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Assessing the Availability and Quality of Inclusive Design Features in Public and Private Schools in Lagos State

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Abstract

This study assesses the availability and quality of inclusive design features in public and private primary schools in Lagos State, Nigeria. Inclusive design in educational settings is essential for fostering accessible, equitable, and diverse learning environments where all students, including those with disabilities, can fully participate. Despite the global push for inclusive education, there remains a significant gap in the practical implementation of inclusive design principles in Nigerian schools, particularly regarding disparities between public and private institutions. This research adopts a systematic literature review (SLR) methodology, analyzing 20 peer-reviewed articles published between 2020 and 2025. A comparative approach is used to evaluate the presence and functional quality of inclusive features such as ramps, accessible restrooms, and adaptive learning technologies. Findings from the review aim to inform policymakers, school administrators, and architects about existing gaps and guide the development of more inclusive educational environments. By identifying specific areas where public and private schools in Lagos differ in

terms of accessibility and design quality, this study contributes to enhancing educational equity through evidence-based recommendations.

Keywords: Inclusive design, Public schools, Private schools, Educational accessibility, Lagos State, Systematic literature review, Universal design, Cognitive accessibility

Introduction

This section sets the stage for the research by outlining its context, importance, and main focus. Inclusive design in educational settings is essential to fostering an environment where all students, regardless of physical abilities or cognitive challenges, can access and participate fully in academic activities. It involves designing spaces that accommodate diverse needs, ensuring that students, teachers, and visitors can navigate and use facilities without barriers (Zallio & Clarkson, 2021). In Nigeria, inclusive design principles in primary schools are particularly important, as early education sets the foundation for lifelong learning and social integration (Atakpo, 2024).

In Lagos State, both public and private primary schools are fundamental in shaping the educational landscape, but they often differ in infrastructure quality and accessibility. Public primary schools, typically funded and managed by the government, often face challenges related to inadequate funding and maintenance, which can result in poorly accessible facilities (Alimba, Awaraiih, & Arinze, 2024). In contrast, private primary schools, funded by private entities or individuals, may have better resources, but this does not always guarantee the inclusion of essential design features for students with disabilities (Ahmed, Isiaka, & Tauheed, 2024).

Despite the importance of inclusive educational environments, many primary schools in Lagos State still lack critical features such as ramps, accessible restrooms, and spacious classrooms. These shortcomings not only hinder physical accessibility but also impact the cognitive and emotional well-being of students, as inadequately designed spaces can negatively affect learning and social interactions (Zallio & Clarkson, 2021). Moreover, limited awareness among school administrators

regarding inclusive design principles exacerbates these challenges (Alimba, Awaraiih, & Arinze, 2024).

The aim of this study is to assess the availability and quality of inclusive design features in both public and private primary schools in Lagos State. By comparing the implementation of inclusive design standards across these two types of institutions, this research seeks to identify gaps and propose strategies to enhance accessibility and inclusivity, ultimately contributing to a more equitable educational environment.

The objectives are to:

i. evaluate the presence and accessibility of inclusive design elements in both public and private primary schools within Lagos State;
ii. compare the quality and effectiveness of inclusive infrastructure and facilities between public and private primary educational institutions in Lagos State; and
iii. identify challenges faced by school administrators and stakeholders in implementing inclusive design standards in Lagos State primary schools and recommend practical improvements.

The significance of this study lies in its potential to highlight the critical role that inclusive design features play in creating equitable learning environments within public and private primary schools in Lagos State. Inclusive design is not merely about physical accessibility but encompasses a broader understanding of diversity, equity, and inclusion, which directly impacts how students with varying abilities interact with their educational settings (Zallio & Clarkson, 2021). By assessing both the availability and quality of these features, this research will provide empirical evidence on the current state of inclusivity in school infrastructures, identifying gaps and strengths that can guide improvements. Moreover, this study contributes to the discourse on educational equity by emphasizing how well-designed inclusive spaces foster positive cognitive, emotional, and social outcomes for all learners, particularly those with disabilities or special educational needs (Alimba, Awaraiih, & Arinze, 2024). It recognizes that such environments support students' overall development, enabling them to fully participate and benefit from education, which is essential for their lifelong success and societal integration.

Importantly, the findings will inform policymakers, school administrators, architects, and other stakeholders on necessary interventions to enhance the

physical and functional quality of school facilities. This can lead to the formulation and enforcement of more effective policies and standards that promote universal design principles and ensure schools are safe, accessible, and welcoming for every child (Ahmed, Isiaka, & Tauheed, 2024). Additionally, raising awareness about inclusive design within the educational sector aligns with global sustainable development goals, particularly those focused on quality education, reduced inequalities, and sustainable communities. Ultimately, this study serves as a catalyst for systemic change by advocating for environments where diversity is respected and educational opportunities are truly accessible to all children regardless of their abilities or background. Such inclusive practices are indispensable for fostering social cohesion, equality, and empowerment in Lagos State and beyond.

LITERATURE REVIEW

Inclusive design (ID) in architectural and educational contexts extends beyond merely accommodating physical disabilities; it embraces a holistic approach that considers how individuals interact with spaces socially, cognitively, and emotionally (Zallio & Clarkson, 2021). The concept of inclusion incorporates not only accessibility but also equity and diversity, aiming to create environments that support all users, including neurodivergent individuals and other marginalized groups. According to Zallio and Clarkson (2021), inclusive design encourages architects and educational planners to think broadly about how people use and experience-built environments, pushing beyond compliance with minimum standards to foster true social inclusion. This progressive understanding underscores the importance of creating school environments that accommodate diverse learners and promote participation, equality, and engagement.

