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Universal Accessibility in the Design of Public Post Primary Schools: A. Case Study of Birnin Kebbi Metropolis

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ABSTRACT: This research investigates the universal accessibility of secondary school buildings in Birnin Kebbi Metropolis, Nigeria, with a specific focus on understanding and improving physical infrastructure to accommodate diverse needs. Recognizing the fundamental right to education for all, including individuals with disabilities, the study utilizes a case study approach to assess the current state of secondary school buildings in the selected region. Employing a qualitative research approach, specifically an observational study and using an observation checklist as a data collection method, the research aims to identify barriers and challenges to universal accessibility. Key areas of examination include the adequacy of infrastructure, the presence of inclusive design features, and overall compliance with accessibility standards. The research contributes valuable insights to the existing knowledge on inclusive education in Nigeria, shedding light on the current status of secondary school buildings in Birnin Kebbi Metropolis. The findings shows that most of the public secondary schools in Birnin Kebbi were not designed with consideration for inclusiveness. The findings also includes recommendations for policy enhancements, architectural interventions, and awareness campaigns to create a more inclusive and accessible educational environment. By advocating for universally accessible secondary school buildings, the research aims to address the diverse needs of students, fostering an equitable and empowering educational experience for all. Overall, this research bridges gaps in understanding the accessibility landscape of secondary schools in Birnin Kebbi Metropolis. It not only identifies existing challenges but also proposes actionable recommendations for policymakers, architects, and educators to collaboratively work towards a more inclusive educational infrastructure in Nigeria.

KEYWORDS: Universal accessibility, Secondary school buildings, Inclusive education, Design characteristics

1.0 INTRODUCTION

Access to quality education is a cornerstone of societal development and individual empowerment. In Nigeria, as in many other countries, the realization of inclusive education is not only a matter of policy but also depends on the physical infrastructure of educational institutions (Hayes & Bulat, 2017). With regard to Nigerian secondary education, the right to education is considered fundamental, and efforts have been made to enhance inclusivity (Obi & Ashi, 2016). This pursuit of inclusive education has gained global recognition as a fundamental human right, ensuring equal opportunities for all individuals, including those with disabilities (Kanter et al., 2014). However, despite these efforts, there exists a critical gap in the understanding and provision of universally accessible school buildings, especially in the case of public secondary schools in Birnin Kebbi Metropolis.

The majority of people with disabilities do not receive an education, and those who do receive an education that is not on par with their non-disabled counterparts. The Convention on the Rights of Persons with Disabilities (CRPD) was adopted by the United Nations in 2006. The CRPD aims to create equality in all aspects of life for individuals with disabilities, including education. Article 24 of the Convention on the Rights of the Child particularly requires States Parties to "ensure an inclusive education system at all levels and lifelong learning" (United Nations, 2022).

The universal call for inclusive education, as underscored by global initiative emphasizes the removal of barriers to education for individuals with diverse needs. Universal accessibility in secondary school buildings constitutes an indispensable element of inclusive education (Sholanke et al., 2019), given its pivotal role during the formative stage of adolescence, the secondary school period represents a critical juncture in shaping the intellectual, emotional, and social development of individuals. Ensuring universal accessibility within educational facilities at this stage is imperative, as it mitigates the potential consequences of discrimination, fostering an inclusive environment that guards against isolation, resentment, and the emergence of deleterious social behaviors (Hayes & Bulat, 2017). By accommodating diverse physical and cognitive needs, universally accessible secondary school buildings not only comply with the principles of equity and social justice but also contribute significantly to the cultivation of an inclusive educational milieu that promotes holistic development, thereby fortifying the foundations for a more harmonious and socially responsible society (Shaeffer, 2019).

In the pursuit of global inclusivity and the fulfillment of the right to education for all, the architectural design of

educational institutions plays a pivotal role. Universal accessibility of secondary school buildings is especially, an essential component of both an inclusive education system and effectively an inclusive society. While policy frameworks exist to support inclusive education, the translation of these policies into architectural design practices remains a challenge, especially in developing regions (Woodcock et al., 2022). This research addresses the imperative need to implement architectural design strategies that foster universal accessibility in secondary school buildings. With a specific focus on secondary schools within Birnin Kebbi Metropolis, the study aims to explore current architectural practices, identify challenges, and propose innovative design interventions to create educational environments that are accessible to students of all abilities. The focus is on understanding and suggesting improvement on the physical infrastructure to accommodate diverse needs, particularly those of students with disabilities. The study is grounded in the broader framework of inclusive education, which emphasizes the importance of creating an educational environment that caters to the diverse needs of all students, regardless of their physical abilities.

1.1 Background to the Study

Global efforts towards inclusive education have gained momentum as nations recognize the imperative of providing quality education for all, irrespective of individual differences (Thoresen, 2023). Governments, international organizations, and non-governmental entities are collaboratively working to dismantle barriers that hinder equal access to education, including those related to gender, disability, socio-economic status, and cultural diversity (Adebayo, 2021). This involves developing inclusive policies, adapting teaching methods, fostering supportive learning environments, and ensuring accessible infrastructure (Hayes & Bulat, 2017). The push for inclusive education aims to empower every learner with the skills and knowledge needed to participate fully in society, fostering a more equitable and diverse global educational landscape (Gottschalk & Weise, 2023).

Several global initiatives have been launched to promote inclusive education on a broad scale, recognizing its pivotal role in fostering sustainable development and social cohesion. The United Nations' Sustainable Development Goal 4 (SDG 4) calls for inclusive and equitable quality education for all, prompting various international programs and partnerships. UNESCO's Education for Sustainable Development (ESD) initiatives emphasize the importance of inclusive and transformative education (Saini et al., 2023). The Global Partnership for Education (GPE) works to ensure that education systems are inclusive, providing financial support and policy guidance to partner countries (Singal, 2020). Additionally, organizations like the World Bank and UNICEF implement projects and programs aimed at removing barriers to education, such as those related to disability and gender disparities (World Bank, 2021). These concerted efforts underscore a global commitment to making education accessible to everyone, irrespective of diverse backgrounds and abilities.

Initiatives towards inclusive education are imperative, particularly in many third-world countries where the prevalence of separate schools for special education perpetuates discrimination (Prilutskaya, 2023). Such segregated systems not only reinforce societal stigmas but also limit the opportunities for individuals with diverse abilities to fully participate in mainstream society (Neubauer & Hofer, 2021). Inclusive education recognizes the inherent value and potential of every learner, fostering an environment where differences are embraced and accommodated (Reid, 2022). These initiatives aim to break the cycle of exclusion, ensuring that all students, regardless of their background or abilities, have equal access to quality education. In doing so, they contribute not only to individual empowerment and social justice but also to the overall development and cohesion of communities, fostering a more equitable and inclusive global society (Gottschalk & Weise, 2023).

The physical environment plays a crucial role in shaping social interactions and educational experiences, and when schools are designed with inclusivity in mind, they set the foundation for a more accessible and welcoming community. Inclusive architecture considers diverse needs, such as those related to mobility, sensory perception, and learning styles, ensuring that spaces are adaptable and universally accessible (Hubbard & Carroll, 2023). This not only accommodates students with disabilities but also promotes a culture of diversity acceptance, breaking down physical barriers and encouraging collaboration among students of varied backgrounds and abilities (Glass, Hickman, & Byars, 2023). Prioritizing inclusive design in educational infrastructure helps society sends a powerful message that values the participation and contributions of every individual, promoting a sense of belonging and equality from an early stage in the educational journey.

2.0 LITERATURE REVIEW

2.1 Universal accessibility

Universal accessibility embodies a fundamental commitment to ensuring that all individuals, regardless of their physical or cognitive abilities, can access and participate fully in the various facets of society (Brillante & Nemeth, 2022). Rooted in the principles of inclusivity and equal opportunity, universal accessibility extends beyond physical accommodations to address a broad spectrum of needs, thereby fostering a more equitable and inclusive world (Kaplan, 2020). In the built environment, universal accessibility manifests through architectural design that considers the diverse requirements of individuals with varying abilities (Steffan, De Salvatore, & Matone, 2022). This includes features such as ramps, elevators, widened doorways, and tactile indicators to facilitate the seamless movement of people with mobility or sensory challenges.

Beyond physical infrastructure, universal accessibility also encompasses digital spaces, advocating for websites, software, and communication platforms that are navigable and comprehensible for users of all abilities (Brillante & Nemeth, 2022).

