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Evaluation of Inclusive Design Strategies for Autism-Friendly Community Centres in Abuja, Nigeria.

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ABSTRACT
Community centres play a crucial role in fostering social interaction, education, and recreation. However, their design often fails to accommodate the needs of neurodiverse individuals, particularly autistic children, who require environments tailored to their sensory sensitivities and behavioural challenges. This study evaluates inclusive design strategies within three special needs establishments in Abuja, Nigeria: JKS Special Needs Centre, SAIMAM Special Needs Care Centre, and C.A.D.E.T. Academy.

Data were collected through a mixed-methods approach, including structured observations, semi-structured interviews, and questionnaires distributed among caregivers, educators, and architects. The study also involved a comprehensive review of existing literature on inclusive design principles. Key findings reveal that while all three establishments incorporate elements of inclusive design, the extent of implementation varies, with C.A.D.E.T. Academy exhibiting the most comprehensive sensory-friendly features.

The study highlights the significance of incorporating flexible spaces, sensory-friendly zones, and multi-sensory environments to foster engagement, comfort, and inclusion for autistic children. Recommendations include the development of regulatory frameworks, capacity-building programmes for design professionals, and increased stakeholder engagement to enhance the adoption of inclusive design practices.

Keywords: Autism spectrum disorder, Community centres, Design strategies, Inclusive design, Sensory-friendly environments.

I. INTRODUCTION

Community centres serve as essential public spaces for social interaction, recreation, and education. For children with autism spectrum disorder (ASD), these centres hold the potential to support social development, sensory engagement, and community integration. However, the existing designs of many community centres fail to meet the specific needs of neurodiverse individuals, exacerbating sensory sensitivities and behavioural challenges, which often lead to exclusion (Smith et al., 2022).

Autism spectrum disorder is characterised by sensory processing difficulties, communication barriers, and social interaction impairments (American Psychiatric Association, 2020). The physical environment plays a significant role in shaping the experiences of individuals with ASD. Features such as overly bright lighting, excessive noise, and unpredictable spatial layouts can contribute to sensory overload, leading to stress and withdrawal (Gaines et al., 2016). Addressing these concerns requires the application of inclusive design principles that go beyond basic accessibility to create adaptable, responsive, and supportive environments.

Inclusive design is a holistic approach that integrates strategies to accommodate diverse needs. For children with ASD, this approach includes sensory-friendly lighting, noise reduction measures, quiet zones, and clear wayfinding systems (Shepley & Pasha, 2021). When applied effectively, these principles transform community centres into inclusive environments that foster comfort, engagement, and active participation. Predictable layouts and calming design features can mitigate sensory overstimulation, providing a sense of security and well-being.

The need for inclusivity in public spaces is underscored by the rising prevalence of autism. The World Health Organization (WHO) estimates that approximately 1 in 100 children worldwide have autism (WHO, 2020). In Nigeria, recent

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studies indicate a growing number of children diagnosed with autism, with an estimated 600,000 affected nationwide (Eze et al., 2023). These figures highlight the urgency of adopting deliberate and thoughtful design strategies that prioritise inclusivity in public architecture.

In Abuja, cultural perceptions and resource constraints pose additional challenges to the implementation of inclusive design. However, these challenges also present opportunities for innovation, where designers and policymakers can pioneer inclusive architectural practices that set a benchmark for autism-friendly community spaces.

II. LITERATURE REVIEW

2.1 Overview of Inclusive Design Principles and Strategiess

Inclusive design is a user-centred approach aimed at ensuring accessibility and usability for individuals with diverse abilities. This approach emphasises equitable use, flexibility, and intuitive design to foster inclusivity (Hamraie, 2020). It seeks to address physical, sensory, and cognitive dimensions to create environments that are functional and engaging for neurodiverse individuals (Centre for Excellence in Universal Design, 2021).

The concept of inclusive design goes beyond legal accessibility requirements to ensure that spaces are comfortable and usable for all. This extends to universal design principles, which focus on creating environments that do not require modifications for specific users (Story et al., 2020). Additionally, inclusive design strategies consider the cultural and social dimensions of accessibility, acknowledging that neurodiverse individuals interact with spaces in unique ways (Imrie, 2019).

2.2 Specific Needs of Autistic Children in Built Environments

Autistic children experience unique sensory sensitivities and require environments that support comfort and predictability. Features such as soundproofing, adaptive lighting, and soothing colour palettes are reported to reduce sensory overload (Pellicano et al., 2021). Structured layouts with clear wayfinding systems enhance navigational ease, potentially reducing anxiety and fostering independence (Sheehy et al., 2020).

