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The Availability and Use of Assistive Technologies among Pupils with Hearing and Visual Impairments in Zanzibar

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ABSTRACT

The study examined the use of Assistive Technologies (AT) among pupils with hearing and visual impairment in selected primary schools in Zanzibar. The study involved 127 respondents. Data was collected using questionnaires, focus group discussions, and observation. Findings indicated that primary schools in Zanzibar had access to hearing aids, sign language interpreters, braille, and speech recognition software. However, the utilization of these technologies posed challenges for most pupils. While pupils with impairments perceived the positive impact of assistive technologies in learning and performance, they encountered several obstacles, including shortage of devices, insufficient training for both teachers and pupils, lack of qualified teachers for instructing pupils in their use, communication issues with hearing-impaired pupils, negative attitudes toward Assistive Technology, and inadequate quality of available devices. The study recommends that the government allocate substantial funds for the procurement and maintenance of assistive technologies and establish support systems and resource centers to enhance effective utilization of assistive technologies in primary schools. This will ultimately promote inclusivity and improve educational experiences of pupils with hearing and visual impairments in Zanzibar.

Keywords: *Assistive technologies; Hearing impairments; Visual impairments; Pupils; Zanzibar*

INTRODUCTION

There has been a growing recognition of the importance of inclusive education to students, regardless of their abilities or disabilities, and for them to have equal access to quality education (Dakar, 2000; Antoninis et al., 2020). This recognition has led to increased efforts worldwide to create educational environments that cater to the diverse needs of all learners (United Nations, 2016). In this context, Assistive Technology has emerged as a crucial tool for enhancing inclusivity in schools, particularly for pupils with disabilities. This comprehensive study delves into the availability and use of assistive technologies in selected primary schools in Zanzibar, specifically focusing on pupils with hearing and visual impairments. The study examined the current landscape, challenges and potential solutions, with the aim of contributing to the development of a more inclusive and equitable educational system in primary schools. Zanzibar, an Island located off the coast of East Africa, is home to a diverse population of children with various disabilities. The Island's commitment to inclusive education is underscored by its adherence to international conventions and frameworks, such as the United Nations Convention on the Rights of Persons with Disabilities (UNCRPD) and the Sustainable Development Goals (SDGs), which emphasize equal access to quality education for all.

However, despite these commitments, significant challenges persist in ensuring that pupils with disabilities receive an education that meets their individual needs. Hersh & Johnson, (2008) argued that traditional educational approaches often struggle to accommodate these pupils, resulting in limited participation, engagement, and learning outcomes. This situation calls for innovative solutions, and assistive technologies which have the potential to bridge this gap by providing

tailored support that caters to the specific requirements of pupils with disabilities (Viner et al., 2020). Assistive technologies encompass a wide range of tools, devices, and software applications that are designed to assist individuals with disabilities in various aspects of their lives, including education (Grönlund et al., 2010). These technologies can aid in communication, mobility, sensory enhancement, and cognitive support, among other areas (WHO and UNICEF, 2022). Integrating these technologies into the educational context can empower pupils with disabilities to actively participate in the learning process, fostering independence and improving their overall educational experiences (Erdem, 2017; Reed et al., 2005). Despite the evident potential of assistive technologies in primary schools, the implementation of Assistive Technology is low in Zanzibar schools. Therefore, this study seeks to examine the availability and the current usage of assistive technologies in Zanzibar's selected primary schools, identifying barriers to their adoption, and proposing recommendations for a more inclusive and accessible educational environment.

LITERATURE REVIEW

Availability of Assistive Technologies (AT)

A study conducted by Eliuteri & Lema (2022) in Tanzania focused on examining the access to assistive devices for special education needs in Morogoro municipal. The study employed a mixed research approach, utilizing the triangulation method and simple random sampling. The study found that although some assistive resources were available for pupils with disabilities, their availability was limited, and users faced difficulties in accessing them. The available assistive devices included writing tools, hearing devices, mobile devices, optical and non-optical devices, which were accessible to students with disabilities. The study provided two recommendations: first, it suggested that assistive resources should be suitable for the users and their environment. Second, the study recommended that assistive devices should be affordable for purchase, acknowledging the financial constraints faced by many individuals and families. Furthermore, the study proposed that government and Non-Government Organizations (NGOs) should support the procurement of assistive devices and distribute them free of charge to people with disabilities, aiming to increase access and alleviate financial burden.

