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Optimizing The Design Of Special Education Centre For The Deaf And Dumb Using Sensory-Friendly Design: The Case Of Some Selected Special Schools In South East Nigeria

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ABSTRACT
The design of special education centres for the deaf and dumb in Nigeria often neglects the unique sensory needs of students, leading to suboptimal learning environments. This study investigates the application of sensory-friendly design principles in optimizing the design of special education centres for the deaf and dumb in South East Nigeria. The research employs a mixed-methods approach, incorporating case studies of selected special schools, surveys, and interviews with stakeholders. The findings highlight the importance of incorporating sensory-friendly design elements, such as visual, tactile, and flexible spaces, to create inclusive and supportive learning environments. The study provides recommendations for policymakers, architects, and educators to prioritize sensory-friendly design in special education centres, enhancing the learning experiences and well-being of students with hearing impairments.
Keywords: Sensory-friendly design, special education, deaf and dumb, inclusive design, Nigeria

INTRODUCTION

Improving the design of special schools is very important for helping deaf and dumb students learn, but this connection is often ignored in education research. This problem is especially clear in places like South East Nigeria, where existing school buildings often are not good enough for their specific learning needs. Students who are deaf primarily communicate using sight and touch/movement, which means their learning environment must reduce noise and maximize visual clarity and an organized layout. Therefore, we urgently need to systematically improve the design of Special Education Centres (SECs), because standard building rules were made for students who can hear, unintentionally creating learning barriers for the deaf. This study suggests that using sensory-friendly spaces—environments carefully designed using elements like lighting, sound control, color, and flexible layouts—can significantly improve teaching quality and students' well-being. By closely examining selected special schools in South East Nigeria, a region facing limited resources and poor infrastructure, this research intends to identify the specific problems with current designs. The goal is to create practical, evidence-based guidelines for architecture that will help establish supportive and effective physical environments. This ensures that the school buildings themselves become a helpful tool in the students' education and growth, rather than a hindrance to their success.

LITERATURE REVIEW

Sensory-friendly design has been increasingly recognized as a crucial aspect of creating inclusive and supportive environments for individuals with sensory processing disorders, including those with deafness and dumbness..

Studies have shown that sensory-friendly design can significantly impact the well-being and learning outcomes of students with sensory processing disorders (Mostafa, 2014; Scott, 2009). In the context of special education centres, sensory-friendly design involves creating spaces that minimize sensory overload, provide comfort, and promote engagement (Gaines et al., 2016).

Several case studies have demonstrated the effectiveness of sensory-friendly design in special education centres. For example, the Perkins School for the Blind in Massachusetts, USA, features a sensory-friendly design that includes flexible learning spaces, sensory rooms, and visual alert systems (Perkins School for the Blind, n.d.). Similarly, the Deaf Childrens' Society in Hyderabad, India, incorporates sensory-friendly elements such as soundproofing, tactile flooring, and colour-coded signage (Deaf Childrens' Society, n.d.).

In Nigeria, the Nigerian Educational Research and Development Council (NERDC) has emphasized the importance of inclusive education, including the use of sensory-friendly design in special education centres (NERDC, 2013). However, there is a need for more research on the application of sensory-friendly design principles in Nigerian special education centres.

Theoretical Framework

The theoretical framework for optimizing the design of special education centers for the deaf and dumb using sensory-friendly design draws on Universal Design for Learning (UDL) and Sensory Integration Theory (SIT). UDL guides flexible and accessible design, while SIT informs sensory

Concept of Sensory-Friendly Design

Sensory-friendly design is an approach to creating environments that prioritize comfort, engagement, and well-being for individuals with sensory processing disorders. It is all about crafting spaces that minimize overwhelming stimuli and cater to diverse needs. By reducing unnecessary noise, incorporating adaptable elements, and promoting predictability, these spaces help individuals feel more at ease.

In practice, sensory-friendly design can be as simple as using calming colors, providing quiet areas, or incorporating tactile elements. It is about understanding how people interact with their environment and creating spaces that support their unique needs. Whether it is a school, home, or public area, sensory-friendly design seeks to create a sense of inclusivity and support.

By prioritizing sensory-friendly design, we can create environments that help individuals thrive. It's not just about aesthetics; it's about crafting spaces that promote well-being and support diverse needs. As we design spaces for the future, let us consider the impact our environments have on our senses and strive to create spaces that feel welcoming and supportive for all.