Table 1: Accessibility Requirements of Inclusive Design for Low Cognitive Users

Categories	Sub Categories	Element	Accessibility Features
User Design	Children design	Text	Using 14-point text size.
		Navigation	Reduced the structures and navigation hierarchy
			Avoid the use of dragging, scrolling
		Button	Uses larger and more prominent buttons. The size of the touch target is 4 times larger than that of an adult user.
		Audio	Provides a sound function on the button.
	Low cognitive user design	Text	Use common terms or basic terms.
		Graphic	Use familiar and recognizable symbols.
		Navigation	Uses a structure and hierarchy that is easy to follow.
		Audio	Use a simple tone and voice
		Button	Provide a repetition function/process in the learning content.
			Provides back button functionality.
		Game element	Avoid using game elements with competition and earing badges that can cause anxiety. Instead use game elements with rewards to increase motivation.
	Children/low cognitive user design	Instruction	Use clear and simple language and instructions.

Source: Zulkifli et al., 2023

Inclusive Design and Sustainable Educational Development

Education, especially at the primary level, is a fundamental driver for sustainable development. Alimba, Awaraiih, and Arinze (2024) highlight that primary education builds foundational cognitive, social, and emotional skills that prepare children for lifelong learning and societal contribution. In this light, inclusive design within schools becomes crucial, as it ensures that all children, regardless of

ability or background, have equitable access to these developmental opportunities. The integration of inclusive design supports sustainable development by promoting social equity and reducing disparities, thereby fostering human capital that can contribute positively to economic and social progress (Alimba et al., 2024). The alignment between inclusive education and sustainable development emphasizes the need for schools to adopt design features that accommodate diverse learners effectively.

Role of Digital Technologies in Supporting Inclusive Education

Digital technologies are increasingly recognized as vital tools in enhancing inclusive education by providing alternative and accessible modes of learning and interaction. Atakpo (2024) discusses how digitalization in early childhood education can foster personalized learning experiences, improve engagement, and expand access to educational resources, particularly for disadvantaged communities. The use of interactive technologies, such as Learning Management Systems and assistive devices, helps address various barriers related to cognition, sensory processing, and communication, complementing physical inclusive design features in schools. Thus, the integration of digital technologies is essential for supporting diverse learners and ensuring equitable educational outcomes in both public and private primary schools (Atakpo, 2024)**.**

Theories of Inclusive Design Features in Educational Facilities

This study's theoretical framework integrates the principles of Inclusive Design (ID), which extends beyond addressing physical accessibility to encompass how diverse individuals experience and interact with built environments. As Zallio and Clarkson (2021) emphasize, inclusive design creates spaces that accommodate physical, sensory, cognitive, and social differences, fostering diversity, equity, and inclusion from the earliest stages of design. Complementing this, the socio-ecological perspective recognizes the dynamic interaction between individuals and their environments, stressing that educational spaces must consider environmental, social, and cultural factors to enable equitable access and support positive cognitive and emotional outcomes for all learners (Zallio & Clarkson, 2021). The framework further incorporates Digital Inclusion Theory, reflecting the increasing role of technology in enhancing educational accessibility. Atakpo (2024) highlights how

digitalization can personalize learning, increase access in underserved communities, and enhance student engagement. Additionally, the framework accounts for socio-economic and institutional disparities between public and private schools in Lagos State, which influence the availability and quality of inclusive design features, as discussed by Ahmed, Isiaka, and Tauheed (2024). By integrating these perspectives, the framework guides the assessment of both the presence and quality of inclusive design in Lagos State's public and private primary schools, with the goal of promoting equitable and supportive learning environments for all students.

Building Information Modelling (BIM) in Maintenance Management

The empirical review examines various studies on inclusive design in educational settings highlights both progress and persistent challenges in ensuring accessibility, equity, and quality across different school types. Zallio and Clarkson (2021) investigated the implementation of inclusion, diversity, equity, and accessibility (IDEA) within architectural design practices, emphasizing that inclusion extends beyond merely addressing physical disabilities. Their study revealed that inclusive design must also consider sensory, cognitive, and social aspects to truly accommodate diverse users, including neurodivergent individuals. Despite increased awareness and emerging regulations, many design professionals and institutions struggle to fully integrate these broader inclusive principles into practice. This gap between theory and practice is particularly relevant when examining schools, where environments must support varied learning and accessibility needs from the earliest stages.

In the Nigerian educational context, Atakpo (2024) emphasizes the importance of digitalization in early childhood education (ECE), pointing out that technology can personalize learning, increase engagement, and improve access for students from disadvantaged or remote areas. These findings suggest that the quality of inclusive design in schools should encompass both physical infrastructure and the availability of digital tools that enhance participation and learning outcomes. This is crucial for Lagos State, where the disparity between urban and peri-urban or under-resourced communities impacts educational equity.

Ahmed, Isiaka, and Tauheed (2024) examined primary education in Delta State with a focus on the accessibility of digital technology to revamp the sector for

sustainable development. Their study found a pronounced gap between public and private schools regarding access to technological resources, with private schools generally better equipped. This disparity affects the delivery and effectiveness of inclusive education, indicating that availability alone is insufficient if quality and contextual relevance are lacking. Given the socio-economic similarities between Delta and Lagos States, these findings likely mirror the challenges in Lagos public schools, underscoring the need for an evaluative study on both availability and quality of inclusive design features across school types.

The role of legislation and professional development in fostering inclusive design has also been empirically examined. Zallio and Clarkson (2021) highlight the importance of ongoing education for design professionals, including up-to-date knowledge of laws, standards, and inclusive terminology. They advocate for the inclusion of diverse teams early in the design process and the use of collaborative tools to enhance understanding of user needs. However, their research indicates that many institutions have yet to fully embrace these practices, which limits the quality and effectiveness of inclusive design features. This suggests that schools, especially in Lagos, may lack both adequate design inputs and the professional guidance necessary to meet inclusive standards comprehensively.

