

**INVESTIGATION ON QUALITY OF EDUCATIONAL
FACILITIES FOR STUDENTS WITH HEARING IMPAIRMENT
AT WAKISO SECONDARY SCHOOL FOR THE DEAF**

BY

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DECLARATION

I, **KADOGO KULUSSEN**, declare that this dissertation entitled, “Investigation on Quality of Educational Facilities for Students with Hearing Impairment at Wakiso Secondary School for the Deaf”, is my original work and has not been submitted to any other university, college, or organization for any academic qualification.

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APPROVAL

This dissertation entitled, “Investigation on Quality of Educational Facilities for Students with Hearing Impairment at Wakiso Secondary School for the Deaf”, was carried out by Kadogo Kulussen, Reg. No. 20/U/GMEF/13031/PD with our supervision and is ready to be submitted for examination.

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DEDICATION

With great honor, I dedicate this dissertation to my parents Mr. Badhube Yusuf and Mrs. Nairuba Zaitun for the effort put into furthering my education. I also dedicate this dissertation to my wife and son; Katushabe Zainabu and Ayaan Bukenya respectively. Your endless prayers for the success of this work cannot be overlooked; indeed, you are the inspiration in all circles of my life.

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This dissertation would not have happened had it not been for the Almighty God. Everything simply comes from Him. I want to say “GLORY BE TO HIM”

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LIST OF ABBREVIATIONS AND ACRONYMS

AOI	Activities of Integration
CTR	Classroom Teacher
DOS	Director of Studies
HT	Head Teacher
ICT	Information Communication Technology
MPs	Members of Parliament
NDC	National Deaf Center
PGDE	Post Graduate Diploma in Education
SLI	Sign Language Interpretations/Interpreters
ST	Student Teacher
STDS	Students
TC	Total Communication
UCC	Uganda Communications Commission
UDHR	Universal Declaration of Human Rights
UNAPCD	Uganda National Action Plan for Children with Disabilities
UNEB	Uganda National Examinations Board
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Emergency Fund
WHO	World Health Organization

ABSTRACT

The quality of educational facilities for students with hearing impairments is crucial for improving their academic performance, and this has been a long-standing issue. This research aimed to investigate the quality of educational facilities for students with hearing impairment at Wakiso Secondary School for the Deaf. The study's objectives included assessing the impact of communication, the availability of learning resources, and the adequacy of physical facilities on students with hearing impairments at Wakiso Secondary School for the Deaf. A descriptive research approach was utilized, with data gathered through interviews, document reviews, and observations. The results showed that students with hearing impairments did not have hearing aids and relied solely on sign language interpretation for their studies. They faced limited access to school facilities, which should be enhanced, expanded, and made appropriate for their educational needs, a situation that was not being addressed. The research found that both modern and traditional communication methods were predominantly employed to convey information to students with hearing impairments within the school environment. The effectiveness of sign language interpretation varied based on the skill of the interpreters in articulating technical terms relevant to various science and arts subjects during the teaching and learning processes. Students with hearing impairments could utilize resources and facilities only during scheduled class times, not beyond those hours. The school had the necessary physical facilities for the education of students with hearing impairments. It was suggested that both modern and traditional methods of conveying information should be employed to facilitate effective communication during teaching and learning for these students. It is important that teachers and students with hearing impairments have access to resources beyond the standard timetable. The physical facilities should be continuously adapted to enhance the educational experiences of students with hearing impairments within the school environment. Upgrades are necessary for the facilities designed to support the well-being of students with hearing impairments, as this would create a more supportive learning atmosphere.

CHAPTER ONE

INTRODUCTION

1.0 Overview

The standard of educational institutions for students with hearing impairments is crucial for improving their academic performance. However, this quality can be affected by several factors. This chapter outlines the fundamental issues, including the background, problem statement, purpose, objectives, research questions, scope, significance of the study, and definitions of key terms.

1.1 Background to the Study

The quality of education facilities on students with hearing impairment from the global to the local contexts are discussed. The emphasis is on historical, theoretical, conceptual, and contextual perspectives as presented in the subsequent section of this report.

1.1.1 Historical Perspective

From a global perspective, several ordinations support the rights of learners with special needs who seek to advance their knowledge and skills through formal education. The Universal Declaration of Human Rights (1948) advocates for the right to education for everyone (Lauterpacht, 1948). The rights of persons with disability, including learners with hearing impairment, advocate for their educational privileges, in pursuit of their knowledge and skills development. Uganda has demonstrated its commitment to education by endorsing the Salamanca Statement and Framework for Action in 1994, which advocates for inclusive schools (UNESCO, 1994).

According to the World Health Organization (WHO) report of 2019, an estimated number 466 million people in the world have hearing loss and children represent approximately 34 million of this population with deafness. However, less than

one in 40 individuals requiring hearing aids possess them. According to Jiang et al. (2020), about 80 percent of those with hearing impairments reside in low and middle-income economies and a substantial 25 percent of cases manifest during early childhood. In sub-Saharan African countries, there is a positive trend with more students with hearing impairments accessing education due to inclusive policies (Wickenden, 2018). This progress contrasts with the situation in 2003, where 98 percent of students with hearing impairments in developing countries did not attend school, and 99 percent of girls with hearing impairments were illiterate (Sadiya, 2022).

Globally, the National Deaf Center (NDC, 2023), found that only 48 percent of the students with hearing impairment graduated from high school (Warner-Czyz et al., 2018). In the United States, only 17 percent of students with hearing impairment graduates attended college compared to 67 percent of hearing students (Van der Straaten et al., 2021). In sub-Sahara Africa, 41 percent of learners with hearing impairments complete primary school, compared to the national average of 87 percent (Abikoye et al., 2020), and in Nigeria, it is estimated that less than 5 percent of children with hearing impairment pass their final exams (Seguya et al., 2021).

In Uganda, the movement to enhance educational access for children with special needs originated in the late 20th century, marked by the creation of special schools for disabled students during the 1970s (Kakooza and Nalugya, 2021; Tumwebaze and Mutono, 2015). In the early 1990s, the country began transitioning toward inclusive education to accommodate students with disabilities within regular schools (Kisakye, 2021). Then the Uganda People with Disabilities Act of 1997 mandated reasonable accommodation in all educational institutions (Kakooza and Nalugya, 2021). Despite these efforts, the challenges persist in ensuring equal access to

education and necessary resources for academic success for students with hearing impairments.

1.1.2 Theoretical Perspective

The Systems Theory, advanced by Bertalanffy in 1960, guided this study. The theory relates an organization to an entity comprised of sub-systems that are integrated into an orderly unit or a system comprising related and dependent elements that form a unitary whole in interaction. The theory asserts that organizations are composed of interconnected subsystems or elements that interact with one another. In addition, these interconnected subsystems work together to form a unified whole or system. It also views an organization as a complete entity rather than just the sum of its parts (Nikiforova, 2023).

In this study, the quality of education facilities refers to a system with interrelated and interdependent components that work together and support each other for the efficiency and effectiveness of the teaching and learning and consequently performance of the student. The importance of this theory is to appreciate the relationship between the different components within the organization and their interrelationship to improve the performance of students. Secondary schools consist of systems made up of sub-systems demonstrating a complex web of interdependent relationships among individuals, tasks or duties, and their surroundings. The quality of any successful school system depends on a better understanding and development of each sub-system, the general environment, and the coordination between the different sub-systems so that each can contribute to the whole (Tumwebaze and Mutono, 2015).

The collective contribution of education facilities namely assistive devices, accessibility to facilities and physical facilities for the students in schools contribute to

good learning environments when each sub-variable is well developed to work in tandem with each other.

1.1.3 Conceptual Perspective

Quality education is defined as a system that encompasses learners, environments, content, processes, and outcomes relevant to institutions catering to the deaf (Colby & Miske Witt & Associates, 2000). In connection, the World Federation of the Deaf (WFD, 2018) describes quality education for students with hearing impairments as the availability of national sign languages, qualified deaf educators, and inclusive settings. While the ideas presented in these references promote inclusivity in education, they also resonate with and pertain to the experiences of learners with hearing impairments in specialized schools. According to Kakooza and Nalugya (2021), the quality of education facilities refers to the extent to which students with hearing impairment physically access the school environment, including classrooms, libraries, laboratories, and other facilities, as well as the availability of specialized resources such as assistive devices, sign language interpreters, and other support services. Educational facilities include physical spaces and resources that support the teaching and learning of students with hearing impairment (Hameen et al., 2020). The classrooms, libraries, laboratories, and specialized resources such as assistive devices, sign language interpreters, and other support services, are necessary for students with hearing impairment to access and fully participate in the educational environment (Takwate, 2018).

Hearing impairment is a partial or total inability to hear in one or both ears (Wei et al., 2018). Hearing impairment denotes all degrees and types of deafness from mild to profound. The inclusion of both of these groups and hard of hearing, diminished hearing but not to the point where it completely prevents them from understanding

spoken language are regarded as hearing impairment. With hearing aids, such a person can frequently hear better with a device for sound amplification (Jizzakh, 2020). In this study, the quality of educational facilities, the nature of educational facilities, accessibility to the facilities and communication with students with hearing impairment shall be conceptualised as outlined by the writers quoted in this section.

1.1.4 Contextual Background

In general, Uganda is making significant strides toward realizing education for all, boasting a net enrollment rate of 93 percent for boys and 96 percent for girls (Kaggya, 2019). This advancement has notably improved educational access for children with special needs, as the net enrollment rate for secondary schools rose from 94 percent in 2010 to a higher percentage in 2019. However, significant disparities remain in the educational opportunities available to hearing-impaired students (Mukasa and Mpfu, 2016). Despite legal provisions requiring inclusive education and equal opportunities for all students, students with hearing impairment often face barriers to accessing education and achieving academic success. Furthermore, the limited access to specialized resources such as assistive devices, sign language interpreters, a lack of understanding and awareness among educators and peers, can socially isolate with low self-image/esteem and result in learning difficulties (Mukasa and Mpfu, 2016). In Uganda, public secondary schools admit students with hearing impairment; it is questionable whether the quality of education facilities differ between the two types of schools. Contextually, the factors contributing to educational outcomes of students with hearing impairment are misunderstood and there is no policy and practice to support inclusive education and equal opportunities for all students.

1.2. Statement of the problem

Whereas all students should have a right of access to education, those with hearing impairments sometimes do not get that right (Article 26 of UDHR, 1948). In many countries, including Uganda, students with hearing impairments often face barriers to accessing appropriate education facilities and services, and that negatively impacts their learning (Kimaro and Kileo, 2023; Wapling, 2016). According to the Uganda National Action Plan for Children with Disabilities (UNAPCD) Report of 2017, students with hearing impairment in Uganda only make up less than 1 percent of the total enrolled students in public secondary schools, with few graduating. This aligns with the fact that limited access to appropriate educational facilities and services for students with hearing impairments could be associated with low achievement, lower graduation rates, and limited opportunities for post-secondary education and career development (Nīmante and Ekša, 2020). Despite numerous studies conducted in other countries, relating to the quality of education facilities and performance of students with hearing impairment, there are still barriers to appropriate educational facilities and services. In the Ugandan context, few studies have been conducted (Omugur, 2023; Kaboggoza, 2022; Kaindu et al. 2022). This study, therefore, was set up to further establish the role of quality education facilities on students with hearing impairment at Wakiso Secondary School for the Deaf, to clear the lack of a more contextual understanding of such aspects and how the problem can be dealt with.

1.3 Purpose of the Study

The purpose of this study was to investigate the quality of education facilities for students with hearing impairment in Wakiso Secondary School for the Deaf in Wakiso District.

1.4 Objectives of the Study

The following objectives guided the study.

- 1.4.1 To examine the influence of communication technology on students with hearing impairment in Wakiso Secondary School for the Deaf.
- 1.4.2 To analyze the influence of accessible learning facilities on students with hearing impairment in Wakiso Secondary School for the Deaf.
- 1.4.3 To establish the influence of physical facilities on students with hearing impairment in Wakiso Secondary School for the Deaf

1.5 Research Questions

- 1.5.1 How has communication technology influenced students with hearing impairment in Wakiso Secondary School for the Deaf?
- 1.5.2 What is the influence of accessible learning facilities on students with hearing impairment in Wakiso Secondary School for the Deaf?
- 1.5.3 How have the physical facilities influenced students with hearing impairment in Wakiso Secondary School for the Deaf?

1.6 Scope of the Study

This scope included the time, location, and content scopes shown in the subsections.

1.6.1 Geographical Scope

The research took place at Wakiso Secondary School for the Deaf, a boarding institution situated in Sentema, Kakiri sub-county within Wakiso District. Wakiso District is found in the Central Region of Uganda, sharing borders with Nakaseke and Luweero Districts to the north, Mukono District to the east, Kalangala District in Lake Victoria to the south, Mpigi District to the southwest, and Mityana District to the northwest. The district headquarters is located in Wakiso, which is approximately 20 kilometers northwest of Kampala, Uganda's capital city. The geographical coordinates of the district are 00 24N, 32 29E.

1.6.2 Content Scope

The independent variable pertains to the quality of educational facilities available for students with hearing impairments. The material discussed the communication strategies utilized when teaching students with hearing impairments; the accessibility of teaching and learning resources for these students; and the appropriateness of physical facilities in schools for instructional practices that can enhance their academic performance. The information was relevant for gathering up-to-date data on the quality of educational facilities for students with hearing impairments by examining the resources available for teaching and learning in schools.

1.6.3 Time Scope

The study was carried out between 2023 and July 2024. A deliberate effort was made to ensure that most of the literature used was 10 years old, between 2013 to 2024.

1.7 Significance of the Study

This study has several implications for various stakeholders involved in educating students with hearing impairment in Uganda.

Policymakers such as the Members of Parliament (MPs), Donors, Non-Governmental Organisations (NGOs), Ministry of Education and Sports, could develop targeted interventions and allocate resources to support special needs education practices that benefit the students with hearing impairment in school.

The results of this study provides new knowledge on the need to guide schools in Uganda on the accessibility to quality facilities in the learning environments for students with hearing impairment.

The outcome of this study empowers academicians, particularly comparative educationists, with insight on the quality of education practices for students with hearing impairment for the improvement of existing policies.

The results of this study ought to empower students with hearing impairment to advocate and demand for more quality inclusive and equitable education practices.

1.8 Justification of the study

Wakiso Secondary School for the Deaf offers an important setting for in-depth research on deaf education, providing a specialized learning environment for students with hearing impairments and serving as a representative and reachable model for shaping inclusive policies and educational practices throughout the region.

1.9 Limitations of the study

Several limitations may affect the credibility and trustworthiness of the findings in this study. These limitations include:

Misinterpretation of information: There was a likeliness that information provided by students with hearing impairment was miscomprehended due to

insufficient knowledge of their meaning as presented through signs. The language of students with hearing impairment is not structured for ordinary people, just as it were for the English language; the chances of misrepresentation of information in this study may have minimally construed the intended meaning.

Lack of sign language proficiency: The researcher's ability to communicate successfully with students who had hearing impairments was limited by their incapacity to ask and answer questions in sign language. The use of sign language interpreters to fill in the communication gaps increased. The quality of responses needed to address the concerns under examination may have been harmed by the use of sign language interpreters, who may have offered secondary viewpoints.

1.10 Definition of Key Terms

Education Facilities

All tangible and non-tangible amenities and systems in the school environment that support the students with hearing impairment, including classrooms, libraries, laboratories, and other facilities, as well as the availability of specialized resources such as assistive devices, sign language interpreters, and other support services (Alimi et al., 2012). The availability of the facilities required for teaching and learning for pupils with hearing impairments in the school.

Hearing Impairment

Refers to the partial or total inability to hear in one or both ears (Wei et al., 2018). All degrees and types of hearing difficulties, from mild to profound, and it includes both of these groups and someone hard of hearing or whose hearing is diminished. Students who attend school at Wakiso School for the Deaf and experience hearing problems.

Information Communication Technology

Communications and Information Technology, sometimes shortened to ICT, is the application of digital technology for information processing and management. ICT includes a range of technologies, including digital devices, networks, software, and computers. ICTs have been utilized to establish e-learning and web-based environments, assist learning processes, prepare instructional materials, make mobile applications, and enhance the education of those with special needs, such as the Deaf population (Samsudin et al., 2017).

Quality

Conformity to specifications or requirements to ensure the ability of the material or component to perform satisfactorily in the application for which it is intended by and for the user. Suitability for the intended use/purpose (TQP, 2020). The level of excellence with which the communication, accessibility, and physical facilities fit the purpose to address the required standards of teaching and learning, meets the experiences of students with hearing impairment to perform in all areas of their educational expectations in school.

Sign Language Interpretations/Interpreters

At the heart of Deaf culture lies sign language, which is a sophisticated and visually oriented form of communication that is just as intricate and expressive as any spoken language. In contrast to spoken languages that rely on sound and verbal structures, sign languages utilize hand shapes, gestures, facial expressions, and body movements to express meaning (Deaf Websites, 2024). At Wakiso School for the Deaf, students with hearing impairments interacted during the educational process using Uganda Sign Language.

Student Teacher

An individual currently involved in a teacher training program that provides supervised teaching experience with adults, children, and youth in both public and private settings. Future educators are prepared to address the academic needs of their students through internships and student teaching during the educational process (LMShero, 2024). In order to fulfill their graduation requirements, university students who are student teachers must receive teaching experience in the fundamental abilities required to become certified educators. They also got the chance to observe teachers in various classrooms at Wakiso School for the Deaf.

