

# INFLUENCE OF ASSISTIVE TECHNOLOGY (HEARING) AID FOR EFFECTIVE TEACHING AND LEARNING IN SENIOR SECONDARY SCHOOLS IN LOKOJA, KOGI STATE

By

**OGBADU Glory Ojimaajo<sup>1</sup>,**  
glory.ogbadu@fulokoja.edu.ng,  
Department of Science Education,  
Federal University Lokoja

**TOLORUNLEKE Emmanuel Adebayo<sup>2</sup>**  
tolorunleke.adebayo@fulokoja.edu.ng  
Department of Educational Foundations,  
Federal University, Lokoja

**DANLADI Momoh**  
Department of Educational Foundations,  
Prince Abubakar Audu University, Anyigba, Kogi State.  
Danladimomoh16@gmail.com

## Abstract

*This study investigated the impact of assistive technology, specifically hearing aids, on effective teaching and learning in secondary schools within the Lokoja metropolis, Kogi State. This research aims to address the educational challenges faced by hearing-impaired students and explored how hearing aids can enhance their academic experience and overall educational outcomes. The study employed a mixed-method approach, combining quantitative surveys and qualitative interviews to gather comprehensive data from students, teachers, and educational administrators. The quantitative aspect involves a structured questionnaire administered to a sample of hearing-impaired students and their teachers across several senior secondary schools. The qualitative component consists of in-depth interviews with selected participants to gain deeper insights into their experiences and perceptions regarding the use of hearing aids in the classroom. The findings revealed that hearing aids significantly improve the auditory capabilities of hearing-impaired students, leading to enhanced comprehension, participation, and academic performance. Teachers reported that students using hearing aids are more engaged and interactive during lessons, which facilitates a more inclusive and effective learning environment. It recommends policies for government and educational institutions to provide adequate funding and resources for hearing aids, alongside training programmes for teachers to effectively incorporate these devices into their teaching practices. The study concludes that with appropriate support and infrastructure, hearing aids can play a crucial role in bridging the educational gap for hearing-impaired students and fostering an inclusive educational environment in senior secondary schools in the Lokoja, Kogi State.*

**Key words:** Hearing Impaired Students, Assistive Technology, Assistive Learning, Effective Teaching and Learning.

### **Introduction**

Education is a fundamental right for all individuals, regardless of their physical abilities or limitations. However, students with hearing impairments often face significant challenges in traditional educational settings due to their inability to hear and process auditory information effectively. These challenges can lead to difficulties in understanding lessons, participating in classroom discussions, and achieving academic success. In recent years, the advancement of assistive technology, particularly hearing aids, have offered promising solutions to mitigate these challenges and improve educational outcomes for hearing-impaired students. Assistive technology encompasses a wide range of devices and tools designed to enhance the functional capabilities of individuals with disabilities. For students with hearing impairments, hearing aids are one of the most critical forms of assistive technology. These devices amplify sound, making it easier for users to hear and understand spoken language. The effective use of hearing aids can significantly enhance the learning experience by improving auditory access to instructional content, fostering better communication, and promoting greater engagement in classroom activities.

### **Objectives of the Study**

This study aims to investigate the influence of hearing aids on effective teaching and learning in senior secondary schools in the Lokoja, Kogi State. The specific objectives are:

- i. assessed the impact of hearing aids on the academic performance of hearing-impaired students in Lokoja, Kogi State.
- ii. evaluated the perceptions of teachers regarding the effectiveness of hearing aids in improving classroom engagement and participation in Lokoja, Kogi State.
- iii. identify the challenges faced by students and teachers in using hearing aids and integrating them into the learning environment in Lokoja, Kogi State.
- iv. Identify the challenges faced by students with hearing impairments in using hearing aids within the classroom setting in Lokoja, Kogi State.

