," Kilimanjaro Blind Trust, and others. As a result, in primary and secondary schools that cater for learners and students with visual impairments, it is usual to

see technology like embossers, computers with software like JAWS and NVDAs, thermoforms, Perkins Braille machines, Orbit readers, and CCTVs. Recent studies support the availability of such tools and their importance in improving blind students' access to school (Samantha, 2017; Odeke-Nato, 2021).

The Uganda National Association of the Blind (UNAB), the Institutional Development Project (IDP), and the World Blind Union (WBU) have worked together to include people with visual impairment into ICT revolution. This partnership resulted in the creation of the first computer lab outfitted with Job Access with Speech (JAWS), a tool that enables people with visual impairments to easily access computers and keep up with events (Busulwa, 2015). Uganda has made tremendous progress in the present by adding Computer Studies (ICT) as a separate topic to the high school curriculum (NCDC, 2019). The ICT policy (2014), specifically in section 5.2.3, underscores the importance of revising secondary and tertiary curricula to seamlessly incorporate ICT into the education process. It is crucial to equip educators with essential ICT skills and fully integrate ICT into teaching methods to enable them effectively employ ICT resources for instructional purposes. The policy also emphasizes the need of providing chances for underprivileged students, such as those who are blind (MoICT, 2014). Notably, after a four-year cycle, this subject has been given examination status by the Uganda National Examinations Board (UNEB). The primary objective of incorporating ICT education at these educational institutions is to empower students with visual impairments, with essential computer skills that foster productivity and creativity, enabling them to generate a livelihood. In recent years, MOES has displayed a proactive approach by putting in place ICT laboratories and equipping them with computers and

multimedia communication tools in secondary schools across the entire country.

In the previous section, focus was on the necessary actions for effectively imparting ICT education to visually impaired students through its integration into the educational framework. The subsequent section will shift attention towards examining the present status of ICT, particularly its utilization in secondary schools.

One of the oldest towns in Uganda is Kabale, which has a total of seventeen (17) secondary schools; including ten privately founded community-based secondary schools and seven government-aided institutions. Notably, Kabale Municipality hosts one of the ten secondary schools for SwVI, with a total of 39 SwVI of which is tucked away within this town. Despite allocation of ICT resources and associated materials to secondary schools in Kabale Municipality, there exists an absence of tangible evidence demonstrating effective implementation. Discernible discrepancy in the transition rate from lower secondary to upper secondary is apparent among SwVI in comparison to their non-disabled counterparts. This phenomenon has prompted inquiries into whether ICT resources are available for educational needs of SwVI during their learning experiences, and whether educators, notably teachers, perceive these ICT tools as instrumental in surmounting the challenges of accessibility. It is against this back ground that the researcher's motivation was kindled to undertake this study, thereby contributing to the existing knowledge gap in this domain.

1.2 Statement of the Problem

The utilization of ICT for educational purposes has gained substantial importance on a global scale in the 21st century, presenting considerable potential in the field

of teaching (Habibu et al., 2021). In Uganda, ICT is incorporated as a subject in Secondary Schools, and efforts have been made to establish ICT laboratories. The government of Uganda, through the Ministry of Education endeavours to collaborate with NGOs to provide necessary ICT tools for teaching purposes, encouraging teachers to incorporate ICT in teaching all students including students with visual impairment in secondary schools. The discrepancies are, however that exist between the incorporation of ICT as a subject and its integration to adapted ICT as a pedagogical tool to enhance teaching across various disciplines for students with visual impairment is that, it still remains a formidable challenge to overcome (Nantongo & Hetland, 2020).

As a result, there exists a noticeable void in understanding the specific details of how (ICT) is harnessed to advance education of visually impaired students within Ugandan secondary schools. The efficacy of ICT education for visually impaired children in this perspective remains uncertain. The present study aims to uncover the underlying reasons behind the difficulties encountered by this specific group of students while utilizing ICT tools for educational purposes within higher education institutions. This research seeks to address this knowledge gap and shed light on these relevant issues.

1.3 Purpose of the Study

The purpose of the study was to examine the factors that influence use of ICT in teaching students with visual impairment in secondary schools in Kabale Municipality, Uganda.

1.4 Objectives of the Study

This investigation was guided by the following objectives;

1. To establish different ICT tools available for teaching SwVI in secondary schools in Kabale Municipality.
2. To examine teachers' competences in using ICT to teach SwVI in secondary schools in Kabale Municipality.
3. To analyse the perception of secondary school teachers towards the use of ICT in teaching SwVI.

1.5 Research Questions

This research was guided by the following research questions;

1. What are the ICT tools available for teaching students with visual impairment in secondary schools?
2. What competence do teachers have in using ICT to teach students with visual impairment in secondary schools?
3. What perception do teachers have towards the use of ICT during teaching SwVI in secondary schools in Kabale Municipality?

1.6 Scope of the Study

This part outlines the extent of content coverage, geographic boundaries, and temporal framework. The study was confined to investigating the utilization of ICT for instructing students with visual impairment (SWVI) within Secondary Schools, encompassing both in-classroom and out-of-classroom situation. This entailed establishing the types of ICT tools available in secondary schools,

examining competencies teachers had in using ICT tools to teach SWVI, and analysing teachers' perception towards the use of ICT in teaching ICT to SwVI.

1.6.1 Content Scope

The research was conducted in one secondary school in Kabale Municipality and it was limited in finding out the use of ICT in the teaching of SwVI in the school.

1.6.2 Geographical Scope

The study was conducted in the South Western Ugandan district of Kabale Municipality at the Y Secondary School. The school was chosen because it had a unit of students with visual impairment who use ICT equipment and at the same time are the beneficiaries of the utilisation of ICT. Secondly, the school had special education teachers who were expected to use ICT tools during teaching SwVI; therefore, they were expected to be potential for the required information.

1.6.3 Time Scope

The research took place from June 2022 to November 2023.

1.7 Significance of the Study

The information gathered from this research is expected to be of help in the following ways;

Assist policy makers and curriculum development authorities in revising and enhancing ICT-related policies and curricula to align with the specific learning requirements of secondary school students with visual impairment.

School management teams may learn to understand that the use of ICT is imperative, and then opt to plan well how to implement and monitor the policies and other guidelines from the MoES.

Teachers may become aware of the different ICT tools that are available and those that are not available in the school but can be accessed with efforts to enhance their teaching.

In order to achieve better, visually impaired students could be inspired to use ICT and work together with their teachers.

The study could potentially stimulate additional research in the realm of ICT, fostering greater exploration of ICT utilization in the instructional processes for secondary school students with visual impairment.

1.8 Definition of operational Terms

ICT is characterized as a diverse range of technological instruments and attributes utilized for information transfer, storing, creation, sharing, and trading. Computers, the Internet (websites, blogs, and emails), live broadcasting media (radio, television, and webcasting), recorded broadcast media (podcasting, audio and video players, and storage devices), and telephony media (fixed or mobile, satellite, vision/video-conferencing, etc.) are some examples of these scientific tools and assets (UNESCO, 2017).

Pedagogical tool: this is a device or instrument that is used to promote interaction between the teachers, students, learning environment and the learning tasks during the teaching process (Murphy, 2008).

The pedagogical tool: The pedagogical tools in this study refers to the ICT resources being utilized as teaching aids to facilitate student's learning.

Teaching: this is an interactive and cooperative process between the teacher and the students to facilitate the active construction and transmission of knowledge, skills and values by students (Ramírez et al., 2015). Teaching has been used to

refer to the process in which teachers interact with SWLV to facilitate access to curricula activities both within and outside the classroom situation.

Visual impairment: this is a condition in which a person has difficulties in sight rendering the performance of visual tasks difficult. Within the scope of this research, the expression "visual impairment" pertains to both blind students and those with limited vision.

1.9 Competence

Competency in ICT, was defined as the confident and critical use of electronic media for work, leisure and communication. These competencies are related to logical and critical thinking, to high-level information management skills, and to well-developed, in learning and teaching learners with VI, (Gonczi et al., 1990; Hager, 1994 & Biggs, 1994). In order for a teacher to be competent in teaching ICT for students with visual impairment, he/she has to have the ability to teach it effectively and efficiently.

1.10 Theoretical Framework

The framework that guided this research was the innovation-decision process model, developed by E.M. Rogers (2003) This model clarified how individuals embrace different innovations and underscores that the choice to adopt a modernization entails multiple phases (Rogers, 2003). Situated within the Diffusion of advance structure, E.M. Rogers scrutinizes the organizational dynamics and processes involved during the introduction of a change. He outlines five distinct stages within the change adoption process, each crucial for effective implementation.

Diffusion of innovations theory Rogers (2003) advances that if faculty members face the new demands placed on them, they will adopt technology and if teachers see that technology is important in their teaching, then they will use it cited in Finley et al. (2003). Therefore, in this case, a teacher is supported to possess knowledge and skills use ICT devices at his his/her reach to deliver content to the SwVI by them on how to use the same ICT technologies to access the content being delivered during teaching process.

In conjunction with these five stages, the innovation-decision process model introduces antecedent conditions pivotal to the assimilation of an innovation. These prerequisites encompass factors such as existing practices, perceived needs or challenges, personal proclivity for innovation, and prevailing societal norms within the relevant social context (Rogers, 2003). Furthermore, the model distinguishes distinct levels of knowledge underpinning the adoption process, including alertness (the recognition of an innovation's existence), how-to knowledge (proficiency in employing an innovation effectively), and principles knowledge (an understanding of the underlying rationale of a given strategy).

The framework outlines elements that impact whether an individual develops a positive or negative perspective toward an innovation. These factors encompass the innovation's comparative benefits, its alignment with existing beliefs and practices, its level of difficulty, the ease of experimentation (trialability), and the possibility of observing others using the modernization prior to making a choice (observability). Additionally, to enhance the likelihood of an innovation being adopted, a person must possess a sufficient degree of understanding before attempting to use the innovation. Thus, this knowledge becomes more critical for relatively complex innovations.

It is essential to be conscious of when a change is being adopted and to ensure that every step of the process is followed. In this manner, stakeholders who were not adequately briefed on the improvement's worth and repercussions won't be able to contest it when it comes to the final authentication process. Failing to do so may set off recurrent behaviors that restrict an organization's ability to continue implementing the innovation.

The viewpoints of the individuals involved will have a significant influence on how they view modernization when changes are implemented. The decision-makers at higher organizational levels will view a certain tool's benefits differently than individual providers in a large-scale technological implementation. For example, the management team will prioritize having a CRM-style information system that more accurately reflects customer patterns while implementing the new call center software. Frontline employees, who might not understand the software's immediate value, may view it as a monitoring tool to assess the quality of their job in the interim.

As long as the people making the changes gradually sense an increase in their own value, the procedure can be divided into five stages to lessen the impact of the change. On the other side, motivation will be lost and creativity is likely to peter out if the person must wait months or years before seeing a value.

The Innovation-Decision Process model is segmented into five distinct phases**:**Knowledge, influence, choice, execution and proof.

Knowledge

When someone becomes aware of the improvement's existence and exhibits a curiosity in finding out how it operates, they move into the knowledge stage. This

information can be obtained from peers and coworkers, conferences, or marketing. The individual may come across an idea when reading a blog post or an email from a marketing campaign. Current vendors or users of the innovation are frequently involved in this step.

Missing the knowledge step might complicate the change management process because important stakeholders might feel under informed or unconsulted. This may cause emotional conflict during the persuading phase and later have an impact on the implementation phase.

Persuasion

During the influencing stage, the person determines the potential advantages of implementing a new idea and continues to assess its potential. At this phase, it is critical that the invention be valued by a potential user or benefactor. This can be accomplished by explaining to them how the innovation in question can improve their performance or help them save money or time. Testimonials are a great way to support these kinds of statements and change people's perceptions.

In a top-down decision-making process, this stage may be skipped if a senior leader is pleased with the invention but others are not convinced of its usefulness. However, when the persuading phase is skipped, people frequently come up with workarounds to continue using their old habits rather than starting new ones.