Total Communication

Total communication is a widely accepted method that promotes the use of both spoken (oral) and signed (manual) languages among deaf children. This typically encompasses the integration of spoken and sign languages, but can also include cued speech, finger spelling, lip reading, facial expressions, writing, pantomime, amplification, and the utilization of residual hearing, tailored to each individual's needs and capabilities (Bireley, 2024; Hidayat et al., cite Denton, 1970). At Wakiso School for the Deaf, students with hearing impairments employed these various communication modes during their classroom teaching and learning experiences.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter explores the existing literature on the quality of education facilities for students with hearing impairment in Uganda. This literature review identified research gaps and provided a better understanding of the issues under investigation, which eventually, informed the methodology and findings of the study.

2.1 Theoretical Underpinning

The System theory grounded by Bertalanffy in 1960 (Bertalanffy, 1969) provided valuable information that guided this study. The systems theory hinges on the relationship between resource inputs and output. The open systems input-output model as applied to educational organizations, indicates how the quality of education facilities can improve their learning experiences. The theory states that organizations are made up of interconnected points for the good of the whole organization. Failure of one part of the organization to effectively perform its functions affects the performance of other parts and the organization as a whole. In this study, educational facilities in schools pass through a process where they are planned, organized, motivated and controlled to improve their learning therefore, if the school has good facilities, would help students with hearing impairments to excel (Zhang and Ahmed, 2020).

Systems theory recognizes the various parts of the organization, such as educational facilities help the other parts of the organization system to effectively and efficiently function (Zhang and Ahmed, 2020). Relatedly, Vanderstraeten (2023) observed that a change in any factor within the organization impacts other organizational or sub-system components. As such, the inputs represented by quality educational facilities, the processors and the generators function well to achieve the

desired outcome to influence better students' learning. Thus, all systems work in harmony to achieve the overall goal of students with hearing impairment.

The weaknesses of the system theory are multifaceted based on Bertalanffy (1969) personal critic of his theory. He mentioned that the theory was most likely to become too abstract and overly generalized, risking a loss of explanatory power when applied across disciplines. He also emphasized that it was not a universal theory, rather, a framework for understanding complexity that is designed to complement, but not replace, traditional scientific methods. He concluded that the theory needed a clearer methodological grounding to be fully effective. According to Fisher (1978), the General Systems Theory (GST) is not a theory, but a loosely organized and highly abstract set of principles that lack the predictable power. Relatedly, Della (1977) argues that GST cannot simultaneously serve as a general framework and explain specific real-world events, a tension that limits its practical application.

Suffice to note is that fact that the critiques from within the systems community helped to shape the GST into a more flexible, interdisciplinary lens rather than a rigid doctrine.

2.2 Review of Related Literature

This section is a review of related literature on communication technology, physical facilities and accessibility in the school setting. While reviewing the literature, the gaps identified through this literature were identified to highlight the missing information that is required for this study.

2.2.1 Communication Technology for Students with Hearing Impairment

The communication of students with hearing impairment is essential in relaying information during the teaching and learning processes, deliberate interventions ought to be adopted by the school to ensure effectiveness as elaborated by different scholars.

Sidi (2019) posits that assistive technology is a supportive mechanism to increase the quality of education facilities for students with hearing impairments. Assistive devices are essential technology tools that help students enhance their hearing abilities through the transmission of electric waves in the innermost part of their ears. Walker et al. (2020) stated that assistive technology benefits individuals with disabilities as it helps them overcome challenges and become more independent in all aspects of their lives. In a similar vein, Sodiqovna (2020) noted that assistive technology can aid students with hearing disabilities in communicating successfully, obtaining information, and engaging in educational activities.

Another mode of communication is realized through the use of professionals who offer interpretation services that relay the information with the use of sign language during the teaching and processes. A study by Ntinda et al. (2019) established that the lack of professional skills to adapt and teach the regular curriculum to students with hearing impairments significantly influences their educational success and overall experience. During curriculum communication, it was ideal for professional teachers to possess the prerequisite skills to support curriculum implementation as proposed by Bamu et al. (2017) that, teacher training was essential for providing quality education for students with hearing impairments.

Furthermore, Atanga et al. (2020) found that students' academic performance was impacted by their knowledge, attitudes, interests, and barriers regarding assistive technology. Following their use, all forms of technology support for student with hearing impairments were critical to their overall academic success. These devices potentially improve the students' perceptions and interests based on their potential for use and adaptation for learning purposes.

Furthermore, Kumar et al. (2020) investigated Malaysians' behavioral intention to use mobile learning. The study looked at how students' propensity to use mobile learning tools was influenced by factors like self-efficiency, subjective norms, and Whatsapp use habits. Using the structural equation model, the study discovered a strong and positive correlation between the use of mobile learning and behavioral intention and attitude. As a way to connect information during the teaching and learning process, mobile phones are recommended as a way to improve the educational experiences of students with hearing impairments. Students and teachers are expected to possess the required knowledge and skills in their operations to access and use them for learning inside and outside of the classroom.

Walker et al. (2020) argued that personalized technology interventions improve self-efficacy and engagement among students with hearing impairment. Qualified personnel including teachers and sign language interpreters create language acquisition and academic development among students with hearing impairment. Training and ongoing professional development ensure that teachers possess the necessary skills and competencies to support the different needs of learners with hearing impairment effectively (Sodiqovna, 2020; Smith, 2020; Abredu et al., 2019).

The environment at Wakiso School for the Deaf is exclusively for students with deafness, requiring specialized interventions that may not compromise their learning in school. Al-Dababneh and Al-Zboon (2022) conducted a study on using assistive technologies in the curriculum of children with specific learning disabilities in Jordan. The research focused on teachers' beliefs and professionalism regarding the integration of assistive technologies into the curriculum for children in inclusive classrooms. In the descriptive survey design, the study found a statistical relationship between teacher's beliefs and their intent to use assistive technologies in the curriculum. The interventions

through curriculum reforms in the schools of students with specific needs require specialized communication facilities for teaching for the improvement of their academics.

The deaf culture intervention with Uganda sign language and the locally invented signs in the classroom was critical in having a common ground to relate the curricula issues. The integration of sign languages into the curricula would enable the flourishing of Deaf culture and go some way to resolving the tensions that have arisen from the promotion of oralist education facilitated by technologies such as cochlear implants (Bowman-Smart et al., 2019). The use of signs as a language of communication should be formal and common to all students with hearing impairment so that their experiences may result in better performance in their academics.

Sign language interpreters with good command of knowledge and interpretation skills help to create rapport between the students and teachers in class. Students with hearing impairment need content to be explained to them in a simplified manner through gestures and signs. According to Leeson et al. (2014), what is expected of interpreters and their role varies depending on whether language is primarily understood as a tool based on a set of rules, or as fulfilling different functions in different contexts as part of human interaction.

According to Bui and Myerson (2014), while note-taking takes place in both educational and non-educational settings, its beneficial effects are most apparent in academic contexts where students are assessed on their ability to remember information from their lessons. According to Migehe (2014), for students to understand teachers, they make use of visual information such as pictures, labels, diagrams, and keywords written as much as possible.

When developing the best curriculum implementation strategy for children with hearing impairments in schools, the severity of student's deafness was essential. While students with modest hearing impairments can use assistive equipment to augment the spoken words in their ears, those with severe hearing impairments require complete communication in order to profit from the course. According to Agomoh and Kanu (2011), hearing plays a major role in one's capacity for interaction and communication in their surroundings. Communication, adjustment, and learning can all be hampered by hearing loss, whether it happens before or after birth. Rizvi and Rana (2023) noted that the incorporation of ICT in educational settings for students with hearing impairments is lacking, as special education teachers infrequently utilize ICT tools (both software and hardware) for instructing students with hearing disabilities, primarily due to the lack of ICT teaching resources. The scholarly views presented in this section of the report display views and opinions of different authors on the communication strategies employed by schools to educate learners with learning difficulties in settings that provide adequate materials and tools in well-established learning environments. However, they fall short of explaining the plight of students with hearing difficulties in low income economies in government owned schools in Uganda is not clearly articulated.

2.2.2 Accessible Learning Facilities for Students with Hearing Impairment

Accessible learning amenities are part of the education facilities for students with hearing impairments. According to Aljedaani et al. (2023), accessible learning materials are not only important for supporting academic achievement but also for creating social inclusion among students with hearing impairment. They suggested that the provision of materials in sign language, captioned videos, and visual aids promote communication skills and peer interactions within the classroom setting. Furthermore, Nakazibwe,

(2018) observed that it is important to adapt flexible delivery of teaching materials via electronic media as children with hearing impairment have difficulty in accessing information in the usual ways.

Accessibility to multimodal practices in school enhances students' opportunities for improving their academic struggles with visual and tactile stimuli for teaching and learning students with hearing impairment in school. Punch et al. (2019) showed that multimodal learning approaches integrate visual and tactile stimuli alongside auditory input, in catering to the different learning needs of students with hearing impairments. However, a literature search shows no study has been done in the public schools in Wakiso to establish accessibility to education facilities for students with hearing impairments. However, this has not been tested anywhere in Uganda, which leaves a gap.

According to a study by Muhombe et al. (2015) on how instructional facilities affect hearing-impaired students' access to secondary school education in Nandi County, Kenya, inclusive education is a helpful strategy used in both public and private schools to improve the standard of learning environments for students with hearing impairments. Accessibility to the facilities at specialized schools necessitates that all students with hearing impairments have an equal chance to utilize any amenities to improve their current school setting.

In Cameroon, Bamu et al. (2017) established that inclusive education creates diversity, promotes equal opportunities, and encourages respect for differences. These advocates of inclusion argued that placing students with disabilities in the same setting as students without disabilities provided equal access to learning experiences.

Eze et al. (2021) studied perceived usefulness; and perceived ease of use in learning facilities for teachers, revealing the association between learning facilities and

use was significant. It was also established that the positive association between learning materials and intended use was transformational in academic progression. The usefulness of facilities used in school should be easier for both the students and teachers to reference during the teaching and learning processes in school. Students should be able to appreciate and learn things with ease in the designated spaces, including access to books, other reading materials and internet access for learning.

The self-efficacy amongst students to access the facilities encompassed confidence in controlling their behaviour, exerting influence over the environment, and staying motivated in pursuit of their academic goals. Huang et al. (2022) established that self-efficacy significantly and positively influences the intent to use learning materials. However, most of these studies were carried out in different school settings of the western world and countries out of Uganda's boundaries, with different education systems. Thus, their results may not hold for Ugandan schools for visually impaired students. However, the intent of students with hearing impairment and their teachers, together with the sign language interpreters was worth establishing to verify their ability to use the facilities and materials academics.

Chimhenga and Sibanda (2016) claim that students with hearing impairments face significant obstacles in accessing the secondary school curriculum because of their struggles with the demands of oral communication. According to the writers, students have a better chance of succeeding academically once they can understand the school's language. Within the school environment, accessibility to learning materials is crucial for both the learners and teachers to familiarise themselves with the curriculum content. The new secondary curriculum for secondary schools in Uganda requires the practical application of knowledge and skills in a new dispensation.

Additionally, Lehloa (2019) discovered that one interpreter covers all courses without being replaced, which results in the interpreter becoming exhausted and having insufficient time to prepare lessons with subject teachers. The findings also show that both teachers and sign language interpreters had to deal with a communication breakdown; teachers say they are unable to speak directly with students who have hearing impairments, and sign language interpreters also lose the message in the process. To reduce the stress and strain that comes with spending longer hours in the classroom, the amount of time an interpreter signs during teaching and learning activities should be controlled.

Hermawati and Pieri (2020) observed that most of these devices were developed and produced in developed countries, which unfortunately results in high purchase prices. Consequently, individuals with severe and profound hearing loss who live in developing countries are less likely to have the necessary financial means to purchase such expensive devices and remain unable to take an active role in the community.

Tucker (2012) added that teachers agreed that viewing the lessons pre-class was not enough for success, but required the integration of the instructional videos with an overall approach, which would induce the required learning outcomes. The videos used for teaching in school should be based on the content generated by the teachers themselves to address the current study needs.

Ordu (2021) that teaching aids enhance classroom instruction, attract learners' attention and create motivation to learn. Students with hearing impairment in school require the use of visual aids for their learning of scientific and technical content during the teaching and learning process. Joseph (2015) opines that with the gradual technological progress, non-conventional teaching aids became available to teachers and students like computers, television/radio, and interactive whiteboard, multimedia.

Students with hearing impairment out to use modern labels to enhance and align their experiences to accessible digital possibilities of the 21st century.

2.2.3 Physical Facilities for Students with Hearing Impairment

Physical facilities influence learning in numerous ways as illustrated by authors in this section of the report. As elaborated by Etale et al. (2020), physical accessibility is important for creating inclusive learning environments that accommodate the different needs of students with hearing impairments. Their study highlighted those architectural design principles, such as universal design and barrier-free access to promote independent mobility and participation within educational settings. The buildings accommodating students with hearing impairment should ensure that all the amenities required for teaching and learning are in place to facilitate the learning experience.

According to Alimi et al. (2012), blocks of classrooms, staff rooms, laboratories, workshops, libraries, consumables, water, chairs, and tables, are among the physical facilities. These facilities are essential for the smooth running of activities in the classroom, besides providing a conducive environment for teachers and students with hearing impairment in the school. Conversely, Sidi (2019) argued that environmental modifications, such as visual alarms and tactile signage improve safety and communication for students with hearing impairment, creating a sense of empowerment within the school community. A further survey of the situation may yield different results, or show some more benefits that did not surface hence the need for further surveys, including the Ugandan situation. Within the school environment, students should be able to see and look at the visual alarms that are placed within the different sections and areas of the school facilities. These alarms should be placed in the classrooms, laboratories, libraries and all structures in the school to help students receive immediate communication signals for their safety.

According to a 2019 study conducted in Nigeria by Olugbenga, the standard of educational facilities has a big impact on how well hearing-impaired pupils learn in public secondary schools. Students with hearing impairments benefit from enhanced communication and greater academic results when educational institutions place a high priority on offering assistive technologies. All children with hearing impairments, particularly those who have been identified with partial hearing issues in the school, must have access to facilities that enable them to hear. The facilities to work and repair the assistive devices were necessary to address any technical issues associated with their failures to relate signals.

Furthermore, research in Lagos-Nigeria by Olamide et al. (2018) indicated that the availability of facilities in educational settings played a crucial role in facilitating effective communication and access to educational content. In order to communicate with children during the teaching and learning process, the educational environment for students with hearing impairments needs equipment. The rooms should be well equipped with facilities that make it easier for students to interact and share knowledge with their peers in the classroom, the library and laboratories. Making these facilities available prepares students with hearing impairment for better understanding and conception of ideas throughout their stay in school.

According to Onyebuanyi et al. (2022), the significance of physical facilities on students' learning in senior secondary schools was instrumental in shaping the direction of learning amongst students with hearing impairment. Physical facilities for students should guarantee their comfort and peaceful co-existence within the environment. Each facility should provide a continuous learning opportunity for the students to gain new experiences as the student advances through their studies in the classroom, library or during the implementation of tasks that contribute to their learning.

By synthesizing the available data, Barrett et al. (2019) investigated how school infrastructure affects learning. They looked at the materials that examine the areas of emphasis for better learning outcomes for students, especially the goal of "accessible, well-built, child-centered, synergetic, and fully realized learning environments." The study was a global synthesis of literature from various countries to evaluate how overall school structure affects the learning outcomes. They found that classrooms with appropriate assistive technologies significantly improved students' ability to comprehend and engage with the curriculum. With the advent of new technology adaptations in schools for teaching and learning purposes, technological integration within the classroom settings provides students with the opportunities to interface with resources that are universally recognized. Learner interest in the subject areas is enhanced to ensure that their performances are appropriate to the expectations of the curriculum requirements. As such, the provision of assistive technologies is necessary to influence learning with learners owning their learning experiences through these devices.

In a related study, Olajide et al. (2021) investigated how school facilities affected junior secondary school students' learning of technology and fundamental science in Osun State, Nigeria. The findings revealed that students with access to inclusive education facilities, which included appropriate accommodations and support services, achieved higher academic outcomes than those in non-inclusive settings. The quality of the school facilities at Wakiso School for the Deaf ought to meet the required standards that permit students to navigate through them with ease. Replication of these findings in school would help improve the standards of learning and teaching that influence better performances amongst the students in all subjects.

Based on the findings of Antia et al. (2017), classroom setups that promote the organization and availability of resources can minimize visual clutter and, in turn, lessen distractions for students who are hearing impaired. Incorporating carrels or dividers can help decrease both visual and auditory distractions during independent tasks; on the other hand, for collective activities, desks can be positioned to face away from entrances and windows. In the case of Wakiso School for the Deaf, the clutter in the classroom should be reorganized to suit adjustments that allow students to concentrate on their reading within the facility. It was assumed that such modifications improve the environment in the classroom through these forms of arrangements. Effective modifications influence students' abilities to perform academically in the absence of numerous distractions.

In light of the educational facilities for the teaching and learning of students with hearing impairment, Mulyasa (2014) distinguishes structures, classrooms, desks, chairs, and preparation materials and media that are directly used to support the educational process. Having records of information in the documentation of the school inventories gives leverage to the school management and extends the much-needed services to a given standard. Frequent absences from school due to illness, a lack of remedial work or catch-up strategies, unfavorable attitudes from teachers, low self-esteem that results in dropping out of school, and other variables are all factors that contribute to academic difficulties (Sichlindi et al., 2022).

2.3 Summary of Literature Review

Although research from other nations has provided insight into the quality of educational facilities for students with hearing impairments, nothing is known about whether the same support systems are in place in the study area. In order to fill this knowledge vacuum, this study aims to investigate the significance of high-quality

educational facilities for students with hearing impairments at Uganda's public secondary schools and inform the concerned persons and organizations with empirical evidence on that matter.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

This chapter of the dissertation goes into detail about the procedures used to conduct the study on the quality of educational facilities for students with hearing impairments. The study design, target population, sample size, sampling strategies, data collection methods, data collection instruments, instrument validity and reliability, data collection processes, ethical issues, and data analysis are all covered.