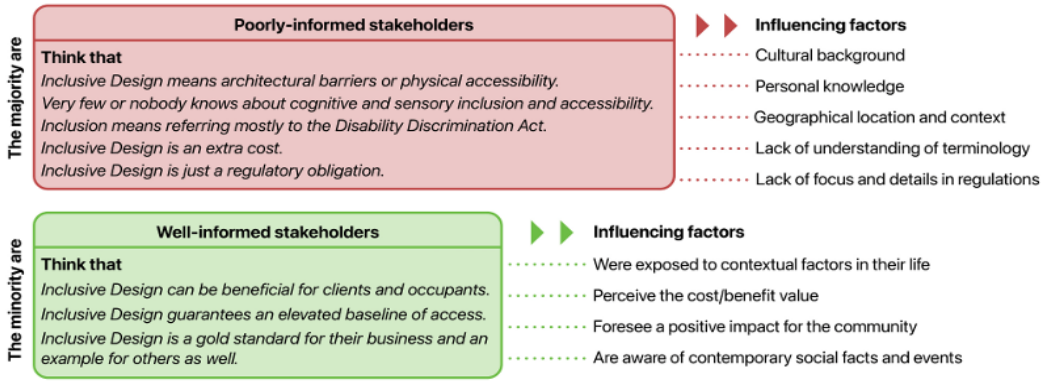


Figure 1: Awareness amongst stakeholders about IDEA: perception and influencing factors.

Source: Zallio and Clarkson (2021)

Moreover, the studies collectively reveal a consistent theme: public schools often face resource constraints and infrastructural inadequacies that compromise the availability and quality of inclusive features compared to private schools. These

disparities affect learners with disabilities, neurodivergent conditions, and other special needs, thereby impacting equitable access to education. For example, physical accessibility might be present but insufficiently supplemented by sensory-friendly spaces or assistive technologies, reducing overall inclusivity (Zallio & Clarkson, 2021; Atakpo, 2024).

Additionally, awareness campaigns and knowledge-sharing platforms, such as online media, social networks, and Continuous Professional Development (CPD) classes, have been recognized as vital mechanisms to improve understanding and application of inclusive design principles among professionals (Zallio & Clarkson, 2021). However, these initiatives are still developing in many Nigerian contexts, suggesting a need for more structured efforts in Lagos to bridge knowledge gaps and promote best practices within schools.

In summary, existing empirical evidence points to a multidimensional challenge in achieving truly inclusive educational environments. It is not sufficient to assess inclusive design by physical standards alone; the quality and contextual appropriateness of features, professional knowledge, legislative support, and integration of technology must also be evaluated. The literature underscores the necessity for comprehensive studies within Lagos State to assess both public and private primary schools on these parameters, aiming to identify gaps and inform policy and practice improvements that ensure equitable and effective education for all learners (Ahmed et al., 2024; Atakpo, 2024; Zallio & Clarkson, 2021).

Identification of Gaps in Literature

This section highlights the research gaps related to the assessment of the availability and quality of inclusive design features in public and private primary schools in Lagos State. Although there is increasing recognition of inclusion, diversity, equity, and accessibility (IDEA) in architectural design, important gaps remain regarding their practical implementation in school environments, especially within the Lagos context.

i. *Limited Context-Specific Research on School Environments:* While extensive studies address inclusive design principles broadly (Zallio & Clarkson, 2021), there is a shortage of empirical research focusing specifically on how these features are available and maintained in public and private primary schools in Lagos State. This results in insufficient

knowledge about the actual conditions and challenges unique to the region's educational infrastructure.

ii. *Inadequate Exploration of Public vs. Private School Disparities:* While extensive studies address inclusive design principles broadly (Zallio & Clarkson, 2021), there is a shortage of empirical research focusing specifically on how these features are available and maintained in public and private primary schools in Lagos State. This results in insufficient knowledge about the actual conditions and challenges unique to the region's educational infrastructure.

iii. *Lack of Awareness and Early Integration in School Design Processes:* There is a documented need for greater awareness and early-stage integration of inclusive design in architectural projects (Zallio & Clarkson, 2021). However, little is known about how such inclusive thinking is embedded from the conceptual phase of school infrastructure planning in Lagos, or how collaborative, diverse design teams are engaged to promote IDEA principles.

iv. *Scarcity of Integrated Studies on Availability and Quality:* Most existing literature tends to treat the availability of inclusive design features separately from their quality or effectiveness. Few studies comprehensively examine both aspects simultaneously in Nigerian schools, leaving a gap in assessing not just the presence but also the functional performance and user satisfaction of inclusive design elements (Atakpo, 2024).

This study aims to address these gaps by thoroughly assessing both the availability and quality of inclusive design features in Lagos State's public and private primary schools, thereby contributing valuable insights toward enhancing equitable learning environments in the Nigerian educational context.

METHODOLOGY

This study adopts a Systematic Literature Review (SLR) as its research methodology. A systematic literature review is a structured and transparent approach to collecting and synthesizing existing research aimed at answering a specific research question comprehensively and objectively. As defined by Dewey and Drahota (2016), an SLR involves identifying, selecting, and critically appraising relevant studies to ensure that conclusions are based on credible, high-

quality evidence. This approach is particularly effective for summarizing broad knowledge areas, identifying gaps in the literature, and establishing a solid foundation for further research. For this study, a systematic search was conducted across major academic databases including Scopus, Web of Science, ERIC, ScienceDirect, and Google Scholar. The search covered literature published between 2020 and 2025 using combinations of keywords such as "inclusive design," "primary schools," "accessibility," "school infrastructure," and "universal design".