Decision

At the decision-making step, it is decided whether an innovation will be accepted or rejected. At this level, a senior leader might need to take part or offer advice. Encouraging cooperation gives everyone a sense of ownership over the decision, even if it is made by a small group of individuals or by one person. To make sure

they feel included, all stakeholders should be involved in the decision-making process, if only through communication. Whether or not to use the enhancement will be up to the individual even after it has been approved.

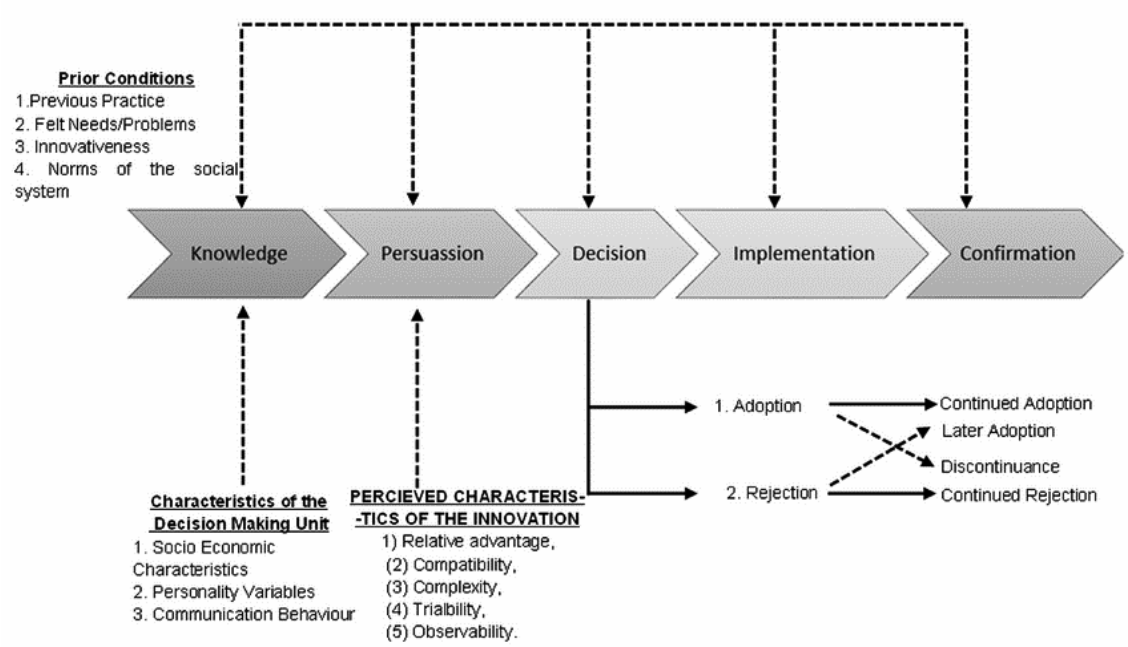
Implementation

The execution phase is the process of turning the idea into a reality. There can still be some debate about the creation's outcomes and whether to continue with it rather than reverting to the previous ways. Usually, a team led by a project manager or a designated change administration board is involved at this step. The implementation team needs to consider ways to reduce the financial, energy, and psychological costs of change, in addition to other costs. Training seminars can significantly reduce the implementation and changeover fee. During the implementation stage, usability is most important. Speaking with people about their effective and unjustified integration of modernization into their actions is another technique to motivate and influence them during this time.

Confirmation

In the final phase of the change-innovation process, known as the proof stage, an individual seeks validation for their decision. In a formal project management technique, the confirmation stage consists of measuring whether or not the fundamental project criteria have been satisfied. The confirmation step is considered successful when people cease looking for shortcuts and antiquated methods.

Communication Channels



Source: E.M. Rogers (2003)

A Model of Five Stages in the Innovation-Decision Process (Source: Diffusion of Innovations, Third Edition by Everett M. Rogers, 2003, Pg-165)

Relevance of DoI theory

As described by Rogers (2003), the Theory of Diffusion suggests a systematic process through which individuals within a social system gradually become informed about innovations through specific channels. It underscores the continuous emergence of innovative ideas (innovations) and technological advancements, stressing the pivotal role of communication in introducing these innovations to societies or communities. The theory encompasses several characteristics associated with innovations, with relative advantage, compatibility, complication, trial ability, and observability (Comer & Kendall, 2013), which guide and facilitate decision-making during the modernization and its diffusion within the environment. This dissemination eventually leads to the adoption of new ideas, practices, or products within a social system.

According to Zhang et al. (2015), the Theory of Diffusion is widely recognized as a prominent framework for investigating the adoption of IT and comprehending the dissemination of IT innovations across societies. It has served as a foundational basis for exploring and promoting the acceptance of innovations across diverse fields such as political science, public health, communications, history, economics, technology, and education. An individual's willingness to embrace a concept, behavior, or product is contingent on their perception of its innovativeness or novelty. This concept underscores the relevance and effectiveness of incorporating ICT into the teaching and learning of SwVI

Criticism of the theory

DOI study links an innovation with specific and quantifiable characteristics. However, this definition gives rise to certain challenges. Firstly, it remains unclear whether the provided list is exhaustive and encompasses all factors that influence the behavior of adopters. This prompts questions such as why attributes like technical elegance or style are absent from the lists, especially when historical studies in technology contradict this omission. Secondly, it raises the query of whether all technological innovations should be encompassed by the same set of attributes. For instance, can Electronic Data Interchange (EDI) be described using the same attributes as a television? Thirdly, it fails to address the varying roles played by these distinct characteristics at different phases of diffusion. For instance, the concept of compatibility may hold different meanings for early adopters compared to late adopters. Lastly, this assumption overlooks the socially constructed nature of extensive technological systems. Extensive research underscores that such innovations are shaped by social interactions, involve extensive learning processes, exhibit complexity, and are interconnected.

Application of DoI to the study

Drawing upon the Creativity Diffusion Theory and the idea of human creativity in the realm of information technology, learning management systems have a significant influence on the application of ICT in the teaching and learning of visually impaired students. With the increasing impact of globalization, information technology (IT) has become a crucial component in the inclusive education landscape of contemporary societies. The Diffusion of Innovations (DOI) theory is employed to comprehensively consider how e-learning, as a method of instruction, harnesses the Internet or Intranet to access educational content for visually impaired students within the interaction between educators and learners. These technological advancements possess the potential to fundamentally and extensively transform the manner in which educators of visually impaired students employ ICT within their instructional practices.

These Information Systems (IS) can improve the effectiveness of education for visually impaired students, resulting in an enhanced learning environment and subsequently improving students' attitudes towards the learning process.

The DOI theory cited hereof is relevant and gives strength to the study at hand. Therefore, this being a theory type of research study, citing a theory that underpins the study topic, is helpful to see, how from theoretical perspective, the study can later be applied for practical purpose, to address the observed challenges on the grounds, whereby ICT becomes the desirable tool in promoting effective learning of SwVI in the area of research, specifically and in the country at large.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.0 Introduction

This section introduces the prevailing body of literature sourced from diverse materials such as books, journals, reports, and historical records, all of which are interconnected with the current research topic. It delves into an analysis of concepts and outcomes derived from previous scholarly investigations, elucidating their relevance and contribution to the ongoing study. Anchored in the research objectives, which encompass the exploration of various categories of ICT tools accessible for instructing SwVI, the identification of teachers' competencies in teaching ICT to visually impaired students, and the evaluation of teachers' perspectives when utilizing ICT for instructing SWVI, this review endeavour seeks to illuminate and inform the current research.

2.1 Different ICT tools available in teaching SwVI;

Enhancing accessibility in teaching and learning for instructors and students with disabilities requires the provision of ICT tools in secondary schools. Information and communication technology (ICT) and specialist software/programs have therefore been created to support SwVI in secondary education. This part will therefore concentrate on a review of the literature from different academics regarding the many ICT tools available for teaching SwVI in classrooms. The Kurzwell Reading Machine, computer, Internet, and World Wide Web are important resources that help teachers provide print materials in accessible formats to students with visual impairment, according to Lucky and Achebe (2012). Similarly, Mugo (2013) recognized the importance of assistive

technology during the teaching and learning process, when students with visual impairments typically interact with their teachers, and named JAWS for job access, NVDA for non-visual devices, Dolphin pen, zoom text, portable scanning and reading programs, and other types of assistive technology.

ICT devices for SWVI are categorized into high tech and low-tech devices (Eerdem 2017 &Sah2013). High tech devices use complex multifunction technology and these include computers with associated adapted software such as screen readers which converts print materials and electronic text into speech, Screen magnifiers which enlarges screen content for the person with low vision,, smartphone, optical Character Recognition software, (OCR), Mobile Television and Clear reader which scans the print materials and reads to the persons with visual impairment. Other technology tools include scanners for converting images from print materials to computer files that can be changed to accessible formats.

While low tech ICT tools are those which are electronic but do not have highly sophicated and advanced components. These may include audio recorders, audio players, handheld magnifiers, table lamps, talking calculators with large keys and electronic magnifiers. The author states that, these ICT tools are essential and compatible for the instruction of SWVI. According to Cassidy (2014), mobile technologies such as smart phones, tactile tablets, iPhones, and iPads are ideal communication tools for students with visual impairments since data required for their learning may be quickly moved from the teachers' device to the students' device. Wachiuri and Nguyo (2015) noted that appropriate ways to support teachers in granting SWVI access to printed materials that have been distributed to regular students with disabilities include ICT tools like screen readers, screen

magnifiers, closed-circuit televisions, electronic magnifiers, scanners, and optical character readers; portable and refreshable Braille displays; digital and electronic data; and accessible cell phones.

These ICT tools are of utmost importance for students with visual impairment particularly those with low vision, as they enable them to access printed information in suitable formats. Specifically, these tools provide audio output for word documents displayed on computer screens and the capability to enlarge font sizes in text resources. The array of available ICT tools for visually impaired students includes tape recorders, Braille note takers, adapted computers, scanners, Closed Circuit TV Scanner Braille Embosser, Special Software Talking Dictionary, voice-over protocols on the Internet, Talking/tactile Watches, and Bluetooth Radio. In schools, teachers can leverage these ICT tools to support students with visual impairments (SWVI) during classroom activities and lessons.

Kisanga (2022) emphasizes the importance of screen readers, Braille translation software, Braille writing equipment, digital access Information System, Optic Character Recognition OCR, and DAISY players in the teaching and learning process. Relatedly, Eligi and Mwantimwa (2017), observe Tape recorders, Computers, Perkins Braille, Closed Circuit TV, Scanner, Braille Embosser, Note Taker, Special software, Talking Dictionary, Internet Talking Watch, Typewriters, and Radios as crucial learning tools for SWVI. All of the ICT tools and applications mentioned above are critical to SwVI because they enable students to obtain print information that would otherwise be difficult for them. On the same note, Mulloy et al., (2014) mention interactive boards such as Promethean boards for the direct display of computer images to students with visual impairment, voice recorders for recording lessons and assignments, and

adapted calculators with large keys, high contrast screens, and lamps for increased illumination as potential ICT tools. They believe that teachers and SWLV should use these ICT tools during class. In addition, Tedla et al., (2012) report that ICT has a significant role in teaching. According to Tedla, educators use ICT to arrange course material and deliver it to students in easily understood formats. It also transforms the classroom into a playground where students and teachers can engage, communicate, and work together during instruction. Finally, it makes teaching enjoyable and maintains students' interests and motivation. According to Cullen et al. (2012), the Dolphin Guide software improves the SwVI's efficiency and confidence in using specific computer technology functions.

Fichten, Asuncion, and Scapin (2014) also report Internet), Web-based learning, and collaborative software programs such as PowerPoint) as essential resources for SwDs including SwVI. They found that individuals with VI are able to perform basic computer functions such as creating papers, sending emails, conversing with friends, and searching for information on the Internet. According to Kleanthous and Meletiou-Mavrotheris (2018), ICT tools that are crucial for enabling virtual learning for SwVi include computers with complex software, graphics calculators, hand-held devices with integrated graphics packages and dynamic geometry software, and web-based applications, especially in math classes in lower and upper secondary schools. Teachers, for example, employ short instructional videos on certain themes that students' study at home. As a result, students can view lectures online and participate in online conversations. As a result, learning is viewed as a social dynamic rather than a purely individual

process (Moore, 2016). This therefore, enhances SwVI participation in learning and accessing information.