Raja (2016) conducted a study focusing on bridging the disability divide through the use of digital technology. From the study, it was found that there were open software packages as well as commercial software available that provide quality alternatives to high priced assistive technologies software. One example of software mentioned in the study is Non-Video Digital Access (NVDA), an open source screen reader. This software is not only available in English but also in 43 other languages, making it accessible to a wide range of users. The study concluded that the Internet and Information Communication Technology (ICT) play a crucial role in the field of assistive and accessible technology. This technology can serve as assistive devices in various areas such as education. Therefore, the study recommended the need to raise awareness and build capacity of people with disabilities in utilizing these technologies effectively. By doing so, it would help to reduce the digital divide and empower individuals with disabilities to fully participate in various aspects of life.

Chinasa et al., (2018) examined the availability and utilization of information resources and services in special education Centre libraries in south-east Nigeria. The researchers utilized a survey research design for their study. The findings of the study indicated that although there were several assistive technologies available for pupils, they were not fully accessible. This lack of accessibility was likely attributed to physical and environmental barriers that hindered the effective utilization of these resources by students. Moreover, the study concluded that the provision of assistive resources for pupils with disabilities was below the expected level. Additionally, it was noted that the available resources were not being fully utilized by individuals with disabilities. Finally, the study recommended the provision of assistive technologies that align with the specific needs of pupils

with disabilities. The aim of this recommendation was to address the gap in resource availability and enhance the accessibility and utilization of assistive resources by students with disabilities.

Utilization of Assistive Technologies

The utilization of assistive technologies (AT) for pupils with disabilities is about creating an effective, efficient and satisfactory user experience (European Agency for Special Needs and Inclusive Education, 2015). The study by Viner et al., (2020) suggested that the effective use of assistive technologies can promote independence and enhance academic performance. The pupils need to have access to appropriate tools to cater to their specific needs, so as to overcome barriers and challenges more effectively.

The study conducted by Alves et al*.,* (2009) focused on the application of Assistive Technology in education for students with visual impairment. Alves and colleagues used a descriptive survey methodology to gather information and analyze the use of assistive technologies on various aspects of students' lives. The findings of the study revealed several benefits of using assistive resources for students with visual impairments. These resources were found to enhance reading and writing skills, improve communication abilities, facilitate mobility and assist with school tasks, and social interaction within the school environment. Additionally, the use of assistive resources helped these students better adjust to a regular learning process and provided them with equal access to various sources of information. The study concluded that teachers should recognize the need for infrastructure and educational support for students with visual impairments. Furthermore, integrating information technology into the application of assistive devices was highlighted as a crucial tool for improving independent access to information and education for visually impaired students (Alves et al., 2009).

Adebisi et al., (2015) concentrated on the use of Assistive Technology in teaching children with learning disabilities in the 21st Century. The study aimed to explore the impact of assistive resources on the students' access to information, quality of life, learning process and ability to write and correct texts. The findings revealed that the use of assistive technologies had several positive effects on the students. First, Assistive technologies made information more readily available to the children, thereby, improving their access to educational content. Second, the accessibility enhanced active participation in the learning process. Third, the use of assistive resources allowed the students to write and correct text, which positively impacted their writing skills and overall academic performance. Moreover, the findings noted that the use of Assistive Technology increased student access to the same types of information as their classmates, promoting inclusivity and equal opportunities for learning. The authors concluded that assistive resources have the potential to significantly improve the lives of children with learning disabilities, by removing barriers and addressing learning difficulties. In fact, the assistive resources can support these students in overcoming challenges and achieving academic success.

Farooq & Iftikhar, (2015) conducted a study which aimed to assess the effectiveness of Assistive Technology in facilitating learning for students with hearing impairments. The study used a descriptive methodology, employing checklists and questionnaires to collect data. From the Farooq & Iftikhar study, it was found that the use of assistive technologies had several positive effects for students with hearing impairments. The devices enabled these students to hear and understand what was being communicated in different settings. Assistive devices aided individuals with hearing needs in listening, comprehending, and recognizing sound while also enhancing the clarity of sound frequencies. The study concluded that the use of assistive devices contributed to students becoming more independent learners and achievers. Farooq & Iftikhar recommended the need to reduce the cost of assistive devices to make them more affordable for students with disabilities. Additionally, they suggested that schools should raise awareness about the use of assistive devices

for students with disabilities, and teaching staff should be trained on how to effectively utilize assistive devices to teach children with disabilities.

The study conducted by Scherer (2005) focused on Assistive Technology in education for hearing impaired students. The study findings noted that the implementation of assistive technologies significantly improved accessibility in various environments. These resources encompassed devices that offered amplified sound as well as alternative methods to access information through visual cues or vibrations. Additionally, the study highlighted the importance of alternative means to access information. Some assistive devices offered visual displays or captions to convey spoken content, enabling students to follow along with the information even if they couldn't hear it clearly. Moreover, it was found that certain devices strengthened a pupil's skills, makes learning fun and less stressful, and helped pupils make links between cause-and-effect relationships, which also made them feel in control of their learning and boosted their self-esteem (Maza, 2021).