Benefits of Sensory-Friendly Design Special School

Sensory-friendly design in special schools can be a game-changer for students with sensory processing disorders or other special needs. By creating a tailored environment that minimizes overwhelming stimuli, schools can help students feel more comfortable and focused. This, in turn, can lead to improved concentration, reduced anxiety, and enhanced accessibility for students with diverse needs. When students feel at ease, they are more likely to engage with their surroundings, participate in activities, and build meaningful relationships with their peers.

One of the most significant benefits of sensory-friendly design is its impact on emotional regulation. By providing calming spaces, gentle lighting, and soothing colors, schools can help students manage their emotions and reduce stress. Thermal comfort is important in schools as it helps students to concentrate (Munonye et al, 2021). This can be especially beneficial for students who experience sensory overload or meltdowns. By creating a supportive environment, schools can empower students to take control of their emotions and develop coping strategies that will serve them well beyond their school years.

The benefits of sensory-friendly design extend beyond the individual student, too. By creating inclusive environments, schools can foster a sense of community and acceptance. When students, teachers, and staff understand and appreciate sensory needs, it promotes a culture of empathy and understanding. This can have a ripple effect, benefiting not just students with special needs but the entire school community. By prioritizing sensory-friendly design, schools can create a more supportive, inclusive, and compassionate environment that allows every student to thrive.

Special Education Centre For The Deaf And Dumb Facility Design Standards

A Special Education Centre for the Deaf and Dumb should incorporate Deaf Space design principles, prioritizing visual communication and mobility. The center's spaces should be designed with soft, glare-free lighting to reduce eye strain and promote visual comfort. Contrasting colors like blues, greens, and reds can be used to enhance visual communication. The facility should have wider corridors and automatic sliding doors for easy navigation, and mobile, armless chairs can facilitate flexible seating arrangements and social interaction. Features like windows, transparent walls, and tactile cues can be incorporated to enhance spatial awareness. Reverberation and background noise should be minimized to reduce distractions. Safety and security features, such as emergency alarms with visual alerts, should be in place. The design should promote social interaction and inclusivity for students with varying abilities, creating a supportive environment that caters to the unique needs of deaf and dumb students.

RESEARCH METHODOLOGY

Research Design

This study starts with a literature review and case studies to identify key design elements, followed by surveys and observations to validate findings. The goal is to create a comprehensive understanding of design requirements for inclusive and supportive learning environments. Multiple data sources are used, including interviews, surveys, and observations, to ensure a robust foundation for design guidelines.

Study Area

The study centers on three schools within South-East Nigeria: Special School For The Deaf And Dumb Onitsha; Basdem Special Education Centre Isulo; And De Paul Inclusive School And Deaf Unit Oraifite These facilities were selected due to their relevance for the deaf and dumb care and their architectural differences.

Figure 1: Special School For The Deaf And Dumb Onitsha
Source : Google Map

Figure 2: Basdem Special Education Centre Isulo
Source : Google Map

Figure 3 De Paul Inclusive School And Deaf Unit Oraifite
Source : Google Map

Methods of Data Collection

Data in this research was obtained through a case study approach from primary and secondary sources. Secondary data was obtained from exisitng books published and unpublished related materials and maps. Field studies through interviews and direct site observations. The collection of data was to explore the current design conditions of selected special schools in the southeastern region of Nigeria, with a particular focus on identifying opportunities for improvement through the integration of sensory-friendly design elements. The researcher observed the physical environment and interacted with staff and students in the schools.

1. Case Studies

Each school was studied carefully. observations and interviews were conducted with the school management and some staffs. The case study method helped situate each school within its broader architectural and academic context.

2. Interviews

Structured interviews were conducted to each participant. These interviews explored perceptions of spatial comfort, environmental satisfaction, emotional well-being, and opinions about nature-related features in the school environment. Interviews were conducted in quiet areas within the school. Each lasted between 20 to 45 minutes, depending on participant willingness.

3 Non-Participant Observations

The researcher conducted **systematic field observations** during multiple visits to each schools. Observations focused on spatial layout, visual and physical access to green areas, lighting conditions, ventilation design, noise levels, use of natural materials, and presence of aesthetic or sensory features. An observation checklist was used to ensure consistency. Where permitted, photographs were taken to document spatial characteristics.

Data Analysis Method

Interview transcripts and observation notes were carefully read and coded manually to identify recurring patterns, contrasting experiences, and unique environmental features.