According to Zając (2016) the concept of universal accessibility transcends physical spaces to encompass services, information, and communication. Accessible transportation, inclusive educational practices, and employment opportunities that accommodate diverse needs are integral components of a universally accessible society. In addressing the barriers that hinder participation, universal accessibility seeks to empower individuals and enhance their quality of life. Moreover, universal accessibility is closely linked to legislative frameworks and policies that promote and enforce inclusive practices. Laws such as the Americans with Disabilities Act (ADA) in the United States and similar legislation globally underscore the societal commitment to breaking down barriers and fostering an environment where everyone can contribute and thrive (Giannoumis & Nordli, 2020).

In the realm of architecture and infrastructure, universal accessibility promotes designs that go beyond compliance with minimum standards. It advocates for features that consider a wide range of abilities, from accessible entrances and restrooms to inclusive signage and seating arrangements (Sherman et al., 2021). This approach acknowledges that designing for accessibility benefits not only those with visible disabilities but also individuals with temporary impairments, parents with strollers, or the aging population (Brillante & Nemeth, 2022).

The principles of universal accessibility extend into the realms of transportation, education, and employment. In education, universal design for learning accommodates diverse learning styles and needs, fostering an environment where all students can succeed (OECD, 2020). Employment practices that prioritize accessibility create workplaces where individuals with disabilities can contribute their skills and talents fully (Kahancová, 2010). Legal frameworks mandate the implementation of inclusive practices, ensuring that public spaces, services, and information are accessible to all (Kobko, 2023). Such laws not only protect the rights of individuals with disabilities but also promote a societal shift towards greater awareness and acceptance (Crossley, 2017).

2.2 Inclusive Architectural Design

Inclusive architectural design, a cornerstone of universal accessibility, is a strategic and indispensable approach aimed at ensuring that built environments cater to the needs of all individuals, regardless of physical abilities or disabilities (Froyen, 2023). This design paradigm transcends mere compliance with accessibility standards; it embodies a commitment to fostering an inclusive and equitable society (Gilbert, 2019). At its core, inclusive architectural design involves creating spaces that are accessible to everyone, irrespective of age, mobility, or sensory capabilities (Vandenburg, 2021). Ramp installations, elevators, and widened doorways are quintessential components that facilitate ease of movement for individuals with mobility challenges, embodying the principle of universal access. Moreover, tactile indicators, audible signals, and visual cues contribute to an inclusive environment that caters to those with visual or auditory impairments (Wong & Cohen, 2016).

The concept of universal accessibility extends beyond mere compliance, embracing a holistic understanding of diverse needs. Inclusivity in architectural design involves creating environments that are not only physically accessible but also cognizant of the sensory and cognitive requirements of the occupants (Zając, 2016). For instance, well-designed lighting and acoustics accommodate individuals with sensory sensitivities, promoting an environment that is universally welcoming. Flexibility and adaptability are paramount in inclusive architectural design. Spaces should be designed with modularity and versatility, allowing for adjustments that cater to evolving needs (De Paris et al., 2023). This adaptability is particularly crucial in educational institutions, where the diverse needs of students and faculty necessitate a dynamic and accommodating physical infrastructure (Rainforth & England, 2020).

Inclusive architectural design for universal accessibility is a multidimensional commitment that transcends the mere provision of physical accommodations (Suwannawut, 2019). It is a pledge to create environments that empower and embrace diversity, acknowledging that true accessibility goes beyond compliance, incorporating the principles of equity, dignity, and inclusion (Brown et al., 2022). This approach not only transforms the physical landscape but also contributes to the creation of a society where everyone can participate fully, independently, and with dignity.

2.3 Universal Access to Education and Inclusive Architectural Design

Inclusive architectural design, with a deliberate focus on accommodating the needs of students with diverse abilities, holds profound significance within the educational milieu (Brown et al., 2022). This is consistent with the core tenets of social justice, striving to establish an educational environment that is equitable and accessible to all learners, regardless of their physical or cognitive capacities (Gilbert, 2019).

Primarily, inclusive design addresses the imperative of physical accessibility, facilitating independent navigation for students with mobility challenges (Chen, 2023). Features such as ramps, elevators, and widened doorways cultivate an environment fostering autonomy, reinforcing the principle of inclusivity (Khuman, 2018). The applicability extends beyond students with apparent disabilities to encompass those with temporary impairments, thereby establishing an adaptable and universally accessible infrastructure.

Furthermore, inclusive architectural design acknowledges the varied sensory needs of students. Incorporating elements such as well-illuminated spaces, tactile surfaces, and auditory aids

caters not only to individuals with specific sensory requirements but also contributes to an environment universally accessible to the entire student body (Suwannawut, 2019).

In addition, inclusive design aligns with and bolsters inclusive education practices by creating spaces that accommodate diverse learning styles (Chen, 2023). Classrooms equipped with flexible furniture arrangements, varied seating options, and integrated technology cater to the spectrum of student needs, promoting an inclusive pedagogical experience (Brown et al., 2022). This fosters collaborative learning, peer support, and interaction among students with differing abilities.

Moreover, inclusively designed school buildings play a pivotal role in destigmatizing disabilities and cultivating a culture of acceptance (Marquardt, 2020). Seamless integration of students with diverse abilities into the physical fabric of the school engenders a sense of belonging, mitigating the risk of isolation or marginalization (Hayes & Bulat, 2017). The importance of inclusive architectural design transcends mere physical accessibility. It not only addresses the imperative of creating an inclusive learning environment but also contributes to the cultivation of a culture characterized by acceptance and understanding, thereby advancing the principles of a just and compassionate society (Zając, 2016).

3.0 METHODOLOGY

The research methodology employs a case study approach to investigate the universal accessibility of secondary school buildings in Birnin Kebbi Metropolis, Nigeria, focusing on enhancing physical infrastructure to accommodate diverse needs. The study recognizes the fundamental right to education for all, including individuals with disabilities, and aims to contribute valuable insights to the existing knowledge on inclusive education in Nigeria.

3.1 Research Design

The study adopts a mix-method research approach, specifically employing an observational study within the selected region to collect both qualitative and quantitative data. The case study design allows for an in-depth exploration of the current state of secondary school buildings in Birnin Kebbi Metropolis, providing context-specific findings.

3.2 Sampling

The research targets the 13 public secondary schools in Birnin Kebbi Metropolis as the primary sampling units. A purposive sampling technique is utilized to select public secondary schools in the region with consideration for demographic factors as well as their representation of the diversity of the region in terms of size, location, and infrastructure.

3.3 Data Collection

Observational study will be the primary method of data collection. Researchers will use an observation checklist developed specifically for this study to systematically assess the physical infrastructure of selected secondary school buildings. The checklist covers key areas such as the adequacy of infrastructure, the presence of inclusive design features, and compliance with accessibility standards. Where (X) represents the presence of such infrastructure and (-) represents as lack of consideration for the infrastructure in the design

Table 1: Checklist of inclusive design elements for universal access in Public secondary school in Birnin Kebb

Secondary School	Ramps	Accessible entrance	Wide Hallways	Accessible Restroom	Adjustable Furniture	V/A Aids	Color/ Contrast	Universal Design Principle	Outdoor Accessibility	Braille and Tactile Signage
Nagari	X	-	X	-	-	X	-	-	X	-
Salamatu Hussaini	X	-	-	-	-	X	X	-	X	-
Zarnan Gwandu	-	-	-	-	-	X	-	-	X	-
Makerar Gandu	-	-	-	-	-	X	-	-	X	-
Junju	-	-	-	-	-	X	-	-	X	-
Nadaniya	-	-	-	-	-	X	X	-	X	-
GGC Unity	X	-	X	-	-	X	X	-	X	X
Army Day	-	-	X	-	-	X	-	-	X	X
GDSS	-	-	-	-	-	X	-	-	X	X
Tudun Wada	-	-	-	-	-	X	-	-	X	-
Bello Bashir	-	-	-	-	-	X	X	-	X	X
Tsohon Gari	-	-	-	-	-	X	-	-	X	-
Doctor Amina	-	-	-	-	-	X	X	-	X	-

Source: Researchers field data

3.4 Data Analysis

Qualitative data obtained from the observations will be analyzed using thematic analysis. The researchers will identify recurring themes related to barriers and challenges to universal accessibility in secondary school buildings. The findings will be triangulated with existing literature on inclusive education and accessibility standards.