### **Research Questions**

The study is guided by the following research questions:

- i. What impact do hearing aids have on the academic performance of students with hearing impairments in secondary schools in Lokoja, Kogi State?
- ii. How do teachers perceive the effectiveness of hearing aids in improving classroom engagement and participation in Lokoja, Kogi State?
- iii. What challenges do students and teachers face in trying to integrate the use of hearing aids into the learning environment in Lokoja, Kogi State?
- iv. What challenges do students with hearing impairments face when using hearing aids in classroom setting in Lokoja, Kogi State?

### **Literature Review**

Recent studies underscore the positive impact of hearing aids on the academic performance of hearing-impaired students. Moeller and Carr (2018) found that hearing aids significantly enhance students' ability to process auditory information, leading to better comprehension and

retention of instructional content. Their study highlighted that students with hearing aids performed better on standardized tests compared to their peers without hearing aids.

Similarly, they emphasized that early intervention with hearing aids is crucial for developing listening and language skills, which are foundational for academic success. Their longitudinal study revealed that students who received hearing aids at an early age showed continuous improvement in reading and mathematics over time. These findings align with the principles of early hearing detection and intervention programmes outlined by (Adams & Brown, 2015). Hearing aids also play a vital role in enhancing classroom engagement and participation. Johnson and Seaton (2021) observed that students with hearing aids were more likely to participate in class discussions and group activities, which are essential for collaborative learning. Their research indicated that hearing aids help bridge the communication gap, allowing hearing-impaired students to interact more freely with their teachers and peers. A study by Sharma and Soni (2018) explored the social aspects of hearing aid use, noting that improved hearing capabilities reduce feelings of isolation and increase confidence among students. They found that hearing-impaired students with hearing aids reported higher levels of satisfaction with their school experience and were more motivated to engage in academic and extracurricular activities. Despite the benefits, several challenges impede the effective use of hearing aids in educational settings. Farmer et al. (2014) identified maintenance issues and the high cost of hearing aids as significant barriers. Their research pointed out that many families struggle to afford the initial cost and ongoing maintenance of hearing aids, which can affect the consistent use of these devices.

Furthermore, Cole and Flexer (2016) highlighted the need for proper training for both teachers and students. Many educators lack the necessary skills to integrate hearing aids into their teaching practices effectively. This gap in knowledge can lead to suboptimal use of hearing aids and reduced benefits for students. The integration of hearing aids into inclusive education frameworks is critical for supporting hearing-impaired students. Berge and Muilenburg (2013) discussed the importance of creating supportive policies that facilitate the use of assistive technologies in schools. They advocated for government subsidies and funding programs to make hearing aids more accessible to all students in need. Educational administrators also play a crucial role in promoting inclusive practices. Adams and Brown (2015) emphasized that school leadership should prioritize professional development programmes that equip teachers with the skills to support hearing-impaired students. Their research suggested that schools with strong administrative support for inclusive education tend to have better outcomes for students with disabilities.

Recent technological advances have further enhanced the effectiveness of hearing aids. Patterson and Lennox (2017) discussed the development of digital hearing aids with advanced features such as noise reduction, directional microphones, and connectivity to other digital devices. These innovations have made hearing aids more adaptable to various classroom environments, improving their usability and effectiveness. Additionally, Cole and Flexer (2016) highlighted the potential of integrated classroom audio systems that work in conjunction with hearing aids to amplify the teacher's voice and reduce background noise. These systems can significantly enhance the learning experience for hearing-impaired students by providing clearer and more focused auditory input.

While the existing literature provides valuable insights into the benefits and challenges of using hearing aids in education, several gaps remain. First, there is limited research on the long-term academic and social outcomes of hearing-impaired students who use hearing aids. Longitudinal studies are needed to track these outcomes over time.

Second, there is a need for more research on the effectiveness of different types of hearing aids and their impact on various aspects of learning and social interaction. Comparative studies can help identify the most effective technologies and inform best practices for their use in educational settings.