A total of twenty peer-reviewed articles were selected for inclusion based on defined criteria. The inclusion criteria required that studies focus on inclusive design in public or private primary schools, be peer-reviewed, published in English between 2020 and 2025, and present clear methodology with either empirical findings or in-depth theoretical insights. Exclusion criteria eliminated articles that focused on secondary or tertiary institutions, lacked methodological clarity, or were opinion-based without sufficient evidence. After removing duplicates and screening titles and abstracts, full-text reviews were conducted to ensure relevance and quality. The selected studies represent a diverse range of perspectives, including those of architects, educators, policymakers, and individuals with disabilities. This systematic selection process ensures methodological transparency and provides a multi-dimensional understanding of how inclusive design is applied across different primary school settings.

FINDINGS

The evaluation of inclusive design features in public and private schools across Lagos State reveals notable disparities in both availability and quality, with private institutions generally demonstrating more progress than their public counterparts. Although awareness of inclusive education is increasing, implementation remains inconsistent. Physical learning environments often lack key inclusive features such as adaptable furniture, shaded outdoor areas, and accessible passageways—elements that students themselves identify as essential for promoting interaction and comfort in daily school activities (Coelho et al., 2022). Pedagogically, the application of Universal Design for Learning (UDL) is more evident in private schools, where varied instructional strategies and assessment methods are somewhat embraced. Conversely, public schools struggle due to inadequate

teacher training and limited infrastructure, which affects the ability to cater to students with special educational needs (Sulaiman & Tahar, 2024). The broader issue lies in outdated school policies and rigid teaching models that fail to accommodate the diversity of today's learners. This highlights the urgent need for a shift from reactive retrofitting to proactive, inclusive planning that integrates accessibility, flexibility, and student-centered design from the outset (Montanari & Persi, 2024). Ultimately, achieving inclusive education in Lagos schools requires sustained investment, teacher capacity-building, and participatory planning involving students, educators, and community stakeholders to ensure equitable access to quality education for all learners.

Table 2: Analysis of Research Articles Relating to Inclusive Design

S/N	Title of Article & Author's & Year	Aims & Objectives	Methodology	Results	Limitation of study
1	Gaurav, N., Kolhe, V., & Jaiswal, A. (2023). Universal design: An embedded case study on the approach towards the inclusion of students with physical disabilities in higher education in India**.**	This study explored architectural barriers faced by students with physical disabilities in Indian higher educational institutions (HEIs) and examined how Universal Design can support their inclusion. It aimed to identify environmental needs that promote participation in academic and social life.	Using a qualitative case study approach, data was gathered from six students with physical disabilities (aged 22–30) and five teachers through interviews and accessibility assessments. Analysis involved identifying key themes through cross-case comparison.	The results showed that most students faced significant barriers, particularly in indoor spaces and areas requiring vertical movement. Students using wheelchairs or walking frames were more affected, leading to reduced participation and social exclusion.	The study is limited by its small sample size and focus solely on physical disabilities, limiting generalizability. While rich in detail, its qualitative nature restricts broad application across all institutions.
2	Babalola, D. O., Sholanke, A. B., Adewale, B. A., & Ene, V. O. (2024). Design of a Therapeutic Student Centre in Covenant University, Ota, Nigeria: User-Centred Approach.	The study aimed to explore students' views on Therapeutic Architecture to guide the design of a therapeutic student center at Covenant University, promoting mental well-being, inclusivity, and holistic health. Objectives included understanding students' awareness and perceptions, identifying important design features, assessing mental health support needs, and uncovering barriers to using such spaces.	Using qualitative methods, data were gathered from student surveys and analyzed thematically. Students emphasized the need for private counseling spaces ensuring confidentiality, recreational areas like gyms and lounges, and sensory elements such as soft lighting, greenery, and calming colors to create a soothing environment.	Accessibility and inclusivity were also crucial, with calls for universal design and gender-neutral facilities to accommodate diverse needs. Integration of technology for virtual counseling and online support was considered essential.	Limitations include the study's focus on a single private university in Nigeria, which may affect broader applicability. The reliance on self-reported survey data limited depth and may introduce bias. Practical challenges like funding and space constraints were not addressed, and some overlapping themes suggest areas for further research refinement.
3	Adewale, B. A., & Odewumi, A. N. (2024). Adoption of Inclusive Architecture Design Strategies in Selected Community Centres, Lagos Mainland, Nigeria.	This study explores student perspectives on therapeutic architecture to inform the design of a student center at Covenant University that promotes mental well-being. It aims to understand students' definitions of	A qualitative approach was used, based on thematic analysis of open-ended survey responses from Covenant University students. The survey gathered insights on	Key findings include the need for private, welcoming counseling spaces, recreational areas, and green outdoor environments. Students valued	The study is limited to students at Covenant University, making findings context-specific and not broadly generalizable. Cultural and institutional factors may influence

