



Perception and Experiences on Teachers in Supporting the Use of Assistive Technologies for Pupils with Hearing and Visual Impairments in Zanzibar Selected Primary Schools

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ABSTRACT

Pupils with hearing and visual impairment face numerous challenges in learning, and information access and assistive technology can be a potential assistance for compensating for their educational requirements. The purpose of this study was to explore teachers' perceptions and experiences in supporting the use of assistive technology among pupils with hearing and visual impairments. A Qualitative approach integrating descriptive research design was applied. The study was conducted at Kisiwandui, Kiembesamaki "A" and Dr. Samia Suluhu Hassan Primary Schools. Data were collected from twenty-six participants via focus group discussion and observation. The data were analyzed using content and narrative analysis and presented via quotations. Results suggested that few teachers have an adequate level of knowledge of using assistive technology, teachers have experience in supporting pupils with impairments. Moreover, the findings show that teachers faced various challenges in supporting pupils in the use of assistive technologies including shortage of professional teachers, inadequate assistive technologies, outdated assistive technologies, low quality and un-durable and shortage of training on the use of assistive technologies. Teachers then, should have acquired training to increase their overall knowledge of implementing assistive technology and using universal design for learning and supporting for pupils with hearing and visual impairments.

Keyword: Assistive technology, teacher, perception, experience, pupils, hearing and visual impairment.

INTRODUCTION

Assistive technologies can play a crucial role in empowering pupils with hearing and visual impairments by providing them with tools and devices that aid their learning and participation in the classroom (Alnahdi et al., 2007). These technologies may include hearing aids, braille devices, screen readers and other specialized tools designed to cater to the unique needs of pupils with disabilities. The integration of assistive technologies in education has brought about significant advancements in supporting pupils with diverse learning needs (United Nations, 2015). The government and educational institutions in Zanzibar have recognized the significance of inclusive education and have made efforts to

integrate pupils with disabilities into mainstream schools (Sera Ya Watu Wenye Ulemavu Zanzibar, 2018). Among these pupils, those with hearing and visual impairments require specialized attention and support to facilitate their learning experiences. In Zanzibar's schools, teachers play a crucial role in creating an inclusive and accessible learning environment for these pupils (Ministry of Education and Vocational Training Zanzibar, 2006). This study aims to explore the perception and experiences of teachers concerning the use of assistive technologies for pupils with hearing and visual impairments. By delving into the perspectives and encounters of educators, this study seeks to shed light on the challenges faced and strategies employed in implementing assistive technologies effectively.

LITERATURE REVIEW

Teachers' Perception on the Use of Assistive Technologies for Pupils with Hearing and Visual Impairments in Education Setting

The proficiency of teachers working with visual and hearing impairments in assistive technologies can be influenced by external factors such as their initial technology training, ongoing professional development

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in technology and the availability of funding for assistive technology resources (Siu and Morash, 2014).

Nordström *et al.*, (2018) conducted a study to examine the perceptions and functionalities of assistive reading and writing applications in the context of student's text assimilation and communication capabilities. The findings illuminated significant variations in teachers' perspectives in text-based learning. Notably 82% of younger students and 47% of older students' sustained technology use post-intervention, although differing extents. Particularly, students with reading challenges effectively harnessed assistive technologies to engage with and convey textual content, thereby unloaking the potential for enhanced inclusion in mainstream education setting. To harness this potential, the study recommendation underscores the necessity of future research centered on tailoring assistive technology support to optimize its efficacy and benefits.

Bachir and Elhousseyn (2021) conducted a study examined challenges faced by visually impaired students when using assistive technology, and explore attitudes of both students and teachers toward the "Be My Eye" app, this app designed to aid blind and visually impaired. The app unites a global community of users, showcasing how technology and human connection enhance lives of the visually impaired. The study found that most of teachers hold a good impression and high appreciation to the use of assistive technology (Be My Eye) valuing its potential to enhance the learning and teaching process and assist with challenging daily tasks. The platform's use is appreciated for its supportive role in overcoming difficulties to students with visually impaired.

Avramidis and Norwich (2002) conducted a study to examine teachers' attitude towards the integration and inclusion of children with special education needs mainstream schools. The study found that teacher's attitudes and perception towards students with disabilities greatly influence the effectiveness of inclusive practice. Furthermore, the study found that teachers who hold positive attitude are more likely to provide appropriate support and create inclusive learning environments. Negative attitudes or perception on other hand, can hinder the successful integration of students with disabilities.