3.1 Research Design

The study employed a descriptive research design comprising the qualitative research approach. This design is appropriate because it can be used to collect data from a sample population at a particular time to obtain information about a group's preferences, practices, or interests (Saunders et al., 2019) allowing comparison of data from different groups. This study used a qualitative approach to describe the different sets of information gathered during the study. Creswell (2014) defines qualitative research as an exploratory, non-numerical method that seeks to understand people's attitudes, beliefs, and experiences through in-depth interviews, observations, and open-ended questions.

3.2 Target population

The total population comprised 34 participants; students (21), student teachers (5), teachers (4), Sign language interpreters (2) and administrators (2), in Wakiso Secondary School for the Deaf.

Table 3.1: Population, sample, and sampling technique

SN	Category of population	Population	Sample	Sampling techniques
1	Administrators	2	2	Purposive
2	Classroom Teachers	12	4	Purposive
3	Student Teachers	5	5	Purposive
4	Sign Language Interpreter	2	2	Purposive
5	Students	30	21	Purposive
	Total	51	34	

3.3 Sample Size

The size of the sample was determined by the number of individuals possessing information and knowledge about hearing impairment. Consequently, the sample included two administrators at the managerial level (the headteacher and the director of studies), four teachers working with students who have hearing impairment, five student teachers, two sign language interpreters, and 21 students experiencing hearing impairment. Participants were selected purposefully for the study as shown in Table 3.1.

3.4 Sampling Techniques

In this research, purposive sampling methods were employed to choose the target population. A purposive sampling approach was utilized to select the administrators, student teachers, and sign language interpreters, considering their roles and their potential to provide valuable information about the institution. The study used purposive sampling to choose teachers and students. From a total of 12 teachers, four were selected, and from 30 students, 21 were chosen; additionally, the two administrators, two student teachers, and two sign language interpreters included in the

study were all part of the sample. This approach involved deliberate selection of participants from the population sample to ensure equal opportunity for every individual choice. The rationale for using purposive sampling was driven by the objective to minimize sample bias and increase the transferability of the findings to the broader population (Saunders *et al.*, 2019).

3.5 Methods of Data Collection

The methods of data collection included interviews and documentary review as presented in this section of the report dissertation.

3.5.1 Interviews

In this study, two sets of interviews were conducted, face-to-face interviews with the head teacher and the Director of Studies (DOS). Face-to-face interviews create direct interaction, flexibility and applicability to a broad range of individuals (Yin, 2018). The focus group discussions were conducted with students and teachers in their respective groups. This study used interview guides as data was gathered from the administrators and teachers.

3.5.2 Documentary Analysis

In this study, various documents were accessed from the school including inventory of reading materials, timetable, activity planner for each term and other relevant information available on the plight of students with hearing impairments. Information from the library provided existing materials for students with hearing impairment to use and improve their learning experiences in school. These documents served as supplementary sources of information, contributing to the background information and reinforcing the findings derived from other research instruments. Other documents considered 'very sensitive and confidential', including receipts and invoices concerning

the acquisition of the equipment, their maintenance, academic records, were not provided by the administration.

3.5.3 Observation

In this study, the observations were done through the use of a camera to capture all the required information about the three objectives of the study which seeks to evaluate the quality of educational facilities at Wakiso School for the Deaf. The researcher verified the information through participant observation of facilities and accessibility to various places on sight. The research assistant also supported the observation process to complement on the quality of the observed facilities with photos and comparing them with the observed facilities viewed by the researcher. The observations focused on gathering information on the three objectives of the study.

3.6 Instruments of Data Collection

The instruments of data collection comprised interview guides, documentary checklists and observation checklists as presented in this section of the dissertation.

3.6.1 Interview Guides

These guides comprised open-ended questions that were used to probe the underlying issues of the three objectives of the study. Each interview session lasted between 30 to 40 minutes. A focus group discussion was administered to the students and teachers during the research process. The open-ended questions provided participants the opportunity to express themselves freely with their opinions regarding the key issues sought for to fulfill the three objectives of the study. Additionally, more information regarding the questions was easily attainable, providing an opportunity to probe where there was need for clarity over an issue that was not well articulated.

3.6.2 Documentary Checklist

The checklist was broad enough to include all information that helped describe the quality of educational facilities for teaching and learning students with hearing impairment at Wakiso School for the Deaf. They included; records of school items, attendance lists of learners and teachers, records of marks and records of activities performed by students. The use of a notebook helped in recording the information gathered on the three objectives of the study in the field.

3.6.3 Observation Checklist

This checklist was used to identify and record facilities used by students, teachers and administrators at Wakiso Secondary School for the Deaf. It included facilities such as types and numbers of assistive devices, accessibility points, learning environment communication strategies, among others. It also helped in observing the sitting arrangement for learner participation in the facilities during the teaching and learning process. A camera was used to take photographs of the different facilities in the school.

3.7 Credibility and Trustworthiness

To ensure credibility, members of the study groups that participated in the study checked and verified the findings of the study as a reflection of their views concerning the outcome of their views. The multiple sources and methods of data from interviews, observations then documentary analysis provided ground triangulation in this study. Through prolonged engagement in the field, it was possible to build trust and gain deeper insights in the underlying issues related to the quality of facilities for students with hearing impairment.

For trustworthiness, the description of the participants with rich information that was relevant for the study, procedures, research context, demographics, and social dynamics for comprehension of the setting. Descriptions of data collection methods and the use

of direct quotes from participants were useful for anchoring themes in participants own words as indicated in Chapters four and five of this study. Lincoln and Guba (1985) supports the use of credibility and trustworthiness to ensure rigor in qualitative research studies.

3.8 Procedure of Data Collection

Before gathering data, the researcher obtained an introductory letter for fieldwork from Kyambogo University, Directorate of Research and Graduate Studies, and presented it to the management of Wakiso School for the Deaf. Through permission from the school, a Focus Group discussion interview was administered to the students because of their large numbers and later, face-to-face interviews with the administrators, comprised of the head teacher and Director of Studies (DOS) as key informants. Student teachers and sign language interpreters were interviewed through face-to-face interviews given their smaller numbers. The researcher continuously visited participants for 'callbacks' and during this time, records of school facilities and supplementary information were obtained by probing for additional information. The use of a video camera helped in capturing the gestures and signs used by students with hearing impairment during the focus group discussions. Images of the respondents were also captured during the interview process to supplement the observed opinions of other participants during the study.

3.9 Ethical Considerations

The researcher ensured that the involvement of participants was voluntary and based on informed consent. Participants were informed of their right to withdraw from the study at any time if they wished to do so. Confidentiality was ensured by concealing participants' real names, to protect the identity of the participants with pseudonyms besides, their personal information was kept confidential without disclosing any details.

When conducting interviews, the purpose of the study was communicated to the interviewees and participants' routines and engagement during conversations were not interrupted. This approach helped to maintain a smooth dialogue flow and prevent distractions. The interviewees were verbally asked for consent to record their voices and signed communication.

3.10 Data Analysis

The data gathered through interviews, observation, and documentary analysis was sorted, cleaned, and analysed based on the three objectives of the study. Interview data was transcribed, filed notes were typed sorted and arranged accordingly. Analysed data was broken down through labels with codes that described each segment of the content. Data was presented according to merging themes that reflect meanings from each category of data. The participants' narratives were stated based on the interviews for each objective of the studies. Similarly, the observations during the field study were organized and written alongside these narratives based on what was seen during the studies as indicated in chapter four of the report. Information from the documentary analysis was used to support the views and opinions of the participants as they unfolded throughout the discussion sections of the report in chapter five. Data analysis hinges on the stages advanced by Creswell and (2018), emphasizing a systematic approach to analysis of information as described in this section the report.

CHAPTER FOUR

PRESENTATION OF FINDINGS, ANALYSIS AND INTERPRETATION

4.0 Introduction

The chapter presents, interprets and presents the findings on the influence of communication technology, accessibility learning, and physical facilities on the performance of learners with hearing impairment in Wakiso Secondary School for the Deaf. These findings are presented based on the three objectives of the study as elaborated in the subsequent sections of this report.

4.1 Demographic characteristics of Participants

The data concerning the demographic features of participants in this research focused on sex, age, gender, subject area, teaching tenure, and the highest attained qualification, with the findings summarized in Table 4.1.

Table 4.1. Demographic characteristics of participants.

	Participant	Gender	Age (Years)	Experience (in years)	Highest Qualifications
1	Administrators	Male (A1)	59	23	Post Graduate Diploma in Education
		Male(A2)	47	10	Diploma in Secondary Education
		Female (-)	-	-	-
2	Classroom Teachers	Male (CTr1)	32	17	Bachelors' Degree
		Female CTR2)	50	10	Bachelors' Degree
		Male (CTR3)	38	16	Bachelors' Degree
		Male (CTR4)	43	20	Bachelors' Degree

3	Student Teachers	Male (STR1)	27	2	Bachelor of Inclusive Deaf Education (Undergraduate)
		Male (STR2)	24	3	Bachelor of Education (Undergraduate)
		Female (STR3)	22	3	Diploma in Sign Language (Undergraduate)
		Male (STR4)	23	2 Months	Bachelor of Inclusive Deaf Education (Undergraduate)
		Female (STR5)	24	2	Bachelor in Special Needs Education (Undergraduate)
4	Sign Language Interpreters	Male (SLI1)	23	2	Bachelors in Sign Language
		Female (SLI2)	21	2 Weeks	Diploma in Sign Language
5	Students	Male (10)	16-20	4	PLE Certificate (S.4)
		Female (11)	16-19	4	

Source: Primary data.

It was established that the two male Administrators (As) were qualified teachers between the ages of 45 and 60 years and had the experience of 10 to 23 years of teaching students with hearing impairment in the school (See Table 4.1). The four (4) Classroom Teachers (CTRs) comprised of 25 percent female and 75 percent males between the age

of 40 and 55 years, were qualified teachers with experience between 10 and 20 years of teaching students with hearing impairment. The two (2) Sign Language Interpreters (SLIs) comprised of one female and one male adult who were between the ages of 20 and 25 years, trained in sign language, and had an experience of between 2 weeks as the least and 2 years respectively, as the highest period of signing for students with hearing impairment in school. The five (5) Student Teachers (STRs) comprised 2 females and 3 males, who were between 20 and 30 years old, with two months as the least and three years as the highest duration of experience in teaching practice, handling students with hearing impairment in the school. The 21 students (STDs) with hearing impairment comprised 10 males and 11 females, between 16 to 20 years of age, and were senior four (S.4) candidates in their final year of studies. The demographic information presented in *Table 4.1* provides a summary.

All participants including teachers, student teachers, administrators, sign language interpreters, and students were conscious of the challenges of hearing impairment and the plight of students with hearing impairment, and therefore possessed the basic skills in sign language as a mode of communication with them in school. The teachers implemented the curriculum for the “O” level with the support of the sign language interpreters who assisted in the teaching process. The 21 students of Senior four (S.4) in the school suffered from hearing impairment challenges, having been assessed before joining Wakiso School for the Deaf for their studies.

4.2 Communication technology for teaching students with hearing Impairment

The initial objective was to identify the various communication technology tools utilized by students with hearing impairments in the classroom. The results from observations, individual interviews, and Focus Group Discussions with the participants are detailed in the following section of the report. Regarding the use of communication

technology for students with hearing impairment in school, almost all participants mentioned the lack of hearing aids to defuse the surrounding noise and help students hear and perceive what was taught in class. This was because most of the learners were totally deaf and did not require the services of hearing aids or devices to amplify the sound. One of the male teachers (CTR4) asserted,

“Most of our students here, they cannot hear, if they can, it’s very minimal so, the use of aids may not apply to most of them.”

Students have been assessed and tested to determine the degree of hearing, with the hopes of acquiring hearing aids, and were still waiting to receive these devices for listening during the teaching and learning processes. Another male teacher (CTR3) wrote,

“There are some organizations that come here; they carry out tests about the level of impairment. When they establish it, the person is recommended for hearing gadgets, but it is not easy for them to access these devices.”

The inability to access hearing gadgets has affected students with hearing impairment who cannot afford hearing aids to help them get direct information from the teachers without the help of interpreters. During a focus group discussion, one of the female students (STD10) reiterated,

“Most deaf have hearing aids but have lost interest in using them.”

Students complained about the discomfort of vibrating electronic movements and sounds in their ears, which created more stress and tension, leading to headaches. As much as students had hearing aids, none of the devices were used in class; students and teachers confirmed the possession of the hearing devices owned by students with

hearing impairment though they were not used due to negative effects on their health.

A male teacher (CTR1) corroborated her submission,

“After the assessment is carried out, students that require hearing aids are provided with them. A few students use them. But some students stop using them because they make them very uncomfortable, with a lot of sound that affects them more.”

In relation to the sign language interpreters, most of the participants confirmed their willingness to assist students with hearing impairments in the school setting, particularly during classroom lessons. Sign language interpreters have managed to convey messages without misrepresenting the perspectives of both teachers and students throughout communication at school. On the topic of the availability of sign language interpreters, a female teacher (CTR2) noted that,

“Sign language interpreters support the teaching in class where the teachers teach normally and besides interpreting, translating into sign language.”

Interpreters play an important role in facilitating the communication between students and their deaf learners in school. A female student (STD4) affirmed through FGD,

“...they need the help and availability of sign language interpreters.”

Sign language interpreters in the classroom provided effective communication during the teaching and learning process. Furthermore, a male teacher (CTR4), during the face-to-face interview, observed the support extended by the sign language interpreters in the school and asserted that

“... for teachers who do not know sign language, they use interpreters, they are available, anything that is for students' interest, we gather them

and communicate at once...”

This has helped students get and access information within a short period, especially where communication requires all their attention and presence. However, the chances of relaying the correct information were dependent on the interpreters' proficiency and accessibility to any of the science or arts subjects for easy signing of visuals and spoken words. In response to a question, “How effective do you think, these supportive mechanisms are in ensuring the educational needs of students with hearing impairment? A male teacher (CTR4) said that,

“...Sign language interpreters, but the challenge with sign language interpreters at times, we disagree because they do not understand the language most especially with sciences. Some terminologies cannot easily be understood by the interpreters unless the interpreter is a science teacher or did a lot of sciences but if this is a person biased in Arts, my friend, he may mislead the learners, yes.”

Misinforming students through sign language affected students' ability to get the required information from the curriculum of the interpreted subject. Total dependence on the interpreter to relay the correct information may affect the learning of students negatively, except where the correct information is relayed.

Regarding the interpretation of the curriculum during the teaching and learning processes, the researcher observed that it was a challenge for teachers and interpreters to communicate the information accurately. This was partly attributed to the adoption of the general curriculum without tailoring the information to suit the needs of students with hearing impairment in the country. In response to the teaching of curriculum for students with hearing impairment, a male teacher (CTR4) concluded that, “We need a very suitable curriculum for each of the subjects to meet the learning needs of the deaf.”

The general curriculum has affected the performance of students with hearing impairment and therefore needs to be modified to suit the specific needs of learners in school. The male teacher (CTR4) said that,

"The curriculum we are teaching is actually for ordinary learners, it is not yet modified to suit these ones (learners with hearing impairment). You cannot tell me that the deaf can excel in this curriculum at the same level as the normal students. So, there are not many modifications which are there in the curriculum today to suit our learners."

The "O" level curriculum for students with hearing impairment was general, and suitable enough for ordinary learners in inclusive schools; there were hardly any considerable changes, specific to the peculiar needs of this category of students with hearing impairment.

The use of videos with sign language interpreters was also prevalent in the dissemination of information as supported by the majority of participants who saw their values in the educational performance of students with hearing impairment. Integration of videos and sign language interpreters was observed by a male administrator (A1), "Projectors are so useful in that they display educational videos. In sign language, this helps learners to grasp better and faster" Students' concentration and attention span during the lessons was high, with a lot of curiosity and enthusiasm to master the steps and processes involved in the implementation of learning activities. A male teacher (CTR4) echoed:

"...if it is a video, you play to the students as you interpret for them. At times, when they look at a video, they can grasp something and at times you have to add sign language."

Concerning the use of visual aids to relay information in class, most participants recognized the use of charts with drawings that depict different items related to the lessons in all areas of their studies. One of the male interpreters (SLI1) asserted,

“The teachers at school provide visual aids and video charts for the learners in class....”

The charts helped students to memorise the information during the teaching and learning processes in class and within the school premises. In regard to the materials for teaching students with hearing impairment in school and their ability to their learning, a male administrator (A2) further said that:

“You need to be prepared with a lot of visual aids. Yes, because some of the things you teach may be abstract but when you vary these methods and bring in these visual aids, at least they get a picture of what you are teaching. So, we use videos, charts, and pictures to express what you want to teach.”

Visual aids are significant in explaining abstract information to students with hearing impairment since they supplement the words and gestures of the teacher and the interpreters in class.

Regarding the use of notes in class, most participants affirmed that teachers prepared lesson notes for them to write during the teaching and learning processes in the classroom. A male teacher (CTR3) justified the use of notes and mentioned that,

“Because, after that, they have to copy the notes. If you just talk, and the interpreter interprets, in the end, they will need to copy the notes. Therefore, writing is important and interpreting is important. So, after interpreting, the learners copy the notes and after that, the notes can be used for their revision and the teacher again, cross-checks because

some of them cannot write exactly what the teacher has written, like there can be some spelling errors.”