		therapeutic spaces, preferred features and services, and potential barriers to usage, with the goal of proposing inclusive, context-specific architectural solutions.	students' experiences with therapeutic spaces, preferred activities, sensory elements, and perceived social or cultural barriers to using such facilities. Responses were coded and analyzed to identify recurring themes relevant to architectural design.	natural lighting, calming scents, acoustic comfort, and sensory-rich elements. Inclusivity and accessibility—across gender, physical ability, and neurodivergence—were emphasized. Technological integration such as virtual counseling, mental health apps, and interactive tools also emerged as important features in therapeutic design.	responses. Additionally, the qualitative nature of the data introduces subjectivity, and the lack of quantitative or longitudinal data limits the assessment of long-term effectiveness. Broader and mixed-method studies are recommended for future research.
4	Ugah, U. K., Sholanke, A. B., Dimuna, K. O., Akinola, A. O., Ene, V. O., & Nduka-Kalu, I. C. (2024). Universal Design Compliance in South-west Nigeria's Federal Universities' Faculty of Environmental Science	The study aimed to assess how well selected Faculty of Environmental Science buildings in Southwest Nigerian universities comply with Universal Design (UD) principles, focusing on accessibility for persons with disabilities (PWDs). It sought to identify barriers within these academic environments, evaluate their alignment with the Discrimination Against Persons with Disabilities (Prohibition) Act of 2018, and suggest improvements for more inclusive design practices.	A qualitative case study approach was used, involving on-site inspections of three universities: University of Lagos, Obafemi Awolowo University, and Federal University of Technology, Akure. The assessment focused on key UD elements such as entrances, ramps, circulation, signage, and interior layouts, using visual observation as the primary data collection method.	Results revealed widespread non-compliance with UD standards. Key issues included inaccessible entrances, poorly designed or absent ramps and handrails, lack of lifts, insufficient tactile features, and inadequate signage. Though some buildings had good natural ventilation and lighting, most failed to reflect inclusive design from the planning stage, suggesting a systemic neglect of accessibility needs.	The study was limited by its focus on environmental science faculties only, reliance on visual observation without user feedback, and absence of detailed analysis of policy enforcement. Nonetheless, it provides valuable baseline data and calls for a more inclusive, policy-driven approach to academic building design in Nigeria.
5	Benítez-Lugo, M. L., Pinero-Pinto, E., Leon-Larios, F., Medrano-	This study aimed to raise awareness about functional diversity among early	Using a mixed-method approach, nine experienced teachers	Findings showed that teachers mainly adapted general	Limitations included the study's single location, small sample

	Sánchez, E. M., de-la-Casa-Almeida, M., & Suarez-Serrano, C. (2021). Inclusive design in the field of education from the paradigm of early intervention.	childhood education students by designing a creative storytelling and game-based task focused on children with special educational needs. It also sought to analyze teachers' coping strategies and perceptions of inclusion, as well as assess children's memory, emotions, and satisfaction related to the activity.	were interviewed about their inclusion practices and training needs, while 97 children participated in the creative task. Teacher responses were analyzed qualitatively, and children's memory and emotional reactions were assessed quantitatively using statistical tests.	classroom activities rather than creating individualized routines due to constraints like time and resources. They stressed the need for ongoing training in functional diversity, which is currently lacking in teacher education. Children generally remembered the story well, showed empathy, and were satisfied with the activity; girls remembered the story better than boys, and older children exhibited greater empathy.	size, and the task being administered only once, which limits generalizability and long-term conclusions. Future research should explore broader contexts and more personalized inclusion strategies.
6	Zulkifli, N. R., Sahari, N., Zin, N. A. M., & Majid, R. A. (2023). Inclusive Design Requirement in Designing Accessibility for Low Cognitive Users.	This study aimed to design **NUMERATica**, an inclusive gamification application to improve learning accessibility for low cognitive children. The objectives were to identify their challenges, analyze inclusive design requirements, develop the application accordingly, and evaluate its usability.	The methodology involved a literature review and requirement analysis focused on the cognitive and physical limitations of children. Based on these findings, NUMERATica was developed with features like simple navigation, large buttons, clear instructions, and familiar graphics. Usability testing was conducted with eight eight-year-old pupils from a remedial class, under teacher supervision, with	Results showed high usability across all modules, with scores ranging from 95% to 100%, indicating that the inclusive design effectively addressed accessibility barriers and supported user engagement. However, the small sample size, limited participant diversity, focus on short-term usability, and controlled testing environment limit the generalizability of the findings.	Results showed high usability across all modules, with scores ranging from 95% to 100%, indicating that the inclusive design effectively addressed accessibility barriers and supported user engagement. However, the small sample size, limited participant diversity, focus on short-term usability, and controlled testing environment limit the generalizability of the findings.

			appropriate approvals and informed consent.		
7	Black, M. H., McGarry, S., Churchill, L., D'Arcy, E., Dalgleish, J., Nash, I., ... & Girdler, S. (2022). Considerations of the built environment for autistic individuals: A review of the literature.	This study aimed to assess how well inclusive architectural design strategies have been adopted in selected community centres in Lagos Mainland, Nigeria. It focused on evaluating accessibility, sensory comfort, signage, material use, and flexible spaces to identify gaps and suggest improvements for accommodating diverse users, including those with disabilities.	The research used a case study approach, examining three community centres through field observations and visual inspections. Each centre was evaluated against inclusive design criteria such as access arrangements, circulation, signage, and facility adaptability. Adoption levels were scored and compared to highlight strengths and weaknesses.	Findings showed varying adoption levels: 70% for Case Study 1, 59% for Case Study 2, and 58% for Case Study 3. Strengths included accessible entrances, clear signage, good circulation, and flexible layouts. However, critical gaps like the absence of accessible toilets, parking spaces, tactile guides, and incomplete handrails were noted. The study emphasized the need to update building codes to enforce inclusive design.	Limitations included a small sample size limited to three centres, restricted access due to renovations and security, and reliance on observations without user feedback. These factors limited the depth and generalizability of the findings. Future studies should expand the sample, use mixed methods, and incorporate user perspectives.
8	Cordan, Ö., & Gülbahar, S. (2023). Design guideline for life center unit for inclusive schools in Turkey.	This study aimed to develop design guidelines for interior spaces of life center units in inclusive education schools in Turkey, focusing on supporting students with special educational needs (SEN) through Universal Design principles. It sought to define spatial and functional requirements to help students acquire essential life skills and guide designers in creating adaptable and user-friendly environments.	The methodology included field studies at two inclusive schools in Ankara, combining literature review, site visits, architectural plan analysis, photographs, and informal interviews with school staff. Data were analyzed based on Universal Design criteria and observations of current usage.	Results showed that life centers are essential support spaces that evolved from open-plan layouts to more structured, flexible designs to better serve students with neurological and muscular disabilities. Key design principles such as equity, flexibility, safety, and ergonomic considerations were highlighted. Collaboration among educators, therapists,	The study was limited by its focus on only two schools, potential subjective biases, and the lack of national standards, which restricts the wider applicability of the findings.