Lastly, there is a paucity of research on the experiences of hearing-impaired students in low-resource settings, such as rural or economically disadvantaged areas. Studies focusing on these contexts can provide insights into the unique challenges and opportunities for using hearing aids in diverse educational environments.

### **Methodology**

This study utilizes a mixed-method approach, combining quantitative and qualitative research methodologies to explore the influence of hearing aids on effective teaching and learning in senior secondary schools within the Lokoja, Kogi State. The study involves three key groups of participants: Hearing-impaired students, Teachers and Educational Administrators. A purposive sampling technique is used to select participants who are directly involved with or affected by the use of hearing aids. The sample includes 100 hearing-impaired students, 50 teachers and 10 educational administrators. Instrument for Data collection includes Questionnaires, interviews and observation checklist. Ethical approval is obtained from the relevant educational authorities. Informed consent is obtained from all participants, ensuring confidentiality and the voluntary nature of participation. Data were analyzed using descriptive and inferential statistics. Statistical tools such as mean, standard deviation, t-tests, and chi-square tests are employed to determine the significance of the findings. Interview transcripts are analyzed using thematic analysis. Key themes and patterns are identified, coded, and categorized to draw meaningful conclusions. Data from the observation checklists are analyzed to complement the findings from the questionnaires and interviews, providing a holistic view of the impact of hearing aids on the classroom environment.

### **Results**

To provide a clear and organized view of the collected data, the following tables represent the key variables and findings from the study. Each table is categorized by the type of data collected: quantitative survey results, qualitative interview themes, and observational findings.

**Table 1: Demographic Information of Participants**

Category	Sub-category	Frequency
Students (n=100)	Age	
	12-14	30
	15-17	50
	18-20	20
Teachers (n=50)	Years of Teaching Experience	
	1-5 years	20
	6-10 years	15
	11+ years	15
Administrators (n=10)	Experience in Education Administration	
	1-5 years	3
	6-10 years	4
	11+ years	3

**Research Question One:** What impact do hearing aids have on the academic performance of students with hearing impairments in secondary schools in Lokoja, Kogi State?

**Table 2: Student Questionnaire Results**

S/ N	Question	Mean Score	Standard Deviation	% Agreement
1.	Performance improvement since using hearing aid	8.5	1.2	85%
2.	Ability to follow lessons before using hearing aid	4.0	1.5	-
3.	Ability to follow lessons after using hearing aid	8.2	1.3	-
4.	Challenges faced when using hearing aid (percentage reporting)			
5.	Background noise interference			60%
6.	Maintenance issues			45%

**Research Question Two:** How do teachers perceive the effectiveness of hearing aids in improving classroom engagement and participation in Lokoja, Kogi State?

**Table 3: Teacher Questionnaire Results**

SN	Question	Mean Score	Standard Deviation	Percentage Agreement
1	Effectiveness of hearing aids in improving engagement	8.0	1.5	80%
2	Improvement in students' performance since using hearing aids	8.3	1.4	83%
3	Challenges faced when teaching hearing-impaired students (percentage reporting)			
4	Lack of training			50%
5	Difficulty in integrating hearing aids into lessons			40%

**Research Question Three:** What challenges do students and teachers face in trying to integrate the use of hearing aids into the learning environment in Lokoja, Kogi State?

**Table 4: Themes from Qualitative Interviews**

Participant Group	Theme	Frequency
<b>Students</b>	Enhanced classroom participation	15
	Challenges with device maintenance	12
	Need for teacher support	18
<b>Teachers</b>	Positive impact on student engagement	8
	Need for specialized training	6
	Classroom management challenges	5
<b>Administrators</b>	Policy support for hearing-impaired	7
	Funding issues for assistive technology	6
	Importance of inclusive education	9

**Research Question Four:** What challenges do students with hearing impairments face when using hearing aids in classroom setting in Lokoja, Kogi State?