3.5 Area of the Study

Birnin Kebbi is a city located in Nigeria's Northwestern region. It is the capital of Kebbi State and the administrative center of the Gwandu Emirate. In 2007, the city's population was expected to be 125,594 people. Kebbi is predominantly a Hausa and Fulani state, with Islam as the predominant religion. It was previously the capital of the Kebbi Emirate, which shifted to Argungu following Gwandu's invasion in 1831. The town remained the capital of Kebbi until 1805, when it was burned in the Fulani jihad ("holy war") by Abdullahi dan Fodio, a brother of the jihad leader and later Emir of Gwandu. Birnin Kebbi was eclipsed in political importance by Gwandu (Gando) town, 30 miles (48 km) east, and as a caravan and riverside market centre by Jega, 20 miles (32 km) southeast, which lay at the head of navigation on the Zamfara River, a tributary of the Sokoto. While Argungu (30 miles northeast) became the traditional seat of Kebbi's king in 1827, Birnin Kebbi became the Gwandu emirate capital after Emir Haliru was inaugurated there in 1906. Birnin Kebbi was established as the capital of the newly formed Nigerian state of Kebbi in 1991. Although Birnin Kebbi's importance as a river port has waned due to silting and political factors, it currently serves as a collection point for peanuts (groundnuts) and rice, as well as a major local market center for millet, sorghum, rice, fish, goats, and cattle. It is home to a state polytechnic institution as well as a government rice research facility. Its Hausa and Fulani people are Muslims. 366,200 people live in the local government area as of 2016 (Yahaya et al., 2019).

Fig 1. Map Showing the Location of Birnin Kebbi (Yahaya et al., 2019)

4.0 RESULTS

In order to facilitate further discussion, the gathered data was evaluated using a descriptive analysis and the outcome was depicted using charts, figures and tables. The numeric values of the results obtained from the data analysis were widely used in the explanation of the results.

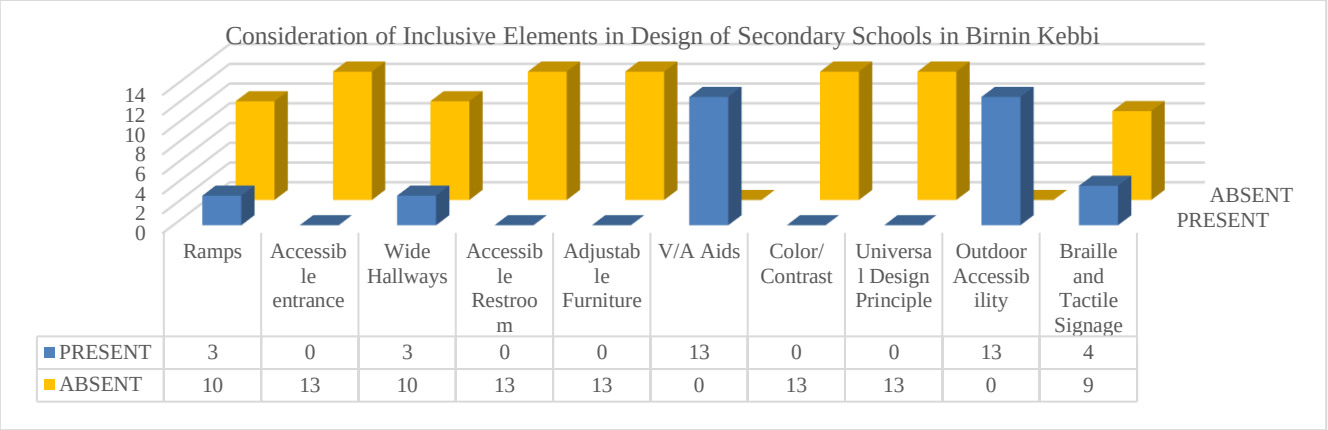
4.1 Inclusive design Elements

Inclusive architectural design involves creating spaces that are accessible to everyone regardless of their abilities. Ten (10) key design considerations for school buildings that will guarantee universal access to public secondary schools in Birnin kebbi were considered and their presence or absence in the design of key infrastructure in the schools such as classrooms, offices, kitchen, halls, and laboratories were observed and the results are presented in the table and chart below:

Table 2: Consideration of Inclusive design Elements for Universal access in Public Secondary Schools in Birnin Kebbi

DESIGN ELEMENT	PRESENT	ABSENT
Ramps	3	10
Accessible entrance	13	0
Wide Hallways	3	10
Accessible Restroom	0	13
Adjustable Furniture	0	13
V/A Aids	0	13
Color/ Contrast	0	13
Universal Design Principle	0	13
Outdoor Accessibility	13	0
Braille and Tactile Signage	4	9

Source: Researchers field data



4.1.1 Ramps

Ramps are inclined surfaces designed for wheelchair accessibility or easy movement between different elevations. Commonly found in buildings, ramps provide a gradual slope instead of stairs, ensuring inclusivity for individuals with mobility challenges (Petryshyna, Radchenko, & Syla, 2020). They play a vital role in universal design, promoting accessibility and facilitating independent mobility for people with varying abilities

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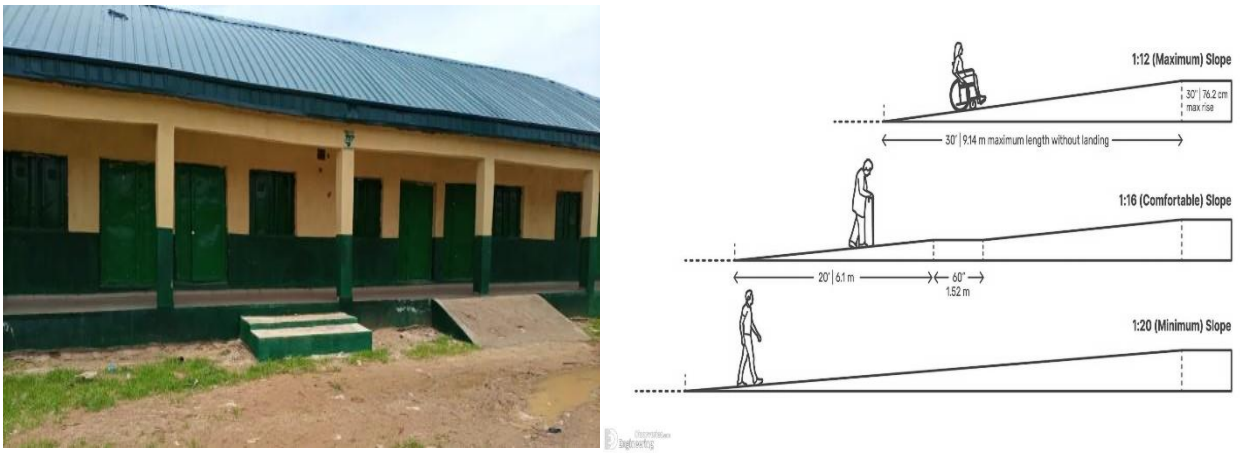


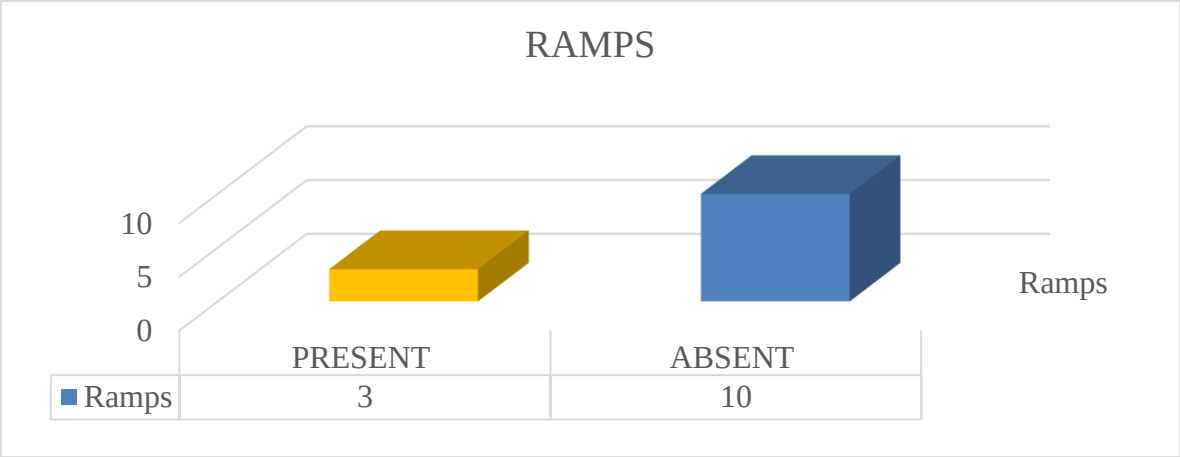
Fig.2: a. Ramp on class Building at Nagari b. Standard Ramps Designs

Table 3: Availability of Ramps in Public Secondary Schools in Birnin Kebbi

DESIGN ELEMENT	PRESENT	ABSENT
Ramps	3	10

Source: Researchers field data

The table 3 presents data on the inclusive design feature of ramps in the 13 public secondary schools, indicating that ramps are present in only 3 (23.08%) of the schools while absent in the remaining 10 (76.92%). This suggests a notable lack of this accessibility feature in a majority of the sampled schools, potentially limiting access for individuals with mobility challenges. The data is shown on the chart below.