Teachers' Experiences in Supporting Pupils with Hearing and Visual Impairments

Teacher's experiences with assistive technologies vary based on factors such as their training, access to resources, and the specific technologies available. Regarding the study conducted by Siu and Morash (2014) to assess the proficiency of teachers working with visually impaired students in assistive technology, as well as their connection to a community of practice

that value such technology. The study found that deficiencies in assistive technology skills among these teachers can hinder student's development, leading to poorer educational and employment outcomes. Moreover, the findings indicate that the survey effectively measure both assistive technology proficiency and community of practice identification. This reliable tool can aid objectively evaluating teacher's proficiency before and after training, supporting the enhancement of assistive technology integration through target professional development.

Ali (2021) conducted a study on visually impaired student-teachers' knowledge and use of basic assistive technology tools for mathematics. The study found that student-teachers had limited familiarity with assistive technology tools but expressed a strong interest in learning and utilizing them for teaching. The study recommended providing accessible assistive technology tools to schools and adapting the mathematics curriculum to incorporate these tools, aiming to promote more inclusive and effective mathematics education for visually impaired students.

Similarly, the study conducted by McClelland *et al.*, (2023) exploring the role and experience of classroom assistants supporting pupils with visual impairment. The study conducted in Northern Ireland. The study found that most of assistants lacked formal training for working with visually impaired pupils, despite their varied efforts to ensure these students' educational, social and physical inclusion. However their contributions were generally positive. The study suggested that reevaluating the classroom assistant role could enhance equitable access to education for children with visually impaired.

MATERIALS AND METHODS

Qualitative approach integrating descriptive research design was applied in this study. The descriptive design was chosen due to facilitate the easy description and interpretation of data, ultimately leading to an in-depth understanding of the research findings. Concerning the study area, the study was collected into three primary schools in Zanzibar namely, Kisiwandui, Kiembesamaki "A" and Dr. Samia Suluhu Hassan primary schools in 2023. The selection of the study area was based on schools having special units specifically designed to cater pupils with hearing and visual impairments. The schools' long-term services and experience in providing education, support and services to pupils with disabilities. Finally, the availability of an adequate number of pupils with hearing and visual impairments for effective data collection. A sample size is a smaller subset of the population elements that is selected to represent the entire population (Kothari and Garg, 2019). In this study, the sample size was 26 (10

Inclusive officer, 3 Heads of school, and 13 special education teachers from selected primary schools. The sample size were selected using purposeful sampling techniques. A purposeful procedure was appropriate to the study that intend an in-depth view of the phenomenon (Shaheen *et al.*, 2018).

Consequently, the study mainly used observation and focus group discussion (FGD) with teachers in Zanzibar selected primary schools to gain insights into their perception and experiences related to assistive technologies. Open-ended questions were used to encourage teachers to share their thoughts, challenges and success stories. The collected data was analyzed using content analysis and narrative analysis and presented in the form of quotation and interpretation to identify common theme and patterns in the teachers' responses.

RESULTS AND DISCUSSION

Teachers' Perception on the Use of Assistive Technologies for Pupils with Hearing and Visual Impairments in Education Setting

The study investigate the perception of teachers on the use of AT for pupils with hearing and visual impairments in education setting is an important and evolving in this study. AT have potential to significantly enhance learning experience and educational outcomes for pupils with special needs. However the success and effectiveness of these tools can be influenced by perception of teachers on awareness and knowledge and provision of training. The findings are explain bellow as:

Awareness and Knowledge on the Use of Assistive Technologies

The respondents were asked about their awareness and knowledge level in the use of available AT. This was examined by asking for knowledge on the use of existing assistive technologies in facilitating teaching, educational processes and supporting pupils with hearing and visual impairments. The findings from FGD show that most of teachers were aware while not have enough knowledge on the use of AT and supporting pupils with hearing and visual impairments. One respondents stating that:-

"Both teachers have awareness on availability of assistive technologies. However, some Teachers have commendably acquired knowledge in utilizing assistive devices to support pupils with special needs, it is evident that a significant number still lack the necessary knowledge and training in this crucial area. To ensure an inclusive and empowering learning environment for all pupils, there is a pressing need for widespread professional development opportunities that equip teachers with the skills and understanding to effectively employ assistive technologies in the classroom,

fostering a more inclusive educational experience for pupils with diverse needs."