Challenges facing pupils with hearing and visual Impairments in utilization of Assistive Technologies

The use of assistive technologies in the classroom is considered one of the most crucial accommodations provided by education agencies. These resources are designed to support teaching and learning effectively. Ahmed (2018) emphasized that teachers should be aware of their students' individual needs and ensure that appropriate assistive technologies are available to them.

According to Copley & Ziviani (2004), the effective use of assistive technologies was directly linked to successful education outcomes. The resources enabled students with disabilities to overcome barriers and actively participate in the learning process (Mwantimwa, 2021). Despite the benefits, scholars have identified challenges associated with the accessibility and use of assistive technologies in schools.

Tangcharoensathien et al., (2018) conducted a study focusing on Improving Access to Assistive Technologies: Challenges and Solutions in low-and middle-income countries. The study identified four main challenges associated with accessing and using assistive resources in these contexts. The first challenge highlighted was lack of awareness among beneficiaries. The second challenge was related to insufficient user perspective in the designation of assistive technologies. The third identified challenge was lack of financial ability for obtaining assistive technologies, such as hearing aids, spectacles or others low-vision devices. Lastly, the study highlighted the problem of low quality for assistive devices which led to ineffective devices. The study identified various solutions including establishment of national policy for assistive devices, the need for product development that focused on creating affordable assistive products, and finally, the provision of in-service training for people with disabilities.

Grönlund et al., (2010) conducted a study on the effective use of Assistive Technology for inclusive education in developing countries, specifically in Bangladesh and Tanzania. An in-depth case study was used to identify and address the challenges associated with assistive devices in these countries. The study highlighted several challenges, including negative attitudes and beliefs toward assistive resources, inadequate access to special materials for education, lack of maintenance of available resources, insufficient technical support and limited administrative and peer support. These challenges were identified as barriers to the successful implementation of inclusive education. The study made recommendations for governments in developing countries, emphasising the importance of implementing a systematic approach to address problems at each level. This included addressing management challenges such as establishing and maintaining professional networks, identifying and retaining knowledge and expertise, effectively managing funding, promoting coordination among ministries, and ensuring application, maintenance, and monitoring of a national program.

Jacobsen, (2012) in a study on Assistive Technology for students with disabilities, examined the resources and challenges encountered by teachers in adopting and utilizing assistive resources to meet the needs of pupils with disabilities. The study was guided by two theoretical models; Roger's Diffusion of Innovation Theory and Davis's Technology Acceptance models. Through qualitative methodology, the study found that one of the challenges teachers faced was limited awareness and insufficient knowledge in adopting and utilizing assistive technologies. This suggested that teachers lacked the necessary understanding and familiarity with available assistive devices. The study concluded that the teachers exhibited inadequate knowledge in terms of reflecting upon, accepting and employing assistive devices and services to effectively address the needs of students with disabilities. This implies that there is a need for further education and support to enhance teacher's understanding and acceptance of assistive devices, allowing them to better meet the device needs of their students with disabilities.

Kisanga & Kisanga, (2020) focused on the access to Assistive Technology among students with visual impairment in a higher education institution in Tanzania. The study applied a qualitative research design and collected data from 17 students with visual impairments through semi-structured interview and an open-ended questionnaire. The study identified several challenges that students with visual impairments encountered when accessing Assistive Technology. These challenges included: a lack of knowledge on how to use assistive resources, a shortage or limited availability of assistive tools, devices that were not customized to suit the environment, a lack of maintenance of assistive tools as well as the high costs associated with acquiring assistive devices for visual impairment. The study provided recommendations to address the need for satisfactory and sustainable financial assets in assistive tools emphasizing the importance of providing regular training on accessing and using assistive devices to enhance the abilities of students with visual impairments.

STUDY DESIGN AND METHODS

The study employed a descriptive research design. A mixed approach that combined both qualitative and quantitative approaches was employed. The aim was to examine the utilization of assistive technologies for pupils with hearing and visual impairments. The descriptive research design was chosen to facilitate a comprehensive interpretation of the data collected. This approach allows researchers to describe the characteristics of a phenomenon and gain an in depth understanding of research findings.

The study focused on three primary schools in in Zanzibar: Kiswandui, Kiembesamaki "A" and Dr. Samia Suluhu Hassan primary schools. These schools were selected based on criteria including the presence of special units for pupils with hearing and visual impairments, and their experience in catering to pupils with impairments.

To get a sample, a combination of purposeful and convenient sampling techniques was employed to gather data from participants. Purposeful sampling was used to select 26 participants, including school heads, teachers, and education officers, who possessed valuable insights related to the study. Convenience sampling was used to select 101 pupils (52 with hearing impairments and 49 with visual impairments).