**Table 5: Observational Findings**

<b>Observation Category</b>	<b>Observed Frequency</b>	<b>Percentage</b>
<b>Student Engagement</b>		
High engagement	30	60%
Moderate engagement	15	30%
Low engagement	5	10%
<b>Hearing Aid Adjustments</b>		
Frequent adjustments	20	40%
Occasional adjustments	20	40%
Rare adjustments	10	20%
<b>Student-Teacher Interactions</b>		
High interaction	25	50%

These tables summarize the key data collected during the study, providing a clear overview of the findings related to the influence of hearing aids on effective teaching and learning in secondary schools within the Lokoja Kogi State. The quantitative data offers measurable insights, while the qualitative data provides deeper contextual understanding.

### **Discussion of the Findings**

In line with the first objectives, studies have shown that students with hearing impairments often face academic challenges due to difficulties in following verbal instructions, participating in discussions, and accessing auditory information. In Lokoja, Kogi State, the introduction of hearing aids has led to noticeable improvements in students' academic performance. Teachers report that students using hearing aids demonstrate better comprehension of lessons, complete assignments more effectively, and show increased enthusiasm for learning. These findings aligned with Patterson and Lennox (2017) research, who observed that students with hearing aids were more likely to participate in class discussions and group activities, which are essential for collaborative learning.

As regards to the second question, which explores how teachers perceive the effectiveness of hearing aids in facilitating communication and learning for students with hearing impairments, findings shows the importance of teacher training in maximizing the benefits of hearing aids. Teachers in Lokoja, Kogi State who received training on how to support hearing-impaired students reported feeling more confident and competent in their teaching. These findings are consistent with Desmond's (2017) study, which highlighted the need for proper training for both teachers and students. Many educators lack the necessary skills to integrate hearing aids into their teaching practices effectively. Training includes understanding how to use assistive technology, adopting inclusive teaching strategies, and effectively communicating with students who have hearing impairments.

It was also discovered that technological advancements in hearing aids have also played a role in their effectiveness. Modern hearing aids are more user-friendly, offer better sound quality, and have features like Bluetooth connectivity, which can enhance the learning experience (Scherer, 2016). Schools in Lokoja, Kogi State that have adopted the latest hearing aid technologies report higher satisfaction among students and teachers

Despite the positive impacts, several challenges persist. These include:

**Financial Constraints:** The cost of hearing aids and related services can be prohibitive for some families. Schools and government agencies need to provide financial assistance or subsidies to ensure all students in need can access hearing aids.

**Maintenance and Technical Support:** Regular maintenance and technical support are essential to keep hearing aids functioning optimally. Schools in Lokoja, Kogi State need to establish partnerships with audiologists and technical experts to provide ongoing support.

**Stigma and Social Acceptance:** Some students may face stigma or feel self-conscious about using hearing aids. Schools must implement programs to promote awareness and acceptance of hearing impairments to create a supportive and inclusive environment.

The findings shows classroom interaction is crucial for effective learning. Hearing aids enable students with hearing impairments to participate more actively in classroom discussions, group work, and other interactive activities. This increased participation not only benefits the hearing-impaired students but also enriches the overall classroom dynamic, fostering a more inclusive and collaborative learning environment.

## **Conclusion**

This study explored the influence of assistive technology, specifically hearing aids, on effective teaching and learning in secondary schools within the Lokoja Kogi State. By employing a mixed-method approach that included quantitative surveys, qualitative interviews, and classroom observations, the research aimed to understand the educational challenges faced by hearing-impaired students and how hearing aids could address these challenges. Key findings from the study revealed that hearing aids significantly improved the auditory capabilities of hearing-impaired students, leading to enhanced comprehension, participation, and academic performance. Teachers reported noticeable improvements in student engagement and interaction, which facilitated a more inclusive and effective learning environment. However, the study also identified several challenges, such as the high cost of hearing aids, maintenance issues, and the need for proper training for both students and teachers. The qualitative interviews provided deeper insights into the personal experiences of students, teachers, and educational administrators. Students expressed a need for continuous support and better maintenance of their devices. Teachers highlighted the positive impact of hearing aids on classroom dynamics but also emphasized the necessity for specialized training to effectively integrate these devices into their teaching practices. Educational administrators pointed out the importance of supportive policies and adequate funding to ensure the sustainability and effectiveness of assistive technologies.

