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Educational Accessibility for Hearing-Impaired Students in Assam: A Case Study

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Abstract:

This case study investigates the educational challenges encountered by hearing-impaired students at B.D.S. Government Higher Secondary School for Hearing Impaired in Kahilipara, Guwahati, Assam. Using a mixed-methods approach, semi-structured interviews with teachers and structured questionnaires completed by Class XII students were conducted. The findings highlighted significant issues related to classroom acoustics, inadequate assistive technologies, teacher accommodations, recreational facilities, and student-teacher ratios. Despite these barriers, teachers implement specialized instructional strategies, including visual aids and sign language integration. The study recommends improvements in school infrastructure, enhanced availability of assistive teaching tools, teacher accommodations, and better recreational facilities to improve educational outcomes for hearing-impaired students.

Keywords: *Hearing-Impaired Students, Educational Challenges, Special Education*

Abbreviations used: *ISL: Indian Sign Language, SCERT: State Council of Educational Research and Training, SEBA: Secondary Education Board of Assam*

1. Introduction:

Education is internationally recognized as a fundamental human right, essential for individual growth and societal development (UNESCO, 2015). For hearing-impaired learners, achieving equitable educational outcomes depends critically on early identification to enable timely intervention, specialized pedagogical methods to address unique learning needs, and tailored communication supports to facilitate effective engagement and comprehension (Moeller, 2000). Integrating assistive communication tools such as sign language interpreters, visual learning aids, and real-time captioning has been shown to significantly enhance participation and understanding within special education settings (Marschark& Hauser, 2012). Furthermore, genuinely inclusive classrooms require educators who not only possess subject matter expertise but are also proficient in Indian Sign Language (ISL) to effectively address diverse learner needs,

as ISL proficiency enables clear communication, better comprehension of instructional content, and fosters a more inclusive and supportive learning environment (Spencer & Marschark, 2010).

In India, however, the implementation of ISL and assistive technologies remains inconsistent. Many schools lack adequate resources, perpetuating disparities for hearing-impaired students (Centre for Social and Economic Studies, 2021). This case study addresses these systemic challenges through an in-depth analysis of B.D.S. Government Higher Secondary School for the Hearing Impaired in Assam. By evaluating the school's infrastructure, resource allocation, and instructional practices, this research identifies critical barriers and proposes evidence-based interventions aimed at enhancing educational outcomes for hearing-impaired learners.

2. Review of Literature:

Research across different countries underscores the urgent need for educational reform tailored to the needs of hearing-impaired students. Adeduyigbe et al. (2024) advocate for the use of visual learning tools and assistive technologies to replace traditional auditory-focused instruction. In Tanzania, Francis (2024) reports that educational challenges stem from a severe shortage of specialized teachers and weak administrative support, calling for institutional reform and teacher training. Basigi et al. (2024) identify critical gaps in mathematics education, including delays in sign language instruction and unmodified curricula. Their findings stress the need for systemic support such as specialized training and extracurricular support structures like sign language clubs. At the tertiary level, Amjad et al. (2024) highlight the prevalence of inaccessible curricula, communication barriers, and inadequate student services, while Unluer (2024) demonstrates how the shift to online learning during the COVID-19 pandemic further marginalized hearing-impaired students due to the absence of accessible digital resources.

In India, hearing-impaired students continue to face significant challenges related to infrastructure, instructional practices, and socio-cultural barriers. Mitchell (2023) notes that the lack of early identification and intervention impedes the development of foundational communication skills. Kulhade and Kumar (2022) show that inclusive classrooms, although promising, present challenges for hearing-impaired students due to difficulties in understanding spoken instructions and lack of specialized pedagogical approaches. Their study also reveals gaps between users of cochlear implants and behind-the-ear devices in terms of classroom engagement. Kanwal et al. (2023) highlight disparities between special education centers and mainstream schools, especially in the use of technology and access to individualized support. Meanwhile, Singh and Mahapatra (2021) report promising outcomes from technology-driven sign language initiatives, such as those by the National Institute of Open Schooling (NIOS), in enhancing educational access and quality for deaf learners. These findings point to a national

need for more inclusive teacher training, better resource allocation, and curriculum reforms aligned with the needs of hearing-impaired learners.

There is a notable lack of region-specific literature focusing on the education of hearing-impaired students in Assam. However, the challenges seen at the national level are likely intensified in North-East India due to its geographic isolation, infrastructural constraints, and shortage of trained special educators.A significant contribution comes from Wallang (2016), who highlights how linguistic diversity and misconceptions about sign language in the North-East region contribute to educational exclusion. She advocates for multilingual models that treat sign language as an equal to spoken languages and calls for pedagogical adaptations rooted in cultural and linguistic awareness.

One of the few Assam specific studies available is by Dubey and Hernwal (2023), which explores teacher attitudes toward the inclusion of hearing-impaired children in mainstream schools in Hapjan Block, Tinsukia District. The study reveals general support for inclusive education but also reflects reservations among teachers regarding assistive technologies and parental involvement. The findings underscore the complexity of implementing inclusive education effectively in the region and the need for targeted teacher training and ongoing dialogue.