Additional information on paper, placed on the buildings’ walls, helped students read and digest the content taught during the lessons. Some information was placed on noticeboards in the classrooms, library, computer lab, and laboratories for students with hearing impairment to consume for their overall knowledge in school.

Regarding the direction of students with hearing impairment to specific facilities and materials for their studies, a large number of participants agreed that labels were visible throughout the school to guide the students and teachers to various locations of different spaces and items during the teaching and learning processes. A female sign language interpreter (SLI2) noted,

“They have everything they might need. They have the library, they have the computer laboratory, the science laboratory and everywhere is labelled. So, there is no way you can get lost because every building is labelled.”

The researcher observed that labels placed on the classroom blocks, laboratories, library buildings, bookshelves, noticeboards, and pathways were indicators of written information to ease communication in the school (See *Figures; 9 & 12*). However, a female student (STD6) through FGDs noted,

“Some buildings do not have names and they need to be labelled because some students may get lost and names can help to make the building clear.”

For those who depended on reading information, it was certain that all buildings under construction were labelled to guide students with hearing impairment in school. The researcher observed that with the new structures under construction.

Regarding the use of Information Communication Technologies (ICT) in school, teachers used and incorporated them in the teaching and learning of students with hearing impairment. The ICT facilities helped relay information to the students, especially through the use of the internet, computers, projectors and Smart TV during the teaching and learning processes in school.

4.3 Accessibility to Learning Facilities for Students with Hearing Impairment

The second objective sought to obtain information on accessibility to learning facilities, and participants established this to highlight the plight of students with hearing impairment in the school. The narratives on accessibility of learning facilities are described in the subsections of this report.

Accessibility to the school library is paramount in helping students get and read the right content from books. As such, a relatively good number of participants affirmed that the students and teachers had access to the library for books and materials relevant to teaching and learning in the classroom. The female interpreter (SLI2) mentioned the ease of access:

"Now for example, you go into the library, all the bookshelves are labelled, with stickers of the subject in that section for example, if you are looking for a computer book, you go to that section, History, the same case and the rest of the other subjects. This makes the books easily identified and the teachers are always available."

The researcher observed that teachers of students with hearing impairment borrowed books and other materials needed to prepare notes and images for teaching and learning in class and help students conceptualise the information faster (See *Figure 9*). Relatedly, a female student (STD17), during the FGD, observed,

"Some teachers refused to explain to them and referred them to the

library or interpreter to get the meaning of those hard words.”

The students who accessed the library attested to the fact that the library was available for their reading whenever they needed information related to comprehension of content in school.

Regarding accessibility to computers in the laboratory, many of the participants asserted that they used them in the computer laboratory to do individual research, prepare notes, and get visual images to illustrate specific aspects of the lesson. One of the male participants (CTR4) affirmed,

“We have a timetable, so whenever the teacher is going for a lesson, they use the timetable, they can access books, they can access the computers, we have one Smart TV 65 Inch that we use for learning purposes in school.”

It was evident that accessibility was made easier when timetables were used alongside the labelling of the different structures for students and teachers of learners with hearing impairments in school. The use of Smart Television was highlighted during the FGD, a female student (STD17) said,

“Television enables us to understand interventions across the world.”

The students learned through television screens that were placed within a large space in the classroom (*Figure 4*). Accessibility to the Smart Television provided a digital opportunity for participants as an alternative method of learning and content delivery.

Regarding internet access, the majority of participants affirmed that it was open for all students and teachers to search the internet and find the necessary information required for supporting the teaching and learning activities. A female student (STD21) asserted,

“Internet is fully available, so anything you can surf, if it is a video, you

play to the students as you interpret for them.”

Free access to internet services, provided by the school through collaborations with service providers, enabled participants to get all the information for their teaching and learning. Students with hearing impairment and their teachers had access to unlimited resources in the computer labs where internet services were provided and readily available for all. A female sign language interpreter (SLI2) said,

“They always inform them, and they have a computer lab and they have Wi-Fi in that, a child cannot get into the computer lab and finds when there is no internet. Internet is always on and the computer lab is always open.”

It was evident that the internet provided access to a wide range of resources for the subjects taught in school, students therefore broadened their knowledge and skills level through these resources. However, a female student (STD21) during FGDs asserted,

“When the teacher gives them a question to research about, they go to the internet of which some internet gives them wrong answers and when they go to the teacher, he/she marks them wrong.”

Students with visual impairment are not well conversant with the skills to gather the required information for any given assignments while conducting research and independent reading. The male administrator (A2) affirmed,

“The Uganda Communication Commission (UCC) connected us to the internet, it is free for a full year and after that, we shall begin paying but now, they are very enthusiastic about going there to the extent that we were forced to make a timetable.”

Free access to the internet has boosted the curiosity of students with hearing impairment to explore its potential use for learning within restricted time-frames that benefit them all. The restricted access to internet facilities has enabled students to find information for their learning and perception of concepts in a conducive environment within the school setting.

The classrooms are accessible enough for students to maneuver the class during the lessons. A relatively small number of the participants appreciated the classroom arrangements in class. According to a male teacher (CTR3),

“You look at the classroom environment, it is so conducive. It is not as congested as in other schools where you find a class that is supposed to accommodate 40 learners and you find 60 or 70 students there. However, here, if you find that even in some instances, the classrooms are underutilized. The students are few, and the resources which are available for them to use in the class, are limited even these shelves where they keep their books.”

The students enjoy learning in a conducive and accessible environment that fosters their knowledge in all subjects at school. It further observed that the students in class sat in positions that allowed them to face each other without disrupting their visibility from the teachers and sign language interpreters in class. The male administrator (A2) affirmed,

“The classrooms are always open apart from at night when they are used for fear of vandalism, and the guards are charged to take precautions.”

To safeguard the property in the school, students with hearing impairment are restricted from using the classrooms throughout the night. The researcher observed the teaching

and learning activities during the daytime, were done on schedule as indicated by the timetable through deliberate accessibility for all lessons.

Regarding accessibility to the Smart TV, a good number of participants agreed it was accessible to students with hearing impairment during the teaching and learning process. According to the male administrator (A2),

“Teachers use Smart T.V, you need those visual aids, and it is of great help, especially for the science subjects and geography, I have seen them using it.”

This was attributed to audio/visual materials that can be displayed through ICT possibilities where videos with sign language interpretations are relayed to students during the teaching and learning processes. (See *Figure 1*).

Regarding access to the projector, many of the participants said that they were used for showing text and images that were relevant for students learning at school, in a specific room. A male administrator (A2) affirmed,

“We have these mobile projectors, we have 3 of them, so again the challenge is that some of us use them and others do not. But they are of good quality with a warranty of 5 years.”

This affirmation was corroborated by a male administrator (A1) that, *“Projectors are available for the teachers to use for every lesson they desire visual presentation.”*

These projectors were readily available for all students with hearing impairment to visualise content and appreciate their conception during the teaching and learning processes. A female teacher (CTL2) corroborated this and said,

“Learning materials like projectors contribute to success in academics because students learn using eyes, feeling, and impressions.”

The concentration of students through this form of display enhanced their perceptions, as evidenced by the level of attention put on the running content during the teaching and learning process.

Regarding the time for entering and exiting the learning facilities, most of the participants supposed that the facilities opened early enough for students' use, and closed at an appropriate time to safeguard the equipment. The male administrator (A2) avowed,

“The classrooms are always open apart from night hours when they are not used for fear of vandalism, and the guards are charged to take precautions.”

The designation of appropriate schedules was instrumental in sustainably managing the space and facilities without affecting the overall objectives of students' academic progress during the teaching and learning processes. However, there was the need to have more access to all teaching and learning facilities besides the timetable as communicated by the male administrator (A2),

“There is a need to increase manpower so that those places are open and easily accessible. In case students want those materials, we are always ready to open them for use.”

Students and teachers have access to visual aids for teaching and learning academics and non-academic programmes. The majority of participants affirmed that visual aids were available with illustrations that help learners comprehend complex ideas taught in class, especially the scientific and technical components of the subject matter. The male administrator (A2) said,

“You need to be prepared with a lot of visual aids because some of these things that you teach may be abstract but when you vary these

methods and bring in these visual aids; at least they get a picture of what you are teaching. So, we use videos, charts, and pictures to express what you want to teach.”

The visual aids are of diverse types, ranging from hand-made charts to digital images and pictures for teaching and learning complex content in the classroom. A female student teacher (STR3) stated,

“...the school has projectors, charts, and markers which are used for visualizing to the students.”

Students with hearing impairment are exposed to local and modern visuals to gain more insight into their perception of academically challenging content.

Regarding accessibility through labelling in school, an average number of participants mentioned that students and teachers reach any facility, find their way around, or get information faster. In this respect, a female SLI2 mentioned,

“...labels were placed everywhere to ensure easy access to the facilities in the school, remember, they do not hear but at least they can read, they can see.”

The labelling of classrooms, laboratories, and library books, pathways are all indicators of the school administration ensuring accessibility to specific facilities, materials, or information. Relatedly, a male student teacher (STR1) affirmed,

“The classrooms were labelled with the class number, and the bathrooms and toilets have pictures indicating each type of gender belonging to a certain bathroom and toilet.”

Deliberate efforts to label facilities minimized the challenges of accessibility that would otherwise have made it difficult for students with hearing impairment to locate and access specific facilities within the school.

4.4 Physical Facilities for Students with Hearing Impairment

The third objective sought to identify the physical facilities used by students with hearing impairment in the school. The views and opinions of participants on the use of physical facilities provided broad perspectives on their existence in school. These submissions are presented in the subsequent sections of the report.

Regarding the library, most participants agreed that the library was well stocked to provide students with books and materials for gaining skills and knowledge in all areas of their studies. There are books for both science and arts subjects, including newspapers and magazines that are properly shelved in the-different sections of the library. One of the female student teachers (STR5) observed that

“The school has put in place a full functioning library where students can get textbooks and other learning materials plus the school has free Wi-fi that students use in researching on the internet.”

This experience exposed learners to resources in the library, besides accessing the internet resources through the free Wi-Fi provided in the school for teachers and students with hearing impairment to access.

The computer lab offers opportunities for students to type information and conduct research from online resources. Almost all participants agreed that these facilities enabled teachers to organise notes as well as prepare lesson plans. A male student teacher (STR2) observed, *“We have a laboratory for ICT”* and the male Administrator (AI) added, *“Computer labs are available and the internet facility is accessible.”*

The internet facility in the laboratory was equipped to serve all the students with hearing impairment and their teachers in school. During the interviews, it was affirmed by a female sign language interpreter (SLI2) that,

“Computers and other reading materials are there, both in the physical and digital libraries”.

Therefore, students with hearing impairment had the opportunity to access information that enhanced their learning experiences with the aid of computers and internet access at their disposal.

Regarding the classrooms, a large number of participants agreed they were conducive enough to accommodate students with hearing impairment and their teachers during the teaching and learning process. The classes are fitted with furniture in a spacious room that caters for students' needs and the lighting is good enough to illuminate the rooms and allow them to read in the same space. A male student teacher (STR1) affirmed,

“We have classroom blocks for senior one to senior 6... Construction of enough space/large classes, enable the comfortability of students and this makes it possible for the teachers to walk around the class and guide them. These classrooms were large enough to accommodate and handle the teachers and students during any single lesson.”

According to a male student teacher (STR1),

“The learning facilities available for these students with hearing impairment are classrooms where their classes are conducted, library and laboratories around the school.”

Students with hearing impairment mainly studied from the classrooms that accommodated them during the face-to-face interactions with their peers. Some of the practical lessons were conducted in the laboratory facilities and in the library where they read books and other relevant materials to complement their studies.

The buildings had ramps to help all students with hearing impairment freely move and access the school facilities, the ramps were built to cater for prospective students with hearing impairment on wheelchairs who joined the school. A reasonable number of participants said that the ramps addressed the needs of students with hearing impairment. This was affirmed by a male administrator (A1) who asserted,

“The entrance to the classrooms and dormitories do not have staircases (steps); all built with a smooth pavement at the entrances and exits.”

The entrances to the classrooms and other buildings were built without steps for easy movement of people and wheelchairs. Another female student teacher (STR5) mentioned,

“Ramps are constructed in buildings for easy movement of learners, including students with hearing and physical impairments/disabilities.”

These ramps were built, not only for students with hearing impairment alone but also for those who may develop physical disabilities, much as the latter were not in the school. A female student teacher (STR3) conceded that,

“Classroom groups are formed to ensure that all learners’ needs are met, bathrooms and toilets are well positioned in such a way that students can easily access them. Also, ramps are built on buildings for easy accessibility to learners with both hearing and physical impairments/ disabilities.”

As far as the toilets are concerned, many of the participants agreed that these facilities were built to suit the needs of students with hearing impairment, including their teachers and administrators in the school. The toilet facilities are built with metallic supports to help students with weak limbs to gain stability while using the toilet facility. A male administrator (A1) said,

“The bathrooms and toilets/latrines in addition have metallic supports to aid those with dysfunctional limbs with taking a long call or bathing.”

All the amenities provided in the school support students with hearing impairment, including those with weak limbs who may require support from other devices.

Regarding the walkways in the school, a reasonable number of participants attributed them to the ease of movement for students, making it easier to navigate around the school with minimal difficulties of a struggle to access the buildings and compound around them. The male administrator (A1) said,

“Walk-ways are all flat and the compound is generally levelled.”

The compound was designed with walkways to allow students with hearing impairment to move around without any obstacles affecting their pathways (see *Figure 11*). The organized terrain provided conducive demarcations for students with hearing impairment and their teachers to use with minimal degradation of the environment.

The quality of facilities for students with hearing impairment varied significantly as observed during the study as illustrated in the findings (*See Appendix I*).

Regarding the record of school items, it was observed that there was no braille machine since all students were hearing impaired. The items include 786 Textbooks, 16 computers, 300 pieces of furniture (chairs and desks) and ICTs (2 Projectors, Free Wifi for internet and a SmartTv).

Regarding attendance of lessons by teachers and their students with hearing impairment in school, there was an attendance book available for teachers to append their signatures, indicating the time of arrival at school to facilitate the teaching/learning activities. However, there was not attendance list for students during their lessons throughout the week since they were expected to attend regularly, given their few numbers.

Regarding the record of marks, they were not readily available for the researcher to see since it was regarded a sensitive matter by the administration. As such, it was difficult to establish the performance of students based on existing records within the school.

Regarding the record of activities performed by students, none was analysed except the information displayed on the timetable to indicate the subjects, lessons time allocation for conducting the activities during the teaching and learning processes.

Regarding the Activities of Integration, the school administration was unwilling to disclose the information, except to Uganda National Examinations Board (UNEB) that is supposed to receive and process the information. The school was also implementing the AOI for the very first time.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

The chapter presents discussions, conclusions, and recommendations for this study based on its objectives. The aspects of communication, accessibility and physical facilities to enhance learning and students' performances are discussed in this chapter of the report.

5.1 Communication technology for students with hearing impairment

The total number of children with hearing impairment at Wakiso School for the deaf was 147 students according to the school records of December 2024; some of the students stopped using hearing aids to enhance their listening abilities, especially those with mild hearing challenges. To this category of students, the use of assistive devices was not evident; yet these devices would improve the general well-being and hearing ability of students with mild hearing problems. According to Sidi (2019), assistive technologies are supportive mechanisms for improving the quality of audibility for students with hearing impairments. Most students with hearing impairments, including those with mild hearing challenges, relied on the services of interpreters who signed during the teaching and learning processes. The use of assistive devices helps to overcome the underlying challenges faced by students with hearing impairment as supported by Sodiqovna (2020) affirmed that assistive technology could help students with hearing impairments to communicate effectively, access information, and participate in academic activities.

To overcome the limitations of assistive devices, signing was adopted as the main language to communicate among students at Wakiso School for the Deaf. Students' learning was enhanced through the help of sign language interpreters who

interpreted the lessons in class and during the practical sessions. This is in line with Sodiqovna (2020) who found that the learning of students with hearing impairment was enhanced through the use of sign language interpreters. The integration of sign language interpreters in the teaching and learning processes helped students with hearing impairment and narrowed the communication gap during the lessons in the classroom. These interpreters have enhanced their ability to communicate effectively with peers and teachers and increased participation in class activities and extracurricular activities. Sign language interpreters, therefore, endeavoured to sign without contradicting the views and opinions of teachers and students during the communication processes in school. The students and teachers alike appreciated the services of the sign language interpreters despite the professional challenges associated with their activities. Walker et al. (2020) advocate for the use of qualified personnel including teachers and sign language interpreters in creating language acquisition and academic development among students with hearing impairment. Much as the teachers and sign language interpreters were available, their limitations in deaf vocabulary influenced effective content delivery. This contradicts the views of Walter et al. (2020) who advocate for the use of dedicated sign language interpreters to fully engage the students in class during the teaching and learning processes.

The role of sign language interpreters was limiting and strenuous for effective handling of the large numbers of students in any single classroom, their insufficient numbers are inadequate for them to meet the increasing demand for their services during the teaching and learning processes. Teachers who possessed limited knowledge and skills in signing, since some of them laboured to communicate using unknown signs or talking without consideration of the consequences of their gestures during the teaching and learning process. According to Leeson et al (2014), interpreters' roles

varied depending on whether sign language was primarily understood as a tool based on a set of rules, or as fulfilling different functions in different contexts as part of human interaction. The school administration ensured the presence of sign language interpreters to help teachers and students at any moment; it built their confidence and helped students appreciate their school experiences for better academic achievements. Teachers with limited knowledge in sign language benefitted from their services while interacting with the students inside the classroom, in the computer lab, in the library, and outside the classroom environment. However, the researcher observed that students interpreted for their peers wherever sign language interpreters were engaged in other classes. The quality of the information relayed by the students and teachers who signed was questionable, creating more tension and confusion among the learners, especially when relayed information created more confusion. Contrary to unprofessional signing by teachers and students, Bamu et al. (2017) emphasized that teacher training was essential for providing quality education for students with hearing impairments.