The study utilized multiple data collection methods to gather data for the insights. These methods included questionnaires and observation for pupils and focus group discussion (FGDs) for teachers, school heads, and education officers. Quantitative data collected through questionnaires was analyzed using the Statistical Package for the Social Science (SPSS). The analysis included the use of tables and figures to present the findings in a clear and organized manner. The qualitative data collected was subjected to content analysis and narrative analysis. Content analysis involved identifying common themes and patterns within the responses, providing a deeper understanding

of how Assistive Technology can enhance inclusive education for pupils with hearing and visual impairments.

RESULTS AND DISCUSSION

Demographic Information of Participants

Demographic information on the respondents, including sex, age and grade class, is crucial for understanding how primary school pupils with hearing and visual impairments access and use assistive technologies. This information helps to identify their unique needs and challenges in inclusive learning environments.

Sex of Respondents

The findings show that 40 respondents (40%) were girls and 61 respondents (60%) were boys, as indicated in Figure 1 below.

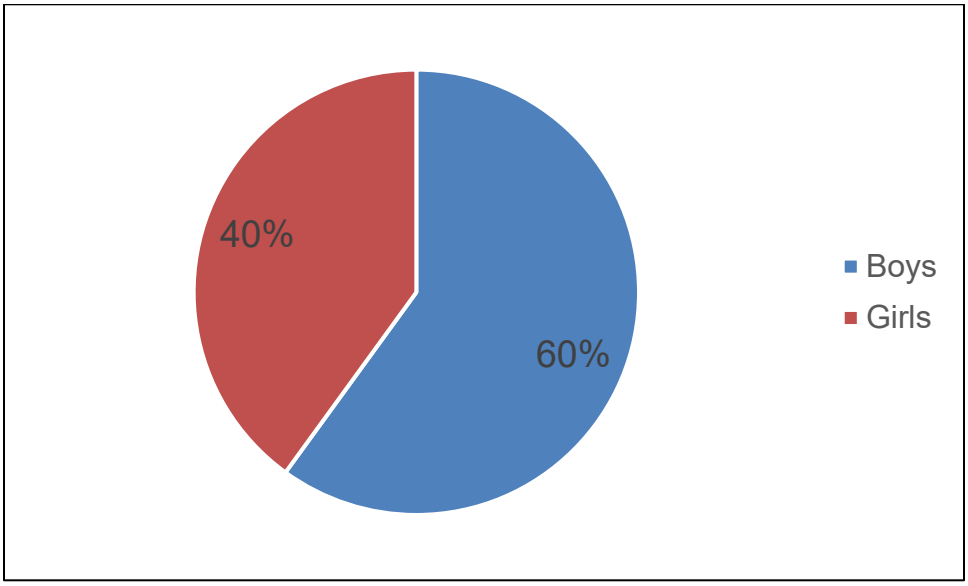


Figure 1: Sex of Respondents
Source: Field Data (2023)

The results in Figure 1 suggest a sex imbalance in the enrollment of pupils with disabilities in Zanzibar's selected primary schools, with a higher population among boys compared to girls. Therefore, to ensure equitable support and services for all pupils, regardless of sex, teachers are required to insist parents/guardians are dedicated and there is sustained commitment to address existing disparities and promote an inclusive educational environment.

Age of Respondents

Respondents were required to indicate their age. The findings show that 21 (21%) of the total respondents were 5 – 8 years old; these are typically young and they are still in early years of primary schools. The age group 9 – 12 years had the largest number of respondents with 48 (47%) of the total number of respondents. Respondents between 13 – 16 years accounted for 32 (32%) of the total respondents. There were no respondents in the 17 – 19 age group. The data shows a relatively balanced distribution of respondents among the age group 5 to 16.

***Table 1**: Age of Respondents (N = 101)*

Respondents Age	Frequency	Percent
5 – 8	21	21
9 – 12	48	47
13 – 16	32	32
Total	**101**	**100**

Source: Field Data (2023)

Table 1 represents a breakdown of the age distribution of respondents. The total number of respondents selected to participate in the study was 101 (100%).

Grade Class of Respondents

The grade class level of respondents was identified for the purpose of determining the relationship existing between the grade class, accessibility and use of assistive technologies among pupils with disabilities especially pupils with visual and hearing impairments in primary schools. The findings show that out of 101(100%) 30 (30%) pupils were in standard one, 27 (27%) were in standard two, 19 (19%) were in standard three, 18 (18%) were in standard four, 3 (3%) were in standard five, and 4 (3%) were in standard six.