4.1.2 Accessible Entrance

An accessible entrance ensures an entry point that accommodates individuals with diverse abilities, ensuring inclusivity (Müller et al., 2022). It typically incorporates features like ramps, wide doorways, and tactile indicators to facilitate easy access for people with mobility challenges, visual impairments, or other disabilities (Petryshyna, Radchenko, & Syla, 2020). These entrances adhere to universal design principles, promoting equal access and creating environments that are welcoming and usable by everyone

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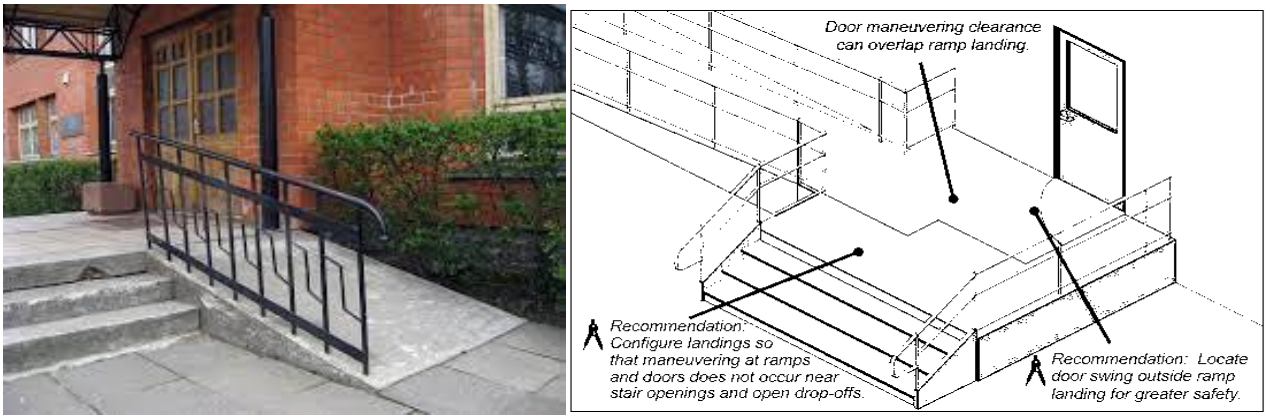


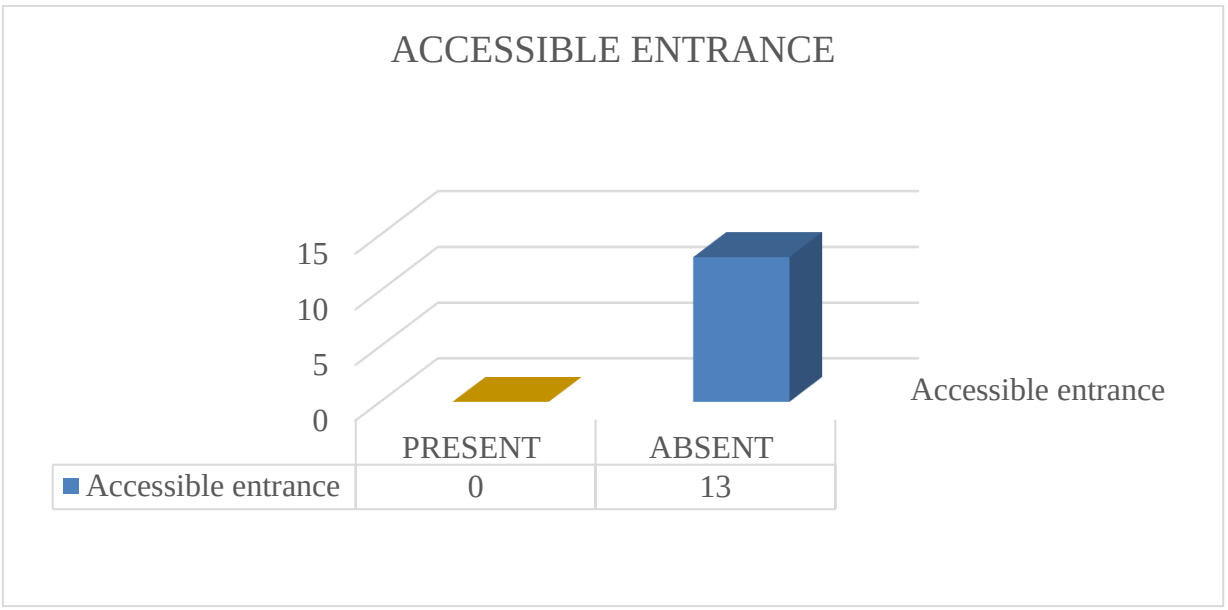
Fig.3: a. Standard Accessible Entrance (intrendhs.com) b. Design of an accessible entrance

Table 4: Availability of Accessible Entrance in Public Secondary Schools in Birnin Kebbi

DESIGN ELEMENT	PRESENT	ABSENT
Accessible entrance	0	13

Source: Researchers field data

Table 4 reveals that none of the 13 public secondary schools in Birnin Kebbi have a standard inclusive accessible entrances, indicating a 0% presence and 100% absence of this crucial inclusive design element. This data underscores a significant deficiency in the schools' attention to accessibility features at entry points, highlighting a potential obstacle for individuals with mobility challenges. The absence of accessible entrances in all schools suggests a universal gap in efforts to ensure equitable access for students, staff, and visitors with disabilities (Müller et al., 2022). The data is shown on the chart below.



4.1.3 Wide Hallways

Wide hallways are crucial elements in inclusive designs as they enhance accessibility and inclusivity within built environments. With ample space provided, wide hallways accommodate individuals with mobility aids such as wheelchairs and walkers, ensuring smooth and unobstructed passage (McMillan & Jarvis, 2022). This design feature caters not only to people with permanent disabilities but also those with temporary impairments, parents with strollers, or individuals carrying large items.

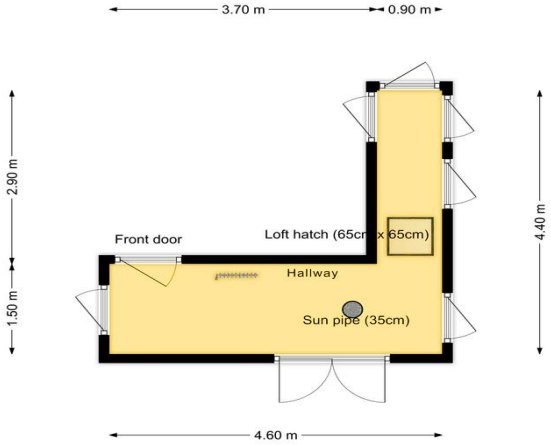


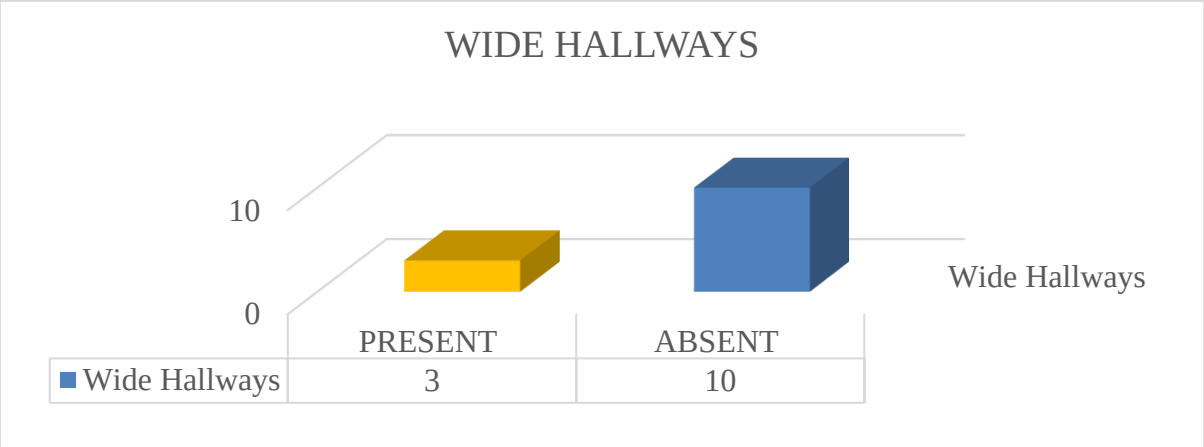
Fig.4: a. Hallway at GGC Birnin Kebbi b. Standard Hallway Design (floorplanner.com)