Through key informant interviews and observational protocols, it was found that in Wakiso district the teacher-student ratio in most of the USE schools was at an average of 1: 60 students. However, the number of interpreters was insufficient to meet the required student-to-interpreter ratio of 1: 40 in any single class during a 40-minute lesson. Two interpreters should be in a single lesson as one monitors the interpretations and exchange their roles at an interval of 30 minutes (Moser-Mercer et al., 1998). At Wakso School for the Deaf, the average teacher-student ratio was 1:28, and in interpreter for who occasionally facilitated the session during the lessons. Standing throughout each lesson while gesturing and expressing the information in class was a tedious experience that could affect the mental state of the interpreter. The longer an interpreter interprets past the 30-minute mark without intervening during rest periods,

the more his/her interpreting skills deteriorate. Lehloa (2019) noted that when one interpreter covers every subject without being replaced, it causes weariness and leaves little time for subject teachers to prepare courses. At Wakiso School for the Deaf, this is not the norm, which has an impact on pupils' academic achievement. A teacher-to-student ratio of 25 is advised by the United Nations Educational, Scientific, and Cultural Organization (UNESCO, 1994). According to research, kids who attend smaller classes typically do better academically, which is the basis for this ratio. According to Kyambi (2019), because they are less likely to participate in class discussions and receive the individualized attention they require to thrive, students in larger courses typically perform worse academically than those in smaller ones.

Much as sign language interpretation assisted in class, curriculum interpretation was necessary to help students with hearing impairment conceptualise content during teaching and learning processes. The new curriculum for the "O" level calls for more student participation in all activities that stimulate their minds through creative processes that require critical skills in problem-solving. Interpretation of the new curriculum poses a great challenge to the school, especially for teachers and sign language interpreters who are constrained by their proficiency in signing complex content during lessons. This is in line with Ntinda et al. (2019) who contend that the lack of professional skills to adapt and teach the regular curriculum to students with hearing impairments significantly influences their educational success and overall experience. Dissemination of the curriculum modifications disregarding students with hearing impairment denies them the opportunity to benefit from the new knowledge. Interpretation of the curriculum was at the discretion of the teachers and sign language interpreters' proficiency in the subject; where technical terminologies and concepts require explanations, some ideas were difficult to communicate using signs. Majoro

(2021) emphasized this, stating that the main obstacles faced by sign language interpreters and students with hearing impairments are inadequate proficiency in sign language, including a lack of learning resources and a restricted vocabulary to convey important ideas in particular disciplines.

To all learners in the classroom, signing helped to provide an in-depth discussion of contents through interactions with teachers during lessons, sign language interpreters in class and peers in the school environment. These interactions were instrumental in promoting motivation, engagement and interest in learning. This may aid in mastery of some vocabulary. Indeed, students have been motivated to learn without hearing aids, doing this by signing during the teaching and learning processes at school. Some teachers have engaged actively in their accomplishments and mastered the sign language vocabulary through gestures and interpretation of concepts. As such, learner interest was enhanced with the curiosity to articulate issues that affected them during the teaching and learning processes in school. On the other hand, Colclasure et al. (2016) advise against using excessive gestures and lip shapes when speaking because they may confuse pupils with hearing impairments.

The use of qualified sign language interpreters has improved the level of comprehension. The central contribution of the interpreter bridges the knowledge extension gap that would have otherwise impeded the student's ability to grasp concepts faster during their interactions in class. However, the reliance on the interpreter's conveyance of information was dependent on their proficiency in communication, lest students focus on the interpreter and fail to learn in the process. (Tipton and Furmanek, 2016). Furthermore, Fleischer (1975) noted that eliminating more and more "non-essential" words from her exact translation, essentially returning to a shorthand version of sign language, may be comprehensible, but it lacks the interest and precision of a

verbatim translation. The assumption that all learners are conversant with sign language may impede those with limited knowledge of the Uganda sign language that uses different signs. Through discussions, students ably learnt new signs and shared their knowledge with others as they enhanced the interpretation of concepts for their learning.

Total Communication has enabled students with hearing impairment to appreciate their learning experiences in school. The gestures and expressions made during the communication processes are effective in disseminating specific messages to both the learners and teachers during the teaching and learning activities. Through these expressions, students' memories of taught content were recallable during the discussions, even at the time of preparing and sitting for exams. Therefore, according to Muiruri (2015), the primary advantage of Total Communication was its capacity to provide all channels and forms of communication in order to improve the educational experiences of students with hearing impairments and lessen the pressure on educators to select one mode over another. Total communication eliminates the possibility of unclear information that would have otherwise been meaningless to the students due to a lack of emphasis on the issues under deliberations. Interpretation of the concepts through total communication creates confidence, builds trust, and fosters interpersonal relationships among students, teachers and sign language interpreters in the school. (Liu, et al., 2024).

Sign language interpreters relieve the teachers and students with the much-needed assistance of creating a liaison between the information taught during the lesson and the perception of the content. The use of interpreters does not result in better performance since they may have limited sign language to clarify concepts to the students in class (Seal, 2000). The current curriculum for teaching students with hearing

impairment falls short of addressing the learning needs of this category of learners with hearing impairment in class. As such, the delivery of specific content was deliberate, especially in science subjects. Aspects that required sound were difficult for students to grasp since they could not interpret them well. The sign language interpreters and teachers' discretion to teach what they assume to be appropriate by their standards, affected the overall completion of the syllabus at a national level. Additionally, it compromised the students' resolve to appreciate the subjects since they believed and relied on the taught content in the classroom during the teaching and learning activities. Integrating sign languages into the curricula should help explain scientific terms and concepts for the benefit of learners (Bowman-Smart et al., 2019).

The use of videos with sign language interpreters was also prevalent in the dissemination of information as supported by many participants. Notably, students concentrated and paid more attention during the lessons with enthusiasm and curiosity. Much as this was the case, Fleischer (1975) observed that omitting increasing numbers of "non-essential" words from the verbatim translation, by reverting to shorthand' sign language compromised the quality and accuracy of the word-for-word translation. Most students focused on the outcome of video presentations, requiring them to oscillate between looking at the interpreter and video images while processing both information to derive meaning from them. During the process of shifting the eyes from the video to the interpreter, students' attention was distracted from the core activity of learning to actions in the video display. Besides the omission of words during the interpretation processes, it was important to take precautions since students with hearing impairment were prone to visual distractions which caused a reduced ability to attend to relevant aspects of the classroom and negatively affected their focus on academic tasks (Antia et al., 2017). The school has dedicated a special room where the Smart TV is placed

and used for displaying information, most of which is appreciated by the students and teachers during the lessons. These videos created interest among the students with hearing impairment, enabling them to learn new information in scientific and technological aspects of the subjects; where concrete concepts were visually explained in a simplified manner. The visual perceptions of the students with hearing impairment are enhanced beyond academics since some videos provide entertainment for them to relax from stressful situations during the week. The use of videos is in line with Farhan and Razmak (2022) that a component of the interface with assistive and adaptive features is that a user attends classes using video-based-sign language, for those with hearing impairment.

Regarding the taking or writing notes in the classroom, participants confirmed their teachers' use of written text to communicate with learners in school, reading the text from where the learners copied their notes during the lessons in class. Some of the information dictated to students were often displayed on different surfaces for students to read a copy during their free time. The written information displayed on the walls, notice boards, the library, computer lab, and papers for students to read and digest was relevant in equipping them with the important information needed to execute their daily academic and non-academic activities. Stein (2013, p. 4) observed that "the child may have trouble with math word problems if they have trouble with reading. Students with hearing impairments frequently struggle to communicate with others. These kids have trouble communicating their ideas to their teachers and peers in a way that makes sense." The perception of the written words affected the comprehension of information during the teaching and learning processes in school thereby affecting their overall academic success in school. Students with hearing impairment participated in writing their notes during the teaching and learning processes; some teachers wrote the

information on the blackboards for learners to write while others dictated the information as the sign language interpreters, related content through signs. However, students who failed to comprehend the written information complained of the handwriting of some teachers that was difficult to read. Students used different note-taking strategies that helped them to memorise content; the specific note-taking strategies that students used dictated whether or not working memory ability played a mediating role in note-taking performance (Bui & Myerson, 2014).

Teachers with difficult-to-read handwriting on the blackboard made notetaking difficult since the information was confusing and difficult for students to comprehend; they want the teachers to be advised about this issue. To this category of students, the communication was skewed and ineffective in enhancing their ability to respond effectively to the intended message or content. Other disabilities are more common among the hearing impaired than among the hearing population, according to Stein (2013), cited by Manchishi (2015). Finding other learning disorders can be challenging because hearing impairment is a learning disability in and of itself. It frequently results in a child's delayed language acquisition, which further affects academic capabilities. Students with hearing impairment use visual aids to communicate and appreciate content during the teaching and learning process at school. Students who participated in the classroom activities with the support of visual aids resolved to learn and comprehend concepts beyond the written words. Through memorization of the visuals, students gained more insight into the subject areas, especially the complex scientific models. This is in line with Stein (2013) that, "severe lack of vocabulary and simple syntax knowledge, work using pictures and picture symbols to support speech and/or signs." (p. 4). The use of creative visual aids like charts, pictures, and diagrams, supported and improved the quality of students' interaction with teachers, interpreters,

and content in the classroom. However, where the quality of the charts, pictures, and diagrams in the visual aids was poor, the same was reflected through interpreted concepts during lessons discussions in class. The misconceptions derived from poor visuals or their interpretations; required deliberate effort to enhance better performance in academics. Additionally, Stein noted that using a range of visual aids for every subject taught was the most obvious technique to assist students with hearing impairments. According to Aljedaani et al. (2023), accessible learning materials are not only important for supporting academic achievement but also for creating social inclusion among students with hearing impairment.

Participants affirmed that labels were placed on school facilities to help learners navigate through different amenities and access the materials and equipment needed for learning purposes. These labels helped show specific places of abode to help and guide students and teachers to different amenities within the school. Students can identify things and places while studying at school, making it easier for them to respond to stimuli within the environment that can make them more responsive to learning. The use of labels to give direction in the school is in line with Migehe (2014) that labels were effective communication strategies for students with hearing impairment as a means of bridging learners' barriers in interpreting verbal communication. The communication of students through the labels is significant in providing the information needed to circumnavigate within the premises without a lot of labour and strain on their performance in the school. For students with hearing impairment who had low memories and depended on their sight to read information; it would be challenging to locate unlabeled places within the school environment. This could affect their ability to know where to find immediate information without the help of their colleagues who were familiar with unlabeled facilities that can accelerate learning. The meanings of

theories are "re-implicated" into the flow of a person's attention by designating the adult-only regions of the room (Boulton, 2011 cited in Crawford, 2016). The labels in the library demarcated designated spaces for storing books and materials for the different subjects taught in school, separating the books from other learning materials on shelves (See *Figure 9*). Students appreciated the order in which library information was organized for the convenience of all users, including students with hearing impairment and their teachers in school.

Throughout the school's teaching and learning procedures, there was a noticeable usage of ICT in communication with pupils who had hearing impairments. Projectors were used to transmit and show information, computers were used to store and retrieve content, laptops were used to do information searches while working on individual tasks, and video resources from the internet and television were used to teach students. ICT integration in education for students with hearing impairments is inadequate because special education teachers have rarely used ICT (software and hardware) for teaching students with hearing impairments due to the lack of ICT-based teaching resources, according to Rizvi and Rana (2023), who also highlighted the challenges in communicating with ICT. Much as students used ICT in the communication of information in school, it was used at a basic level of group learning, since few teachers utilized the ICT equipment for teaching and learning purposes in class. This was partly attributed to the limited knowledge and skills teachers of students with hearing impairment possessed to operate the equipment effectively without the help of technicians. As such, the students' ability to communicate effectively, using available ICT possibilities was limited to the lessons that required their application during the teaching and learning processes. Students with hearing impairment, left at the discretion of the ICT lab technicians, learned from the resources in the library.

Technology-based interventions and skillful utilization of ICT tools can enhance the learning experiences of students with hearing impairment (Ismaili & Ibrahim, 2017)

5.3 Accessibility to learning facilities for students with hearing impairment

The accessibility aspect hinged on using existing educational facilities to enhance students' hearing impairment experiences, capitalise and spur their performances in academics and other vocational skills areas. The uniqueness of these facilities was central to uplifting the standards of students' performances since they made life more feasible, given their peculiar conditions. A shift from the old to the new curriculum required students to conduct individual research activities to define their areas of competencies. Because they struggle to adapt to the demands of oral communication, students with hearing impairments may find it challenging to access secondary school curricula, according to Chimhenga and Sibanda (2016). According to the authors, their chances of succeeding academically increased once they could understand the language used at school. As explained in the next sections of this chapter, accessibility was made possible in every facility at Wakiso Secondary School for the Deaf. Accessibility to resources in the library provided students with a wide range of information they needed to appreciate the knowledge and skills application during their studies. Many of the participants attested to the frequent visits by students and teachers to the library for books and other educational materials, expounding their knowledge with relevant information to supplement their learning in class and enhance their learning. This is in line with Aljedaani et al. (2023) who affirmed that accessible learning materials supported academic achievement and created social inclusion among students with hearing impairment. Books and other materials were identifiable through different labels and locations within the spacious library place, designed for easy accessibility to specific materials as illustrated by *Figure 9 (See Appendix H)*. Teachers in the school

were able to find specific materials required for handling and managing lessons during classroom interactions. Nakazibwe (2018) observed that it was important to adapt flexible delivery of teaching materials via electronic media as children with hearing impairment have difficulty accessing information in the usual ways. However, the students also mentioned that the new curriculum presented a scenario that required students' responses to practical questions without the new materials and resources for revision in the library. Ondicho, (2015) argued that textbooks are the primary books that teachers use to organize their lessons and make content knowledge and skills available to students. These textbooks contain the content that students are expected to learn, and most teachers focus their instruction on the materials included in the books they use. Textbooks provide the main resource for teachers, enabling them to animate the curricula and give life to the subjects taught in the classroom. Most of the materials in the library for the old curriculum are being phased out in favour of the current one, yet these new demands require a different set of resources that are not available for students and teachers to use in this situation. Accessibility to outdated textbooks and materials in the library has deprived students of the much-needed resources to adopt the new curriculum that requires current skills and knowledge of their practices. The digital library resources in the school were insufficient, and most of the information did not address the prevailing needs of the curriculum. Omariba (2013) argued that most of the instructional technologies were available but inadequate in terms of quantity and were not easily accessible for both teachers and learners for teaching and learning. This observation describes the current situation at the Wakiso School for the Deaf where the library requires specific and current materials to address the new curriculum demands for students with hearing impairment.

Computers in the school were available for students with hearing impairment to use during teaching and learning. As the participants accessed the computers, their numbers were few; students and teachers were restricted from using the equipment effectively. Most of the computers, stored in the laboratory, were accessed through scheduled lessons indicated by timetable, especially for students and teachers to use for learning purposes. However, the few computers accessed by students and teachers were in good working condition, and some of them needed repairs and upgrades in the system. Those in poor working conditions were covered to stop others from using them, while others did not have the repaired updated software for running the computers. It is costly to access and install specialized software for teaching students with hearing impairment; it requires the skills and knowledge of trained professionals whose services were not sufficiently catered for by the school administration.

The costs of these assistive technologies like computers were in line with Hermawati and Pieri (2020) who argue that most of these devices were developed and produced in developed countries, which unfortunately results in high purchase prices. Consequently, individuals with severe and profound hearing loss who live in developing countries are less likely to have the necessary financial means to purchase such expensive devices and remain unable to take an active role in the community. At Wakiso School for the Deaf, the use of assistive devices like the state-of-the-art computer system ought to help address accessibility to the latest forms of devices to aid students with hearing impairment.

Internet access was available through dedicated wi-fi possibilities for all in the school to use, including students with hearing impairment who constitute the largest beneficiaries. It was open for all students and teachers to search for information on the internet and use projectors to find or display the necessary information required to

support the teaching and learning activities. It was clear that the internet gave users access to a wealth of resources related to the subjects taught in schools; as a result, pupils' knowledge and proficiency levels were raised. Haksız (2014) asserts that visual aids are crucial for students with hearing impairments, and that using technology educational resources like television and computers improves their academic performance. Through online study resources, students with hearing impairment access new information for their learning while their teachers search for teaching resources through the same internet service. The deliberate provision of a reliable internet access point and service was a good practice that allowed students to conduct independent studies beyond their classroom experiences. Teachers have benefitted from the internet services, through the underlying open access opportunities guaranteed to them by the terms of their employment in the school. All teachers and students had unrestricted access to the internet at school. Teachers have accessed notes, images and video resources that are relevant for teaching students with hearing impairment in, the classroom.

Much as students accessed these facilities, the tedious processes of searching for information consumed a lot of time, their focus on the other information online, and the limited time for using them diverted their attention from the core activities in the curriculum. Sometimes, accessibility to internet services was regulated to determine the frequency of usage and access at any given time. The enthusiasm to access these facilities created a demand for their usage, resulting in commotion amongst teachers and students regarding the accessibility of these services at any given time. According to Punch et al. (2019), multimodal learning approaches integrate visual and tactile stimuli alongside auditory input, in catering to the different learning needs of students with hearing impairments. The school administration deliberately created a timeline for

students to access the ICT facilities for their learning activities, including teachers' search for teaching materials and other resources to support the classroom activities and experiences. To regulate access to the internet with computers in the laboratory, a timetable was prepared to regulate and access these facilities for optimum use by students with hearing impairment in school.