Sereros (2010) identifies Braille systems, Voice synthesizers, Optical Character Recognition Systems, Closed Circuit Camera Systems, Text, enlargement software, Interactive Whiteboard as appropriate to support SwVI to access the internet Sereros reveals that there was a disparity in the preparation of teachers of which those in rural special schools had received training in Braille other than ICT, while those in urban areas had some training in ICT use. The study, therefore observes that utilizing ICT as a pedagogical tool has consequences on the side of teachers' training needs. Similarly, Phiri (2016) conducted a study in Zambia and found that although schools in urban settings have reported success, effective and efficient technology implementation still faces numerous obstacles, including inadequate access to electricity, difficulty adjusting to constantly evolving new technologies, and a shortage of ICT tools. According to Phiri, kids value ICT more than teachers do when it comes to studying and teaching mathematics. One would question how educators can use technology so well when there are still obstacles to successful ICT integration in the classroom. These obstacles include low appreciation but unsupportive curricula, a lack of internet connectivity, a shortage of ICT facilities, and the high expense of purchasing and maintaining ICT instruments. Studies reveal that the main obstacles to implementing technology in teacher training are inadequate administrative support, poor curriculum fit, lack of confidence in teachers, lack of time, lack of training opportunities, technical issues, and lack of access to resources (Nikolopoulou & Gialamas, 2016). Adegbenro et al., (2017) assert that it is essential that teachers receive training in ICT to be able to fully integrate ICT

in their teaching practices. Teachers have problems in the use of various ICT devices for SWLV in terms of setting them up for teaching for learning purposes and are not confident enough to teach SWLV though they had trained in Special Needs Education (SNE) (Mugambi, 2011). Similarly, Sah (2015) notes that low tech ICT tools are electronic devices that do not comprise of sophisticated and complex software like electronic voice recorders, audio players, talking calculators with large keys/printers and electronic magnifiers. Studies reveal that the main obstacles to implementing technology in teacher training are inadequate administrative support, poor curriculum fit, lack of confidence in teachers, lack of time, lack of training opportunities, technical issues, and lack of access to resources (Nikolopoulou & Gialamas, 2016).

Ramadhan (2018) also explains several useful tools for students with visual impairment in their learning, such as mobile phones, screen readers, desktop computers, laptops, and specialized keyboards. He emphasized the importance of specialized software like screen readers, talking word processors, and screen magnifiers, which enable students with visual impairments to navigate the screen and read text without difficulty. With these ICT tools available in accessible formats, students with visual impairment can independently access course study notes and handouts on eLearning platforms without relying on sighted individuals for assistance. Wong and Cohen (2015), in their study on the access and challenges of assistive technology application among teachers of students with visual impairment in Singapore, identified essential ICT tools, including high-tech devices such as computers with built-in job access speech (JAWS), magnification software, zoom text, and CCTV, as well as low-tech devices like table lamps and photocopiers to enlarge text for better visibility.

Simui, Nyaruwata, and Kasonde (2017) emphasized the significance of various ICT tools, including ordinary typewriters, voice recorders, scanners, jaws, and computers, in assisting students with visual impairment (SwVI) to write and read print materials. Notably, the JAWS software plays a crucial role as it reads the text displayed on the screen aloud, enabling SwVI to access and comprehend written information effectively. They point out computers with magnifying software to enlarge the content being helpful to students with low vision. Similarly, in a study conducted by Shikden (2015) observed that computers, talking calculators and clocks as available ICT tools to use by SwVI in schools. In his study, Shikden found out that low tech ICT tools were the only one's schools had while high tech ICT tools were not available. Additionally, Sah (2015) observe low tech ICT tools as electronic devices that do not comprise of sophisticated and complex software like electronic voice recorders, audio players, talking calculators with large keys/printers and electronic magnifiers which would otherwise help the SWVI in accessing print information.

A study by Eguavoen (2016) reveals that while majority of Students with visual impairment apply smart mobile phones to access information, a few use personal computers as well as e-learning platforms including internet implying that ICT resources like smart mobile phones were likely to be of more use since they are seen to be cheaper as compared to PCs on the local market. With this, ICTs is essential as it enables students with visual impairment to access the learning materials alongside the sighted students hence gain confidence and increase learning aptitude.

The researcher is in full agreement with the views stated above. The researcher says that school administrators ought to encourage teachers to adopt the use of

these technologies for the reason that they not only facilitate teachers to impart knowledge and skills to their students but also contribute towards positive learning outcomes in an inclusive school arrangement. This implies that if such mid and high tech are availed to schools cognizant of the number of students with visual impairment taking note of their various vision levels and tactile abilities is likely to enhance participation of students with visual impairment through an inclusive mode of education attainment as a result of narrowing the academic gap hence, scaling up performance across all disciplines. Secondary schools ought to put in place ICT infrastructure as well as equipment meant to support the teaching of SWVI. On the other hand, SWVI should be encouraged and trained to use ICT tools available as a way of enhancing their learning.

2.2 Competences teachers have in using ICT to teach students with visual impairment

Tondeur et al. (2008) describe computer competence as the ability to handle a diverse range of computer applications for a variety of objectives. According to Afolabi (2010), education world over is regarded as a crucial factor in the way countries have been implementing this mother right that is; providing special education school model to units attached to mainstream schools and inclusive school models with ICT playing a significant role of using accommodative instructional strategies by teachers (Syed, 2016).

Mugabi (2011) acknowledges the validity of the principles discussed earlier, he asserts that the quality of education and training provided to students with visual impairment (SWVI) largely hinges on factors such as the academic qualifications, training, commitment, and dedication of the teachers involved. The incorporation of ICT in the teaching of learners with visual impairment promotes constant

contact between teachers and students thus, allowing students with VI to actively participate in the on-going lessons (Zou et al., 2012). Research shows that teachers' attitudes towards technology influence their acceptance of technology's utility and integration into teaching (Holden & Rada, 2011). They further assert that if teachers' attitudes towards technology are positive, helps to facilitate the provision of useful insight into the acceptance and incorporation of ICT into teaching processes. As result Teachers' knowledge and attitudes are among the many factors that influence their use of ICT in teaching learners with visual impairment (Ngubane-Mokiwa & Khoza, 2021). This means that change of attitudes in teaches makes teachers have positive attitudes towards teaching of ICT.

In regard to Y secondary school, not much has been done to incorporate ICT in the teaching of learners with visual impairment. Because of inadequate ICT tools for the VI students, there is less contact between teachers and students. This therefore limits students with VI to actively participate in lessons like their counterparts without visual impairment.

In the United Kingdom, as in other countries, ICT is seen as a vital aspect of all students' day-to-day learning experiences, including students with visual impairment SWVI. ICT solutions such as virtual learning libraries and internet apps such as e-learning and e-mail have made it easier for professors of many disciplines to reach out to a large number of SWVI. Additionally, SWVI interface with ICT resources facilitate access to information with support from teachers Therefore, utilization of ICT in teaching is premised on aiding the presentation of information to students in a more appropriate format; promoting independent learning including searching for information (Livingstone, 2012).

According to Mnyanyi, Bakari, and Mbwette (2012), teachers employ a variety of information and communication technologies to teach courses entirely face to face or entirely online. This means that if teachers employ these technologies to meet the requirements of their pupils, students' ability to search for, retrieve, and access more information from various sources will improve, as well their reading. Tohara, (2021), noted that ICT has become increasingly significant in the assessment and learning of students with visual impairments for practicing teachers. As a result, most special educators today believe that ICT can help Students with VI improve their course grades and standardized test scores (Tohara, 2021). As such the use of ICT by teachers to teach SWVI has improved teaching and learning thus becoming more widely recognized (Kamaghe et al., 2020). Likewise, Ramos and de Andrade (2016) in their study findings observe that teachers had confidence in ICT capabilities. Besides, they were found with less resourcefulness in some of the ICT tools and software specific to low vision with a substantial number of teachers ignoring to use many of these ICT tools. They further account that the lack of specific training is considered to be the main impediment for teachers regarding the full integration of ICT in teaching their SWLV. This is in agreement with Zhou et al., (2011) who observed in his study that, majority of teachers (74 %) expressed having lower level of knowledge and skills than they ought to have in ICT implying lack of knowledge and skills to use for teaching purposes. They further indicate that teachers lacked confidence to use ICT to teach SWVI in the class.

Wong Meng Ee and Libby Cohen (2010) add that; if teachers have limited skills and knowledge in ICT, how then can students with visual impairment receive instruction using ICT. Contrary, Siu & Morash, (2014) in their study, observe

that most teachers had good proficiency in using ICT as an AT for teaching and that deficit in the proficiency of teachers in ICT negatively affected SWVIS' ability to use ICT in their learning. They go on to say that the proficiency of teachers in applying ICT is determined by their level of pre-service as well as continuous ICT training. They therefore, advocate for increased pre-service training as well as the incorporation of ICT into teacher training programmes as a strategy for adequately preparing teachers to teach students with visual impairment in schools.

A teacher for learners with visual Impairment can collaborate with a learners to assist them in developing efficient vision use (Eligi & Mwantimwa, 2017). Where appropriate, teachers can allow learners with visual impairment to tape class notes and/or provide enlarged versions of the notes. Using a photocopier to enlarge the materials for the classroom, make large print copies of them available. Additionally, teachers must communicate whatever is written on the chalkboard orally for instance reading loud subtitles when using media resources. As such, With ICT can be a useful resource to make content more interactive and engaging for learners and to improve the quality of materials; therefore, it is important for teachers to incorporate technology in their teaching to generate benefits for their students (Medina-Garca, Higueras-Rodrguez, Gara-Vita, Doa-Toledo, 2021).

Malburg's (2012) study indicates that teachers use ICT tools especially tape recorders to record their notes for teaching and make SWVI listen to the notes, thus enabling them participate in class discussions and visual presentation effectively. According to Ong'eta and Nyambura (2013), the availability of many alternative media such as audio tapes, Braille outputs, electronic texts, tactile

drawings, and aural descriptions promotes increased learning autonomy. While, Wong et al. (2016) noted that teachers were familiar with both low and high-tech ICT devices but lacked the necessary expertise to effectively utilize them in their teaching methodologies, highlighting a deficiency in integrating these tools into their instructional practices. The findings revealed that the majority of teachers were willing to apply their skills but admitted that they had limited knowledge and skills while others were using SWLV who were in the know of ICT to apply it in their teaching. They report that teachers instead still relied on Braille literacy even for SWLV in teaching other than ICT. Whereas Bouck et al. (2011), observe that, ICT allows SWVI to present their assignments and do scientific calculations within the teaching/learning process, allowing students to finish their work in less time. As a result, it is correct to argue that ICTs enable SWVI learners to access learning materials alongside sighted individuals, gaining confidence and increasing learning aptitude.

In ICT, most teachers lack professional qualifications, and those that do have training is usually quite basic (Matevula and Uwizeyimana, 2014). This affected every student's capacity and self-assurance to use ICT in the classroom, particularly SWLV students. They continue by saying that in order to build sufficient capacity among instructors, ICT requires the development of new skills, attitudes, and pedagogical techniques through ongoing training programs. The following skills and abilities are identified as vital in ICT by this study: maintaining files and databases; sending and receiving emails; communicating using digital tools; organizing resources to connect their classes; and presenting content using projectors, videos, and podcasts.

Various studies show that, teachers' attitudes about technology play a critical role in determining how eager they are to adopt and use technological tools into their teaching practices (Holden & Rada, 2011). Likewise, the success of the incorporation of ICT into instructional approaches is greatly influenced by the instructors' positive attitudes toward technology (Ngubane-Mokiwa & Khoza, 2021). Towkareva & Turner, (2011) point out that, some of the barriers of using ICT are negative attitudes and limited training They emphasize that digital competence is one of the key aptitudes in the new skills especially in the use of ICT equipment and digital content and tools in the teaching for learning. They further noted that, the purpose is to enhance digital skills and literacy for improving accessibility by SwVI.