Table 5: Availability of Wide hallways in Public Secondary Schools in Birnin Kebbi

DESIGN ELEMENT	PRESENT	ABSENT
Wide Hallways	3	10

Source: Researchers field data

Table 5 presents data on the consideration of wide hallways as a design element in public secondary schools in Birnin Kebbi. Out of the 13 surveyed schools, wide hallways are present in 3 (23.08%), while they are absent in 10 (76.92%) of the schools. This data underscores a notable deficiency in the consideration of wide hallways as a design element in the majority of the sampled schools. Wide hallways are crucial for promoting accessibility and facilitating movement, particularly for individuals with mobility aids or disabilities. The data is shown on the chart below.



4.1.4 Accessible Restroom

Accessible restrooms facilities typically feature wider doorways, grab bars, and ample space to accommodate mobility aids such as wheelchairs. Tactile signage and accessible fixtures further enhance usability for individuals with visual impairments. Universal accessibility-compliant restroom dimensions include a clear floor space of 30x48 inches, toilet seat height between 17-19 inches, and grab bars positioned at 33-36 inches. Sink rims should not exceed 34 inches, allowing knee clearance (Marquardt, 2020). Inclusive restroom design enables a more universally accessible and equitable built environment that values the comfort and independence of all users.

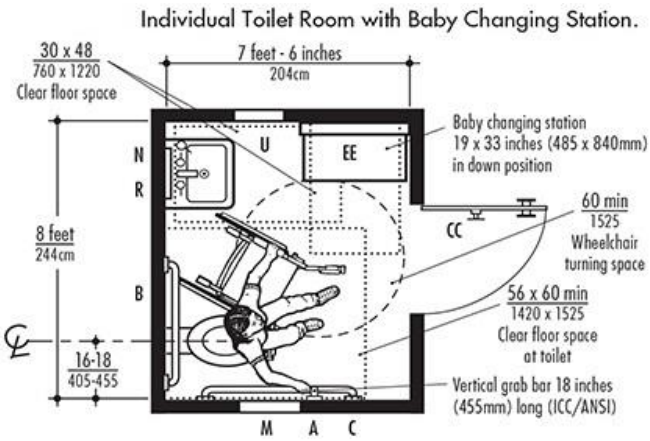


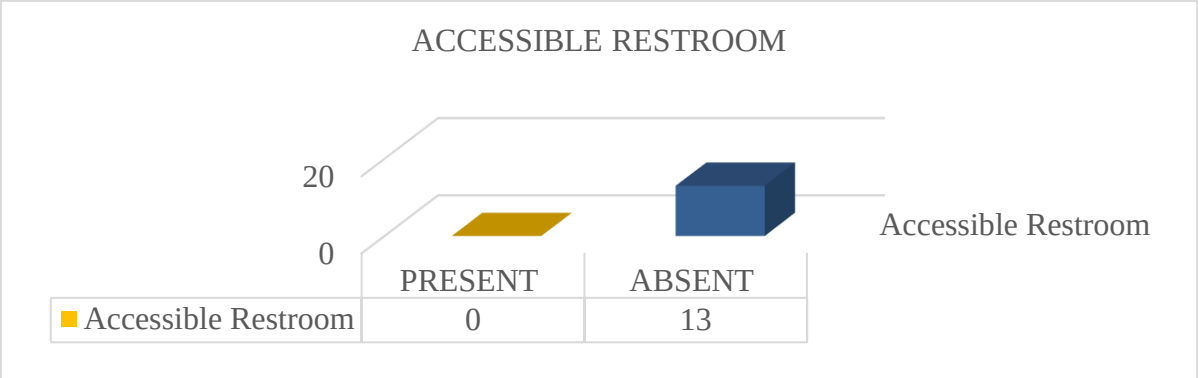
Fig.5: a. Restroom facility at Nadaniya Secondary School, Birnin Kebbi (5b). ADA Standard Accessible restrooms Design (harborcitysupply.com)

Table 6: Availability of Accessible Restroom in Public Secondary Schools in Birnin Kebbi

DESIGN ELEMENT	PRESENT	ABSENT
Accessible Restroom	0	13

Source: Researchers field data

Table 6 provides information on the availability of accessible restrooms as a design element in public secondary schools in Birnin Kebbi. According to the data, none of the surveyed schools have accessible restrooms, indicating a 0% presence and 100% absence of this essential facility. The absence of accessible restrooms in all schools highlights a significant deficiency in meeting the needs of individuals with disabilities. The data on table 6 is shown on the chart below.



4.1.5 Adjustable Furniture

Adjustable furniture is created with a flexibility that enables customization to suit individual requirements, making spaces more accessible for people with different heights, abilities, or mobility challenges (Cullen, 2015). Adjustable desks, chairs, and tables contribute to creating environments that cater to the diverse needs of users, promoting inclusivity in educational, work, or public settings (Kariippanon et al., 2018). This adaptability not only enhances comfort and usability but also aligns with the principles of universal design, ensuring that spaces are welcoming and functional for a wide range of individuals.

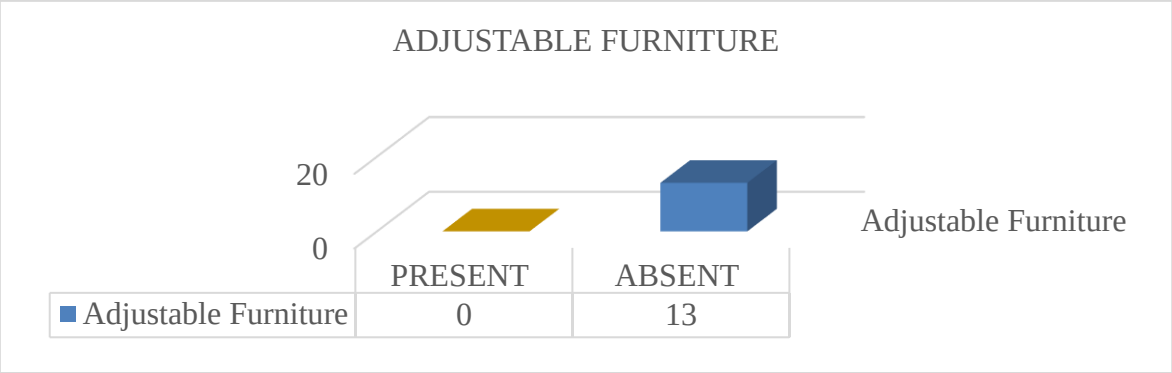
Fig.6: a. Classroom Furniture at Emir. Bello Bashir Secondary School, Birnin Kebbi (6b). Standard Adjustable furniture Design (indiamart.com)

Table 7: Availability of Adjustable furniture in Public Secondary Schools in Birnin Kebbi

DESIGN ELEMENT	PRESENT	ABSENT
Adjustable Furniture	0	13

Source: Researchers field data

Table 7 provides information on the availability of adjustable furniture in public secondary schools in Birnin Kebbi. The data indicates that none of the surveyed schools have adjustable furniture, resulting in a 0% presence and 100% absence of this inclusive design feature. The absence of adjustable furniture in all schools suggests a limitation in catering to the diverse needs of students, especially those with specific physical disabilities. The data on table 7 is shown on the chart below.