Classroom observations corroborated these findings, showing high levels of student engagement and interaction when hearing aids were used effectively. However, frequent adjustments and occasional technical issues were noted, underscoring the need for ongoing support and training.

The study concludes that hearing aids play a crucial role in bridging the educational gap for hearing-impaired students in secondary schools within the Lokoja Kogi State. The use of hearing aids has been shown to significantly enhance the learning experiences and academic



outcomes of these students by improving their ability to hear and participate in classroom activities.

### **Recommendations**

To maximize the benefits of hearing aids, the following recommendations are made:

- i. **Funding and Resources:** Government and educational institutions should provide adequate funding for the purchase and maintenance of hearing aids. This includes subsidies for families who cannot afford these devices and the establishment of maintenance programs to ensure the longevity and functionality of the hearing aids.
- ii. **Training and Professional Development:** Teachers should receive specialized training on how to support hearing-impaired students and effectively integrate hearing aids into their teaching practices. Continuous professional development programs can help teachers stay updated on the latest assistive technologies and instructional strategies.
- iii. **Supportive Policies:** Educational policies should be designed to support the inclusion of hearing-impaired students in mainstream classrooms. This includes creating inclusive education frameworks that accommodate the needs of all students and ensuring that schools have the necessary resources and support systems in place.
- iv. **Ongoing Support and Counseling:** Schools should provide ongoing support and counseling services for hearing-impaired students to address any social or emotional challenges they may face. This includes regular check-ins with audiologists and counselors to monitor the students' progress and well-being.

By implementing these recommendations, secondary schools in the Lokoja Kogi State can create a more inclusive and effective educational environment for hearing-impaired students, ensuring that they have equal opportunities to succeed academically and socially. The study highlights the transformative potential of assistive technology in education and underscores the importance of continued investment in these tools to support diverse learning needs.

### **Reference**

- Adams, P., & Brown, E. (2015). The impact of assistive technology on educational performance: A systematic review. *Journal of Educational Technology*, 22(3), 45-58.
- Berge, Z. L., & Muilenburg, L. Y. (2013). Assistive technology in education: Enhancing learning for students with disabilities. *Education and Information Technologies*, 18(4), 529-549.
- Cole, E., & Flexer, C. (2016). Children with hearing loss: Developing listening and talking, birth to six. Plural Publishing.
- Desmond, D. (2017). The use of hearing aids in inclusive education settings. *International Journal of Inclusive Education*, 21(5), 504-517.

- Farmer, M., Riddick, R., & Sterling, L. (2014). Bridging the gap: Effective teaching strategies for students with hearing impairments. *Journal of Special Education Technology*, 19(2), 123-135.
- Johnson, C., & Seaton, J. (2021). Educational audiology handbook. Plural Publishing.
- Moeller, M. P., & Carr, G. (2018). Advances in the assessment of hearing-impaired children. *Trends in Amplification*, 22(3), 151-162.
- Patterson, M. B., & Lennox, C. (2017). Hearing aids and their impact on school performance. *Deafness & Education International*, 19(3), 157-174.
- Scherer, M. J. (2016). Living in a world with hearing loss: New insights into the impact of hearing aids. *Hearing Research Journal*, 23(2), 95-108.
- Sharma, M., & Soni, V. (2018). Educational outcomes for hearing-impaired students: The role of technology. *International Journal of Educational Development*, 61, 165-172.
- Yoshinaga-Itano, C. (2014). Principles and guidelines for early hearing detection and intervention programs. *Pediatrics*, 120(4), 898-921.