				and inclusive education organizations was found crucial for effective design.	
9	Blackwell, B., & Yaneva, A. (2024). School buildings as performative machines: the new architectural devices of control.	This study investigates how control and discipline are mediated through the architecture of a contemporary school, focusing on how spatial design influences the daily practices of pupils and teachers. It explores how features like sightlines, sound, and spatial arrangements create overlapping "orbits of control," enabling informal surveillance and behavioural management. The research challenges traditional ideas of spatial control by revealing a fluid, polycentric network of control where both students and teachers experience visibility and negotiation within the built environment.	Methodologically, the study uses qualitative interviews with staff and pupils, observations of spatial use, and analysis of architectural plans. It emphasizes both visual and auditory aspects of control, drawing on spatial theories to analyze the complex interactions between architecture and schooling practices.	Findings show the school's atrium serves as a social hub and site of informal surveillance, with teachers maintaining control through open doors and sound monitoring. Some areas become "blind spots" where control weakens, highlighting tensions between openness and privacy that lead to ongoing spatial adjustments. The study reveals that control is partial, negotiated, and multi-directional, rather than fixed or absolute.	Limitations include the focus on a single school, potential subjectivity in qualitative data, and incomplete capture of sound-based control. The study suggests further research with diverse and longitudinal methods to better understand the evolving and unstable nature of spatial control in schools.
10	Ahmed, S., Isiaka, N. A., & Tauheed, I. A. (2024). Effectiveness of Inclusive Design for Children with Disabilities in Nigerian Education Buildings.	This study aimed to examine how inclusive design principles are applied in Nigerian public primary schools and their impact on children with physical disabilities. It focused on assessing the accessibility of school buildings and facilities, identifying design barriers, and recommending	Using questionnaires, the study collected data from physically disabled pupils and school staff in Abuja public primary schools. The analysis showed that 66.4% of respondents valued inclusive design for their spatial experience, but many school buildings lacked	The findings highlight that inclusive design principles are largely absent in these schools, stressing the need for policy changes and infrastructure upgrades to better support students with disabilities.	The study was limited by its inability to include deaf and dumb children due to communication barriers, focusing only on children with physical disabilities. Future research should address accessibility for all disability types.

		improvements for a more inclusive environment.	essential features like ramps, accessible restrooms, and adequate hallway and bathroom sizes. Classroom furniture also restricted mobility. Ten key accessibility criteria were statistically significant but not reflected in existing infrastructure. However, the study excluded deaf and dumb children due to communication difficulties, limiting its scope.		
11	Alimba, R. U., Awaraiih, I. A., & Arinze, P. N. (2024). REVAMPING PRIMARY EDUCATION SECTOR FOR SUSTAINABLE DEVELOPMENT IN DELTA STATE THROUGH ACCESSIBITY OF DIGITAL TECHNOLOGIES.	The study aimed to evaluate the accessibility of digital hardware and software technologies among primary school teachers in Delta State, with a focus on their potential to support sustainable development in education.	A survey was conducted involving 1,336 primary school teachers who rated the accessibility of various hardware and software digital technologies in their schools using a standardized scale.	Findings revealed that only smartphones were accessible among hardware technologies, while devices such as laptops, tablets, and computer labs were largely inaccessible. Similarly, all assessed software tools, including internet browsers, productivity suites, and learning management systems, were rated as not accessible. This indicates poor availability of digital technologies necessary for improving the primary education sector in Delta State.	The study was limited to Delta State, relying on self-reported data which may introduce bias. It focused on accessibility rather than actual usage or quality of technologies and did not account for possible urban-rural disparities.

12	Atakpo, T. E. (2024). Digital Natives and Digitalization for Building Early Childhood Education Future in Nigeria	This study explores how digital technology and digital natives influence the future of early childhood education. It highlights benefits such as personalized learning, increased access for disadvantaged communities, and enhanced engagement through interactive tools. The study also addresses challenges like limited teacher training, resistance to technology use, equity issues, and health concerns related to screen time. It aims to offer practical recommendations for parents, educators, and policymakers on effectively integrating technology to improve learning outcomes.	The methodology involves a review of existing literature from researchers like Downes et al. (2021) and Judge (2022), synthesizing findings about the current use, benefits, and barriers to technology adoption in early childhood settings. This approach provides a broad overview without collecting new primary data.	Results show that digital tools can support social interaction, improve documentation of children's progress, and aid cognitive development in areas such as logic and math. However, challenges remain, including lack of teacher preparedness, unequal access to technology, and outdated curricula. Resistance to technology based on concerns about its appropriateness for young children also limits uptake	Limitations of the study include its reliance on secondary data, which may not fully capture recent trends or local contexts, especially in resource-limited settings. The absence of primary research restricts insights into real-time technology use, and measuring long-term learning impacts remains difficult. Despite these constraints, the study underscores the importance of equitable access, ongoing teacher support, and thoughtful implementation for digital technologies to truly benefit early childhood education.
13	Zallio, M., & Clarkson, P. J. (2021). Inclusion, diversity, equity and accessibility in the built environment: A study of architectural design practice.	The study aims to explore the challenges and opportunities that Inclusion, Diversity, Equity, and Accessibility (ID) bring to architectural design, focusing on professionals' perceptions and expanding ID beyond physical accessibility to include sensory and cognitive needs. The study appears to use a qualitative approach, examining current practices, legislation, and educational efforts influencing ID in architecture.	The study employs a qualitative research approach to explore architectural professionals' perceptions of Inclusion, Diversity, Equity, and Accessibility (ID) in their design practices. While specific methods are not detailed in the excerpt, the research likely involves interviews, surveys, or case studies to gather insights on the challenges and	The findings show that inclusion involves understanding how people interact with spaces socially and cognitively, not just physically. While ID is well established in engineering and product design, it is only recently gaining attention in architecture. The study highlights the importance of updated legislation, continuous education, collaborative design	Limitations include the novelty of ID in architecture, evolving standards that require ongoing learning, possible resource constraints for diverse teams, and the complexity of addressing cognitive inclusion fully. The research likely relies on self-reported professional views, which may affect consistency.