4.1.6 Visual and Auditory Aids

Visual and auditory aids are crucial components of inclusive designs. Incorporating visual aids such as charts, diagrams, and multimedia presentations caters to students with varied learning styles and helps convey information in multiple formats (Jayakumar, 2017). Similarly, auditory aids like sound amplification systems and captioning benefit students with hearing impairments. These design elements create an inclusive learning environment, ensuring that all students, regardless of their sensory abilities, can access and engage with educational content effectively.

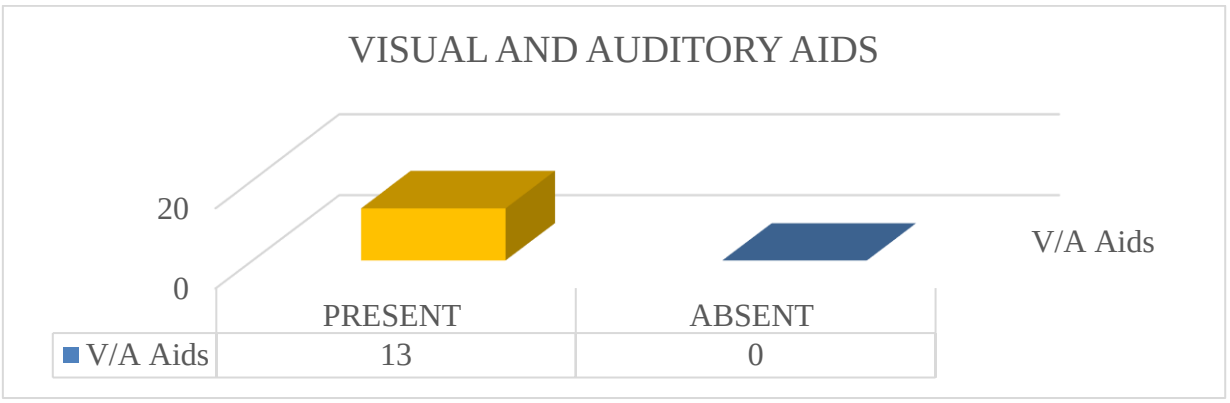
Fig.7: Temporary Visual and auditory aids in a Classroom at Army Day Secondary School, Birnin Kebbi

Table 8: Availability of Visual and auditory aids in Public Secondary Schools in Birnin Kebbi

DESIGN ELEMENT	PRESENT	ABSENT
Visual and Auditory Aids	13	0

Source: Researchers field data

Table 8 provides information on the availability of visual and auditory aids as design elements in public secondary schools in Birnin Kebbi. According to the data, all of the surveyed schools have visual and auditory aids, resulting in a 100% presence and 0% absence of these inclusive design features. This positive scenario indicates a proactive approach in providing educational resources that cater to diverse learning styles. The presence of visual and auditory aids in all schools underscores a commitment to creating inclusive educational environments that can benefit all students, including those with specific sensory needs. Table 8 data is shown on the chart below.



4.1.7 Color/ Contrast

Color and contrast hold paramount significance in inclusive designs for schools by aiding accessibility and accommodating diverse visual needs. Thoughtful selection of colors and contrasts in educational environments benefits students with visual impairments or color vision deficiencies, ensuring clarity in visual information (Lee, Jabbar, & Cho, 2020). High color contrast on materials, signage, and educational resources enhances readability for all students. Additionally, well-chosen color schemes can create a stimulating and conducive learning environment, positively impacting students' focus and engagement (Malamed, 2015).

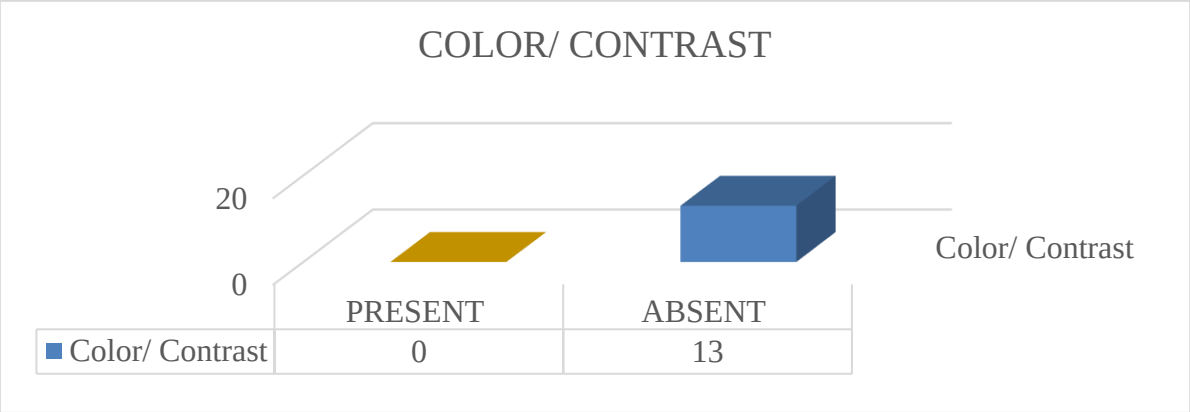
Fig.8: a. School Building at Junju Secondary School, Birnin Kebbi (8b). Standard Color Contrasted School Design

Table 9: Availability of Visual and auditory aids in Public Secondary Schools in Birnin Kebbi

DESIGN ELEMENT	PRESENT	ABSENT
Color/ Contrast	0	13

Source: Researchers field data

Table 9 provides information on the consideration of color/contrast in the design of public secondary schools in Birnin Kebbi. According to the data, none of the surveyed schools have taken color/contrast into consideration, resulting in a 0% presence and 100% absence of this design element. The absence of attention to color and contrast in all schools suggests a potential oversight in considering the visual needs of students, particularly those with visual impairments or sensitivities. Table 9 data is shown on the chart below.



4.1.8 Universal Design Principle

The Universal Design Principle holds profound significance in inclusive designs for schools as it advocates for creating environments that are inherently accessible to all individuals, regardless of their abilities or disabilities. Universal design principles is incorporate with a 7ft wide corridor, a large double-side elevator, and specialized controls (Moore, 2021). Provide intuitive and perceptible elements, including acoustic landmarks, automatic doors, and textured pavement for wayfinding. Ensure low physical effort, ample space, visible signage with contrast, and aesthetically pleasing vertical circulation (Harper & Jacobson, 2018). Universal design fosters an inclusive educational environment where every student, irrespective of their background or capabilities, can fully participate and benefit.