In order to enhance accessibility in education for both instructors and visually impaired students, the presence of (ICT) technologies within secondary schools is essential. Specialist software and programs, alongside dedicated ICT tools, have been developed to support Swvi.

As a result, several of the listed assistive technology tools were not used by participating teachers since they were unfamiliar with them (Safhi et al., 2019).

This implies that visually impaired pupils will not be able to integrate into the teaching and learning process with their peers who are not visually impaired if teachers do not provide them with assistance through training. Only if the teachers use the same ICT tools will this training be possible. In a similar vein, Andin & hHazman (2010) note that the use of ICT in education helps teachers manage teaching and learning more efficiently and effectively while also increasing student participation. Kamis and Khalid (2017) point out that ICT can be beneficial for teaching and learning if it is used in the correct ways, with the

relevant sources, training techniques, and support systems. According to Subedi (2021), the majority of SWVI teachers were proficient in assistive technology and were using it to instruct students who had visual impairments. In addition, they needed ongoing ICT training to improve their ability to use digital technology for teaching. In his study, he found that teachers require ongoing training to stay current while using ICT to teach students new abilities since educational technology is changing so quickly that they can impart new knowledge to their pupils. According to Oira (2016), schools ought to be outfitted with contemporary assistive technology that promotes independence in learning and is easier, faster, less cumbersome, and more motivating.

According to this study, the majority of teachers in Y secondary school are unfamiliar with using assistive technology to teach pupils with visual impairment. It is also critical that they receive ICT training in order to improve their skills in using digital technology when teaching pupils with visual impairment of ICT into the teaching of visually impaired learners as to make it easier for teachers and students to interact continuously. This implies that ICT devices appear to be used sparingly at Y Secondary School in the instruction of visually challenged students. On the other hand, interaction between professors and students has made it more difficult for visually impaired students to utilize ICT resources. This makes it more challenging for visually impaired children to participate in class than it is for their peers who do not have vision impairment.

2.3 Teachers' perception towards the use of ICT during Teaching SwVI

In this section, I wanted to find the teachers' perception towards the use of ICT to teach students with SwVI. Webster and Mary (2014) define perception as a way of explaining or interpreting something by giving opinion. It is not afresh idea to

integrate ICT into teaching and learning. It might be as old as televisions and radios, among other technologies (Jenko & Zupan, 2010). Particularly web-based technology is developing rapidly, making it an increasingly significant component of the learning environment. As a result, teachers are actively working to improve the standard of instruction by utilizing cutting-edge strategies. Numerous studies examining the critical role that ICT plays in the teaching process have shown a number of aspects that impact instructors' viewpoints. These factors include things like self-efficacy, motivation for using computers, attitudes toward computer technology, the relationship between attitudes and behaviour, technology assimilation, constructivist viewpoints, motivation for adopting ICT, attitudes concerning ICT in education, structuring of learning experiences, institutional climate, resource availability, educators' pedagogical beliefs, perspectives on ICT-related educational policies, and individual perspectives. In line with this, teachers' attitudes and understanding have a significant impact on how well they use ICT to manage diverse student populations (Andoh, 2012).

Holden and Rada (2011) point out that teachers' positive attitudes toward the value of the incorporation of technology play a crucial role in generating important insights for incorporating ICT into instructional practices (Ngubane-Mokiwa & khoza, 2021). Previous studies have shown that when teachers integrate ICT into lesson plans; the curriculum is modified, allowing visually impaired students to become proficient in difficult subjects like mathematics and other scientific fields (Hutchison & Reinlcing, 2011). ICT was originally intended to be used largely to increase educational process efficiency (Miller et al., 2008). Therefore, the incorporation of ICT into education has the power to

improve knowledge, inspire motivation, and strengthen memory recall. ICT can also operate as a catalyst for collaborative learning experiences, which include projects, group problem-solving, and role-playing (Wepner et al., 2006; Lawless & Pellegrino, 2007; Brinkerhoff et al., 2006).

Teachers' perception regarding ICT are closely related to the integration of ICT into educational processes, including the difficulties educators face when employing ICT in education, Wang (2012) asserts that teachers' perception regarding ICT's application can elucidate how a teacher comprehends, interprets, and integrates ICT in the learning environment. In essence, teachers' perception shows significant influence over the success or failure of ICT integration in education (Apeanti, 2014).

Consequently, investigating teachers' perceptions, acceptance, and attitudes towards ICT becomes imperative for comprehending the dynamics of ICT integration in classrooms (Hutchison & Reinlcing, 2011). Abasi et al. (2021) emphasize that teachers' personal perceptions and beliefs significantly contribute to the effective or ineffective integration of technology, as these beliefs guide their instructional decisions on how to incorporate ICT within their teaching practices, especially in supporting students with visual impairment. Concurring with the above viewpoints, Hongeru et al. (2017) underline that teachers' instructional strategies are profoundly shaped by their pedagogical convictions. Furthermore, educators tend to favor technological applications that align with their pedagogical approaches and preexisting educational convictions. Put simply, teachers, particularly those with more computer experience, exhibit greater confidence in effectively employing ICT to enrich diverse learning in their daily instructional procedures (Taimalu & Luik, 2019).

Simseket al., (2010) has found that most of the teachers (trainers) who were teaching SWLV in using ICT had only attended a course on how to teach SWVI but the training did not sufficiently give them the capacity to teach ICT to students with visual impairment as a pedagogical tool. They therefore observe that teacher preparation programmes ought to include arrangements for ICT training as a capacity-building strategy. Similarly, Tendla (2012) points out that most teachers lack knowledge in the using ICT as they indicated not have had any training in ICT. Tedla further explains that ICT usage is highly dependent on teachers skills and confidence. They therefore need ICT training for both pre-service and in-service training. ICT use in mathematics education is "dependent on several issues, including teachers' perceptions of ICT skills, teachers' attitudes toward ICT contribution to mathematics teaching, and teachers' attitudes toward ICT contribution to students' mathematics learning," according to Das (2019). Likewise, they argue that "all subjects are subordinate to mathematics."

In a similar vein, Bandung et al. (2016) have noted that successful ICT integration in the classroom depends heavily on teacher development. They claimed that, regardless of experience level with ICT training programs, teachers' proficiency in using it affects their attitudes toward using it and helps them rearrange how they use it. They also mentioned how modern technology tools play a big role in SwVI students' learning. Technology is currently the most effective methodology in the educational system for teaching mathematics, according to McCulloch et al. (2018). This implies that a teacher needs to be sufficiently equipped to incorporate technology into ICT teaching and learning, and pre-service training is one way to do this. For this reason, a study of this kind

is pertinent to SWVI teaching and learning in this digital age. Several studies have demonstrated that ICT-related training programs, whether intended for novice or experienced educators, help teachers advance their computer literacy and change their attitudes toward the technology. Teachers that employ technology in their assignments can also benefit from these training programs (Plair et al., 2008). While this is the case, it's crucial to remember that instructors are often discouraged from adopting and utilizing ICT in their classrooms due to "fear of failure" and "lack of ICT knowledge." This highlights how crucial it is to inform educators about the advantages of using ICT and inspire them to do so in order to improve the quality of educational support that SwVI can receive.

The study concurs that if suitable assistive technologies for students with visual impairments are purchased and provided to schools, along with training for teachers on how to utilize them, teachers' concerns will be reduced in the first place. Secondly, the technology will not only spark teachers' interest, but will also fully engage students with visual impairments in lesson activities involving ICT.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This study presents the methodology which guided the study on ICT and its use in teaching SwVI in Secondary Schools in Kabale Municipality, Uganda. Aligned with the aforementioned research objectives, the chapter covers the presentation of the research approach, research design, target population, sample selection, and sampling method. It further details the data collection methods, procedures, ethical considerations, and outlines the intended data analysis process. It also presents the limitations and delimitations of the study.

3.1 Research Approach

There are numerous research procedures available for examination, including mixed, qualitative, and quantitative approaches (Bryman, 2016). The research methodology adopted for this study is qualitative, which is a thorough investigation to understand a particular social phenomenon from the perspectives of individuals or groups (Farr, 2008). Employing a qualitative research approach was imperative for this study as it facilitated the direct gathering of comprehensive and specific insights from participants regarding the utilization of ICT for educating children with visual impairment within a classroom setting (Creswell & Creswell, 2018). Adopting a qualitative research strategy is essential since it can accurately capture complex and first-hand accounts of a small participant pool.

3.2 Research Design

In the realm of qualitative research methodologies, various research designs can be employed. Options such as case studies, action research, ethnographic studies, grounded theory, among others, are encompassed within these choices. For this particular study, the selected research design was that of a case study. As outlined by Yin et al. (2012), a case study serves as an investigative approach wherein the researcher engages in an in-depth exploration of a specific occurrence, often involving a program, event, activity, process, or one or more individuals within an authentic context.

3.3 Study Area

The study took place in one secondary school in Kabale Municipality, in South Western Uganda. The school was chosen because it has a unit of learners with visual impairment who use ICT equipment and at the same time are the beneficiaries of the use of ICT. Secondly, the school had special education teachers whom the researcher thought would contribute to the study by providing information about teaching of ICT in the school.

3.4 Target Population

The study targeted teachers and SwVI. According to Vujkovic-Cvijin et al. (2020), a study population is a predetermined group of people selected based on particular inclusion and exclusion criteria relevant to the variables under examination. It makes up the bigger population that will ultimately serve as the source of the sample (Majid, 2017). A total of seventy-three (73) participants which comprised teachers (N=43) and SwVI (N=30) participated in this study. The involvement of visually impaired students was crucial since they are the

main users of ICT resources in educational settings. Teachers were included as they are responsible for utilizing ICT to impart knowledge to SwVI.

3.5 Sample Size

The sample size denotes the quantity of individuals encompassed in a study to effectively represent the broader population (Lakens, 2022). The determination of the sample size was guided by a sampling table. For this study, a specific subset of participants was chosen from the overall population. This study was cognizant of Creswell's (2014) argument of having a case study involving a limited number of participants sought at the researcher can collect as much detailed information as possible from each participant. The study sample then comprised teachers (N=7) and students (N=5), as illustrated in Table 1.

Table 1:

Composition of study population and sample

Category of population	**Population**	**Sample size**	**Sampling technique**
Teachers	43	07	Purposive
Students with Visual Impairment	30	05	Purposive
Total	**73**	**12**	

Source: Primary data, (2024)

3.6 Sampling Technique

A sampling Technique is a deliberate process used by researchers to select a sample of participants that fairly depicts the entire population, enabling the drawing of insightful conclusions (Casteel & Bridier, 2021). Although there are many different methodologies, this study used the purposive sampling technique. To include representative groups or distinctive contexts in the sample, a

deliberate and criteria-based selection method known as "purposeful sampling" was used (Patton, 2015). To carry out this study, purposive sampling was used in selecting teachers and SwVI as participants. Purposive sampling is a non - probability type of sampling, in which selection of units including people, organization, documents, and items are based on the understanding the research problem and the phenomena in the study (Creswell, 2013; Bryman, 2016). This criterion was used to deliberately choose participants who had characteristics or experiences in common with the study question. It was typically chosen when the researcher aimed to gain profound insights from a specific subgroup or demographic. In this study, the researcher intentionally opted for participants who possessed predetermined qualities or characteristics considered significant for the research. The sample selected for the study comprised 7 teachers and 5 SwVI. Selection of each of the participants involved purposive method. Specifically, 2 SwVI from senior four (male and female), 1 from senior five, (male), two from senior six (male and female) because of prolonged exposure to the school environment. Furthermore, teachers with over five years of teaching experience were included because they had a lot of experience in teaching SwVI.

3.7 Methods of Data Collection

Various methods exist for collecting data in qualitative research. These include focus group discussions, interviews, analysis of documents, and observations (Creswell & Creswell, 2018). To fulfil the requirements of this study, interview was selected as the data collection technique.