Several studies highlight the importance of tactile and visual elements in supporting children with ASD. Research by Kinnaer et al. (2021) indicates that access to natural light and textured surfaces helps regulate sensory experiences. Additionally, the integration of interactive spaces, such as sensory rooms, has been found to improve engagement and emotional regulation (Moore et al., 2022).

2.3 Inclusive Design and Community Centres

Community centres serve as vital public spaces for fostering social interaction and engagement. However, their inclusivity for autistic children remains underexplored, particularly in Abuja. Features such as sensory-friendly zones, adaptable furniture, and accessible layouts are essential for creating welcoming environments.

Case studies from international autism-friendly centres provide insight into best practices. For example, The Eden Academy in the United Kingdom has successfully implemented adaptive furniture and zoning strategies to create calming, engaging environments for neurodiverse children (Jones & Thomas, 2021). Similarly, Treetops School in the United States has prioritised multi-sensory spaces with designated quiet zones, leading to positive behavioural outcomes among autistic students (Moore et al., 2022). These case studies suggest that a comprehensive design approach integrating multiple sensory elements is most effective in fostering inclusion.

2.4 Challenges in Implementing Inclusive Design Principles

Despite the potential benefits of inclusive design, several challenges hinder its effective implementation. Financial constraints, limited technical expertise, and a lack of awareness among stakeholders are significant barriers (Turner & Clarke, 2021). In developing regions like Nigeria, these challenges are compounded by limited resources and competing priorities in urban planning. Furthermore, the absence of regulatory frameworks promoting inclusive design often leads to inconsistent application of its principles (Adeyemi et al., 2022).

2.5 The Role of Culture and Context in Inclusive Design

Cultural values and societal attitudes significantly influence the success of inclusive design projects. In African contexts, community-based approaches that prioritise collective well-being may offer unique opportunities for fostering inclusivity (Nnamdi et al., 2021). However, the interplay between traditional practices and modern design principles requires careful consideration to ensure culturally sensitive solutions.

Research suggests that locally adapted inclusive design strategies are more effective than direct adaptations of Western models (Adebayo & Johnson, 2021). For example, open-air sensory spaces may be more suitable in Nigeria's warm climate compared to enclosed sensory rooms common in Western contexts. This highlights the need for design flexibility based on regional and cultural contexts.

III. RESEARCH METHODOLOGY

3.1 Research Design

This study employs a qualitative research design with a case study approach to evaluate inclusive design strategies in autism-friendly community centres. The qualitative approach allows for an in-depth exploration of the challenges and effectiveness of inclusive design strategies. The case study method focuses on three community centres in Abuja, Nigeria, selected based on accessibility, available data, and their emphasis on inclusive design.

3.2 Study Area and Population

The study was conducted in Abuja, Nigeria's capital, known for its diverse population and expanding urban development. The three community centres examined in this study—JKS Special Needs Centre, SAIMAM Special Needs Care Centre, and C.A.D.E.T. Academy—were selected due to their commitment to providing inclusive spaces for autistic children.

3.3 Sampling Technique

A purposive sampling technique was used to select participants, ensuring that only relevant stakeholders contributed to the study. The sample included:

i. Caregivers and parents of autistic children (n = 20)
ii. Educators and therapists working in the centres (n = 15)
iii. Architects and facility managers responsible for designing or maintaining the spaces (n = 10)

3.4 Data Collection Methods

To gather comprehensive data, multiple methods were used:

i. Observations: The researcher conducted structured observations of the physical environment, focusing on design elements such as lighting, acoustics, spatial organisation, and sensory-friendly features.
ii. Interviews: Semi-structured interviews were conducted with caregivers, educators, and architects to gain insights into their experiences and perspectives on inclusive design strategies.
iii. Questionnaires: Structured questionnaires were distributed to obtain quantitative data on user satisfaction and accessibility challenges.
iv. Document Review: Existing literature, building plans, and government policies were reviewed to understand regulatory frameworks and design standards.

3.5 Data Analysis

The data collected were analysed using thematic analysis for qualitative data and descriptive statistics for questionnaire responses. Thematic analysis involved coding interview transcripts and observational notes to identify recurring themes related to inclusive design strategies. Questionnaire responses were analysed using percentages and frequency distributions.

IV. RESULTS AND DISCUSSION

4.1 Overview of Findings

The findings from the study highlight the extent to which inclusive design strategies have been implemented in autism-friendly community centres in Abuja. While all three centres integrate inclusive design principles, their approaches differ in effectiveness, coverage, and user satisfaction.