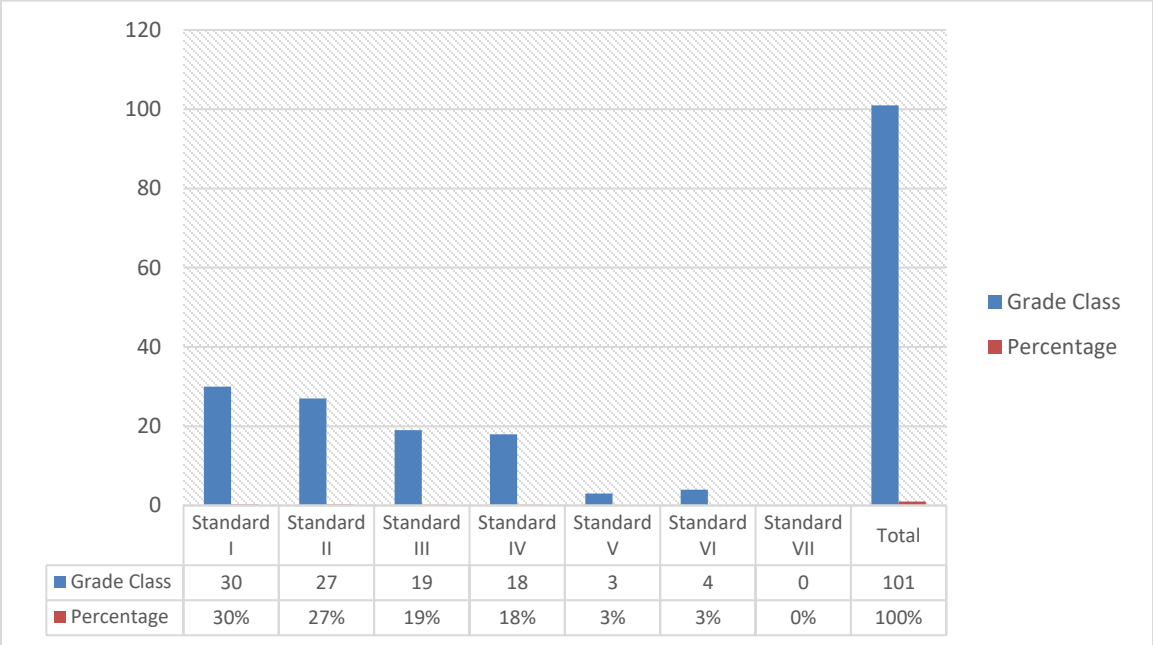


Figure 2: Respondents Grade Class
Source: Study Data (2023)

The data in Figure 2 indicates that the largest number of respondents were in standard one 30 (30%) compared to others, and there were no respondents in standard seven. This could mean that pupils with disabilities give up early on learning and fail to continue in school, as found in a study conducted in Tanzania by Violet (2014) which found that children with disabilities were significantly less likely to enroll, attend school and successfully complete grade five.

Availability of Assistive Technologies

The study investigated the presence of assistive technologies for pupils with visual and hearing impairments in schools. Among 101 respondents, 81.2% confirmed the availability of such technologies, while 18.8% reported a lack of these resources. The findings are summarized in Table 2.

***Table 2**: Availability of Assistive Technologies (AT) in Schools (N = 101)*

Response	Frequency	Percent
Yes	82	81.2
No	19	18.8
Total	**101**	**100**

Source: Field Data (2023)

The findings established that the majority of respondents (81.2% of the total number of respondents) reported that assistive technologies were available in their schools. The findings from focus groups conducted from those schools and inclusive education units reported that, the AT was available in those schools. However, it was found that the existing Assistive Technology was not sufficient to meet the needs of all pupils with disabilities, considering the total number of pupils in those schools who required such support.

The findings from the focus group discussion conducted with schools and inclusive education units reveal that while there was availability of Assistive Technology in schools, there was a lack of equal distribution for pupils with hearing and visual impairments. While some resources were deemed sufficient for the number of available pupils, there are specific reasons they are lacking: one teacher mentioned that;

> "*The assistive Technologies are available but some assistive technologies are adequate, but others, such as A4 frames, are insufficient. The pupils have to share this frames, which create challenges during teaching session. To accommodate all pupils, they resort to using AT in phase and grouping pupils in smaller groups"* (Teacher 1)

The findings from observation from various schools reveal that while Assistive Technology (AT) is present in these educational settings, its current availability falls short of adequately meeting the diverse needs of pupils with hearing and visual impairment. Particularly evident at Kiembesamaki "A" school, where AT resources are geared towards supporting pupils with visual impairments, such as magnifier and large print materials, however, this leaves a notable gap in provision for pupils with hearing impairments. The school lacks essential resources like hearing aids, sign language support and captioned videos, highlighting an urgent need for more comprehensive and inclusive AT solutions to ensure equitable education for pupils.