Interviews

A conversation between the interviewer and interviewee that aims to go thoroughly into the subject or issue in order to elicit meaningful information from

the interviewee is known as an interview (Almenqeete, 2014). The interviewer directs the conversation and asks questions, and the interviewee responds with their responses. Both in-person and telephone interviews are acceptable (Gubrium & Holstein, 2011). There are three types of interviews; structured, semi-structured and unstructured (opened ended) interviews were available for this study. For the purpose of this study, unstructured interview was used which was distinguished by its open-ended and non-prescriptive style and lack of a pre-established list of questions (Tegan, 2022). This method was especially well-suited for this topic since it would elicit detailed feedback about the incorporation of ICT in teaching from teachers and students, surpassing simple binary responses that might limit the researcher.

Interview method was carried out with the use of an interview guide. The interview guide as an instrument of data collection enabled the researcher to structure the way to conduct her participants' interviews based on the research questions.

3.8 Data Collection Procedures

Before the researcher went to the field for data gathering, she developed the instruments for data collection which were discussed with the supervisors and ensured the proposal was approved by the supervisors. The researcher sought a formal introductory letter from the Directorate of Research and Graduate Training and then prepared introductory letter which had a consent form to give to the expectant participants.

The researcher sought approval from the school administration to engage with participants and built a connection, during which she elucidated the study's

objectives and elucidate the measures in place to safeguard participants. Subsequently, an initial step involved observing the school's ICT resources, followed by conducting interviews with participants at mutually agreed upon times. Throughout these activities, the researcher diligently documented and recorded all pertinent information to ensure full coverage and prevent any omission of details.

3.9 Piloting

Before initiating the data collection process, the researcher undertook a preliminary investigation in form of a pilot study. This initial exploration was a limited-scale inquiry designed to evaluate and refine the research procedures, methodologies, tool validity, and sample size determination (Arain et al., 2010). The central objective of the pilot study was to pre-test the data collection instruments and pinpoint any potential deficiencies in the formulated inquiries. This pilot study was scheduled subsequent to the endorsement of the research proposal and was anticipated to span a two-day period, from June eleventh to June thirteenth taking place at St. Peter's Katukuru secondary school in Mbarara city. 6 participants, selected to ensure gender balance, were taken into consideration. Prior to engagement, participants received a clear elucidation of the research objectives. The ensuing interviews were transpired within the school premises, facilitated by an audio recorder to foster a comfortable and conducive interaction.

The pilot study serves multiple purposes, including evaluating the interview guide's alignment with the research goals, assessing participants' understanding of the questions, determining if the questions are appropriate, manageable, and acceptable, and examining the suitability of the sampling

method. Should any challenges arise in utilizing the questions, the researcher had to duly revise them, ensuring they facilitate the acquisition of valid and reliable information for the main study.

3.10 Data Analysis

Data analysis is an integral aspect of the research process. It involves the transformation of raw data, field notes, and unrefined information into meaningful and valuable insights, enabling the derivation of conclusions (Makena, 2013; Id et al., 2022). Data analysis is essentially a method of condensing and organizing extensive and diverse data sets to extract coherent meaning from them. Considering the aim of this study to make a meaningful contribution to the broader realm of knowledge, the analysis phase holds notable importance.

Upon the completion of data collection, the gathered data underwent through a thematic data analysis, a crucial analytical technique. This selection is attributed to its capacity to identify recurring themes by deducing insights from the research questions and objectives, subsequently arranging them into categories and sub-categories. The practice of identifying trends or recurrent themes in qualitative data is known as thematic analysis (Bryman, 2016). Thematic analysis is the process of identifying patterns or themes within qualitative data (Stranges et al., 2014).

Qualitative coding was used to help with the systematic categorization of themes and sub-themes and to maintain participant anonymity (Tracy, 2013). Qualitative coding is a process of systematically categorizing excerpts in the qualitative study, in order to find themes and patterns. It enables the researcher to take

unstructured or semi-structured data such as transcripts from in-depth interviews or focus groups and structure it into themes and patterns for easy analysis. Open, axial and selective are three distinct processes used in qualitative research, particularly in the field of grounded theory. They involve the systematic analysis and categorization of data to identify patterns, themes, and relationships.

In the final step, verbatim excerpts from participant narratives was coded, preserving the originality of the data and reinforcing the credibility and authenticity (Bryman, 2016). As there were two categories of participants, namely: teachers (N=7) and students (N=5), coding them was done as follow. Teachers were given codes: Tr1, Tr2… Tr7. The students were coded as: St1, St2…St5. These codes were to be placed against each of the excerpts (the verbatim narratives). These codes are introduced in this Chapter Three, but they are for the analysis in Chapter Four.

3.11 Credibility and Authenticity

The rapid recognition of human experiences by people who have had similar interactions is crucial for a qualitative study's credibility. It has to do with how readers understand the validity and accuracy of data based on how it was presented and interpreted by the researcher (Polit & Beck, 2012). On the other hand, authenticity is the ability of the researcher to faithfully capture the feelings and emotions that underlie participants' experiences (Polit & Beck, 2012). In essence, the researcher's dedication to authenticity is entwined with credibility. The researcher employed tactics to guarantee both credibility and authenticity in order to sustain this dual idea. The researcher vividly depicted her own experiences while corroborating findings with participants, employing a process akin to member checking. Triangulation of methods, involving both interviews

and observations, further enhanced the research's trustworthiness. Additionally, the researcher implemented triangulation of participants, involving diverse individuals, to garner a multifaceted range of data. This comprehensive approach seeks to bolster both the credibility and authenticity of the study's outcomes.

3.12 Ethical Consideration

Ethical considerations constitute a vital aspect of research that holds considerable significance, as adhering to these principles is crucial for protecting the rights of research participants. This commitment establishes a sense of reliability between the researcher and the participants, ultimately aiding the smooth integration of research efforts.

With a strong commitment to ensuring the utmost credibility and authenticity, the researcher diligently upheld ethical standards throughout all phases of the research process. An official consent agreement was established, outlining the commitment to maintaining the confidentiality of shared information, thereby ensuring the privacy and anonymity of participants (Vanclay et al., 2013). By steadfastly upholding these ethical principles, participants felt more at ease in sharing their insights without hesitation.

In a sincere commitment to fulfil these ethical responsibilities, the researcher transparently communicated the study's objectives, duration, and the intended application of gathered data to participants. This was facilitated through a meticulously drafted consent form, inviting participants to contribute their valuable perspectives to the study and granting permission for the recording of their viewpoints, all in the interest of preventing any potential encroachment upon their rights.

CHAPTER FOUR

DATA PRESENTATION, INTERPRETATION AND DISCUSSION OF FINDINGS

4.0 Introduction

This chapter provides the presentation, interpretation and discussion of the study findings which aimed to examine the use of ICT in teaching students with visual impairment in secondary schools in Kabale Municipality, Uganda. The data is presented following the study guiding questions derived from objectives, these are: What are the ICT tools available for teaching students with visual impairment in secondary schools? What competence do teachers have in using ICT to teach students with visual impairment in secondary schools? And what is the perception of teachers have towards the use of ICT during teaching SwVI in secondary schools in Kabale Municipality? In line with this, the data was qualitatively analysed, presented and discussed basing on the emerging themes from the questions and the original narrations as obtained from participants through interviews presented mainly to maintain originality of the information. To maintain ethical issues, the researcher ensured anonymity and confidentiality of the information through the use of pseudonyms by coding the participant names as Teachers as Tr, students with visual impairment as St and the school was coded school Y. Moreover, in each section, the researcher first presents, interprets, and discusses the findings according to the literature review in chapter two. In order to keep the privacy of the participants, codes like St1, Tr1 have been used.

4.1 Description of Participants

This section describes the participants of the study. This information was personally gathered by the researcher from the field and presents them as follows in Table 2;

Table 2:

Demographic Characteristics of Participants

Participant category	**Gender**		**Total**
	Male	Female	
Teachers (Tr1, Tr2…Tr7)	04	03	07
Students with visual Impairment (St1, St2…5)	03	02	05
Total	**07**	**05**	**12**

Source: Primary Data, 2024

Table 2 describes all the participants in total of twelve (12) who were accessible and interviewed by the researcher. Being a small sample size, it became easy for the researcher to deeply interview them and obtain the necessary information as required by the study. There were 7 teachers, including Tr1, Tr3, Tr5, 6 and 7 who were male participants and Tr2 and Tr4who were female participants as shown in Table 2.

Table 3:

Teachers' profile

S/n	Teachers' code	Teachers' profile
1	Tr1	A male teacher. Holds a bachelor's Degree in Special Needs Education and two short course certificates in adapted ICT for persons with visual impairment with an experience of 7 years teaching Runyangkole-Rukiga and Music.
2	Tr2	A female teacher, holds a master's degree in education with experience of 10 years teaching history and religious education in both A and O- level.
3	Tr3	A male teacher. He holds a bachelor degree in ICT with experience of 8 years teaching ICT.
4	Tr4	A female teacher. Holds bachelors in Special Needs Education. She teaches Literature and English at both O'level and A'level.
5	Tr5	A male teacher, holding a Master's degree. With experience of 5 years teaching ICT.
6	Tr6	A male teacher. Holding degree in history and religious education, with experience of 10 years teaching
7	Tr7	A male teacher holding bachelor degree in Kiswahili with experience of 8 years teaching

Source: Primary Data, 2024

The focus was on students with visual impairments who were 5. These participants were personally interviewed and provided detailed information basing on the focus of this study. These students were included in the study in order to gather firsthand information about the use of ICT in teaching and learning. These students were selected across O'level and A'level as shown in the table below:

Table 4:

Students' profile

S/n	Students' code	Students' Profile
1	St1	A male student with visual impairment in S.3 Among the subjects he offers include Religious Education and History.
2	St2	A female in S.3 offering History, Kiswahili and Religious Education.
3	St3	A female in S.4 taking Religious Education and Literature.
4	St4	A female in S.4 offering History, Agriculture, Religious Education and Kiswahili.
5	St5	A Male student in S.5 taking History, Divinity and ICT.

Source: Primary Data, 2024

4.2 Different ICT tools available for teaching students with visual impairment

The first objective of the study intended to find out the different types of ICT tool available for teaching SwVI in secondary schools. This aspect was imperative to the study because the availability of ICT tools determine how quality the teaching and learning process is as influenced by the use of these tools. The focus to this aspect was to find out what are the available ICT tools, condition of available ICT tools, and how these ICT tools are being put in use by Teachers and SwVI in secondary schools to enhance the teaching and learning process.

To obtain this vital information, a question was posed for participants to state which ICT tools they have in the school. They explained that the schools have some of the ICT tools but they seem not to be enough.

Two of the participants said;

The school has like twenty-seven Perkins braille machines, twenty-nine slates and thirty styluses, twelve orbit readers as the ICT devices available for use by SwVI in teaching and during examination (Tr1 and Tr7).

Another one added that *"We have braille machines, slates and needle-like tools which SwVI use for pricking the paper to produce dots" (Tr5)*

Other participants had this to say;

> We have two talking clocks which were given by Rotary Club and victor readers which we use for recording and are easy to use because, if you press any button, it reads clearly what is recorded than the regular audio recorders. They can also be connected to computer and then turn a word document into audio (St5).

In similar view other participants (Tr2, Tr3, and Tr4*)*

Mentioned braille machines, slates, styluses, computers installed with JAWS, Braille embosser and scanner, CCTV, twelve orbit readers, five victor readers, clear reader as the ICT tools available in their school.