3. Emergence of the Problem:

3.1 Summary of Research Gap:

Despite valuable global and national insights into education for hearing-impaired learners, region-specific research in North-East India, particularly Assam, remains notably limited. Existing studies highlight the critical need for localised strategies, policy reforms, and context-sensitive pedagogical frameworks. Addressing this research gap through region-specific case studies, such as the current research on B.D.S. Government Higher Secondary School, is essential to inform effective planning, resource allocation, and policy development, thereby ensuring equitable educational opportunities for hearing-impaired students in Assam.

3.2 Research Question: What are the key educational challenges faced by hearing-impaired students and teachers at B.D.S. Government Higher Secondary School, and how can these be addressed to improve learning outcomes?

3.3 Objectives of the Study:

(i) To assess the adequacy of infrastructure and learning resources
(ii) To examine the use of assistive technologies and teaching aids
(iii) To understand the challenges faced by teachers in delivering quality education

(iv) To explore students' academic and communication challenges

(v) To suggest practical recommendations for improving educational outcomes for hearing-impaired students.

3.3 Case Description and Significance of the Study

B.D.S. Government Higher Secondary School for Hearing Impaired, located in Kahilipara, Guwahati, Assam, established in 1949 by Bhauri Devi Seraugi and now managed by the Department of Social Justice and Empowerment, Government of Assam, enrolls 571 students (360 boys; 211 girls) from pre-primary to Class XII under the SCERT and SEBA syllabus. The school comprises 17 classrooms, a library, hostel accommodations, a playground, a craft section, a principal's office, and a common room for teachers. Eleven educators staff the institution, eight of whom are specially trained in sign language and special education.

Despite its historic legacy and comprehensive facilities, the school faces significant challenges: inadequate classroom infrastructure (poor acoustics, lighting, ventilation), limited and outdated assistive technologies, insufficient teacher accommodation, lack of well-equipped recreational spaces, and a high student-teacher ratio. These shortcomings adversely affect teaching effectiveness, student engagement, and holistic development. This study leverages the school's unique context to provide actionable recommendations—strengthening infrastructure, expanding assistive resources, enhancing teacher training, and fostering community engagement—to fill a critical research gap in hearing-impaired education in Assam and inform institutional and regional policy and practice.

4. Research Methodology:

4.1Research Design:

This study adopted a qualitative case study design to explore the educational challenges experienced by hearing-impaired students and their teachers at B.D.S. Government Higher Secondary School. This approach was chosen for its ability to capture the complexity of real-life educational settings. The researchers gathered in-depth insights using multiple data collection methods, including questionnaires to understand general patterns, semi-structured interviews to explore individual experiences in detail, and non-participant observation to document classroom practices and learning environments objectively.

4.2 Sample Design:

A purposive sampling technique was employed in this study. The sample consisted of 47 hearing-impaired students from Class XII, selected for their long-term enrolment and rich experiential

knowledge of the school's functioning. Additionally, all 11 teachers were included to capture diverse instructional perspectives. This sampling strategy was chosen to ensure that participants had sufficient experience and understanding of the educational environment, enabling a comprehensive exploration of existing challenges and possible interventions.

4.3 Data Collection Instruments:

A semi-structured interview guide was developed to gather qualitative insights from teachers, featuring open-ended questions on classroom infrastructure, instructional strategies, and available support services. Complementing this, a structured questionnaire was administered to students to capture their perceptions across four domains: the physical classroom environment, access to assistive technologies, communication challenges, and the adequacy of learning resources. The reliability and validity of the instruments were established through expert review and pilot testing to ensure clarity, appropriateness, and consistency of the data collected.

5. Data Collections and Analysis:

Individual interviews with teachers were conducted on campus, each lasting 30–40 minutes, recorded with consent, and transcribed verbatim. Student questionnaires were administered in classroom settings and collected immediately, ensuring a 100% response rate. Interview transcripts were reviewed and analysed descriptively to summarize recurring challenges and insights. Questionnaire responses were analysed using descriptive statistics to capture student perceptions across key domains. Additionally, non-participant observations were conducted to assess the school's physical and classroom infrastructure, documenting aspects such as classroom layout, availability of learning materials, and overall environmental conditions.

6. FINDINGS

(i) **Demographic Profiles of the Respondents:** The study included a total of 58 respondents, comprising 11 teachers and 47 hearing impaired students from class 12. Among the students the majority were between 17 to 20 years of age, with 64% male and 36% female students. The teacher group include 7 males and 4 females, with varying level of experiences. All had general academic qualifications while, 70% of the male teachers and all female teachers held professional teaching qualifications. In terms of sign language proficiency, 70% of male teachers and 75% of female teachers had received formal training in sign language.