			opportunities related to ID. Additionally, the study reviews relevant legislation, standards, and educational initiatives that influence how ID is understood and applied within the architectural field.	teams, and inclusive terminology to improve ID implementation from early design stages.	
14	Coelho, C., Cordeiro, A., Alcoforado, L., & Moniz, G. C. (2022). Survey on Student School Spaces: An inclusive design tool for a better school.	This study aimed to develop and test a participatory design tool—the Survey on Student School Spaces (S3S)—to gather student feedback on their school environments and inform future refurbishments. The goal was to create more inclusive, adaptable, and resilient learning spaces by engaging students directly in the design process, fostering a stronger connection between users and their physical environment.	The methodology combined an online questionnaire and a physical walkthrough. The questionnaire used photographs of school spaces to prompt student ratings on usage, comfort, cleanliness, and emotional responses. Walkthroughs allowed small groups of students to explore selected spaces and suggest improvements. Prior to these steps, researchers conducted socio-geographic analyses and staff interviews to tailor the tool to each school's context. Data collected was synthesized and shared with a design team to guide refurbishment proposals.	Results showed that S3S effectively captured student perspectives and produced actionable insights, even during the COVID-19 pandemic. Students responded well to the visual, interactive format and provided concrete suggestions that informed meaningful design interventions. While piloted in two schools in Coimbra, Portugal, early trials in the UK, Italy, and Australia indicated its broader potential.	Limitations included the small sample size and the focus on a single city, which may limit generalizability. Online access issues and limited student participation in walkthroughs also posed challenges. Additionally, implementation of proposed changes depended on available resources and policy support. Further testing across diverse contexts is needed to validate the tool's broader applicability.
15	Angelaki, S., Frelin, A., Grannäs, J., Besenecker, U., & Danielsson, C. B. (2024, March).	The study aimed to understand how spatial elements in primary school classrooms such as furniture layout, lighting,	Conducted in a Swedish primary school, the study used participatory workshops with	Teachers proposed diverse layouts tailored to different activities, favoring more structured setups	One group's data was excluded due to model mismatch, and the study's single-site focus limits generalizability.

	Methods for inclusive design processes at the early stages of a research project in School Environments.	and architectural features affect teaching and learning. It focused on capturing teachers' insights through participatory design workshops, exploring their preferences for different classroom setups based on various learning activities like teacher-led sessions, individual work, and group tasks. The goal was to move beyond traditional retrofitting by involving teachers in creative spatial planning.	teachers, involving scale models, worksheets, observations, photos, and a questionnaire. Teachers worked in groups to design layouts for specific learning scenarios, proposing spatial and lighting solutions. The feedback was collected through both discussions and structured questionnaires, providing a mix of qualitative and quantitative data.	for teacher-led sessions and flexible ones for group work. Lighting preferences included combining ceiling lights with movable lamps for adaptability. Teachers valued digital tools for presentations and analog tools for individual tasks. Feedback highlighted the usefulness of scale models and a desire for more time and resources during sessions. Window placement and lighting control were also noted as important factors in student focus.	Some teachers were unfamiliar with new digital tools, which may have affected their input. Time constraints and inconsistent worksheet responses also impacted data quality, though later sessions were adjusted to address these issues.
16	Odhiambo, A. I. Inclusive Project Design Orientation and Educational Achievements of Orphaned Primary School Learners Registered in Orphan Support Projects in Kenya.	This study aimed to examine how inclusive project design influences the educational achievement of orphaned and vulnerable children in Homa Bay County, Kenya. It focused on how elements like valuing learners' views, fostering a sense of belonging, and addressing individual needs affect academic outcomes. The goal was also to provide insights for improving inclusive practices in support projects.	A quantitative approach was used, with 918 participants responding to structured questionnaires. Responses to both positive and negative statements about project inclusiveness were analyzed using descriptive statistics, Pearson correlation, and simple linear regression. ANOVA was applied to test the significance of the regression model.	Findings showed that inclusive design—such as listening to learners and making them feel valued—was positively associated with better academic performance. Regression results indicated that inclusive project orientation significantly predicted educational outcomes, explaining 34.5% of the variance in performance.	The study was limited by its focus on one region, reliance on self-reported data, and the lack of qualitative insights. It also highlighted the absence of a national policy framework for orphaned learners' education as a barrier to broader implementation of inclusive practices.
17	Coelho, C., Cordeiro, A., Alcoforado, L., &	The projects aimed to create inclusive learning	The methodology involved play-based	Results showed increased pupil	Limitations included children's short