Moreover, during observation it was found that there are differences in the ability of pupils to use AT. For instance, pupils who were in standard one seem to have limited knowledge and understanding of how to use AT effectively. Nevertheless, pupils who were in Standard two, had noticeable improvement in their ability to use AT, although it is still relatively limited. In addition, pupils who were in standard three and above demonstrated a greater competence and proficiency in using AT.

The observation findings indicates that first grade pupils have limited knowledge of using AT, while second-grade show some improvement and third-grade and above pupils display a greater ability to use AT. This finding suggests that higher grade pupils was probability received more education and guidance on assistive devices usage, leading to have knowledge on the use of the available assistive technologies. Kisanga and Kisanga, (2020) conducted a study on access to assistive technology among students with visual impairments in Tanzania found out lack of knowledge on how to use assistive resources among students with visual impairments.

Provision of Training on the Use of Assistive Technology

The respondents were asked whether provide assistance and training to pupils on the use of assistive technologies. The study question aimed to gain a comprehensive understanding of the needs and opportunities associated with AT in the context of learning process. The insight obtained from respondents contributes to the advancement of knowledge and the development of effective strategies to enhance inclusive education, especially for pupils with hearing and visual impairments. The results show that teachers provided training on the use of AT. One key informative stating that:

"We are committed to empowering our pupils by offering comprehensive assistance, training and support in the use of available assistive technologies. Our approach involves not only providing training on how to effectively navigate these resources but also emphasizing the profound significance of their use. We firmly believe that by equipping our pupils with the knowledge and tools to harness these technologies, we are fostering inclusivity and enabling them to unlock their full potential in their educational journey."

The finding indicated that teachers in schools recognize the significance of incorporating AT in their teaching practices, by providing training on the use of AT. This training can help pupils with hearing and visual impairments to participate more fully in the learning process.

Teachers' Experiences in Supporting Pupils with Hearing and Visual Impairments

The study asked respondents about their experiences in supporting pupils with hearing and visual impairments. The study employed focus group discussion conducted with teachers in schools and officers from inclusive education unit. The study delved into two aspects, including the teachers experience in teaching pupils with disabilities particularly pupils with hearing and visual impairments, and teachers experience with assistive technology. The findings from this aspect are presented in below subdivision:

Teachers' Experience in Teaching Pupils with Hearing and Visual Impairments

The main study question explore participants expressed their teaching experiences with pupils who have hearing and visual impairments. The participants expressed a range of emotions regarding their interaction with these pupils. Here are findings captured from group discussion when respondents narrated their experiences on teaching pupils with hearing and visual impairments, as follow: one respondents stated that:-

"Over seven years teaching and supporting pupils with special needs. My deep understanding of their unique challenges fuels my commitment to creating inclusive and engaging learning environments. Passionate about both academic and personal growth, I constantly seek innovative teaching strategies to ensure every pupils reaches their full potential. I am a proud advocate for inclusivity, believing that every pupils, regardless of abilities, deserves a development and empowering educational experience."

Moreover the findings from another respondent narrate her experiences in teaching pupils with hearing impairments by stating:-

"I have extensive hands-on experience in teaching pupils with hearing impairments, leveraging my practical insights to provide effective support and guidance. While I may not have formal education in specialized teaching methods, my proven ability to connect with and assist these pupils reflects a commitment to their individual growth and success."

On other hand, the findings from FGD with Inclusive Education Unit officers shows that, one respondents state that:-

"We recognize the importance of inclusive education for pupils with special needs. While most teachers in our school have experience in this area, we acknowledge that some of them have not knowledge of teaching such kind of pupils so that we decide providing opportunities for those teachers to enhance their skills and knowledge, ensuring a more professional and effective support system for all pupils."

This finding implies that respondent's value for expressed their personal experiences and development

which reflect their ability to teach pupils with disabilities particularly pupils with hearing and visual impairments.

Teacher experience on the use of Assistive Technologies

The respondents were asked to indicate the appropriate kinds/types of assistive technologies used in a particular school to assist pupils with visual and hearing impairments because it has an impact on performance of the pupils learning. The findings show that types of AT used by teachers to support or assist pupils with hearing and visual impairments, some these are sign language, magnifier, large print materials, captioned video, audio recorder, braille, hearing aids/loops, non-visual desktop, speech recognition software, and personal amplification systems.