Students with hearing impairment had access to the classroom very early in the morning as stipulated in the school timetable, which provided a sense of order to help students access different facilities within the school setting. Most of the facilities were locked for the security and safety of the equipment but were mainly accessible during the day. Despite using timetables, the time given to students with hearing impairment was insufficient, requiring more access time to practice, and learning the different software and interface for information search. Accessibility to learning materials and facilities was not only important for supporting academic achievement but also for creating social inclusion among students with hearing impairment (Aljedaani et al. 2023). This experience illustrates how teachers navigated through difficult situations to encounter the challenges of slow learners' efforts toward accessibility to facilities and resources in school. As such, lesson preparation should effectively address the timelines for teaching and learning, short of which, extra time for remedial classes be organized to compensate for the knowledge and skills gaps.

The classrooms were accessible to students with hearing impairment in the school since the lessons started as early as 8:00 am every morning and within the classrooms, the sitting arrangements were similar to those in ordinary classes. Students sat in positions that allowed them to face each other without disrupting their visibility from the teachers and sign language interpreters during lessons. The close interactions among the students provided a sense of belonging during the teaching and learning

processes. Students had the freedom to move within the classroom and access any part of the class. However, the seating arrangement where students sat while facing each other, exposed students to glaring light reflections from the windows, and the arrangement of tables created congestion and disrupted the free movement of students and teachers during the teaching and learning processes as indicated by *Figure 3*. Students strain their necks by turning their heads sideways to listen and attend to teachers and sign language interpreters, making it difficult for them to concentrate as they take notes and comprehend the communicated message. Changing the seating arrangement, decreasing stimuli, changing the lighting, organizing materials, clearing and controlling pathways, creating individual versus group work areas, rearranging the teacher's desk, and introducing aromas and background colours (Antia et al, 2017).

However, it took love, and the creative skills of the teacher, to provide extra lessons without any remuneration or compensation from the school administration. As a result, the performance of students with hearing impairment would improve, especially where the core issues in the syllabus were prioritized for their learning, even if accessibility to the facilities was regulated. According to Nzoka (2014) making timetables visible to all students makes them and other students feel more engaged in the learning process. Therefore, displaying timetables helps them, and the rest of the learners, feel involved in the school day. When a schedule was readily visible, students mentally prepared for their favourite or least favourite activities by anticipating them. Based on the timetable, students with hearing impairment appreciated access to video lessons; videos have been played with sign language interpretations to enhance better comprehension of taught knowledge. "At times when they look at a video, they can grasp something and at times you have to add sign language." It was also observed that signers were limited by their knowledge in all subjects, especially the sciences where technical words and

terminologies were used to explain concepts. Lehloa (2019) discovered that one interpreter covers all courses without being replaced, which results in the interpreter becoming exhausted and having insufficient time to prepare lessons with subject teachers.

Accessibility to facilities in the school was well planned to suit the needs of the students with hearing impairment to gain more experience in their studies and to achieve the highest level of academic success possible. Hayat (2017) provided support for the measures taken to guarantee that all infrastructure was easily accessible, arguing that having access to functional restrooms improves school enrollment, attendance rates, and academic results. This observation was attributed to the situation at Wakiso School for the Deaf where VIP toilets were accessible to students in proximity to their places of abode and classroom environment. The distance between the toilet and learning facilities was shorter, allowing students to access the toilets within the shortest time possible, even in the event of any emergencies that may arise. As such, the chances of students with hearing impairment concentrating on their academics were greater as opposed to situations where accessibility was not possible.

Access to the Smart TV was feasible for the teachers and students in the school; restrictions on the use of the Smart TV were based on the urgency to teach and learn with the facility that was fixed within a specific room. As such, the users were bound to maximise their learning within the specified time scheduled on the timetable, as illustrated in *Figure 1 (see Appendix H)*. The accessibility to summarized digital information on scientific and technical subjects was visible through the display of video-recorded lessons for students with hearing impairment. This was in line with Tucker (2012) who argued that teachers agreed that viewing the lessons pre-class was not enough for success, but required the integration of the instructional videos with an

overall approach, which would induce the required learning outcomes. The need for a Smart TV has created unlimited demand for their use in most lessons and recreational purposes, making it the most sought-after digital tool for mass education students in school. In some incidences, lessons conducted beyond the scheduled time were occasionally interrupted, either by the presence of the next class of students waiting to attend their lessons in the same room, or deliberate reminder by the teachers for the lesson to end. Much as the Smart TV was accessible, the increased demand for their use was limiting its full potential for complete learning and teaching of concepts during any single lesson.

The school was equipped with a projector that was connected to a computer and was readily available for teachers and students with hearing impairment to project content during the teaching and learning process. The projection of lessons during the teaching and learning processes provided visual impressions that communicate through gestures and expressions displayed in class. The use of projectors was plausible since they were in good working conditions and enabled teachers to display clear presentations of the lessons with ease. Teachers also used the notes, images, and video resources stored in the computer to realise relevant comprehension of knowledge and skills; making their work and assignments much easier to implement the teaching and learning activities.

Accessibility within the school and other related facilities ensured that teachers and students with hearing impairment, at any single moment of the day or night, navigated through the environment without difficulty. Labelling the classroom blocks, the pathways in the compound, and the different resource materials like books and newspaper sections in the library, simplified the setting of their environment for accessibility to all. This is in line with Luckner, et al. (2016) who observed that this

requires that the child has preferences, has experiences that are referenced by the representations, is presented with accessible options, comprehends the specific representations for the presented options, and has a clear indicating response. These labels have created a sense of order and organization within the school environment, including the classrooms and libraries where information for their learning is stored. Students with hearing impairment were conscious of their movements as they appreciated places where facilities and specific items were placed in the school.

Additionally, labels were placed on school facilities to help students navigate through different amenities and access the materials and equipment needed for learning purposes. These labels helped show specific places of abode and guide students and teachers to different amenities within the school. Students were able to identify things and places while studying at school, making it easier for them to respond to stimuli within the environment that can make them more responsive to learning. However, the quality of labels needs to be improved beyond the use of Manila paper and markers. The use of permanent surfaces, including modern technology to write the labels with clear text and colour that can be read and appreciated by teachers and students with hearing impairment to easily interpret the information. Much as the present technological possibilities allow for the modification of labels and signage, the budgetary allocation for the school does not cater for these alterations.

The visual aids for teaching students with hearing impairment were accessible for implementing the learning activities in the classroom. Most of the aids were manually created on manilla papers of different colours, illustrating the technical and scientific representations of complex text during the teaching and learning processes. The frequent use of the teaching aids resulted in wear and tear of the teaching aids, given the delicate nature of the material that should not be exposed to too much tension.

Exposure of the paper to liquid substances degraded the quality of the materials, which required frequent creation of new images. Ordu (2021) supports accessibility to teaching aids by stating that they improve classroom education, capture students' attention, and inspire them to learn. Given their familiarity with the materials and equipment used to create the teaching aids, students with hearing impairments found the usage of traditional teaching aids to be realistic. However, the use of technology to create more refined labels would improve the visibility of the information and make accessibility easier. According to Joseph (2015), as technology advanced gradually, teachers and students had access to non-traditional teaching tools such as computers, interactive whiteboards, multimedia, and televisions and radios. Digital labeling of information can change how labels that identify facilities and access points for students with hearing impairments in the school seem overall.

5.4 Physical facilities for students with hearing impairment

The physical facilities are essential educational amenities that enhance conducive learning experiences for students with hearing impairment to influence their academic success in school. These facilities are designed to provide students with the most comfortable environment and motivate them to concentrate and focus on learning with others in similar conditions within the same school while using the shared amenities. Alimi et al. (2012) explained that physical facilities comprise blocks of classrooms, staffrooms, laboratories, workshops, libraries, laboratories, consumables, water, chairs, and tables amongst other things. Efforts to ensure that the physical facilities were conducive to teaching and learning were guaranteed by the school administration for the comfort of all students' performances in academics. Given the multiplicity of students with hearing impairment, there was a need for extra assignments in a quiet environment that facilitated a comprehensive understanding of the subject matter. Some

of the quiet places were in the computer labs where students conducted research activities during their private reading sessions.

The library facility was designed to accommodate a small number of students with hearing impairment. The environment was well organised to ensure that the materials in the space were well arranged and within reach for all the students with hearing impairment, together with their teachers to access information as illustrated by *Figure 9 (see Appendix H)*. Much as the library space provided room for reading and storage of different books and materials, many of the books required replacement with current information that addressed the "O" level curriculum requirements. The changing curriculum needs were not reflected in the library materials, forcing teachers and their students to rely on outdated books and materials that do not address the current demands of the new curriculum. According to Dyer et al. (2018), a 24-hour library schedule provides many opportunities for students to complete the work at a time that is convenient for them. The integration of a digital library system in the school would provide an enabling environment for the teachers and students with disability to access the state-of-the-art repository for the new curriculum information that is critical for their learning. Their dependency on the old curriculum material disfavours them from aligning to the digital library information system.

The school is equipped with numerous facilities where computers and projectors are readily available for the performance of tasks and the projection of lessons during the teaching and learning processes. Computers in the laboratory were secured in a safe environment to help teachers process, store and retrieve information related to their studies regularly. Some of the computers and projectors were in good working condition, enabling all users to appreciate the lessons taught in class and the compilation of tasks for students in the school. The availability of computers and

projectors eased the work of teaching, teachers used the computer to store notes, images and video resources that were relevant to learner comprehension of knowledge and skills. These equipment made the work and assignments much easier to implement within the shortest time possible. Computers were often covered to prevent them from dust and destruction when not in use as indicated in *Figure 7 (see Appendix H)*. The presence of these equipment indicates the deliberate efforts in place to address the changes in technological advancement that demand 21st-century skills through infrastructure provision. Much as the computer facilities were available in school, they were an older generation of desktop computers with weaker operation systems, apart from a few modern ones donated to the school by different stakeholders.

According to Vanderheiden et al. (2024), increasing access to shared-use computers in libraries and schools through the use of free open-source programs can help close the digital gap. They argue that not everyone has a computer themselves, those who require assistive technology like students with hearing impairment, may not participate in using them due to missing software for their specific needs of learning in school. When someone is forced to use a specific computer rather than their own, they come to the conclusion that this is problematic and completely prevents others who don't own a computer from using it. However, Dar (2022) observed that, in this era, the methods of teaching were greatly affected by the development of new technologies including computers, computer-assisted instructions, projector slides and multimedia. The integration of new technologies should be deliberate enough to provide a broader learning opportunity for students with hearing impairment in school, with different experiences of their uses. In the classrooms, students studied in an environment with adequate lighting that allowed them to read, write and implement their class activities without any hustles. There was enough lighting in all classrooms as well as the

residential areas for learners with chairs and tables providing comfort during the teaching and learning processes in class. Adaptations to inclusive learning environments foster students' resolve to perform and improve their recitals in class during lessons, besides preparations for final exams at the end of each academic calendar.

The school's classroom blocks provided sufficient accommodations for teachers and students with hearing impairments to participate in the teaching and learning process. Fullerton and Guardino (2010) assert that the physical surroundings of classrooms can affect how students act. Students' behavior and focus on academic assignments can be influenced by the physical layout and elements of the classroom, including the lighting, seating arrangements, and organization. As indicated in *Figure 5* (see *Appendix H*, the early morning revision allowed students to use artificial light that was not adequate to allow visibility of the written notes at night, this has affected the ability of students with hearing impairment to maintain good eyesight during the revision process. The ceiling on the roof of the classroom block is off, exposing teachers and students with hearing impairment to extreme heat in the room during the day and chills during the night, depending on the intensity of the weather. The wooden frames expose the vulnerability of the environment to the health of the students whenever they use the space.

This is in line with the observations of Salary et al. (2018) that, the existence of a strong and uncontrolled amount of light in a classroom, created by glare from too much amount of daylight and artificial light in a room, may distract students from their concentration and relatively affects student performance. The ability to control the amount of light entering the classroom building is critical, though it was not the case as indicated in *Figure 6* (see *Appendix H*. Allen and Macomber (2020) observed that

visual comfort depends on direct sunlight and the natural lighting of the space. In their study, they established that the degree of thermal and visual comfort strongly affected the productivity of users. There is a need to consider the student-teacher ratio for students with Hearing Impairment who use the existing facilities, their numbers should be manageable for the teachers to handle, given the size of the classrooms designed to accommodate them. The large number of learners in a single class drains and strains the teachers' efforts to articulate and handle issues more effectively lest the quality of their learning compromised their academics due to congestion in the classroom.

The classroom setup for students with hearing impairment was unique and different from conventional spaces. The furniture arrangements in the classrooms were well positioned and available for the teachers, sign language interpreters and students with hearing impairment to use; and for effective concentration during the teaching and learning process. Changes in the classroom arrangement should be comparatively simple through the modification of the seating arrangement, organizing materials, and reducing visual distractions (Santander, 2022). All the facilities in the school were designed to help students benefit from their studies within the same environment. Besides the classroom blocks for senior one to senior six, other structures in the school included the staffroom, laboratory for ICT and science, dormitories for girls and boys, staff quarters, kitchen and a perimeter fence. The presence of the physical facilities provided a wide range of opportunities for participants to utilize them and improve the welfare of students with hearing impairment. The overall purpose of these facilities was for all to benefit from using them to improve their academic and vocational skills within a free and safe environment. There is no perfect classroom environment to satisfy all types of academic activities, sometimes not much can be done to change a specific

attribute and how much a physical environment matters depends on a student's perceptions (Yang et al., 2013).

Additionally, Antia et al (2017) observed that classroom arrangements for students with hearing impairment allow for organization and access to materials can reduce visual clutter and thus reduce visual distractions. The use of carrels or partitions can reduce visual and auditory distraction during individual work, whereas for group work, desks can be arranged facing away from doors and windows. In the case of Wakiso School for the Deaf, the classroom structures were organized traditionally with most of the windows allowing more light to penetrate through. Such modifications that would improve the environment require specialized funding given the budgetary restraint on the school activities related to classroom arrangement. Much as the desks in the classrooms face each other, students continue to bear the burden of learning in an environment that restrains their ability to perform academically due to numerous distractions including the light as illustrated in *Figure 10 (see Appendix H)*. Providing sufficient space for each student will directly affect their productivity and performance in academics.

Some of the buildings had ramps with walkway facilities in the school compound to enable students with hearing impairment to stroll through the environment and access the amenities without much difficulty. This has made for teachers and students with hearing impairment much easier, enabling them to navigate the school with minimal difficulties. All the walkways were clearly demarcated, designed and, were painted with visible black and white colours, in a clean flat array next to the compound, generally levelled and slashed to create a good ambience. These walkways allowed students with hearing impairment to move around without any obstacles affecting their pathways as illustrated by *Figure 11 (see Appendix H)*.

These facilities provided a piece of mind for students and teachers in the school, the much-needed state of mind required for relaxing as the students move to the next activity within the school environment. Through meditation and reflections students made as they walked through these areas, they remembered numerous things from the lessons and discussions in class and other academic activities. According to Salary, et al. (2018) safety is a primary concern, but decision-makers should know if they are trading safety for other important building features that influence student performance. Another facility for students with hearing impairment was the toilet facilities built within the proximity of the classrooms and other building amenities in the school environment. Students did not have to move longer distances to access the places of convenience from the classrooms or dormitories. The toilet facilities were conveniently built to suit the needs of male and female students with hearing impairment, including their teachers and administrators in the school.

Oluremi and Olubukola (2013) assert that students' academic advancement is significantly impacted by facilities, and that subpar conditions result in subpar performance. The physical space must give students with hearing impairments the chance to practice proper hygiene and health practices in a structured learning environment. The facilities were in good working conditions, and the toilets for the boys and girls were separated, allowing students to have their privacy at their convenience within a shorter distance from other facilities in the school as indicated in *Figure 12 (see Appendix H)*. Clean running water from the taps and storage in the water tanks were available for students and teachers to use and ensured that good sanitation practices were upheld to minimize any chances of disease outbreaks due to poor hygiene.

The construction of well-resourced schools with separate toilets for girls results in a 20 percent increase in female enrollment for learners, including students with hearing impairment in school. Separate toilets were also positively related to test scores in female students (Kazianga, et al., 2013). Overall, the quality of sanitation and hygiene practices exercised by students with hearing impairment has motivated students to focus on their academics with more focus on performing well in their grades.

The record of school items indicated that the school had 786 textbooks, 16 computers, 300 pieces of furniture, specifically the chairs with desks; and different ICTs including 2 Projectors, Wi-fi with functioning internet accessibility; and a Smart Tv for students. These quantities support the deliberate effort of the school to ensure that a minimal level of facilities were available to facilitate the teaching and learning activities of children with hearing impairment. Including the number of facilities provides appropriate information for the suitability of resources in addressing the needs requirements of the students with hearing impairment in school as supported (Mulyasa 2014).

The teachers of students with hearing impairment attended their lessons and taught students with hearing impairment in school as indicated in the timetable (see *Figure 13 in Appendix H*). It was evident in the daily attendance book where teachers appended their signatures by indicating their arrival time in the books, confirming their availability to facilitate the teaching/learning activities. The records of students' attendance were not seen during the study process; this was partly attributed to the small number of students in class and with regular attendance of lessons, they were easily monitored. Teachers were able to take note of their attendance. However, absenteeism among teachers and students resulted in poor performance due to poor health, lack of

remedial work or catch-up strategy, negative teacher attitude, and low self-esteem (Sichlindi, et al., 2022).