	Moniz, G. C. (2022). Survey on Student School Spaces: An Inclusive Design Tool for a Better School.	environments that support participation, respect differences, and develop both individual and group identities in preschool and primary schools. Objectives included enhancing pupil autonomy, fostering social skills, and providing teachers with tools to design motivating, accessible lessons that cater to diverse needs, especially for pupils with special educational needs.	learning, peer tutoring, and hands-on activities using multisensory materials like art, music, and digital tools. The projects engaged children in small and large groups throughout the year, encouraging creativity, social interaction, and community involvement. Teachers and pupils participated in self-assessment to adapt and improve the learning process.	engagement, better inclusion of special needs children, and stronger social bonds. Creative activities helped children express themselves and develop a sense of belonging. Teachers benefited from ongoing reflection, and community collaboration enriched the learning experience.	attention spans, occasional classroom management challenges, and reliance on resources and external support. Scaling these practices sustainably requires wider systemic support beyond individual classrooms.
18	Sulaiman, L. H., & Tahar, M. M. (2024). Implementation of universal learning design principles by mainstream teacher in inclusive education programs.	The main aim was to develop inclusive, supportive, and motivating learning environments for pupils in preschool and primary education, with a focus on accommodating diverse learning needs, including those with special educational needs. The objectives included enhancing pupils' autonomy and social skills, fostering group identity, improving teacher competence in inclusive pedagogies, and creating engaging, accessible lessons that promote participation and creativity.	The study employed play-based learning approaches, peer tutoring, and multisensory activities such as art, music, and digital tools to engage pupils. Both small and large group interactions were facilitated throughout the school year. Teachers and pupils took part in self-assessment processes to continuously adapt and improve the learning environment. The methodology emphasized active involvement, creativity, and collaboration	The approach led to increased pupil engagement, better inclusion of children with special educational needs, and strengthened social relationships. Creative and hands-on activities allowed pupils to express themselves and build a sense of community. Teachers gained from reflective practices and increased confidence in inclusive teaching strategies, while community involvement enriched the learning process.	Challenges included managing children's limited attention spans, occasional classroom discipline issues, and dependency on adequate resources and external support. Additionally, sustaining these inclusive practices on a larger scale requires systemic backing beyond individual schools.
19	Michail, N., Ozbil Torun, A., & Parnell, R. (2025). Towards child-friendly and walkable	The study aimed to explore how neighbourhood design affects children's experiences and choices	Using a child-centred qualitative approach, the study collected data through focus groups	Results showed that pedestrian streets, cycling lanes, low-traffic areas, and local	Limitations included a small sample size, lack of parental input, and context-specific

	cities: Children's insights on neighbourhood design.	regarding active travel to school. It focused on identifying child-friendly urban features like green spaces and pedestrian areas that encourage walking and social interaction. The study also emphasized the importance of involving children directly in research to improve urban planning.	and mapping activities where children shared their experiences. Due to COVID-19, planned walking tours were canceled. Data were analyzed thematically, supported by qualitative GIS to map children's spatial experiences.	green spaces positively influenced children's active travel and play. Safety concerns and busy roads discouraged walking. Social benefits of pedestrianisation were evident, promoting community ties and children's sense of belonging. The study also found that healthy food shops near parks may encourage better eating habits. Involving children provided valuable insights often missed by adult-only research.	findings. COVID-19 restrictions limited observational methods, and some factors like travel modes and demographics were not fully explored. Further research is needed to understand cultural and economic influences on children's travel behaviours.
20	Montanari, M., & Persi, R. (2024). Designing for/in the inclusive school.	The study aimed to create an inclusive educational program combining music and art to help primary pupils explore the seasons. Objectives included developing pupils' skills in music, visual arts, understanding class content, and encouraging creativity while promoting participation from all pupils, including those with special needs or socio-cultural challenges	The approach used play, peer tutoring, and hands-on workshops involving sensory materials, digital tools, and group activities. Pupils engaged in creating musical instruments, art projects, and interactive games. Field trips and documentation through videos, diaries, and self-assessments supported reflection and improvement.	The project increased pupil engagement and cooperation, successfully including children with diverse needs. Peer tutoring enhanced social interaction and motivation. The mix of artistic, musical, and digital activities supported varied learning styles, fostering creativity and autonomy. Ongoing reflection helped adapt teaching methods.	Challenges included managing energetic pupils and resource dependency, limiting wider application. The study was limited to one class and short duration, affecting generalizability and long-term impact. Self-assessment methods also relied on participant honesty, which may influence evaluation accuracy.

CONCLUSION AND RECOMMENDATIONS

This research on using simulation to study the availability and quality of inclusive design features in public and private primary schools in Lagos State highlights the critical need for inclusivity in educational environments. Inclusive design is essential for fostering accessibility, equity, and diversity, ensuring that all students, regardless of their abilities or backgrounds, can participate fully in the learning process (Zallio & Clarkson, 2021). While the global discourse on inclusion and accessibility in architecture has made significant progress, there remains a gap in the practical implementation of these principles within Nigerian primary schools, particularly when comparing public and private institutions. Several studies have emphasized the transformative role of digital technologies and inclusive educational practices (Alimba, Awaraiih, & Arinze, 2024; Atakpo, 2024). However, empirical evidence specifically addressing the availability and quality of inclusive design features within Lagos State primary schools is sparse. Additionally, existing research often fails to comprehensively evaluate both availability and functional quality together, thereby limiting the understanding of how inclusive features impact the educational experiences of students.

To address these gaps, this study recommends conducting localized research to better understand the unique challenges faced by public and private primary schools in Lagos State concerning inclusive design. Comparative analyses should evaluate the differences between public and private schools to identify disparities and areas needing targeted interventions. Additionally, a systematic review of policies and professional practices influencing the adoption of inclusive design features can help bridge the policy-practice gap. Raising awareness among school administrators and design professionals about inclusive design standards is crucial, as is providing training and continuous professional development to promote the integration of inclusion principles from the planning and construction stages (Zallio & Clarkson, 2021). Addressing these areas can significantly enhance the accessibility and quality of learning environments in Lagos State, fostering a more inclusive educational system that aligns with global best practices.

Limitations

This study is based solely on a systematic review of literature, with no collection of primary data from Lagos State schools. As such, findings are reliant on

secondary sources and may not fully capture the on-ground realities, cultural nuances, or infrastructural constraints faced by local institutions. Future studies should incorporate field observations, stakeholder interviews, or user-centered evaluations to validate and expand upon the insights presented here.

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