The data from the narrations above shows that the ICT tools available in schools include; Perkins braille machines, talking calculators, slates and styluses, Taylor frames and types, talking clocks, computers installed with JAWS, Brail embosser and scanner, CCTV, orbit readers, victor readers, clear reader, as the ICT tools available in their school. The data above indicates that secondary schools have some of the ICT tools readily available for use in teaching and learning process of SwVI. It therefore implies that SwVI in

secondary schools have the opportunities to access most of the educational opportunities since they have opportunities to use ICT tools for accessibility of learning information. The findings above concur with the findings in Shikden (2015) who revealed that computers, talking calculators and clocks were the only available ICT devices to use by SwVI in schools. Lucky and Achebe (2012) observed that Kurzwell Reading Machine, Computer, Internet and World Wide Web WWW as essential resources that aid teachers to avail students with visual impairment print materials in accessible formats. In addition, Wachiuri and Nguyo (2015) mentioned ICT tools like screen readers, screen magnifiers, closed-circuit televisions, electronic magnifiers, scanners and optical character readers, portable and refreshable Braille displays, digital and electronic data, digital readers, and accessible cell phones as essential ICT tools that support SWVI learning.

4.2.1 Condition of ICT tools in schools

In this sub-section, the researcher's interest was to find out the state of the available ICT tools in schools. This rose after knowing that some of the ICT tools are available and therefore, the question here are they enough and suitable to cater for the learning needs of SwVI? When participants were asked to describe the state in which the ICT tools were, they (St5, St3, St2, Tr1, Tr7 and Tr4) explained that some of the tools are functioning but others are not functioning.

One of the participants said; *"of the ICT machines we have at school, I am aware of one victor reader, five Perkins braille machines and five orbit readers which are not working" (St4)*

Another one responded that; "*Some ICT devices were broken down like six Perkin braile machines and were beyond repair while others were working though not very well" (Tr1)*

Another one added that; *"We only have two computers installed with JAWS and 7 orbit readers for over 39 students with visual impairment which are working perfectly (Tr4).*

The data from narrations above indicates that most of the ICT tools available in schools were not in use due to the reason that they were broken down and not repaired. On the other hand, the data shows that some of the ICT tools necessary to enhance the teaching and learning of SwVI were either not available or not enough.

The findings above suggest that the use of ICT tool in secondary schools is not effectively done because teachers and SwVI who are the prime users have limited access to most of ICT tools. This is due to the reason that most of the tools are spoilt and repair is not taken seriously, and most of them, more especially the modern ones are not available to the satisfying state. This may lead to the difficulties for SwVI to access most of the educational opportunities and in the end continually lag behind their counterpart students without visual impairment in secondary schools. *T*his finding is in line with María Álvarez-Pallete (2023) who noted the in absence of ICT devices for SWVI in school leads to distractions and affects students' learning due to lack of attention that limits their access to information. Yet, according to Majinge & Stilwell (2014) notes that ICT is used to facilitate access to information in accessible electronic databases and on the internet and that it provides equal opportunities to access to information as per the needs of SwVI just like their colleagues with sight.

The findings also support Rogers' (2003) DOI hypothesis, which cites McKenzie, 2001; Sherry, 1997, and holds that an individual's usage of IT may be adversely affected by an IT system's incompatibility with their needs. Furthermore, every innovation has an impact on instructors' attitudes, values, and beliefs on teaching, according to Hoerup (2001). Therefore, if an invention can meet the needs of an individual, uncertainty will go down and adoption of the innovation will happen more quickly. Thus, an essential component of compatibility is merely naming the invention. As "the degree to which an innovation is perceived as relatively difficult to understand and use," this suggests that innovation called should be relevant and clear to the potential adopter.

4.2.2 The Use of ICT tools in secondary schools

In this sub-section, the researcher was interested in finding out how ICT tools were being put in use by both teachers and students with visual impairment during the process of teaching and learning in and outside the classroom. This aspect was vital due to the reason that for one to make an inference to whether ICT tools are in good or bad conditions, that person must be aware of whether and how they are being utilized. When participants were asked, their responses (Tr1, Tr5, Tr3, Tr6 St2 and St4) indicated that teachers use different ICT tools to prepare suitable materials for SwVI. One of the participants said;

> Most of the instructional materials that are available at school for instance reference books are not in braille as such, these formats are not compatible for SWVI. So, I use these devices like Victor readers, audio recorders, and Orbit readers to record textbooks, literature novels, and notes that are availed to students so that, they can be able to read them in

advance and thereafter participating with the rest of the ordinary students during teaching (Tr1)

Another one added that;

As you know for me, I use these tools like the computer to enlarge and print the font sizes for students who are challenged with low vision to read their materials and understand the concepts (Tr5)

Another one added; *"Of recent our school received a Braille embosser from Lions club. This machine is used by teachers to translate printed work and have it embossed into Braille" (St4)*

The narrations above indicated that one of the important ways' teachers were making use of the available ICT tools in schools was to ensure access to learning materials that could not be accessed without the use of the tools. Teachers were able to provide audio information to students through recording by using audio recording and orbit readers.

This finding above suggests that the teaching and learning process of SwVI was enhanced since teachers were able to prepare alternative teaching materials while learners' access most of the learning information which may in the end enhance their performance. On the other hand, ICT tools seem to be few in schools. This is because there are lot of ICT tools for preparing suitable materials including recording using digital tape recorders, computers installed with JAWS and NVDAs, use of an embossing machine to produce brailed materials for blind students but all these are not mentioned. This may suggest that SwVI have limited access to the learning materials due to limited use of ICT tools dedicated for material preparations.

The findings are consistent with those of Okugbue (2019), who observes that pupils do not appear to be frequent users of ICT in their schools due to a lack of training and the acquisition of the ICT skills required to utilize them effectively, which could result in subpar performance.

Other participants (Tr3, Tr4, Tr5 and Tr7) "*responses indicated that teachers used ICT tools to teach the students different concepts and skills.* "

They specificity explained that teaching students with visual impairment how to write and read text was one of the ways of utilizing the ICT tools in schools.

Two of the participants had this to say; *"We teach these students to become skilled in writing and reading text on the few computers using screen readers that are available at school" (Tr3 and Tr7)*

Another one added;

> We manage SwVI learning needs by developing their skills to use a omni reader to scan print materials and reads the scanned materials so that they access the information they require for learning and participate in activities given by their teachers in the classroom and even outside the classroom (Tr5)

From the narration above, it is indicated that SwVI have opportunities to use different ICT tools since teachers are committed to impart knowledge of how to use them in the process of learning. It is shown that SwVI were accessing different information presented to them in a format that they wish to and that suit to their need. For instance, SwVI were able to use a computer installed with screen readers to write and read text because they were given such skills to use them.

The findings above, suggest that even though not officially planned in the school schedules teachers try their best to train SwVI to use ICT tools by using the ICT tool as teaching materials. It is indicated that have opportunities to use the tools which may in the end help them to perform better in their academic activities.

The findings are consistent with Shahadat Hossain Khan's (2012) observation that although technology enables pupils to work more successfully than in the past, teachers now have an increasingly demanding role in classrooms with a high-tech presence. According to Hossain, ICT has the power to completely change the way that education is delivered by strengthening the design work that instructors do, expanding the responsibilities that teachers and students play in the educational process, and fostering collaborative learning environments, among other things.

Other participants (St1, St3 and St5) explained that students were using ICT tools such as omni readers to scan text so that they may be suitable for them to read.

One of the participants said;

> Apart from using these tools to record passages in English and literature and notes by teachers, the skills I and other students with visual impairment have attained in using these tools enable us to also read widely like those students who are not visually impaired through using the omni reader to scan print books and have the scanned information converted into audio and also looking up for information on the internet using computers installed with JAWS (St1)

The verbatim above indicated that students were making use of the available ICT tools to enhance their reading activities. They specifically used an omni reader to scan and read different documents presented to them in unsuitable format. This finding suggests that SwVI in secondary schools are being assisted and their learning is being enhanced due to how they are using ICT tools. This result corroborate with Edgar Pacheco et al., (2017)who established that ICT plays an essential role in compensating for the impairment and improving communication including access to information as well increasing participation in learning of students with visual impairment an enabling them to benefit from the teaching, access text information particularly print books, audio recorders to record notes, zoom text to software to manipulate text fonts on computers according to their needs which increase their reading pace hence obtaining larger amount of information from different sources in time.

Basing on the above responses, the study findings revealed that, ICT devices were used by teachers to produce and avail information to students in accessible formats. Although information gathered indicated that teachers used ICT tools as means of integrating students with visual impairment in lessons, the study findings noted that they were used to engage students with visual impairment in extensive reading and incidental learning.

4.3 Teachers' Competence in Using ICT to teach Students with Visual Impairment in Secondary Schools

The second objective of the study was to determine the Teachers' competence in using ICT to teach students with visual impairment in secondary schools. The study focused on abilities, formal ICT training and challenges of using ICT tools as the sub-themes which emerged from the objective.

4.3.1 Abilities

The researcher asked a question about teachers' ability in using ICT to teach students with visual impairment; St2 said;

> I feel teachers have the knowledge and are skilled in the utilization of ordinary computers but they have little or no knowledge and skills on how to use ICT tools for the blind.

Another participant St5 said;

> Teachers do not have the required skills to handle SwVI especially in ICT because they are not trained in dealing with blind persons. For example, the teacher who teaches us ICT is an ordinary ICT teacher teaching ICT to the whole school and yet he does not have the knowledge and skills related to ICT of the blind and he is very fast when teaching.

St2 and St3 stated that,

> the rest have very little knowledge about the ICT of the SwVI. ST4 reported teachers having no skills of using adapted ICT for visually impaired learners. The student added that the teacher of mathematics does not have the skills to use the tera frame and types and talking calculators to do mathematics work.

St3 stated that,

> our teacher who handles ICT in our class is knowledgeable as far as teaching of ICT to students with visual impairment is concerned. Because of his skills, he has enabled some of us to use a variety of ICT tools which have assisted us succeed in our studies.

The student further said that,

> "One of the teachers in our school is blind. He was taken to Kireka UNAB high-tech where he got training in computer as he was waiting to join University".

He was also sponsored for training on how to use other assistive technologies like the victor reader, omni reader by Sense International, actually is very beneficial to us because all the ICT skills we have are as a result of his efforts.

Teachers were asked the same question and the responses were as follows:

> The participants Tr1, Tr2, Tr3, Tr4, Tr5, admitted of having basics in using ICT tools for SwVI. Besides, one teacher reported having knowledge and skills in ICT tools of the SwVI and for ordinary students Tr3. The participant stated, "I teach SwVI how to use victor readers and orbit readers to record notes in class and computers with JAWS.

In this study, the researcher noted the following teachers' abilities as provided by the participants; teachers are at learning stage. According to Mugabi (2011), the quality of education and training provided to students with visual impairment (SWVI) largely hinges on factors such as the academic qualifications, training, commitment, and dedication of the teachers involved. This implies that the quality of education and training provided to students with visual impairment (SWVI) in secondary schools in Kabale municipality is largely affected since the teachers are still at the learning stage of using ICT. The diffusion of innovation theory developed by Rogers (2003) lends more weight to this argument. It argues that even individuals who possess knowledge and skills in ICT may not use

technology in the classroom if they are not aware of how to use it properly. Because students require assistance in order to use technology in the classroom effectively, technology is not employed at the intended level. In addition, before attempting an invention, a person should be sufficiently knowledgeable about it to maximize the likelihood that it will be adopted.

Thus, this knowledge becomes more critical for relatively complex innovations. In this study it was also noted the teachers have knowledge and skills in the utilization of ordinary computers. This was supported by Andrade (2016) who reported that teachers had confidence in ordinary ICT capabilities**.** This study further showed that teachers were not trained in adapted ICT of SwVI. This concurs with a study conducted by Andrade (2016) which revealed that teachers were found with less resourcefulness in some of the ICT tools and software specific to low vision with a substantial number of teachers ignoring to use many of these ICT tools. It was further reported in this study that only one teacher had knowledge and skills in using both ordinary and adapted ICT tools of the SwVI. This finding is in agreement with Mathevula and Uwizeyimana (2014) who reported that the majority of teachers do not have professional qualifications in ICT, and those who have only have rudimentary training.

The findings reveal that, the minimal knowledge and skills teachers have are basic and cannot help them to support SwVI effectively.

4.3.2 Formal Training

When participants were asked about the formal training, they had in using ICT technologies to teach SwVI: Tr 2 responded;

I didn't have formal training in how to use ICT devices of the VI, but I have a friend who is blind and teaches me how to use those ICT devices like victor readers, braille machines and JAWS.