(ii) **Infrastructure and Learning Resources:** The school’s physical environment presents several challenges for hearing-impaired learners. Classrooms are not acoustically treated, resulting in high background noise that impedes concentration and communication. Overcrowding, poor ventilation, and inadequate lighting further diminish the learning environment, while

outdated furniture fails to meet students' ergonomic needs. Additionally, the absence of fully functional digital classrooms—limited to a few operative computers—combined with scarce recreational and common spaces, curtails opportunities for peer interaction and holistic development.

(iii) **Assistive Technologies and Teaching Aids:** Assistive resources are unevenly allocated and largely outdated. Many students lack effective hearing aids, and available devices often underperform. Out of 47 students only 38.29% students had hearing aids while 61.70% students didn't have any hearing aid facility. The school has not integrated essential audiovisual supports such as real-time captioning systems or interactive smart boards, and instructional materials rely predominantly on standard CBCS textbooks without visual enhancements or sign language supplements. Consequently, students face barrier-ridden access to tailored learning tools.

(iv) **Challenges Faced by Teachers:** Educators contend with multiple professional constraints that compromise instructional quality. Although seven teachers possess basic sign language training, formal specialization in special education is limited. High student–teacher ratios of 1:25 hinder the delivery of individualized instruction, and instructors frequently struggle to convey abstract concepts in subjects like mathematics and science. These pressures contribute to elevated stress levels and occasional burnout among teaching staff.

(v) **Students' Academic and Communication Challenges:** Hearing-impaired students often experience comprehension gaps due to inconsistent implementation of Indian Sign Language (ISL) in classroom interactions and limited parental proficiency in ISL at home. Many learners enter secondary education without prior early intervention or preschool experience, affecting foundational academic readiness. Furthermore, co-curricular and skill-based learning opportunities remain minimal, reducing avenues for practical engagement and holistic skill development.

8. Interpretation of the Findings:

The synthesis of findings underscores a network of systemic deficiencies that compromise educational equity for hearing-impaired students. In particular, inadequate physical infrastructure, manifested in poor acoustics, overcrowding, obsolete furnishings, etc. detracts from the learning environment's accessibility. Concurrently, the absence of modern assistive technologies such as real-time captioning and interactive smart boards perpetuates communication barriers and exacerbates disparities. Furthermore, limited professional

specialisation in special education and restricted proficiency in Indian Sign Language among educators diminish the effectiveness of pedagogical interventions. Finally, insufficient early intervention services and low parental competence in sign language impede reinforcement of learning beyond the classroom. Together, these interconnected factors produce a fragmented educational ecosystem in which both cognitive and psychosocial development are hindered, thereby necessitating a comprehensive strategy that addresses infrastructural, technological, instructional, and familial dimensions.

9. Suggestions:

Based on the identified challenges, the following practical suggestions are proposed to enhance educational outcomes for hearing-impaired students at B.D.S. Government Higher Secondary School:

(i) **Strengthen Human Resources:** Recruit additional special educators with formal training in special education and proficiency in Indian Sign Language (ISL). Implement regular professional development workshops covering advanced pedagogical techniques, speech therapy integration, and classroom management for diverse learners.

(ii) **Upgrade Infrastructure and Technology:** Invest in acoustic modifications (sound-absorbing panels, noise-reducing flooring), improved lighting and ventilation, and ergonomic furniture. Equip classrooms with digital teaching aids such as smart boards, real-time captioning systems, and updated hearing devices to facilitate accessible learning.

(iii) **Expand Extracurricular and Vocational Programs:** Introduce sign language clubs, craft and vocational workshops, and life-skills training sessions to foster holistic development. Engage specialists in speech therapy, physiotherapy, and vocational education to lead these initiatives.

(iv) **Enhance Community and Parental Engagement:** Organize regular sign language training sessions and orientation workshops for parents and community members to support learning continuity at home. Launch awareness campaigns in collaboration with local organizations to promote early identification of hearing impairments and reduce stigma.

10. Limitations of the Study:

This study is confined to a single institution and relies on convenience sampling of teachers and Class XII students, which may limit the generalisability of findings. Perspectives from parents,

alumni, and external stakeholders were not captured. Additionally, the reliance on self-reported data may introduce response biases. Future research incorporating diverse stakeholder views and multiple school contexts would enhance the robustness of conclusions.

11. Comments:

This case study illuminates critical challenges faced by hearing-impaired students at B.D.S. Government Higher Secondary School, including infrastructure deficits, outdated assistive technologies, high student-teacher ratios, and communication gaps in sign language proficiency. While hostel accommodations and basic medical services are strengths, shortcomings in transport, room conditions, and recreational facilities further impede student engagement. Educator workload and limited parental ISL skills exacerbate these issues. Despite these obstacles, the school's longstanding commitment and dedicated staff provide a strong foundation for improvement. Addressing these barriers through targeted infrastructure upgrades, enhanced assistive resources, specialised teacher training, and strengthened community engagement can transform the school into a model of inclusive education for hearing-impaired learners in Assam and beyond.

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