Management was privy to sharing any of their documents regarded as sensitive and confidential, including records of scores attained through the Activities of Integration, and any other assessment records centered on students' progress. The administration regarded the discretion to share such information as a sensitive matter, making it difficult to establish the performance of students based on existing records within the school. They argue that these outcomes, especially the scores on the Activities of Integration (AOI), were a preserve of the Uganda National Examinations Board. It was observed that the schools feared exposing their weakness through this study since students and teachers were experiencing the new curriculum for the first time. The lack of transparency in sharing the scores indicate the lack of preparedness of the school in handling issues of scores in this regard as indicated by Atwine (2024) that the curriculum intended to be student-centered, uses the traditional teaching methods of delivery.

The record of activities performed by students was based on the information displayed on the timetable to indicate the subjects, lessons time allocation for conducting the activities during the teaching and learning processes. The term planner indicated many activities that students and teachers were required to know for their participation during the school calendar as indicated in *Figure 14*. Besides the school planner, the daily activities on the timetable provided useful information that helped students to participate in all lessons under the new lower secondary school curriculum (See *Figure 13*). Timetables give students, teachers and administrators a clear picture of what's happening in the classroom at any given time; assists in maximizing school resources such as classroom availability, teacher availability, and materials availability;

add structure to the school system for planning, documentation purposes and help to ensure accountability. (Enenche, 2019).

5.5 Conclusion

The two modes of communication technology used for teaching learners with hearing impairment at Wakiso School for the Deaf were; modern and traditional strategies for relaying information to students at school. As such, the main methods of communication involved Sign Language Interpretations (SLI), Video interpretations, Writing notes, use of Visual Aids, Curriculum Interpretation, Labelling buildings/materials, and the Use of ICT. Much as these methods were used to teach students with Hearing Impairment, the quality of communication was yet to be achieved since none of the students used assistive devices in the classroom but relied on sign language interpretations. The proficiency of sign language interpretation depended on the aptitude of the two interpreters in communicating technical terms used in the different areas of science or arts subjects during the teaching and learning process.

Accessibility to teaching and learning facilities was ensured for students with hearing impairment to access amenities such as the library to find reading books and other materials, use computers in the laboratory, and search information from the internet resources to learn. Teachers and students used the classrooms to study in a well-set environment, used the Smart Television and projectors for information display, and easily accessed different rooms and materials due to written labels, teaching/visual aids, and early entry to the learning facilities. Students with hearing impairment require more time to use and access the school facilities to maximize their learning experiences. However, their accessibility is limited to the normal lesson periods of 40 minutes per lesson, which is not ample enough for students to benefit from their use since other students need to use them as scheduled by the timetable.

The physical facilities for teaching students with hearing impairment include the library with well-stocked books and materials, a lab with desktop and laptop computers, Classrooms with good lighting/furniture, Buildings with steps and ramps, Toilets for students to use, and beautiful walkways for students. These facilities that were put in place to support the well-being of students with hearing impairment need to be upgraded so that the learning environment is more conducive.

5.6 Recommendations

The facilitators of students with hearing impairment should ensure that the modern and traditional strategies of relaying information to students with hearing impairment at Wakiso School for the Deaf are used effectively to teach students in school. Using assistive devices should be adopted to help students with hearing impairment hear the spoken words with devices that do not exasperate their hearing ability. Assistive listening devices will complement the signing of taught content with signals and gestures used by teachers and sign language interpreters during the teaching and learning processes in class, thereby improving performance of the students in all subjects.

Accessibility to teaching and learning facilities should be revisited so that students and teachers can use the amenities beyond the stipulated time on the timetable. Once students with hearing impairment are given more time to use and access the school facilities, their resolve to undertake personal reading activities can empower them with habits that maximize their learning experiences and improve their learning experiences. Increasing time for students' accessibility to extra periods, before and after classes, would provide enough opportunities for students to benefit from using these facilities beyond the schedule timetable.

The physical facilities for teaching students with hearing impairment should be modified to suit the teaching and learning experiences of learners within the school premises by stocking the library with books and materials with the new curriculum content. The number of computers and other ICT equipment should be placed in all classrooms so that students can use them for lessons instead of lab that may not provide opportunities for longer use in a restricted environment. The seating arrangement in class for students with hearing impairment should be modified with fewer chairs and tables, permitting them to navigate their space without glaring lighting that affects their eyes and disrupt their reading. These modifications will improve the learning experiences of students with hearing impairment.

REFERENCES

- Abikoye, T. M., Aribaba, O. T., Musa, K. O., & Idowu, O. O. (2020). Prevalence and causes of visual impairment among hearing impaired students in Lagos, Nigeria. *International Journal of Pediatric Otorhinolaryngology*, *139*, 110487
- Abredu, P., Chen, Y., Amarteifio, E. N. A., & Essien, F. K. (2019). Academic facility availability and influence on students' academic performance and enrollment: moderating and mediating effects of facility maintenance. *International Journal of Management Sciences and Business Research*, *9*(5), 217-226
- Agomoh, O. E. and Kanu, S. (2011). *Introduction to Psychology of Special Needs Children Understanding Special Needs Education*. Port Harcourt. Kanissi Books.
- Al-Dababneh, K. A., & Al-Zboon, E. K. (2022). Using assistive technologies in the curriculum of children with specific learning disabilities served in inclusion settings: teachers' beliefs and professionalism. *Disability and Rehabilitation: Assistive Technology*, *17*(1), 23-33
- Aljedaani, W., Krasniqi, R., Aljedaani, S., Mkaouer, M. W., Ludi, S., & Al-Raddah, K. (2023). If online learning works for you, what about deaf students? Emerging challenges of online learning for deaf and hearing-impaired students during COVID-19: A literature review. *Universal Access in the Information Society*, *22*(3), 1027-1046
- Alimi, O. S., Ehinola, G. B., & Alabi, F. O. (2012). School Types, Facilities and Academic Performance of Students in Senior Secondary Schools in Ondo State, Nigeria. *International education studies*, *5*(3), 44-48.
- Allen, J. G., & Macomber, J. D. (2020). *Healthy buildings: How indoor spaces drive performance and productivity*. Harvard University Press.

- Antia, S. D., Guardino, C., & Cannon, J. E. (2017). Single case design. *Research in deaf education: Contexts, challenges, and considerations*, 225-250.
- Atanga, C., Jones, B. A., Krueger, L. E., & Lu, S. (2020). Teachers of students with learning disabilities: Assistive technology knowledge, perceptions, interests, and barriers. *Journal of Special Education Technology*, 35(4), 236-248
- Atwine (September, 2024). One month to exams, survey reveals gaps in implementation of revised O-Level curriculum. *The Independence Magazine*. Available at <https://www.independent.co.ug/one-month-to-exams-survey-reveals-gaps-in-implementation-of-revised-o-level-curriculum/>
- Bamu, B.N., De Schauwer, E., Verstraete, S., & Van Hove, G. (2017). Inclusive education for students with hearing impairment in the regular secondary schools in the North-West Region of Cameroon: Initiatives and challenges. *International Journal of Disability, Development and Education*, 64(6), 612-623
- Barrett, P., Treves, A., Shmis, T., Ambasz, D., & Ustinova, M. (2019). The impact of school infrastructure on learning: A synthesis of the evidence. *International Development in Focus*. The World Bank
- Bertalanffy, L. von. (1969). *General system theory: Foundations, Development, Applications*. New York: George Braziller
- Bowman-Smart, H., Gyngell, C., Morgan, A., & Savulescu, J. (2019). The moral case for sign language education. *Monash Bioethics Review*, 37(3), 94-110
- Bui, D. C., & Myerson, J. (2014). The role of working memory abilities in lecture note-taking. *Learning and Individual Differences*, 33, 12-22.

- Chimhenga, S., & Sibanda, P. (2016). Accessibility of Curriculum by Learners with Hearing Impairment in Schools: A Case Study of Bulawayo Secondary Schools in Zimbabwe. *Global Journal of Advanced Research*, 3(10), 947-952.
- Colby, J., & Miske Witt & Associates. (2000). *Defining Quality in Education*. UNICEF Programme Division, Education Section. Working Paper Series, Document No. UNICEF/PD/ED/00/02. Presented at the meeting of the International Working Group on Education, Florence, Italy, June 2000. United Nations Children's Fund, New York, NY, USA.
- Colclasure, B. C., Thoron, A. C., & LaRose, S. E. (2016). Teaching Students with Disabilities: Hearing Impairments and Deafness. *University of Florida*.
- Crawford, R. (2016). *Introducing classroom labeling as an innovative method to inform educational practice*. University of Missouri-Saint Louis
- Creswell, J. W. (2014). *Research design: qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks, CA: Sage
- Creswell, J. W., & Poth, C. N. (2018). *Qualitative inquiry and research design: Choosing among five approaches* (4th ed.). Thousand Oaks, CA: SAGE Publications.
- Deaf Websites (2024). *Exploring the Deaf Community: Language, Identity, and Experiences*. Available at: <https://deafwebsites.com/exploring-the-deaf-community-language-identity-and-experiences>
- Doleck, T., & Lajoie, S. (2018). Social networking and academic performance: A review. *Education and Information Technologies*, 23, 435-465
- Dyer, E., Swartzlander, B. J., & Gugliucci, M. R. (2018). Using virtual reality in medical education to teach empathy. *Journal of the Medical Library Association: JMLA*, 106(4), 498–500. <https://doi.org/10.5195/jmla.2018.518>

- Etale, O. Y., Agnes, O., & Felicity, M. (2020). Influence of physical facilities on the teaching-learning process in public primary schools in Bungoma County, Kenya. *Africa Journal of Technical and Vocational Education and Training*, 5(1), 187-195
- Eze, N., Madu, M., Nwosu, F., Ogbonnaya, E., Obichukwu, P., Okanazu, O., ... & Nwokoro, M. (2021). Mediating Effects of Perceived Usefulness and Perceived Ease of Use on ICT Support and Use. *Ubiquitous Learning*, 15(1), 9
- Farhan, W., & Razmak, J. (2022). A comparative study of an assistive e-learning interface among students with and without visual and hearing impairments. *Disability and Rehabilitation: Assistive Technology*, 17(4), 431-441.
- Fleischer, L. R. (1975). *Sign language interpretation under four interpreting conditions*. Brigham Young University
- Fullerton, E. K., & Guardino, C. (2010). Teacher and students' perceptions of a modified inclusion classroom environment. *Electronic Journal for Inclusive Education*, 2(5), 1-17
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. London: Sage Publications.
- Hidayat, L., Gunarhadi, G., & Hidayatulloh, F. (2017). Multimedia based learning materials for deaf students. *European Journal of Special Education Research*, 2(3). Doi: 10.5281/zenodo.376744
- Haksız, M. (2014). Investigation of tablet computer use in special education teachers' courses. *Procedia-Social and Behavioral Sciences*, 141, 1392-1399
- Hameen, E. C., Ken-Opurum, B., Priyadarshini, S., Lartigue, B., & Anath-Pisipati, S. (2020). Effects of school facilities' mechanical and plumbing characteristics and conditions on student attendance, academic performance and

- health. *International Journal of Civil and Environmental Engineering*, 14(7), 193-201
- Hayat, F. A. (2017). *The relationship between access to toilets and school enrollment in Pakistan*. [Doctoral Dissertation, Georgetown University]. Washington DC: Georgetown University
- Huang, F., Teo, T., & Scherer, R. (2022). Investigating the antecedents of university students' perceived ease of using the Internet for learning. *Interactive learning environments*, 30(6), 1060-1076.
- Jiang, F., Kubwimana, C., Eaton, J., Kuper, H., & Bright, T. (2020). The relationship between mental health conditions and hearing loss in low-and middle-income countries. *Tropical Medicine & International Health*, 25(6), 646-659.
- Jizzakh, T. G. K. (2020). Using hearing aids in determining the level of speech development in children with hearing impairment. *Mental Enlightenment Scientific-Methodological Journal*, 111-117.
- Joseph, O. (2015): Teaching Aids: a special pedagogy of brain development in school children, interest and academic achievement to enhance future technology. *Journal of Education and Practice*, 6(29), 92-101
- Kaboggoza, P. (2022). *How Educators have served and supported deaf students in Uganda: A case study at a secondary school for the deaf* [Doctoral dissertation, Wayne State University]. Detroit, MI: Wayne State University
- Kaggya, B. N. (2019). Successes and Challenges in the Reporting about the Situation of Persons With Disabilities inline With The SDGs: The Uganda case. *A paper presented at the Experts Group Meeting on Strengthening Evidence based Research for Disability Inclusive Implementation, Monitoring and Evaluation of the Sustainable Development Goals (SDGs)*, UN Headquarters, New York

- Kaindu, E., Simuyaba, E., Muleya, G., & Simui, F. (2022). *Exploration of academic performance of learners with hearing impairment at Munali Secondary School, Zambia*, [Doctoral dissertation, University of Zambia]
- Kakooza, E. & Nalugya, J. (2021). The impact of climate change on household welfare in Uganda. *Environmental Science & Policy*, 124, 207-215.
- Kazianga, H., Levy, D., Linden, L. L., & Sloan, M. (2013). The Effects of "Girl-friendly Schools: Evidence from the BRIGHT School Construction Program in Burkina Faso. *American Economic Journal: Applied Economics*, 5(3), 41-62.
- Kisakye, D. (2021). *Classroom communication techniques and cognitive learning of children with hearing impairment in primary schools in Kampala capital city authority* (Doctoral dissertation, Kyambogo University [unpublished work]).
- Kimaro, A. R., & Kileo, S. E. (2023). Factors Contributing to Low Academic Achievement Among Pupils with Hearing Impairment: A Case of Selected Inclusive Primary Schools in Dodoma Municipality, Tanzania. *Journal of Adult Education in Tanzania*, 25(1)
- Kumar, J. A., Bervell, B., Annamalai, N., & Osman, S. (2020). Behavioral intention to use mobile learning: Evaluating the role of self-efficacy, subjective norm, and WhatsApp use habit. *IEEE Access*, 8, 208058-208074. <https://doi.org/10.1109/ACCESS.2020.3038269>
- Lauterpacht, H. (1948). The universal declaration of human rights. *British Year Book of International Law*, 25, 354
- Leeson, L., Wurm, S., & Vermeerbergen, M. (Eds.). (2014). *Signed language interpreting: Preparation, practice and performance*. New York: Routledge

- Lehloa, H. (2019). *Investigating access to education for learners with hearing impairment at secondary schools*. [Doctoral dissertation, National University of Lesotho] Maseru, Lesotho: National University of Lesotho
- LMSHERO (2024). *What Is a Student Teacher? Definition, Advantages & Importance*.
<https://lmshero.com/student-teacher>
- Luckner, J. L., Bruce, S. M., & Ferrell, K. A. (2016). A summary of the communication and literacy evidence-based practices for students who are deaf or hard of hearing, visually impaired, and deafblind. *Communication Disorders Quarterly*, 37(4), 225-241
- Majoro, N. E. (2021). *Challenges of using sign language interpreting to facilitate teaching and learning for learners with hearing impairment*. [Doctoral dissertation, National University of Lesotho].
- Manchishi, S. (2015). *Factors contributing to low achievement levels in mathematics among hearing impaired learners: A case of selected Schools of Lusaka, Zambia*. [Doctoral dissertation, The University of Zambia]. The University of Zambia
- Migehe, G. J. (2014). *An analysis of academic performance of students with hearing impairment in Tanzania secondary schools*. [Doctoral dissertation, The Open University of Tanzania]. The Open University of Tanzania
- Moser-Mercer, B., Künzli, A., & Korac, M. (1998). Prolonged turns in interpreting: effects on quality, physiological and psychological stress (Pilot study). *Interpreting*, 3, 47-64.
- Muhombe, J.A., Naftali, K.R., Ogola, F.O., & Wesonga, J.N. (2015). Influence of special needs education policy on access to secondary school education by

- learners with hearing impairments in Nandi County, Kenya. *Journal of Education and Practice*, 6(36), 29-41.
- Muiruri, L. W. (2015) *Determining Classroom Communication and Academic Performance of Learners with Hearing Impairment; A case of Kambui School for the Deaf- Kiambu County-Kenya*. [Master's Thesis. Kenyatta University]. Kenyatta University.
- Mukasa, S., & Mpofo, S. (2016). Factors influencing teachers' use of information and communication technology in teaching in Uganda. *The Electronic Journal of Information Systems in Developing Countries*, 77(1), 1-17.
- Mulyasa, E. (2014). *School-Based Management*. Bandung: PT Remaja Rosdakarya.
- Nakazibwe, S. (2018). *Factors Affecting Academic Performance of Learners with Hearing Impairments in Special Schools: A Case Study of Wakiso Secondary School for the Deaf*. [Unpublished undergraduate dissertation] Kampala International University.
- Hermawati, S., & Pieri, K. (2020). *Assistive technologies for severe and profound hearing loss: Beyond hearing aids and implants*. *Assistive Technology*. University of Nottingham.
- Nikiforova, A. A. (2023). The Systems Approach. *Knowledge Organization*, 49(7), 529-542.
- Nimante, D., & Ekša, L. (2020). Inclusion of a child with a hearing impairment in a mainstream school, single case study. *Human, Technologies and Quality of Education*, 62-77.
- Nzoka, F., K. (2024). Pedagogical and Curriculum Issues in Teaching Children With Special Needs in Regular Classrooms: Classroom Practices, Management and