4.2 Inclusive Design Features Implemented in the Centres

A comparative analysis of the three centres reveals key variations in the adoption of inclusive design strategies. The following tables summarise the presence of essential inclusive design elements:

Table 1: Comparison of Inclusive Design Features in the Three Centres

Inclusive Design Feature	JKS Special Needs Centre	SAIMAM Special Needs Care Centre	C.A.D.E.T. Academy
Sensory Rooms	Not available	Basic sensory features	Fully equipped
Quiet Zones	Small designated spaces	None specifically designated	Dedicated rooms

Flexible Learning Spaces	Limited	Moderately available	Extensive
Visual Signage & Wayfinding	Minimal signage	Clear wayfinding systems	Advanced signage
Outdoor Safe Spaces	Limited outdoor area	Secure outdoor play spaces	Spacious interactive areas

Figure 1: Visual Signage and Wayfinding at JKS Special Needs Centre
source: https://jesuskidsng.org/gallery. (Retrieved January, 2024).

Table 2: User Satisfaction Levels Across Centres

Satisfaction Parameter	JKS Special Needs Centre	SAIMAM Special Needs Care Centre	C.A.D.E.T. Academy
Sensory Environment	2.5/5	3.0/5	4.8/5
Staff Competence	3.0/5	3.5/5	4.7/5
Accessibility of Spaces	2.8/5	3.2/5	4.9/5
Family Engagement	3.0/5	3.3/5	4.6/5

4.3 User Perception of Inclusive Design

Feedback from caregivers and educators indicates that while the centres aim to be autism-friendly, there are challenges related to inadequate funding, limited resources, and insufficient sensory-friendly features in some centres. The majority of respondents noted that C.A.D.E.T.Academy provides the most comprehensive inclusive design strategies, while JKS Special Needs Centre and SAIMAM Special Needs Care Centre require improvements in sensory a4.3 User Perception of Inclusive Design

Table 4: Summary of Questionnaire Responses on User Satisfaction

Parameter Evaluated	**JKS Special Needs Centre**	**SAIMAM Special Needs Care Centre**	**C.A.D.E.T. Academy**
Sensory Room Availability	20% Satisfied	35% Satisfied	85% Satisfied
Wayfinding & Signage	30% Satisfied	50% Satisfied	90% Satisfied
Staff Training on Autism	40% Satisfied	55% Satisfied	95% Satisfied
Overall Accessibility	45% Satisfied	50% Satisfied	92% Satisfied

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Figure 2: Sensory Room at SAIMAM Special Needs Care Centre

A dedicated sensory space designed to support children with special needs, enhancing their comfort and engagement in a controlled environment. source:https://saimamcentre.com.ng/.(Retrieved January, 2024).

Figure 3: Inclusive Learning Space at C.A.D.E.T. Academy (ComprehensiveAutismandRelatedDisabilitiesEducationandTrainingAcademy). source:https://www.cacademy.sch.ng/.(Retrieved January,2024).

The results indicate that C.A.D.E.T. Academy has the highest user satisfaction across all parameters, particularly in sensory room availability and staff training. JKS Special Needs Centre has the lowest satisfaction scores, with users highlighting inadequate wayfinding and sensory-friendly spaces. These trends align with qualitative feedback from interviews, reinforcing the need for improved training and facility upgrades in other centres.

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4.4 Challenges in Implementing Inclusive Design Strategies

The study identifies several challenges affecting the implementation of inclusive design strategies, including:

i. Financial Constraints: Limited funding restricts the ability to develop fully equipped sensory rooms and adaptive furniture.
ii. Lack of Technical Expertise: Some staff members are not adequately trained in handling neurodiverse children.
iii. Cultural Barriers: Societal awareness and acceptance of autism remain a challenge in Nigeria, influencing design priorities.
iv. Regulatory Limitations: The absence of strict policies on inclusive design contributes to inconsistencies in implementation.

4.5 Discussion of Results in Relation to Existing Literature

The findings align with global studies on inclusive design, which emphasise the importance of multi-sensory environments in improving user experience for autistic children (Shepley & Pasha, 2021). Additionally, previous studies suggest that policy support and funding are critical factors influencing the success of autism-friendly community centres (Pellicano et al., 2021).

V. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study has demonstrated the critical role of inclusive design in fostering autism-friendly environments within community centres in Abuja, Nigeria. Through an analysis of three selected special needs centres, it is evident that while varying levels of inclusive design strategies have been adopted, there remains significant room for improvement in sensory accommodations, staff training, and regulatory support.

The findings reveal that C.A.D.E.T. Academy exhibits the most comprehensive approach to inclusive design, incorporating dedicated sensory rooms, flexible learning spaces, and well-trained staff. However, JKS Special Needs Centre and SAIMAM Special Needs Care Centre face challenges such as limited sensory rooms, inconsistent signage, and inadequate funding.