Furthermore, key informants mentioned others types of assistive technologies used by pupils with hearing and visual impairments by stating:

"There are various types of assistive technologies such as embosser, audio meter, otoscope, orbit reader 20, Non-Visual Desktop Access (NVDA), packing braille, and A4 frames. These ATs play a vital role in enhancing the learning experience, fostering inclusivity, and facilitating participation in various school activities for pupils with hearing and visual impairments."

Based on this findings it implies that there were various AT available in schools teachers used 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 and Mazana (2017) observed that there were relatively few assistive tools 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 and TV.

Challenges/barriers faced by teachers in Supporting the Use of Assistive Technologies for Pupils with Hearing and Visual Impairments

The study asked respondents about challenges faced them when assist pupils with hearing and visual impairments in the use of assistive technologies available in their schools. The study question aimed to gather valuable information that drives positive change, improve utilization to AT and create more inclusive learning environments for pupils with visual and hearing impairments. The results gathered during Focus Group

Discussion (FGD) with schools show that respondents highlight several challenges in addressing the needs of pupils with disabilities. One of the significance challenges mentioned is lack of regular training for teachers, another is the shortage of professional teachers who are equipped to teach pupils with disabilities. The example one respondent from visited school reported that

“There only one teacher possess the necessary expertise in inclusive education, particularly in sign language. Also there a specific problem regarding miscommunication between teachers and pupils, especially those who hearing impairments that use sign language. It is noted that the student to differentiate the latter “B” and “P” due to related on pronunciation. This lead to the pupils’ difficulty in perceiving the distinctions of certain sign.”

Moreover, the data gathered during Focus Group Discussion at Inclusive Education Unit (IEU) highlighted several challenges related to the implementation of assistive technology one respondent from IED stated that,

“There have a shortage of assistive technologies in schools, and the available assistive technologies are not quality and outdated also are not durable, moreover delay in obtaining assistive technologies, and shortage of training to teachers, pupils with disabilities and parents or guardians on proper use of AT.”

Other respondent reported that:

“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 phrase and grouping pupils in smaller groups”.

On the other hand, findings from focus group discussion show that at Dr. Samia Suluhu Hassan primary school one respondent stating that

“The existing AT are not enough for even a quarter of the total number of pupils in school. Despite having eight hearing aids, there are numerous pupils who require them. As a result, the school has made decision to provide hearing aids to only a few pupils while the rest have to rely on sign language”

Additionally, the findings from observation show that a teachers posed a various challenges in supporting the use of assistive technology for the pupils with hearing and visual impairments included shortage of regular training, shortage of professional teachers, lack of syllabus that related to pupils with disabilities, inability to compete syllabus or course of content and lack of classrooms to accumulate the total available pupils with hearing and visual impairments. Most of schools have

one classroom which grouped into different section and all pupils are setting according to their disability group.

These findings comply with the most studies, for instance the study conducted by Karakoc and Aslan (2022) found that difficulty in some topics, abstractness of the course content, inability to benefit from visual content, inability to do all activities and inability to complete the curriculum. Moreover, Flanagan, Brouck and Richardson (2013) in their study found that cost, usability, and lack of training are the major challenges faced by teachers in supporting pupils with disabilities in using AT. Additionally, Ayantoye (2023) addresses challenges in subjects like reading, writing and math, moreover, challenges such as inadequate training, poor infrastructure, cultural barriers and limited awareness about assistive technology were identified. Sikanku (2018) and Mugambi (2011) found that inadequate of assistive technology for aiding visually impaired students’ learning, limited specialized facilities and Insufficient support from the school administration.

CONCLUSION

Regardless of teacher not having enough knowledge on the use of available assistive technologies, it has been found that assistive technology are very essential devices that plays a vital role in development an inclusive educational environment to pupils with hearing and visual impairments. The effective teachers support to the use of AT decrease pupils' isolation and dependence from other pupils and pupils’ supporters, moreover, increase community collaboration and allow them to become part of consistent education settings in primary schools.

RECOMMENDATION

The study recommended that government should allocate adequate funds for the procurement and maintenance of assistive technologies in primary schools. Also provide professional development opportunities and training for teachers to enhance their knowledge and skills in utilizing assistive technologies effectively.

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