Types of Assistive Technologies available in Schools

The study examined the availability of assistive technologies for pupils with visual and hearing impairments in the specific schools participating in the study, focusing on their educational and learning performance. Respondents were asked to identify suitable types of AT from a list, with the option to choose multiple answers. The results, presented in Table 3 below highlight the various AT available in the selected schools

Table 3: *Types of AT Available in Schools for Pupils with VI and HI (N = 101)*

Types of Resources	Frequency	Percent
Sign language	52	51.4
Magnifier	45	44.6
Large print materials	42	41.6
Captioned videos	36	35.6
Audio recorder	36	35.6
Braille	30	29.7
Hearing aid/loop	27	26.7
Non visual desktop	22	21.8
Speech recognition software	17	16.8
Personal amplification systems	4	4.0

Source: Field Data (2023)

The findings in Table 3 show that 26.7% reported the availability of hearing aids, 4% reported personal amplification system, 51.4% reported that sign language resources were available, while 35.6% of respondents reported that captioned videos were available. Large print materials were noted by 41.6% of respondents. Some of the assistive technologies were not identified by any of the respondents, indicating their absence in the selected primary schools. These included Bluetooth system, telephone devices, screen reader, tactile graphics, audiobooks and electronic books.

Further findings from the focus group discussion and observations highlighted the types of assistive technologies available for pupils with hearing and visual impairments. Some of the types of AT mentioned by key informants are illustrated in the following:

> *"There are various types of assistive technologies that you have not listed, such as embosser, audio meter, otoscope, orbit reader 20, Non-Visual Desktop Access (NVDA), packing braille, and A4 frames. These AT play a vital role in enhancing the learning experience, fostering inclusivity, and facilitating participation in various schools' activities for pupils with hearing and visual impairments."* (Key Informant)

Based on the findings shown in Table 3 above, it appears that, there were various AT available in schools to support pupils with hearing and visual impairments. These resources enhance access to information, communications and learning opportunities. Similarly the study conducted in Tanzania by Mutarubukwa & Mazana (2017) observed that there were relatively few assistive tools available in terms of both the number and types. However, despite the limited range of tools, the study identified several types of assistive tools that were accessible and available to students with visual and hearing impairments. These included computer screen magnification, descriptive video services, screen readers, braille scanning software, independent text reading, audio devices, braille note takers, personal frequency modulation, infrared systems, text telephones, computerized speech recognition and close captioned TV. Additionally, the study found that despite the limited number and type of assistive tools available, students with visual and hearing impairments did

access and utilize these resources in their learning process and classroom interactions. As a result, their participation in various activities improved, enabling them to have a more inclusive education experience.

These findings correspond with a study conducted in Tanzania by Eliuteri & Lema (2022) who found that the assistive technologies are available for pupils with disabilities however, they are limited and pupils were faced with some difficulties. Therefore, assistive technologies should be made available for pupils with disabilities especially pupils with hearing and visual impairment for the purpose of supporting their learning and information access.

The use of Assistive Technology

Respondents were asked to state the use of assistive technologies. The question aimed to understand why respondents seek out and utilized these assistive technologies. The results show that, 78.2% of the respondents use AT for learning purposes, 38.6% of the respondents said they use it in drawing, and 45.5% of the respondents used AT to enhance their performance. The findings are summarized in Figure 3.