DATA PRESENTATION AND ANALYSIS

Introduction

Data was collected through case studies, interviews, and structured site observations conducted across the three Special Schools in South-East Nigeria: Special School For The Deaf And Dumb Onitsha; Basdem

Special Education Centre Isulo; And De Paul Inclusive School And Deaf Unit Oraifite The aim is to optimize the design of special education centres for the deaf and dumb in South East Nigeria using sensory-friendly design principles, such as visual communication systems, tactile cues, flexible learning spaces, and reduced auditory distractions, to create an inclusive and supportive learning environment that enhances the academic and social development of students with hearing impairments.

1.Case Study Overview

Each school was examined as an individual case with regard to architectural layout, sensory-friendly spaces, and students comfort.

Case Study One:

Name: Special School For The Deaf And Dumb Onitsha

Location: Odoakpu Onitsha, Onitsha South Local Government Area, Anambra State, Nigeria.

School Overview: The "Special School for the Deaf" in Onitsha, Anambra State, Nigeria, is a dedicated educational institution for deaf children, providing them with specialized learning and support to help them develop academic and life skills; it is often referred to as the "Onitsha School for the Deaf" and is considered a key facility for hearing-impaired individuals in the region.

The School Facilities

- Classrooms
- Dormitories,
- Specialized learning areas designed to support deaf students.

Plate 1: Approach view Special School,Onitsha.
Source: Field study (2025)

Plate 2: Image showing Special Primary school
Source: Field study (2025)

Merits

Simplicity in design towards cost and flow

1. The site is accessible
2. Sufficient Natural lighting for the building
3. Adequate air
4. Adequate circulation spaces

Demerits

1. Landscape work was lacking components i.e greenery, walkways, buffers
2. Noise pollution
3. The school library space is compacted

Deductions

1. Landscaping must be interactive and flow with the building spaces within
2. Site location must be situated in areas that is noise free
3. Functional library

Limitations

Restrictions were placed to some areas as a result of critical operations that occur there.

Case Study Two:

Name: Basdem Special Education Centre Isulo

Location: Isulo Orumba South Local Government Area Anambra State, Nigeria.

- **School Overview:** Basden Memorial Special Education Centre In Isulo, Anambra state, Nigeria. is a dedicated educational institution for deaf children, providing them with specialized learning and support to help them develop academic and life skills; and is considered a key facility for hearing-impaired individuals in the region These facilities include: classrooms, dormitories, and specialized learning areas designed to support deaf students.

Plate 3: Image Showing Approach view classroom
Source: Field study (2025)

Plate 4: Image showing the primary school
Source: Field study (2025)

Merit:

1. Simplicity in design towards cost and flow
2. The site is accessible
3. Sufficient Natural lighting for the building
4. Adequate air spaces
5. Adequate circulation spaces

Demerits

1. Landscape work was lacking components i.e greenery, walkways, buffers
2. The school library space is Compacted

Deductions

1. Landscaping must be interactive and flow with the building spaces within
2. Standard space for the library is to be considered.

Limitations

Restrictions were placed to some areas as a result of critical operations that occur there.

Case Study Three:

Name: De Paul Inclusive School And Deaf Unit Oraifite

Location: Amakom Oraifite, Ekwusigo Local Government Area Anambra State, Nigeria.

Overview: As the oldest continuously run educational institution, De Paul Secondary School and Deaf Unit remains committed to providing an academically rigorous education to students who will walk out of school ready for lives of leadership and service to their community. From literacy to music and art, each day at the Champions School is filled with activities that are both enriching and fun

Plate 5: Approach view of de Paul primary school classroom
Source: field Study (2025)

Plate 6: Image showing the primary school
Source: Field Study (2025)

Merits

1. Simplicity in design towards cost and flow
2. The site is accessible
3. Sufficient lighting for the building
4. Adequate air spaces
5. Adequate circulation spaces

Demerits

1. Landscape work was lacking components i.e greenery, walkways, buffers
2. Insufficient parking space

Deductions

1. 1. Landscaping must be interactive and flow with the building spaces within
2. Sufficient parking space

Limitations

Restriction were placed to some areas as a result of critical operations that occur there.

Interpretation of Findings

This study confirms sensory-friendly design is severely lacking in the special schools for the deaf and dumb studied. Physical and emotional discomfort stem from environmental features. The implication is clear: sensory-friendly design isn't integrated as a system or policy in these schools.

Environmental design matters; its neglect affects students' recovery, well-being, and morale. Academic resources alone aren't enough. Sensory-friendly design can improve learning and well-being, incorporating elements like visual cues, tactile communication, and flexible spaces.

DISCUSSION

Discussion of Key Findings

The discussion of key findings for this study on optimizing the design of special education centres for the deaf and dumb using sensory-friendly design in South East Nigeria reveals several critical insights.