Tr1 said,

"I attended short courses organized by UNAB, Sense International and Sustain to Life where I got certificates in using software like JAWS and NVDA, clear readers/omni readers and braille machines."

He further said:

> I was also trained how to repair braille machines and if there are spare parts, the school doesn't hire someone else to come and repair the machines unless the spare parts are not available.

Similar response was also given by Tr4 who said,

> There is no formal training I received but I had the opportunity to attend short courses organized by UNAB in the computer skills trainings, in focus blue forty and orbit readers during the term holidays by Sustain to life project Kabale, Sense International and all we see is possibility workshops.

Tr3 said; "I have knowledge and skills that I received during my high school and while at the University but I have no formal training in ICT for the blind."

Tr7 said "I did not get any formal training but instead was trained on the job". Tr3 reported having acquired skills from a friend through interacting with computers using JAWS.

Tr5 and Tr6 said “we have no training in ICT for the blind. We use teachers who teach them to help us whenever there is work to record or braille.

Based on the above, the responses show that teachers were trained on job, by their colleagues and others had attended short courses. With this, the findings reveal that teachers had no formal training in computer and therefore chances of teachers having low proficient level in teaching SwVI using adapted ICT devices remains high.

This finding is consistent with the findings of Mathevula et al. (2014), who found that most teachers lacked certification in the use of adapted ICT, and that those who did had very rudimentary training, which affected their comfort level and competence while utilizing ICT tools to teach SwVI. They go on to say that in order to give instructors confidence, ICT requires the creation of new attitudes, abilities, and pedagogical techniques through ongoing training. Additionally, the studies found that teachers are interested in instructing the SwVI utilizing the modified ICT. This result is consistent with Rogers' Diffusion of Innovations Theory (2003), which argues that faculty members will adopt technology if they are faced with new demands and that teachers will use technology if they believe it will improve their teaching (Finley et al., 1995; Spotts, 1999). As a result, in this instance, an instructor is assisted in having the knowledge and abilities to use the ICT resources at their disposal to impart content to the SWVI, who in turn receives instruction on how to use the same ICT resources to access the lessons being taught.

From the above discussion, it is clear that having formal training in ICT technologies empowers teachers with knowledge and skills needed to use ICT devices as teaching tool to SWVI in secondary schools.

4.3.3 Challenges in Using ICT tools

When participants were asked the challenges, they encounter while using ICT tools, the following responses were recorded;

Tr5 and Tr7 responded that "they have limited knowledge and skills in using adapted ICT devices for persons with visual impairment" Tr1, Tr2, Tr4 and Tr6 said, "they find it difficult to allocate time to teach the students since it was not allocated on the timetable.

Tr4 responded that;

"some students were not interested in learning ICT", and preferred using braille than using recorded work.

Tr2 said, "there was unreliable power supply to charge ICT devices for SwVI.

*The researcher asked SwVI the same question and their responses were as follows; St*1, St3, St4 and St5 stated that there is *inadequate ICT tools to use during teaching. ST2* and 5 Responded that there is a challenge of not getting recorded work in time because of the power cuts. The participants explained that,

> They are given orbit readers to help them access information by recording class notes and some selected parts in the novels, but they are unable due to frequent power cuts. Secondly, they are forced to share these ICT tools because of not being enough for all of them. Tr1 and Tr5 revealed that some devices were broken down such as victor readers, Perkins braille machines

> and orbit readers and because of this, some students were using slates and styluses which makes them slow to complete the task given.

ST2, ST3, ST4 and ST5 also revealed that the laboratory being too small and that was always locked. So, they cannot access it".

The above-mentioned responses suggest that the following are the main obstacles to using ICT tools to support teaching and learning: teachers' lack of training in using ICT tools, which prevented them from gaining the necessary knowledge and skills to be able to use ICT to support students with disabilities, SwVI's lack of interest in learning ICT and preference for using Braille over recorded information, an unstable power supply, a lack of space to accommodate all SwVI, and inadequate space for keeping ICT equipment. The findings also showed that regular teachers find it challenging to assist SwVI in accessing information in suitable formats during instruction since they have not had sufficient training in ICT.

The findings are in agreement with Simseket al., (2010) who noted that most of the teachers (trainers) who were teaching SWVI in using ICT had only attended a course on how to teach SWVI but the training did not sufficiently give them the capacity to teach ICT to SwVI as a pedagogical tool. This, therefore, limited the abilities of students with visual impairment to explore the possibility of using ICT as a basis to have equal access to curricula. This implies that a teacher cannot appropriately teach SwVI using ICT because it is technical and requires specialized training for one to do so.

The findings are supported by Meng, and Libby (2010) who observe that limited skills and knowledge of teachers in using ICT tools affects their quality of teaching using ICT tools generally, how then can students with visual impairment receive instruction using ICT. In a study done in Zambia, Phiri (2016) added that while schools in urban settings have seen success, there are still many obstacles standing in the way of effective and efficient technology implementation, including a lack of ICT tools, difficulty adjusting to constantly evolving new technologies, and access to electricity. Phiri questioned how educators could use technology so skillfully when there were insufficient ICT facilities and expensive acquisition and maintenance costs that prevented efficient ICT integration. Studies reveal that the main obstacles to implementing technology in teacher training are inadequate administrative support, poor curriculum fit, lack of confidence in teachers, lack of time, lack of training opportunities, technical issues, and lack of access to resources (Nikolopoulou & Gialamas, 2016).

In line with the aforementioned research studies, Msila (2015) concludes that any innovations in education, including the use of ICT, require competent teachers. ICT competence is strongly correlated with professional development, attitudes, and training, as well as parent ingredients. The diffusion of invention theory, which postulates that a single person may possess all required information, also backed this. This does not imply that the person will accept the innovation because attitudes influence whether something is accepted or rejected. The Persuasion Stage is another way to do this. Whether a person has a favorable or unfavorable attitude toward an innovation, "the formation of a positive or negative attitude toward an innovation does not always lead directly or indirectly to an adoption or rejection" (Rogers, 2003: 176), and person cannot necessarily

be convinced. The persuasion stage of the innovation-decision process comes after the knowledge stage since the individual forms their attitude after learning about the invention. Additionally, according to Rogers, the persuasion stage is more affective or feeling centered than the knowledge stage, which is more cognitive or knowing centered. As a result, at the persuasive stage of the innovation, the person is more delicately involved. The level of ambiguity surrounding how the innovation will work as well as the social validation from peers and coworkers.

The above findings imply that a teacher cannot appropriately teach SwVI using ICT because it is technical and requires specialized training for one to do so. This is something that deprives SwVI of quality learning which subsequently has a negative impact on their learning outcome. Consequently, the researcher strongly agrees with the views above, she suggests that the few teachers having knowledge in the use of computer, need to be built upon and shared with other staff as a few of them cannot proficiently use ICT as a pedagogical tool for SWVI in all learning areas.

4.3.4 Suggestions to overcome the challenges

When the participants were asked about how they can overcome challenges identified during teaching and learning: Participants stated that; “The school should lobby for ICT equipment’s so that each SwVI has device to use to avoid sharing these equipment St1, St3, St4 and ST5”. Participants also responded “there is need for Ministry of Education and Sports to provide the school with more ICT tools to support SwVI (Tr2, Tr3, Tr4, Tr5, and Tr7).” They explained that the ICT tools, we have per now are few compared to the number of the SwVI in the school. Participants St4 and St5 had this to said Ministry should provide

ICT tools in large numbers so that SwVI are able to practice how to write to use computers in their free time. Tr1, Tr2, Tr3, Tr4 and Tr5.

"Participants responded "Teachers need to undergo training so that they learn how to use adapted ICT technologies for students' with visual impairment ".

This finding shows that teachers in secondary schools be provided with chance to train in adapted ICT of the SwVI at the initial stage when still in colleges so that when they qualify and posted to secondary schools, they can be able to teach SwVI. Besides, teachers already in teaching and have no ICT skills can be trained during the in-service training to enable them get the skills to use ICT in their teaching as a means of increasing learning opportunities for SwVI in secondary schools.

This is in line with Tokareva & Turner, (2011) who state that dedicated staff development and training in ICT to ensure that they have the necessary knowledge in the use of ICT for pedagogical purposes as a means of addressing the unique needs of SwVI is a necessity. Similarly, Bandung et al., (2016) pointed out that, teacher development is a key factor in the successful integration of ICT in teaching. They noted that ICT training programs develop teachers' competences in its use, influence their attitudes towards its use and help teachers to reorganize the task of technology and how new technology tools are significant in SwVI learning. On the other hand, Wong et al., (2016) observe that, the professional development of teachers in ICT for the entire staff is critical. This implies that teacher training institutions should not only aim at developing teachers' skills in ICT but also enable them how to adapt ICT tools and use them to benefit SwVI during teaching and learning process.

The findings also indicate that Ministry of Education and Sports need to put into consideration secondary schools which have SwVI by providing them with ICT tools because these students are at higher disadvantage compared to their sighted colleagues in far as accessing print information during teaching is concerned.

The ICT devices should be accessible so as to give SwVI enough time to practice and make use of them for teaching when they are in class. This Suggestion is in agreement with Oira (2016) who noted that, schools should be equipped with modern assistive devices which are less bulky, easier quick and motivating as it encourages independent learning. This implies that, ICT devices enable SwVI to access print information in time and do practice. Secondly, to do their work timely whenever, they are given assignments.

4.4 perception of teachers towards teaching ICT to students with visual impairment in secondary schools

This section was developed into two themes; the perception of teachers towards teaching ICT to students with visual impairment and the Recommendations to improve the use of ICT in teaching SwVI

4.4.1 Perception of teachers towards teaching ICT to students with visual impairment

Participants were asked about their perception towards teaching ICT to SwVI. The following responses were recorded: Tr1, Tr3 and Tr5 responded that; “SwVI need to learn ICT because, it is the way to go since the world is going digital something that should be encouraged”. The participant further explained that ICT teaching should be embraced by all as it increases independence for SwVI. Tr3 Tr4, Tr6 and Tr7 said, the use of ICT in teaching SwVI is good because it

relieves them from carrying bulky braille books since they record their work and save it on the computer and are able to listen to it later. Tr2 said;

> I offered IT double main while I was at the University. When I was posted here and was informed by the office that among the students, I was to handle in ICT were blind, this put me aside but after seeing blind students in Kyambogo University operating these machines, it gave me courage after seeing that it was possible.

So, I said to myself that I ought to support these learners in ICT which am doing as of now though with some challenges.

Another participant said,

> It is important for SwVI to acquire ICT skills because, it helps them to search for information, save their work and be able to read it independently without support from other people Tr5

SwVI were also asked the same question and their responses were as follows: St1 responded that, “As students we need to put much effort to ensure we learn computer skills if we want to succeed in education”. The participant added that, Studying ICT is good because it can help us know skills in computer application and we are able to read print materials on our own. St3 and St4 participant responded that, “Teachers were positive towards teaching ICT to SwVI but had no knowledge of using ICT for SwVI. St2 and St5 said, learning ICT is good because, it relieves us from having too many braille books and secondly, when notes are recorded, we are able to remember the teacher’s explanations during the lesson.

St5 said:

> For example, we are able to do our work independently using orbit reader and computer with JAWS without seeking for support from sighted students.

St4 responded that; "I believe that teachers must adopt a more reflective mindset, realizing that the support they provide students is insufficient, and they must also advance their ICT proficiency so that students can emulate their actions."

> The participant further explained that teachers were not committed to teach them ICT skills and secondly, they are busy teaching other subjects; also, ICT of the blind is not allocated on the timetable. More so the participant stated that, if the school could give the teachers some allowances in order to motivate them probably, they would pick interest in teaching SwVI and even be encouraged to go for training in adapted ICT of the SwVI.

The above responses indicate that teachers support the idea of SwVI studying ICT since, it helps them to do their work without support from sighted individuals. The findings also reveal that, teachers were willing to teach SwVI ICT but they lacked time as were engaged teaching other subjects and ICT for SwVI was not allocated on the timetable. The results also revealed that SwVI were interested in learning ICT.