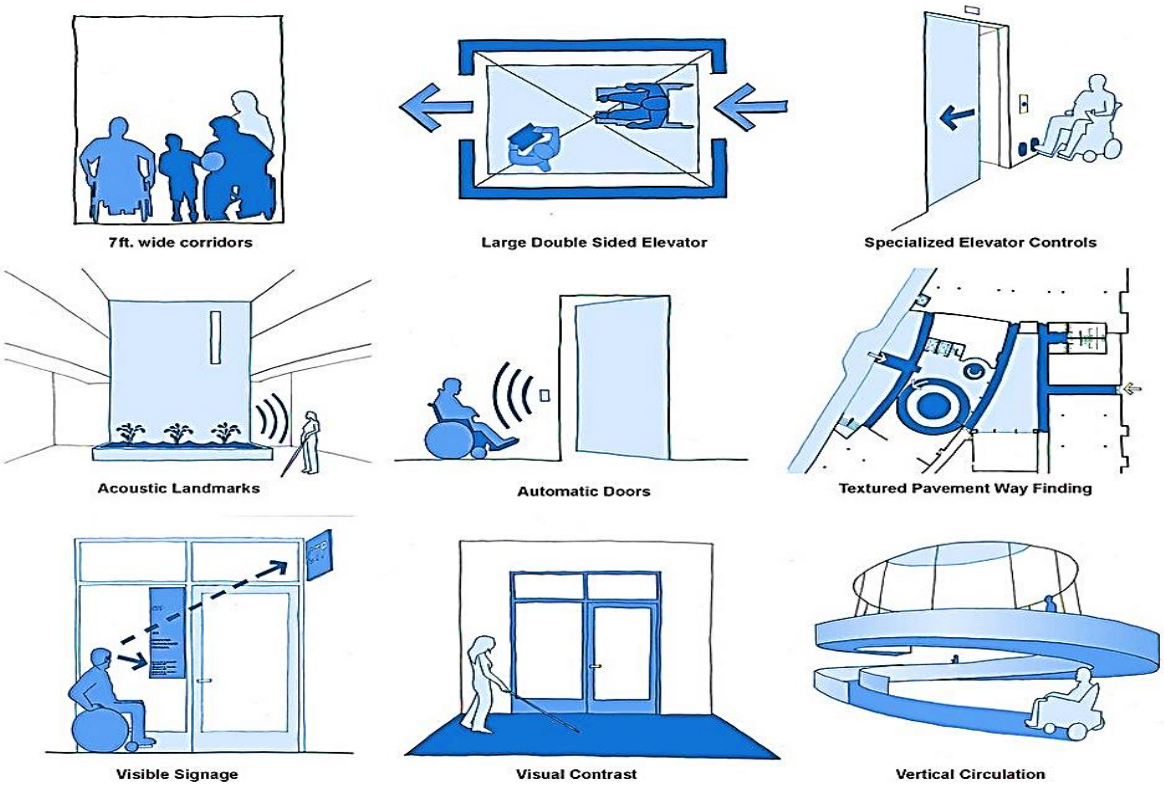


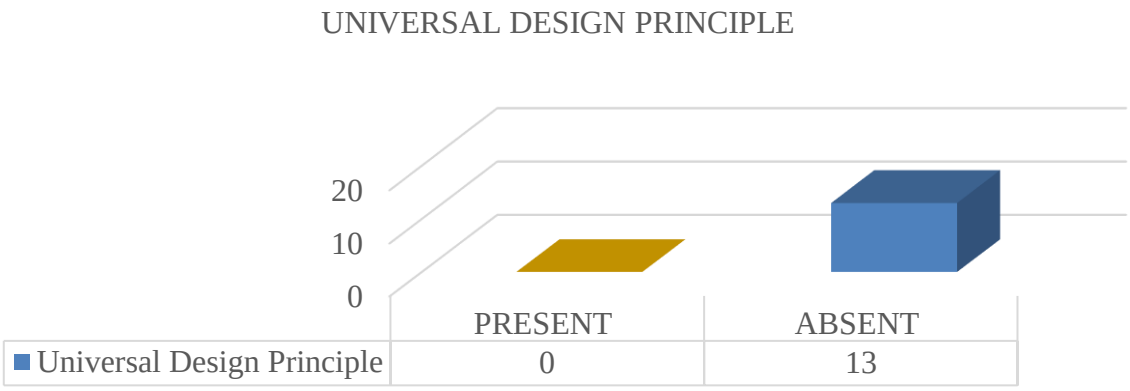
Fig.9: Universal Design Principle (re-thinkingthefuture.com)

Table 10: Availability of Visual and auditory aids in Public Secondary Schools in Birnin Kebbi

DESIGN ELEMENT	PRESENT	ABSENT
Universal Design Principle	0	13

Source: Researchers field data

Table 10 indicates the presence and absence of the Universal Design Principle in the design of public secondary schools in Birnin Kebbi. According to the data, none of the surveyed schools have implemented the Universal Design Principle, resulting in a 0% presence and 100% absence of this design element. The absence of the Universal Design Principle in all schools suggests a potential missed opportunity to create environments that are inherently inclusive and accessible to individuals with diverse abilities. Table 10 data is shown on the chart below.



4.1.9 Outdoor Accessibility

Outdoor accessibility is of paramount significance in inclusive designs for schools as it extends the principles of inclusivity beyond the classroom. Designing school outdoor spaces with accessibility in mind ensures that all students, including those with mobility challenges, can engage in recreational and educational activities (Petryshyna, Radchenko, & Syla, 2020). Accessible pathways, ramps, and outdoor equipment accommodate diverse physical abilities, promoting social interaction and physical well-being (Müller et al., 2022). Furthermore, outdoor areas designed with inclusive principles contribute to a sense of belonging, allowing students of all abilities to participate fully in school life, fostering a more equitable and enriching educational experience (Kariippanon et al., 2018).

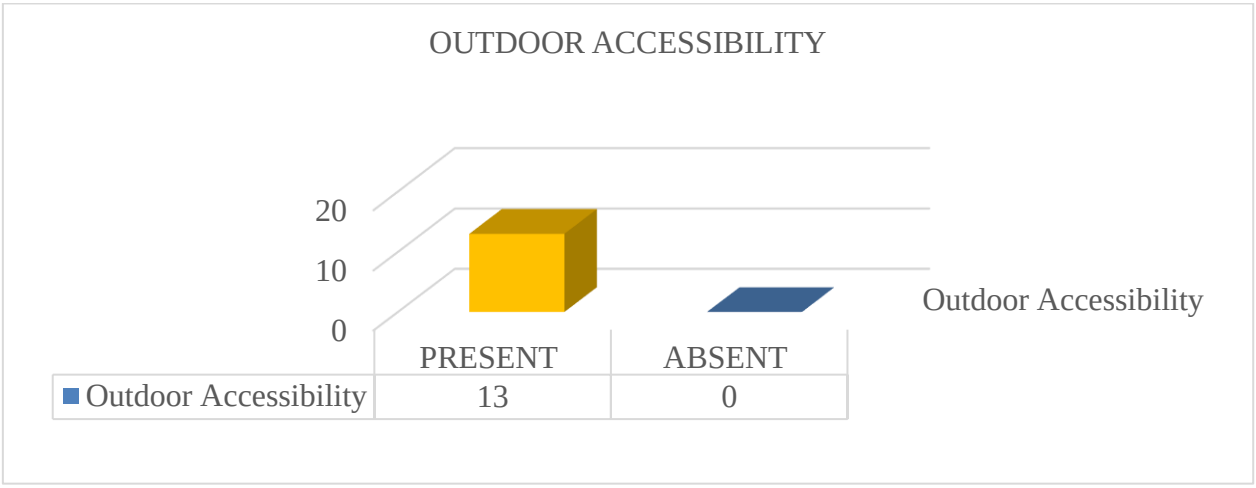
Fig.10: Accessible Outdoor space at Dr. Amina Secondary School. Birnin Kebbi

Table 11: Consideration of Accessible Outdoor in Public Secondary Schools in Birnin Kebbi

DESIGN ELEMENT	PRESENT	ABSENT
Outdoor Accessibility	13	0

Source: Researchers field data

Table 11 indicates that all public secondary schools surveyed in Birnin Kebbi have outdoor accessibility, with a 100% presence and 0% absence of this design element. This positive finding suggests that all the schools have taken into consideration the importance of outdoor accessibility in their design, ensuring that outdoor spaces are accessible to individuals with diverse abilities, including those with mobility challenges. The data reflects a commendable commitment to creating inclusive and accommodating educational environments in terms of outdoor accessibility in public secondary schools in Birnin Kebbi. Table 11 data is shown on the chart below.



4.1.10 Braille and Tactile Signage

Braille and tactile signage play an important part in inclusive school designs by improving accessibility for people with visual impairments. These design elements provide vital information through touch, allowing students with blindness or low vision to navigate school environments independently (Marquardt, 2020). Tactile signage, which includes raised letters, symbols, and Braille, ensures that important information, such as room numbers and directional signs, is accessible to all.