The study found that the current design of special education centres in South East Nigeria often neglects the unique sensory needs of students with hearing impairments, leading to suboptimal learning environments. The lack of visual cues, tactile markers, and flexible learning spaces hinders academic achievement, social interaction, and emotional well-being.

Key findings indicate that incorporating sensory-friendly design elements such as visual alerts, tactile signage, and adaptable learning spaces can significantly enhance the learning experiences of students with hearing impairments. The study also highlights the importance of reducing auditory distractions and incorporating natural elements to create a supportive learning environment.

The research underscores the need for policymakers, architects, and educators to prioritize sensory-friendly design in special education centres. By doing so, we can create inclusive and supportive learning environments that promote academic achievement, social interaction, and emotional well-being for students with hearing impairments in South East Nigeria.

These findings have significant implications for the design of special education centres in Nigeria, emphasizing the need for a shift towards more inclusive and sensory-friendly design approaches.

Implications for Special School Design in Nigeria

The absence of sensory-friendly design in Nigerian special schools has profound and far-reaching implications, compromising the comfort, learning, and overall well-being of students with hearing impairments, as it perpetuates a learning environment that is often fraught with physical and emotional discomfort, stress, and anxiety, ultimately undermining their academic performance, social interactions, and long-term development; this oversight underscores the urgent need for inclusive design that prioritizes visual, tactile, and flexible spaces, incorporating elements such as clear visual cues, adaptable learning areas, and reduced auditory distractions, to support their unique needs, foster a conducive learning environment, and promote equal access to education, thereby emphasizing the imperative for policymakers, educators, and architects to collaborate in reimagining special school design in Nigeria to ensure that these institutions truly serve the needs of their students.

Recommendations for Stakeholders

Stakeholders, including policymakers, educators, architects, and disability advocates, should prioritize the integration of sensory-friendly design principles in special school infrastructure, recognizing that this is a critical step towards creating inclusive learning environments that cater to the unique needs of students with hearing impairments.

To achieve this, stakeholders should collaborate to develop and implement comprehensive design guidelines that incorporate visual, tactile, and flexible spaces, taking into account the specific requirements of students with hearing impairments. This may involve incorporating features such as clear visual cues, adaptable learning areas, reduced auditory distractions, and accessible communication systems.

Furthermore, stakeholders should provide training and capacity-building programs for educators and architects on sensory-friendly design principles, ensuring that they are equipped to design and implement effective learning environments that support the diverse needs of students with hearing impairments.

Additionally, stakeholders should allocate sufficient resources for the implementation and maintenance of sensory-friendly design elements in special schools, recognizing that this is an essential investment in the education and well-being of students with hearing impairments.

Finally, stakeholders should conduct regular audits and assessments to ensure that special schools are meeting the required standards for sensory-friendly design, and make necessary adjustments to ensure that these environments continue to support the evolving needs of students with hearing impairments.

By taking these steps, stakeholders can play a critical role in creating inclusive and supportive learning environments that enable students with hearing impairments to reach their full potential.

CONCLUSION

The findings of this study underscore a critical oversight in the design of special education centres for the deaf and dumb in Nigeria. The absence of sensory-friendly design principles in these institutions perpetuates a learning environment that is often fraught with physical and emotional discomfort, stress, and anxiety, ultimately undermining the academic, social, and emotional growth of students with hearing impairments.

As evidenced by the case studies of special schools in South-East Nigeria, the neglect of sensory-friendly design leads to suboptimal learning environments, mirroring the experiences of students with hearing impairments. The study reveals that sensory-friendly design is not a nicety, but a necessity for special education centres. By integrating design principles that cater to visual, tactile, and flexible spaces,

educators can create inclusive, supportive learning environments that foster academic achievement, social interaction, and emotional well-being.

The recognition by educators and administrators of the limitations of current environments and their expressed readiness for change presents a window of opportunity for transformation. It is imperative that policymakers, architects, and educators collaborate to develop and implement sensory-friendly design guidelines that prioritize the needs of students with hearing impairments.

This study serves as a clarion call to rethink the design of special education centres, shifting from a focus on mere functionality to a holistic approach that acknowledges the profound impact of environment on learning and well-being. By embedding sensory-friendly design principles into the fabric of these institutions, we can create spaces that not only support the unique needs of students with hearing impairments but also promote dignity, inclusivity, and connection to their environment, ultimately contributing to a more equitable and just society.

The time for change is now. Let us reimagine special education centres that are not just buildings, but beacons of hope, empowerment, and possibility, where students with hearing impairments can thrive, grow, and reach their full potential.

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