- Assessment. *International Journal of Research in Education Humanities and Commerce*, 5(4), 125-133. <https://doi.org/10.37602/IJREHC.2024.5410>
- Ntinda, K., Thwala, S.K. & Tfusi, B. (2019). Experiences of teachers of deaf and hard-of-hearing students' in a special needs school: an exploratory study. *Journal of Education and Training Studies*, 7(7), 79-89.
- Olajide, S.O., Olanipekun, B.V., Obafunmilayo, A.O. (2021). Influence of school facilities on students' academic performance in basic science and technology in junior secondary schools in Osun State, Nigeria. *International Journal of Innovative Research & Development*, 10(2), 182-186
- Olamide, A., Abdul-Lateef, O.A., & Adebayo, A.S. (2018). Impact of school facilities on students' academic performance in Oshodi-Isolo I. G. A. senior secondary schools, Lagos state. *International Journal of Educational Research and Management Technology*, 7(3), 25-34
- Olugbenga, M. (2019). Impact of school facilities on the academic performance of secondary school students in Kaduna State, Nigeria. *International Journal of Social Science and Humanities Research*, 7(3), 497-507
- Oluremi, F. D., & Olubukola, O. O. (2013). Impact of facilities on academic performance of students with special needs in mainstreamed public schools in Southwestern Nigeria. *Journal of research in special educational needs*, 13(2), 159-167
- Omugur, J. P. (2023). Ugandan sign language interpretation services for learners with hearing impairment in inclusive secondary schools in Uganda: Challenges and successes. In *Handbook of Speech-Language Therapy in Sub-Saharan Africa: Integrating Research and Practice* (pp. 705-720). Cham: Springer International Publishing

- Ondicho, R. M. N. (2015). *Availability and use of media resources in teaching and learning: A case of selected secondary schools for the hearing impaired in Western Kenya*, [Doctoral Dissertation, Kabarak University]. Kabarak University
- Onyebuanyi, P.N., Onovo, N.E., Ewe, U.C., & Njoku, N.A. (2022). Impact of school physical facilities on students' academic performance in senior secondary schools in Aba Education Zone of Abia state. *Technology and Vocational Education*, 276-282
- Ordu, U. B. A. (2021). The Role of Teaching and Learning Aids/Methods in a Changing World. *Bulgarian Comparative Education Society*, 9, 210–216.
- Punch, J. L., Hitt, R., & Smith, S. W. (2019). Hearing loss and quality of life. *Journal of communication disorders*, 78, 33-45
- Rizvi, Q., & Rana, R. A. (2023). Exploring Special Education Teachers' Perception, Readiness, and Practices for ICT Integration in Classrooms for Students with Hearing Impairment. *Journal of Asian Development Studies*, 12(3), 994-1004.
- Sadiya, I. (2022). *The role of teachers in supporting learners who have a hearing impairment*. [Doctoral Dissertation, University of Johannesburg]. University of Johannesburg
- Salary, S., Holliday, L., Keese, M., & Wachter, H. P. (2018). Building features in schools that influence academic performance. *Journal of Civil Engineering and Architecture*, 12(3), 163-197
- Samsudin, M., Guan, T., Yusof, A., & Yaacob, M. (2017). A review of mobile application characteristics based on teaching and learning theory for mute and deaf students. *International Journal of Technology in Education and Science*, 1(1), 24-28.

- Santander, M. J. W. (2022). *How Seating Arrangements Play a Role in Classroom Management*. [Doctoral dissertation, St. Thomas University]. St. Thomas University
- Saunders, M.N.K., Lewis, P. & Thornhill, A. (2019). *Research methods for business students*. 8th Edition. New York: Pearson
- Seguya, A., Bajunirwe, F., Kakande, E., & Nakku, D. (2021). Maternal knowledge on infant hearing loss and acceptability of hearing aids as an intervention at a Referral Hospital in southwestern Uganda. *International Journal of Pediatric Otorhinolaryngology*, 145, 1-34
- Sichlindi, B. M., Mulunda, H., Chishiba, A., & Simui, F. (2022). Disablers to Access to Healthcare services experienced by Learners with Hearing Impairment at Musakanya School in Mpika District, Zambia. *International Journal of Research and Scientific Innovation*, 9(1), 65-74.
- Sidi, A., U. (2019). The impact of school facilities on students' level of motivation and academic achievement in senior secondary schools in Northwest Zone, Nigeria. *Prestige Journal of Education*, 2(2), 254-263
- Smith, C. (2020). Challenges and opportunities for teaching students with disabilities during the COVID-19 pandemic. *International Journal of Multidisciplinary Perspectives in Higher Education*, 5(1), 167-173
- Sodiqovna, R. K. (2020). Preparation of preschool children with cochlear implants for independent learning. *European Journal of Research and Reflection in Educational Sciences*, 8(8), 159-161
- Seal, B. C. (2000). Working with educational interpreters. *Language, Speech, and Hearing Services in Schools*, 31(1), 15-25

- Stein, C. (2013). *Hearing Impairment and ADHD: How they Affect Students' Ability to Learn Math*. Georgia: Georgia College and State University
- Takwate, K. T. (2018). Allocation, availability and maintenance of school facilities as a correlate of academic performance of senior secondary school in Anambra State, Nigeria. *International Journal of Scientific and Research Publications*, 8(9), 42-81
- Tipton, R., & Furmanek, O. (2016). *Dialogue interpreting: A guide to interpreting in public services and the community*. London: Routledge.
- TQP (2020). *What is Quality? Quality Definition, Quality Meaning*. Available at https://techqualitypedia.com/quality/#Degree_of_Excellence
- Tucker, B. (2012). The flipped classroom. *Education Next*, 12(1), 82–83.
- Tumwebaze, S. M., & Mutono, R. (2015). The effects of internal control systems on financial performance in an institution of higher learning: A case of Makerere University Business School. *International Journal of Business and Commerce*, 4(8), 1-13.
- UNESCO (1994). *The Salamanca Statement and Framework for Action on Special Needs Education*. Paris: UNESCO
- Van der Straaten, T. F., Briaire, J. J., Dirks, E., Soede, W., Rieffe, C., & Frijns, J. H. (2021). The school career of children with hearing loss in different primary educational settings—a large longitudinal nationwide study. *The Journal of Deaf Studies and Deaf Education*, 26(3), 405-416.
- Vanderstraeten, R. (2023). Systems theory approaches to researching educational organizations. In *Oxford Research Encyclopedia of Education*. Oxford University Press.

- Walker, E. A., Sapp, C., Dallapiazza, M., Spratford, M., McCreery, R. W., & Oleson, J. J. (2020). Language and reading outcomes in fourth-grade children with mild hearing loss compared to age-matched hearing peers. *Language, Speech, and Hearing Services in Schools, 51*(1), 17-28.
- Warner-Czyz, A. D., Loy, B., Pourchot, H., White, T., & Cokely, E. (2018). Effect of hearing loss on peer victimization in school-age children. *Exceptional Children, 84*(3), 280-297.
- Wei, J., Hu, Y., Zhang, L., Hao, Q., Yang, R., Lu, H., & Chandrasekar, E. K. (2018). Hearing impairment, mild cognitive impairment, and dementia: a meta-analysis of cohort studies. *Dementia and geriatric cognitive disorders extra, 7*(3), 440-452.
- Wapling, L. (2016). *Inclusive education and children with disabilities: Quality education for all in low and middle income countries*. CBM. <https://www.cbm.org>.
- Wickenden, M. (2018). Listening to children with disabilities: Voices from Uganda and Malawi. In N Singal (Ed.), *Education and disability in the global south: New perspectives from Africa and Asia* (pp. 267-288). London: Bloomsbury Publishing
- World Federation of the Deaf. (2018). *Position paper on inclusive education*. Helsinki, Finland: World Federation of the Deaf.
- World Health Organization. (2019). Deafness and hearing loss. Available at <https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss>
- Yang, Z., Becerik-Gerber, B., & Mino, L. (2013). A study on student perceptions of higher education classrooms: Impact of classroom attributes on student satisfaction and performance. *Building and environment, 70*, 171-188

Yin, R. K. (2018). *Case study research and applications (Vol. 6)*. Thousand Oaks, CA: Sage

Zhang, B.H., Ahmed, S.A.M. (2020). Systems Thinking—Ludwig Von Bertalanffy, Peter Senge, and Donella Meadows. In: Akpan, B., Kennedy, T.J. (eds) *Science Education in Theory and Practice*. Springer Texts in Education. Springer, Cham.

APPENDICES

Appendix A: Interview Guide for Teachers

Dear Participant,

My name is Kadogo Kulussen, and I am a student at Kyambogo University pursuing a degree of Masters of Education in Educational Foundations. As part of my academic requirements, I am conducting a research study on the quality of education facilities for students with hearing impairment in Wakiso Secondary School. Your participation in this study is greatly appreciated. Your responses will be kept confidential and used only for academic purposes.

Thank you for your time and valuable contribution to this research study.

1. Please talk about yourself? (Probe for age, level of education, and period spent with students with hearing impairment)
2. What experience do you have working with students with hearing impairment or other special needs?
3. In your opinion, what are the main education facilities available for students with hearing impairment in your school?
4. How does the school ensure that learning materials are accessible for students with hearing impairment?
5. What measures have been taken to make classrooms, bathrooms, toilets and others easily accessible for these students?
6. Can you tell me about the availability of hearing aids and other devices that support the learning of students with hearing impairment in our school?
7. How is sign language interpreting done in the classrooms to assist with communication?

8. How effective do you think these supportive mechanisms are in ensuring the educational needs of students with hearing impairment?
9. How do accessible learning materials and classroom accommodations contribute to the academic success of these students?
10. Do you have any additional comments or suggestions related to the topic?

Thank you for your time

Appendix B: Focus Group Discussion Guide for Students

Dear Participant,

My name is Kadogo Kulussen, and I am a student at Kyambogo University pursuing a degree of Masters of Education in Educational Foundations. As part of my academic requirements, I am conducting a research study on the Quality of Education Facilities for Students with Hearing Impairment in Wakiso Secondary School. Your participation in this study is greatly appreciated. Your responses will be kept confidential and used only for academic purposes.

Thank you for your time and valuable contribution to this research study.

1. Please talk about yourself? (Probe for age, level of education, and period spent with students with hearing impairment)
2. What experience do you have as a student with hearing impairment or other special needs?
3. In your opinion, what are the main education facilities available for students with hearing impairment in your school?
4. How does the school ensure that learning materials are accessible for students with hearing impairment?
5. What measures have been taken to make classrooms, bathrooms, toilets and others easily accessible for these students?
6. Can you tell me about the availability of hearing aids and other devices that support the learning of students with hearing impairment in our school?
7. How is sign language interpreting done in the classrooms to assist with communication?
8. How effective do you think these supportive mechanisms are in ensuring the educational needs of students with hearing impairment?

9. How do accessible learning materials and classroom accommodations contribute to the academic success of these students?
10. Do you have any additional comments or suggestions related to the topic?

Thank you for your time

Appendix C: Interview Guide for Administrators

Dear Participant,

My name is Kadogo Kulussen, and I am a student at Kyambogo University pursuing a degree of Masters of Education in Educational Foundations. As part of my academic requirements, I am conducting a research study on the Quality of Education Facilities for Students with Hearing Impairment in Wakiso Secondary School. Your participation in this study is greatly appreciated. Your responses will be kept confidential and used only for academic purposes.

Thank you for your time and valuable contribution to this research study.

1. Please talk about yourself? (Probe for age, level of education, and period spent with students with hearing impairment)
2. What experience do you have working with students with hearing impairment or other special needs?
3. In your opinion, what are the main education facilities available for students with hearing impairment in your school?
4. How does the school ensure that learning materials are accessible for students with hearing impairment?
5. What measures have been taken to make classrooms, bathrooms, toilets and others easily accessible for these students?
6. Can you tell me about the availability of hearing aids and other devices that support the learning of students with hearing impairment in our school?
7. How is sign language interpreting done in the classrooms to assist with communication?
8. How effective do you think these supportive mechanisms ensure the educational needs of students with hearing impairment?

9. How do accessible learning materials and classroom accommodations contribute to the academic success of these students?
10. Do you have any additional comments or suggestions related to the topic?

Thank you for your time

Appendix D: Documentary Checklist


Item		Tick
Records of school items	Braille	
	Textbooks	
Attendance list of learners and teachers		
Record of facilities		
Record of activities performed by students		
Learning facilities	List of facilities/scores for/in different activities of integration	

Appendix E: Observation Checklist

Item	Comment	Tick
Students regularly use assistive listening devices		
Functional assistive devices		
Assistive devices enable students to access tasks.		
Assistive device assessments.		
Training on the use of assistive devices.		
Assistive devices are available in all classrooms.		
Students using hearing aids in this school.		
The learning materials are accessible to students with hearing impairments.		
Specialized learning resources for students with hearing impairments.		
Library resources for students with hearing impairments.		
Students have access to multimedia resources.		
Visual aids for students with hearing impairments.		
Learning environment for students with hearing impairments.		
Classrooms are set up for students with hearing impairments.		
Sound systems for students with hearing impairments		
Visual alert systems in classrooms for students with hearing impairments.		

Access to all school facilities		
Condition of physical facilities for students with hearing impairments		
Suitability of desks for easy use by students with hearing impairments		

Appendix F: Introductory Letter for Research


KYAMBOGO UNIVERSITY
P. O. BOX 1 KYAMBOGO
Tel: 041 - 4286792 Fax: 256-41-220464
Website: www.kyu.ac.ug Email: drgt@kyu.ac.ug
Directorate of Research and Graduate Training
Office of the Director

Date: 17/06/2024

TO WHOM IT MAY CONCERN

RE: KADOGO KULUSSEN

Dear Sir/Madam,

This is to introduce to you the above-named student Reg: No **20/U/GMEF/13031/PD** pursuing Master of Education in Educational Foundations, Kyambogo University.

He intends to carry out research on ***“Quality of Education Facilities and Academic Performance of Students with Hearing Impairments in Wakiso Secondary School for the Deaf in Wakiso District.”*** in partial fulfillment of the requirements for the award of Master of Education in Educational Foundations of Kyambogo University.

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

Any assistance rendered to his will be highly appreciated.

Yours sincerely



Prof. Bosco Bua
AG. DIRECTOR



Appendix G: Facilities at Wakiso School for the Deaf



Figure 1: Students watching a programme on a Smart TV



Figure 2: Pathway with steps and a ramp on the right-hand side.



Figure 3: Students in the classroom with too much lighting.



Figure 4: Ambience for students in the school environment.



Figure 6: Students reading their books in the early morning hours.



Figure 5: Computers in the Lab.



Figure 7: Glaring light entering the classrooms.



Figure 8: School environment for students with hearing impairment



Figure 9: Display of well-labelled materials in the library.



Figure 10: Students revising during preps.



Figure 11: Pathways in the compound with steps and ramps.



Figure 12: Toilet facilities for the boys (l) and girls (r) in the school.

WAKISO S.S FOR THE DEAF GENERAL TIME TABLE 2024

DAY	8:00 - 9:00	9:00 - 10:00	10:00 - 11:00	11:00 - 12:00	12:00 - 1:00	1:00 - 2:00	2:00 - 3:00	3:00 - 4:00	4:00 - 5:00
MONDAY									
TUESDAY									
WEDNESDAY									
THURSDAY									
FRIDAY									

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Figure 13: Timetable for teaching at Wakiso School for the Deaf.

WAKISO SECONDARY SCHOOL FOR THE DEAF
CALENDAR OF KEY SCHOOL ACTIVITIES FOR TERM 2 2024
UPDATED 10TH JUNE 2024

DATE	TIME	ACTIVITY
Sunday 26 th May 2024	10:00 a.m. - 6:00 p.m.	Students report back to school
Monday 27 th May 2024		Term opens
Wednesday 29 th May 2024	9:00 a.m. - 1:00 p.m.	Beginning of Term Staff Meeting
Monday 3 rd June 2024		Public Holiday - Martyrs' Day
Sunday 9 th June 2024		Public Holiday - Heroes' Day
Wednesday 12 th June 2024	7:00 a.m. - 6:00 p.m.	Geography Fieldwork Study in Entebbe
Sunday 16 th June 2024	12:00 p.m. - 6:00 p.m.	S.4 & S.6 Farewell Luncheon/Party
Saturday 22 nd June 2024		Visit of Christian SL Interpreters
Monday 17 th June 2024		Public Holiday - Eid El Adha Day
Wednesday 26 th June 2024	7:00 a.m. - 6:00 p.m.	Agricultural Show at Bukalasa
Friday 28 th June 2024		Prefects' Elections for the Year 2024/25
Saturday 13 th July 2024		Prefects' Workshop at WAKISSHA R.C.
Sunday 14 th July 2024	9:00 a.m. - 1:00 p.m.	Sports' Day
	1:00 p.m. - 5:00 p.m.	Visitation Day
Monday 29 th July 2024 to Friday 16 th Aug 2024		Mock Examinations
Wednesday 7 th Aug 2024 to Friday 16 th Aug 2024		End of Term Internal Examinations
Friday 9 th August 2024		Confirmation Service at Namirembe
Wednesday 21 st August 2024	9:00 a.m. - 1:00 p.m.	End of Term Staff Meeting
Friday 23 rd August 2024	7:00 a.m. - 10:00 a.m.	Term ends. Parents collect their children

Figure 14: School planner for the activities during the term

Appendix H: Quality of Facilities at Wakiso School for the Deaf

Item		Tick	Quantity	Specifications			
Records of school items	Braille	X	-	-			
	Textbooks	✓	786	Fairly good			
	Computers	✓	16	Good			
	ICTs/Internet	✓	4	Excellent			
	Furniture	✓	300	Very good			
Attendance list of learners and teachers				Wk1	Wk2	Wk3	Wk3
	Teachers	✓	16	15	14	15	12
	Students	✓	29	29	29	29	29
Record of marks	Students	X	29	-			
Record of activities performed by students	Timetables and year planner	✓	2	Very good			
Academic performance	AOI	X	-	-			
	Final Exams						

Source: Primary data