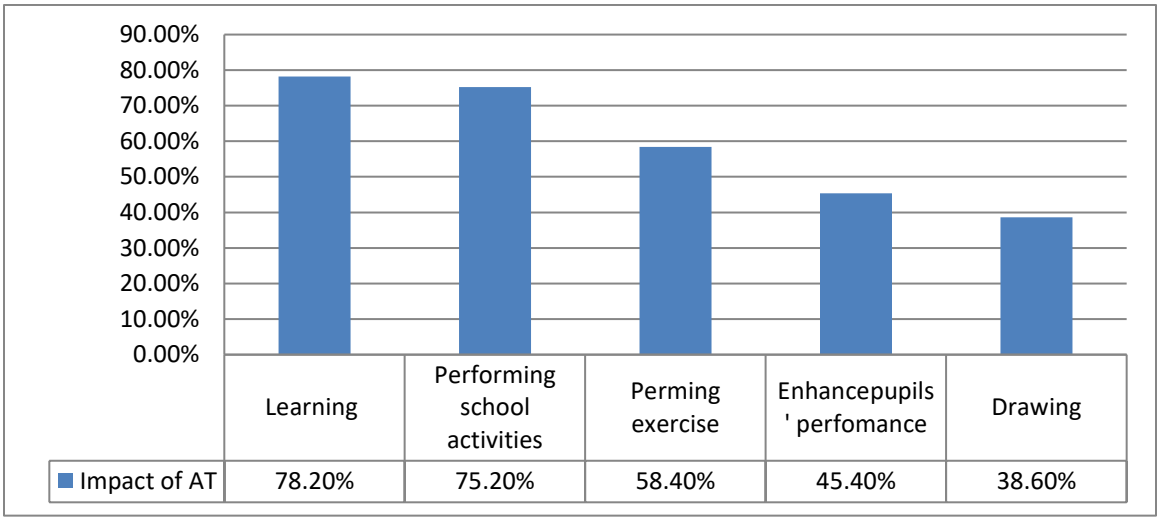
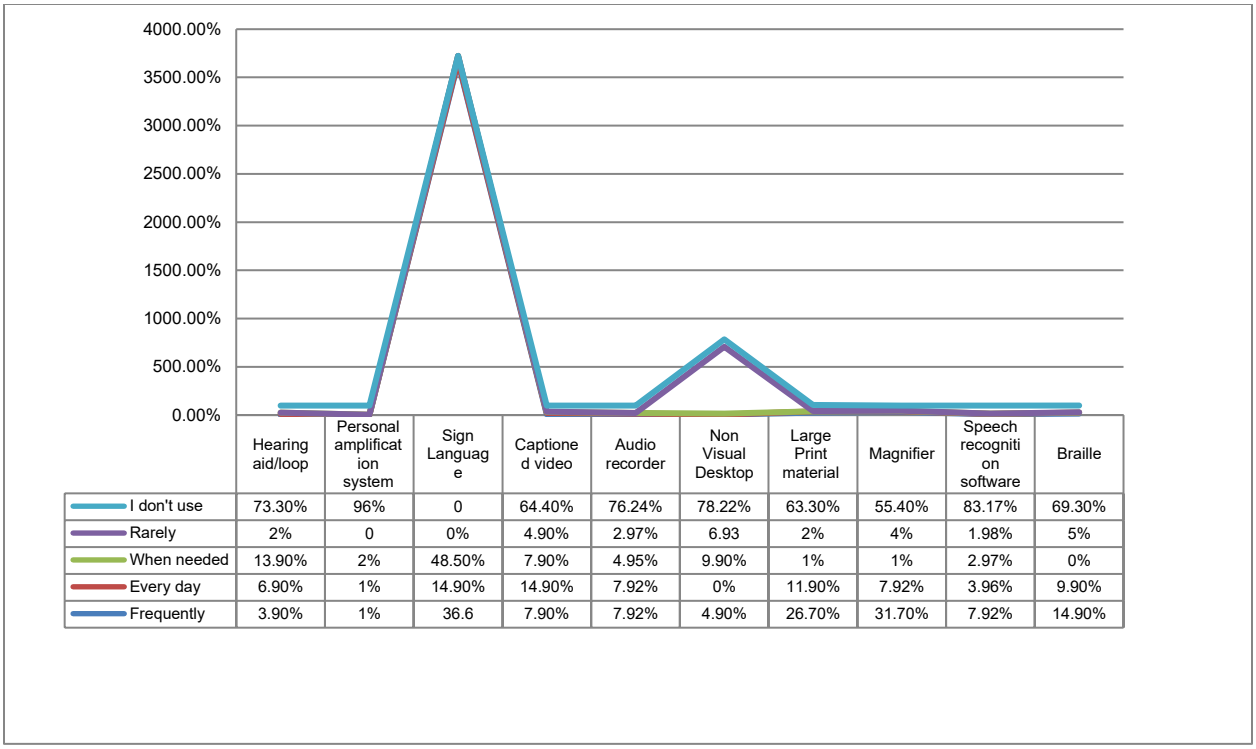


Figure 3: The Use of Assistive Technology
Source: Field Data (2023)

Based on the above findings, we note that AT is widely used for learning purposes, including performing exercise, engaging in school activities and enhancing the performance of pupils with disabilities. Additionally, it is very interesting to note that AT was also used for creative activities such as drawing. These findings emphasize the significance of assistive technologies as a versatile tool for education, information access, supporting diverse learning needs and facilitating inclusive practices within educational environments.

Extent to which Assistive Technology is utilized

Respondents were asked to state the extent to which they use specific assistive technologies. The purpose was to gain insights into the effectiveness of these resources in meeting the needs of individuals with hearing and visual impairments. The findings are represented in Figure 4.