The above findings are backed up by the views of Abasi et al. (2021) who pointed out that teachers' personal perceptions and beliefs play an essential role of ineffective technology integration as their beliefs define their pedagogical

decisions on how to integrate ICT within their instructional practices that support the incorporation of students with visual impairment in their everyday lesson implementation. Wang (2012) point out that, teachers' positive perceptions are crucial in determining the success of integrating ICT in education. This implies that teachers are sensitized and encouraged to develop a positive response regarding integrating ICT into their lessons, as such will help enhance more teachers availing educational support to students with visual impairment.

4.4.2 Recommendations

Participants were asked the recommendations they have to improve the teaching of ICT to students with visual impairment: Tr1, Tr3 and Tr4 said, they are glad that the ministry of education through UCC have been providing computers to schools which is good but the only challenge is that they bring these computers without screen readers like JAWS and magnifiers for low vision users which only benefit the ordinary students and the visually impaired students are left out. They suggested that of the packages that the government brings to schools especially those schools that have enrolled blind students if they could also avail the computers together with the screen readers' software because they are quite costly and the school cannot manage to buy them. Tr2, Tr3 and Tr5 said that, Teachers need to be trained in the use of ICT for persons with visual impairment so that they are able to teach students effectively".

Whereas all 7 SwVI responded that, teachers need to be sensitized and trained in adapted ICT for persons with visual impairment so that they are able to help us when the machines get problems.

The findings are in line with those of Simek, et al., (2010), who observes that most of the teachers (trainers) who were teaching SwLV in using ICT had only attended a course on how to teach SwVI but the training did not sufficiently give them the capacity to teach ICT to students with visual impairment as a pedagogical tool. They therefore observe that teacher preparation programmes ought to include arrangements for ICT training as a capacity-building strategy.

Students with visual impairment should be encouraged to pick interest in ICT since it was the way to go if one wanted to attain success in whatever he or she did" T1. Other study findings revealed that students with visual impairment were getting a raw deal as far as practical lessons in ICT were concerned, SwV2 explains; "

> Because of the big number of students with visual impairment and the insufficient number of teachers knowledgeable in ICT for the blind you find that most of us attend the lesson twice a week on top of that we cannot get time for practice. Am of the view that there is need to allocate more time which will help solve our problem.

These views are in line with those of Taimalu and Luik (2019) teachers with more experience with computers have greater confidence to respond to the use of ICT as means of enhancing diverse learning in their day-to-day lesson implementation processes which not only them get close to students but also interest them to develop interest in attaining knowledge associated to ICT and its related prospects.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS AND SUGGESTION

5.0 Introduction

This chapter presents the summary of findings, conclusion, recommendations and suggestions sought to examine information and communication technology (ICT) it uses in the teaching of SwVI in one of the secondary schools in Kabale Municipality in Southwestern Uganda as shown in subsequent headings. The study presents the suggestions for further research in areas to those who may be interested in conducting the research. These presentations are aligned to the study objectives.

5.1 Summary of findings

The study findings revealed that braille machines, slates and styluses tailyr frames, calculators and types were the main ICT tools available for SwVI in the secondary school where the study was conducted. These were majorly mentioned because they are easy to manipulate and use by both the teachers and SwVI which made SwVI rely heavily on brailled materials. The results also revealed the school having one omni reader, five victor readers, twelve orbit readers, a scanner, a printer and a braille embosser, CCTV and seven computers which were adapted to the needs of the SwVI. Besides the study findings revealed one victor reader not working, 6 Perkins braille machines broken beyond repair, five orbit readers not working, 2 computers not functioning. More to that, it was observed that the ICT tools were dusty, with some appearing quite outdated

while, internet and electricity which are the most highly needed resources were found to be not available for use by both teachers and SwVI.

The results revealed that ICT equipment which were available in the school were being used in different ways to facilitate learning of SwVI. For example, the findings indicated that Devices like victor readers, audio recorders and orbit readers were used to record textbooks, literature novels and notes which were availed to students so as to give opportunities to fully participate in the teaching and access information and do the reading independently without support from their sighted peers. The study also revealed that students were taught to become skilled in writing and reading text on the computers using screen readers, the SwLV to use CCTV to enlarge the font sizes for them to read and using talking calculators for calculating mathematics. Besides, it was discovered that the school had few ICT equipment compared to the number of the SwVI in the school.

The study established that teachers were not trained in using adapted ICT technologies for the SwVI and integrating it into the teaching of SwVI due to lack of knowledge and skills. It indicated that even the 2 specialist teachers involved in teaching ICT skills to SwVI did not have any formal training in adapted ICT. The study revealed they had only attended workshops and short courses which skills were not sufficient enough to enable them teach ICT to SwVI.

The study brought to light that teachers had several challenges towards using ICT as a teaching method including unreliable power supply, inadequate space that could accommodate all SwVI and for keeping ICT equipment, and lack of interest by SwVI in learning ICT. The study indicated that, SwVI preferred using

Braille than recorded information. More so, ICT equipments were not enough and inaccessible since the lab was always locked as mentioned in chapter four by participants.

The findings further revealed that teaching SwVI on how to use tools ICT was challenging due to frequent power cut down thus making students' go to class with no recorded materials and devices to record notes which made them lag behind their colleagues with sight. The study findings showed that SwVI had no interest in learning how to use some ICT equipment especially computers with JAWS because, they felt learning computer was hard compared to perkins braille machines. The results indicated that SwVI who had the knowledge in ICT supported those who had interest to learn ICT and did not have the skills. Besides, the study findings revealed that SwVI had no time to learn ICT as they were full time in class studying other subjects. This finding was also revealed by teachers who said were always occupied teaching other subjects and adapted ICT was not allocated on the timetable.

5.3 Conclusions

The study aim was to examine information and communication technology its use in the teaching of SwVI in one selected secondary school and can be concluded that; teachers had positive attitudes towards the use of ICT in teaching SwVI but encountered various challenges such as lack of knowledge and skills, inadequate devices to use, power cuts and workload. Basing on the findings, it was concluded that braille machines, slates and styluses, calculators, tailor frames and types were the majorly used ICT equipment in the secondary school though computers, CCTV, omni reader, braille embosser, victor readers, orbit readers and audio recorders were also used despite they were not enough compared to the

number of SwVI enrolled in the school. Teachers were not trained in ICT which limited their ability to use ICT as a pedagogical tool in teaching SwVI. This was due to lack of knowledge and skills in adapted technologies for SwVI which was a result of not being trained in ICT.

Although, the use of ICT is still low in secondary schools' it has transformed the teaching and helped SwVI to access print information. Hence, enabling them to be at the same level with others in learning and in communication.

In respect to the above specific conclusion, general conclusions were drawn as follows.

It is concluded that it is Schools role to lobby for more ICT tools to make them available in the school for the benefit of the SwVI in the school.

Last but not least, it was concluded that it is high time for SwVI to stop depending solely on braille but to embrace the use of ICT because it is the strongest way to go in modern times.

5.4 Recommendations

Basing on the findings and conclusions, the study provided recommendations as follows:

1. Ministry of Education and Sports and other NGO's should equip secondary schools with adequate ICT tools.
2. Teachers ought to be trained and retrained at both pre-service and in-service levels on how to adapt and integrate ICT into teaching SwVI.

Ministry of education ought to employ specialist in ICT for students with visual impairment to help schools in repairing machines in case, they are broken down.

3. Comments teachers make are valid and therefore should be used to guide in the improvement of teaching ICT to SwVI.

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APPENDICES

APPENDIX I: INTRODUCTORY LETTER

KYAMBOGO UNIVERSITY
P. O. BOX 1 KYAMBOGO
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Website:www.kyu.ac.ug Email: drgt@kyu.ac.ug
Directorate of Research and Graduate Training
Office of the Director

Date: 07/02/2024

TO WHOM IT MAY CONCERN

RE: NIRINGIYIMANA FLAVIA

Dear Sir/Madam,

This is to introduce to you the above-named student Reg: No **21/U/GMSN/14483/PE** pursuing Master of Special Needs Education, Department of Visual Impairment Studies, Kyambogo University.

She intends to carry out research on **"Information and Communication Technology, its use in Teaching Students with Visual Impairment in Kabale District South Western Uganda."** in partial fulfillment of the requirements for the award of Master of Special Needs Education of Kyambogo University.

The purpose of this letter therefore is to request you to grant her permission to carry out her study in your institution.

Any assistance rendered to her will be highly appreciated.

Yours sincerely

Prof. Bosco Bua
DIRECTOR

KYAMBOGO UNIVERSITY
07 FEB 2024
DIRECTOR
DIRECTORATE OF RESEARCH AND GRADUATE TRAINING

APPENDIX II: CONSENT FORM

Consent Form to the Participants

Introduction

My name is Niringiyimaana Flavia a student of Kyambogo University. I am carrying out a study on Information and Communication Technology and I request you to participate in the study. The information you give will be used only for this study. This information will be treated with confidentiality.

Signature

Niringiyimaana Flavia

NIRINGIYIMAANA FLAVIA

APPENDIX III: INTERVIEW GUIDE FOR TEACHERS

I am Niringimaana Flavia a student of Kyambogo University pursuing a Master's degree in Special Needs Education. I am carrying out a research study entitled "INFORMATION AND Communication TECHNOLOGY (ICT): ITS USE IN TEACHING STUDENTS WITH VISUAL IMPAIRMENT IN SECONDARY SCHOOLS IN KABALE MUNICIPALITY., You have been identified to participate in this study. The information you provided will be for the purpose of the study and will be kept confidential.

Background information including gender, subjects and classes taught and teaching experience of SWLV

i. What is your gender?
ii. What is your level of training?
iii. How many students with visual impairment do you have in your class?
iv. What subjects do you teach them?

1. Different ICT tools teachers use in teaching students with visual impairment

i. What are the different types of ICT tools do you have in your school?
ii. What is the condition of the ICT devices you have mentioned?
iii. What is the compatibility of the ICT tools mentioned to SwVI?

2. Competences in using ICT to teach SwVI

i. What abilities do you have in teaching SwVI?
ii. What formal training do you have in using ICT when teaching LWVI in your class?

iii. What challenges do you encounter when using ICT tools when teaching students with visual impairment in class?

iv. Suggest solutions to challenges learners face during the teaching of ICT.

3. Comments of secondary school teachers towards teaching SwVI to use ICT

i. What is your comment towards teaching ICT to SwVI?

ii. What do you recommend that can improve the teaching of ICT to SwVI in your school?

iii. Thank you for your participation.

APPENDIX IV: INTERVIEW GUIDE FOR STUDENTS WITH VISUAL IMPAIRMENT

I am Niringiyimaana Flavia, a student of Kyambogo University, pursuing a Master's degree in Special Needs Education. I am carrying out a research study entitled "**Information and Communication Technology (ICT): Its Use in Teaching Students with Visual Impairment in Secondary Schools in Kabale Municipality".** You have been identified to participate in this study. The information you provided will be for the purpose of the study and will be kept confidential.

Background information

i. What is your gender?
ii. In which class are you?
iii. How many students with visual impairment are in your class?
iv. State at least any two subjects you are offering.

Different ICT tools available for teaching

i. What are the specific different types of ICT tools do you have in your school?
ii. What is the condition of the ICT tools in your school?
iii. What is the compatibility of the ICT tools that you have mentioned above towards teaching ICT, to you, learners with visual impairment?

Competences teachers have to in using ICT during teaching

i. What abilities do teachers have to teach ICT during learning/ teaching to learners with visual impairment?
ii. What formal training do your teachers have?

iii. What challenges do you encounter when teachers are teaching you ICT?

iv. What suggestions do you give that can improve the teaching of ICT to you SwVI?

Comments of secondary school teachers towards teaching SwVI to use ICT

i. What do you comment on teachers teaching you ICT in class?

ii. What do you recommend that can improve the teaching of ICT in your school?

Thank you for your participation.