The study aligns with global research emphasising the importance of sensory-friendly environments and flexible spatial design in enhancing the well-being and engagement of autistic children. Addressing the identified gaps requires a collaborative effort among policymakers, designers, and community stakeholders to create more accessible and inclusive community centres.

5.2 Recommendations

Based on the study's findings, the following recommendations are proposed to enhance the inclusivity of community centres for autistic children:

Table 3: Summary of Key Recommendations

Recommendation	Expected Impact
Policy Development	Enforces the adoption of inclusive design standards in public and private community centres.
Capacity Building for Staff	Enhances understanding and implementation of autism-friendly practices.
Increased Funding and Resource Allocation	Provides financial support for sensory-friendly infrastructure and specialised training.
Integration of Multi-Sensory Environments	Improves engagement and comfort for autistic children.
Community Engagement and Awareness	Encourages societal acceptance and support for autism-friendly initiatives.

5.3 Future Research Directions

While this study provides valuable insights, further research is needed to:

i. Assess the long-term impact of inclusive design on the cognitive and social development of autistic children.
ii. Explore cost-effective solutions for implementing inclusive design in resource-limited environments.
iii. Investigate the applicability of global best practices in the Nigerian context to develop a standardised framework for autism-friendly spaces.

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REFERENCES

[1]. Adeyemi, T., Ojo, F., &Abiola, S. (2022). Regulatory frameworks for inclusive design in developing countries. Urban Policy Studies, 27(4), 310–325.

[2]. AmericanPsychiatricAssociation.(2020).Diagnosticandstatisticalmanualofmental disorders (5th ed.). Arlington, VA: American Psychiatric Publishing.

[3]. CentreforExcellenceinUniversal Design.(2021).Principlesofuniversal design.v

[4]. CentreforInclusiveDesign.(2023).Inclusive designprinciples.Retrievedfrom https://centerforinclusivedesign.org

[5]. Eze, C. O., Okonkwo, I. J., &Adamu, A. K. (2023). Autism prevalence in Nigeria: A systematic review and meta-analysis. African Journal of Child Development, 15(2), 112–125.

[6]. Eze,I.O.,Adeola,T.O.,&Johnson,A.P.(2023).TheunmaskingofautisminSouthAfrica and Nigeria. Pediatric and Developmental Health Journal. Retrieved from https://pmc.ncbi.nlm.nih.gov/articles/PMC11088825/

[7]. Gaines,K.,Curry,Z.,&Isaacs,J.(2016).Designingforautismspectrumdisorders.Journal of Interior Design, 41(3), 37–51.

[8]. Hamraie,A.(2020).Buildingaccess:Universaldesignandthepoliticsofdisability.

[9]. Universityof MinnesotaPress.

[10]. Jones, R., & Thomas, L. (2021). Inclusive design strategies for schools: Lessons from The Eden Academy. Architectural Research Quarterly, 25(2), 118–130.

[11]. Mills,J.,&Merritt,P.(2022).Designingforautism:Strategiesforinclusivespaces.Journal of Autism and Developmental Disorders.

[12]. Moore, S., Roper,K.,& Taylor,M. (2022).Creating autism-friendly environments: Acase studyofTreetopsSchool.JournalofAutismandDevelopmentalDisorders,52(4),1347–1360.

[13]. Nnamdi, O., Udo, J., &Agwu, E. (2021). Cultural considerations in inclusive design: Insights from Africa. Journal of Architecture and Urbanism, 45(3), 202–215.

[14]. Pellicano, E., Vivanti, G., & Dissanayake, C. (2021). Sensory sensitivities in autism: Implications for design. Autism Research and Practice, 14(3), 145–160.

[15]. Sheehy, K., Nind, M., & Simmons, B. (2020). Navigating spaces: Wayfinding systems for autistic children in educational settings. Disability & Society, 35(4), 500–515.

[16]. Shepley,M.,&Pasha,S.(2021).Designforautism:Anevidence-basedapproach.

[17]. Routledge.

[18]. Smith, A., Roberts, C., & Thompson, J. (2022). Barriers to inclusive community spaces: Perspectives from families of autistic children. Community Design Review, 18(2), 89– 101.

[19]. Turner,D.,&Clarke,R.(2021).Addressingchallengesinimplementinginclusivedesigninurban planning. International Journal of Urban Design, 30(1), 75–90.

[20]. World Health Organization. (2020). Autism spectrum disorders. World Health Organization. Retrieved from https://www.who.int/news-room/fact-sheets/detail/autism-spectrum-disorders