	Hearing aid/loop	Personal amplification system	Sign Language	Captioned video	Audio recorder	Non Visual Desktop	Large Print material	Magnifier	Speech recognition software	Braille
I don't use	73.30%	96%	0	64.40%	76.24%	78.22%	63.30%	55.40%	83.17%	69.30%
Rarely	2%	0	0%	4.90%	2.97%	6.93	2%	4%	1.98%	5%
When needed	13.90%	2%	48.50%	7.90%	4.95%	9.90%	1%	1%	2.97%	0%
Every day	6.90%	1%	14.90%	14.90%	7.92%	0%	11.90%	7.92%	3.96%	9.90%
Frequently	3.90%	1%	36.6	7.90%	7.92%	4.90%	26.70%	31.70%	7.92%	14.90%

Figure 2: Extent of Utilization of Assistive Technologies
Source: Study Field (2023)

The findings in Figure 4 indicate varying usage levels of assistive technologies among respondents. Sign language, large print materials, magnifier and Braille were reported to be used frequently by respondents and other assistive technologies were rarely used. Other assistive technologies such as Bluetooth system, telephone devices, screen reader, tactic graphic, audio books and electronic books were not used at all by any respondents. This indicates that these assistive technologies were not available in those schools. The lack of certain assistive technologies can hinder pupils with hearing and visual impairments from accessing information, and fully engaging in their educational journey. The disparity in the usage of assistive technologies among pupils with hearing and visual impairments was probably influenced by multiple factors, including lack of awareness, inadequate training and knowledge in utilizing AT tools, limited availability, nature of disability, and the age and grade level of pupils involved in selected primary schools in Zanzibar.

Challenges faced by pupils with disabilities in utilization of Assistive Technologies

Respondents were required to indicate challenges facing them in utilizing available Assistive Technologies. The results revealed that lack of awareness about AT availability (22.8 %,) insufficient knowledge on how to use AT (22.8%), negative attitude towards AT (24.8%) inadequate resources and limited tools (77.2%), devices not suited to the need (33.7%), and difficulty in using the devices 15.8%). The findings are summarized in Table 4 below.

Table 4: *Challenges faced pupils HI and VI in Utilization of Assistive Technology (N = 101)*

Challenges	Response Frequency	Percent
In adequate resources/limited number of assistive tools	78	77.2
Devices not suit to the needs	34	33.7
Negative attitude toward AT	25	24.8
Lack of awareness on the availability of AT	23	22.8
Lack of knowledge on how to use AT	23	22.8
Hard to use	16	15.8

Source: Field data (2023)

The findings provided in Table 4 provide valuable insights into challenges faced by pupils with hearing and visual impairments when accessing and using AT in their schools. Addressing these challenges can contribute to improving accessibility, use, promoting positive attitudes and creating more inclusive learning environments for these pupils.

Data gathered during focus group discussion from selected primary schools highlighted several challenges facing teachers in addressing the needs of pupils with hearing and visual impairment. One of the challenges mentioned was lack of regular training for teachers. Another challenge was shortage of professional teachers who are equipped to teach pupils with disabilities. For example, during FGD with Kiembesamki “A” it was highlighted that only one teacher possessed the necessary expertise in inclusive education, specifically in the utilization of sign language. Also, during FGD with Dr. Samia Suluhu Hassan Primary School one respondent mentioned a specific problem regarding miscommunication between teachers and pupils stating that:

> "*The primary challenge faced by pupils, especially those with hearing impairments and teachers who use sign language, is the occurrence of miscommunication. Some pupils fail to distinguish between the letters 'B' and 'P', which is attributed to the pupils' struggle in perceiving the subtle differences in certain signs*." (Teacher)

These findings concur with other studies such as that conducted in Bangladesh and Tanzania by Grönlund, Lim & Larsson, (2010); study conducted in Thailand by Tangchoraensathien et al., (2018); and a study conducted in Tanzania by Kisanga & Kisanga, (2020). These researchers noted that negative attitudes toward assistive technologies, inadequate access, lack of maintenance, limited administrative and peer support, lack of awareness and knowledge, low quality of assistive tools, and shortage or limited availability of assistive tools affects the utilization of Assistive Technology among pupils.

CONCLUSION AND RECOMMENDATION

Conclusion

Despite, the various challenges faced by pupils with hearing and visual impairments, the availability and utilization of assistive technologies in schools play a crucial role in enhancing inclusivity in learning and educational environments. Moreover, assistive technologies enhance social interaction, and enable them to be fully integrated into school activities, and learning set within primary schools.

Recommendation

The study strongly advocates for proactive government intervention, including the allocation of substantial funds for procurement and sustained maintenance of assistive technologies within

primary schools. Additionally, the study proposes the establishment of dedicated support systems and resource centers or rooms in every district, aimed at fostering accessibility and the effective utilization of assistive technologies among pupils with hearing and visual impairments in primary schools. These initiatives are crucial steps toward ensuring equitable educational opportunities for all pupils, regardless of their abilities.

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