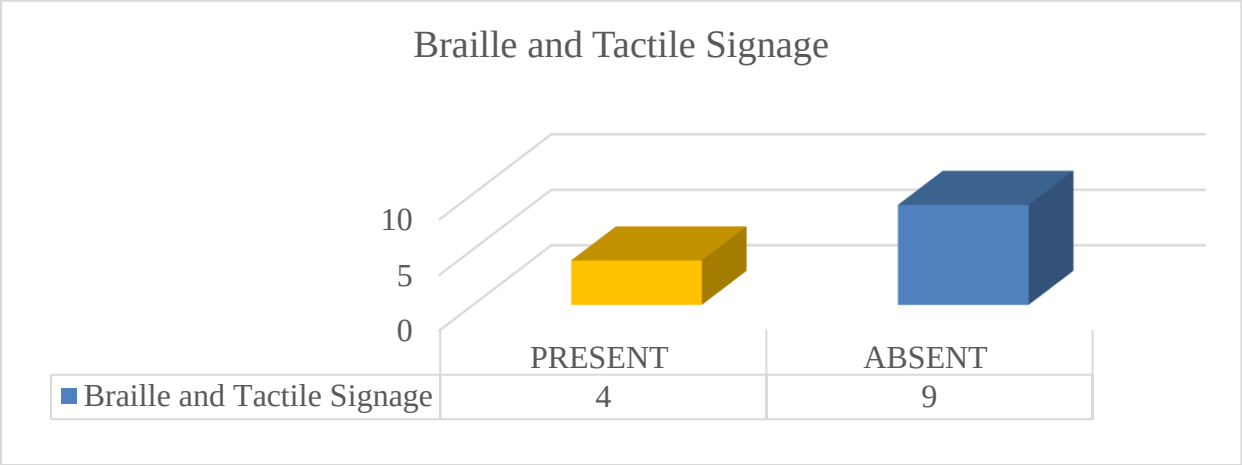
Fig.2: a. Braille and tactile signage on restroom at GDSS b. Standard Braille and tactile signage

Table 12: Consideration of Accessible Outdoor in Public Secondary Schools in Birnin Kebbi

DESIGN ELEMENT	PRESENT	ABSENT
Braille and Tactile Signage	4	9

Source: Researchers field data

Table 12 provides information on the consideration of Braille and tactile signage in the design of public secondary schools in Birnin Kebbi. According to the data, Braille and tactile signage are present in 4 out of the 13 surveyed schools, indicating a 30.77% presence, while they are absent in 9 schools, reflecting a 69.23% absence of this design element. The presence of Braille and tactile signage in some schools is a positive step toward creating an inclusive environment for individuals with visual impairments or those who benefit from tactile information. Table 12 data is shown on the chart below.



DISCUSSION

The findings from the study examining the various design elements for universal accessibility considered in public secondary schools in Birnin Kebbi to present a comprehensive overview of the current state of inclusivity and accessibility within educational environments in the state. This study shed light on the availability of critical design elements that directly impact universal accessibility and inclusiveness of these schools.

The study found a total absence of accessible entrances in all surveyed schools, a significant concern that speaks to a stereotype of the physically challenged individuals. Accessible entrances are fundamental for providing equal access to individuals with mobility challenges (Müller et al., 2022: Marquardt, 2020), and the 100% absence at strategic spaces suggests a systemic deficiency in addressing basic accessibility needs. Randomly placed poorly constructed ramps where found in 23.08% of the surveyed schools. This underscores the urgency for infrastructure improvements to ensure that entry points are inclusive and welcoming to all members of the school community.

Further critical gap in universal accessibility with the absence of accessible restrooms in all schools with most schools using pit latrines that are neither hygienic nor universally accessible. Accessible restrooms are essential for ensuring the dignity and independence of individuals with disabilities (Marquardt, 2020). At a time when the climate debate is at the heart of every conversation, a practical way of improving the uninhabitable toilet facilities could be by incorporating eco-friendly design concepts (Alegbe & Mtaver, 2023) such as conversion of the pits to biogas digester that makes the systems energy-efficient with inclusive features. The 100% absence indicates a pressing need for investment in facilities that cater to the diverse needs of students, staff, and visitors, emphasizing the importance of inclusive restroom design (Petryshyna, Radchenko, & Syla, 2020).

On the positive side, all of the surveyed schools have visual and auditory aids, albeit mostly temporary placed which suggest a discrepancy in the availability and implementation of educational resources that support diverse learning styles. It underscores the importance of consistent access to aids that enhance the educational experience for all students, irrespective of their sensory needs (Jayakumar, 2017). According to Ludi, Simpson, & Merchant (2016), incorporating both visual and auditory elements makes information become more accessible to a broader audience. Visual aids, such as images, diagrams, and videos cater to individuals with diverse learning styles and those who may have difficulty processing written information while auditory aids, including spoken content, audio descriptions, and sound cues, benefit individuals with visual impairments or literacy challenges.

The absence of adjustable furniture in all the public schools also speaks to a stereotype that discourages those with disabilities from fully participating in the society (Babik & Gardner, 2021). Adjustable furniture is crucial for creating an adaptable and inclusive learning environment that accommodates students with varying physical needs (Kariippanon et al., 2018). According to Cullen (2015), Adjustable furniture is particularly beneficial in promoting ergonomic comfort, supporting diverse user abilities, and optimizing space utilization. Its flexibility enhances functionality and ensures that the furniture can adapt to the dynamic and evolving needs of users. This underscores the necessity for schools to invest in ergonomic and flexible

furniture to create a more inclusive and comfortable setting for all students.

Similarly, a total absence of color/contrast consideration in the design of public secondary schools. Interaction Design Foundation - IxDF, (2016) reports that well-thought-out color schemes and contrasts contribute to clarity and effective communication, guiding the viewer's attention and reinforcing visual hierarchy. In the realm of accessibility, sufficient color contrast is crucial for individuals with visual impairments, ensuring legibility of text and distinguishability of elements. Meeting color contrast standards enhances the inclusivity of digital and physical environments (Lee, Jabbar, & Cho, 2020). The absence of attention to these design elements indicates a potential oversight in creating inclusive and visually accessible spaces within the schools.

The presence of outdoor accessibility in all surveyed schools bring attention to a positive aspect of the findings. Kariippanon et al., (2018), avows that accessible paths, ramps, and outdoor equipment cater to a wide range of physical abilities, encouraging social connection as well as physical well-being. This suggests a proactive approach to ensure that outdoor spaces are accessible to everyone, contributing to a more inclusive and welcoming school environment. Outdoor accessibility is crucial for the well-being and participation of all individuals, and this finding reflects a commendable commitment to inclusivity. (Mtaver & Stephen, 2024) echoed the interdependency of design and communal integration in participation and promotion of sustainable living and also providing a platform for interaction and knowledge sharing.

Furthermore, the presence of Braille and tactile signage in only 30.77% of the surveyed schools indicate a mild consideration for universal accessibility in the design. While the inclusion of these features in some schools is a positive step toward inclusivity for individuals with visual impairments, the majority of schools lacking these elements indicates a need for broader implementation. Marquardt, (2020) affirms that braille and tactile signage improves independence and wayfinding for those with visual impairments and are critical for providing essential information in a format accessible to those with visual impairments.

Fundamentally, the findings from the various design elements considered in public secondary schools in Birnin Kebbi reveal a mixed landscape of inclusivity and accessibility. While some positive aspects, such as the presence of outdoor accessibility and certain design elements like visual and auditory aids, are evident, there are significant gaps in fundamental areas such as accessible entrances, restrooms, and consideration of color/contrast. Addressing these deficiencies will require infrastructure improvements, policy advocacy, and a commitment to inclusive design principles. Prioritizing these factors would result in environments that actually cater to their students' different needs, enabling a more inclusive and fair educational experience in Birnin Kebbi's public secondary schools.

CONCLUSION

The analysis of design elements within the purview of public secondary schools in Birnin Kebbi manifests a distinctive view concerning inclusivity and accessibility. The universal absence of pivotal features like accessible entrances and restrooms across all surveyed schools raises salient apprehensions about the overall accessibility paradigm within these educational establishments. This underscores an exigent necessity for infrastructural improvements, concomitant with a strategic imperative to render foundational facilities inclusive and hospitable to individuals of diverse needs.

Despite certain affirmative aspects, such as the ubiquity of outdoor accessibility and the integration of certain design elements like visual and auditory aids (as depicted in Table 8), incongruities and gaps identified in other precincts allude to potential areas necessitating redress. The conspicuous dearth of consideration accorded to color/contrast and the conspicuous absence of adjustable furniture intimate a putative oversight in the formulation of visually accessible and adaptively responsive pedagogical environs.

Moreover, the discernible heterogeneity in the presence of Braille and tactile signage underscores a requisite for a more standardized and equitable approach, ensuring equitable access to indispensable information for individuals afflicted with visual impairments. These collective findings accentuate the imperativeness of a holistic, multidimensional approach to the tenets of inclusive design within the scholastic domain. Addressing these salient deficiencies mandates proactive engagement in advocacy initiatives, the formulation of judicious policies, and the establishment of collaborative frameworks between educational institutions and experts in accessibility. Strategic infrastructural enhancements, underpinned by the precepts of universal design, can serve as instrumental conduits towards the realization of educational spaces that authentically accommodate the diversified exigencies of all students, thereby engendering a more accessible and inclusive pedagogical milieu.

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