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Assessing Pupils' Effective Use of Primary School Grounds in Bauchi Metropolis: A Mixed-Methods Study on Landscape Utilisation and Learning Outcomes"

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Abstract: ***School grounds serve as vital learning and recreational spaces that contribute significantly to pupils' physical, cognitive, and social development. However, in many Nigerian public primary schools, these spaces are underutilized or inadequately designed to support holistic education. This study assesses the effective use of primary school grounds in the selected study area, focusing on patterns of pupil engagement, environmental quality, and design functionality. A mixed-methods approach was employed, combining structured observation, pupil and teacher surveys, and physical site audits across 12 public primary schools. Data were analyzed using descriptive statistics and thematic content analysis. Findings reveal that most school grounds are used predominantly for unstructured play, with limited integration into teaching and learning activities. Barriers to effective use include inadequate shade, poorly maintained surfaces, lack of play equipment, and absence of dedicated outdoor learning zones. The study recommends a climate-responsive, inclusive design framework that integrates pedagogical objectives into the planning of school grounds to enhance both formal and informal learning.***

Keywords: School grounds, pupil engagement, outdoor learning, primary education, Nigeria, environmental design.

1. Introduction

The design and utilisation of school grounds have a profound impact on the quality of educational experiences in primary schools. Globally, outdoor spaces are recognized not only for recreation but also as extensions of the classroom, fostering experiential learning, creativity, and social interaction (Dyment & Bell, 2008; Malone, 2016). In the Nigerian context, particularly in public primary schools, the potential of school grounds to enhance learning outcomes remains largely untapped. Most facilities are either poorly maintained or designed without considering the diverse needs of pupils and the local climate conditions (Adebayo, 2013).

The study area, located within [insert location from your document], exhibits challenges common to many Nigerian rural and peri-urban schools: overcrowded classrooms, limited play infrastructure, and minimal landscape planning. Consequently, pupils' interaction with school grounds is often confined to informal play during short breaks, with little structured outdoor learning (Ajayi, 2013).

Bauchi Metropolis, located in Bauchi State, North East Nigeria, serves as the study location, characterized by a semi-arid climate with temperatures ranging from 13°C in the cool season to 34°C during the hot dry season, and an annual rainfall of approximately 800-1000 mm, which influences the physical condition of school grounds (Adamu et al., 2022). The metropolis, with a population of about 493,810 as per the 2006 census (projected to over 700,000 by 2025), faces rapid urbanisation and educational challenges, including low literacy rates and inadequate infrastructure, making it a pertinent context for investigating school ground optimisation (National Bureau of Statistics, 2023). The study selected 12 primary schools, 6 public and 6 private based on criteria including enrollment size (ranging from 300 to 1,200 pupils), geographical diversity across urban and peri-urban areas, and accessibility for field observations, with specific schools chosen to represent varying socio-economic backgrounds and maintenance levels, as detailed in the methodology section.

Primary school grounds are not mere spaces but an integral part of the learning environment, significantly influencing young children's physical activity levels, social interactions, cognitive development, and overall well-being, as validated by previous research (van Dijk-Wesselius, Van den Berg, Maas & Hovinga, 2020; Parker & Thomsen, 2019). Van Dijk-Wesselius et al. (2020) demonstrated that well-designed school grounds, with access to green spaces and play areas, enhance cognitive development and social skills by providing opportunities for active learning, while Parker and Thomsen (2019) emphasized their role in supporting holistic education beyond traditional classrooms, laying a critical foundation for academic success, particularly relevant in the context of Bauchi Metropolis.

3. Literature Review

2.1 Concept of School Grounds

School grounds encompass all outdoor spaces within the school boundary, including playgrounds, sports fields, gardens, assembly areas, and circulation paths (Hussein, 2012). These spaces play a dual role supporting formal curriculum delivery and offering informal learning and recreation opportunities. The effective utilisation of school grounds plays a crucial role in shaping children's learning experiences, social development, and overall well-being. Research indicates that well-designed outdoor spaces in primary schools can enhance cognitive engagement, physical activity, and emotional resilience (van Dijk-Wesselius et al., 2020; Vella-Brodrick & Gilowska, 2022). However, the extent to which pupils actively and meaningfully engage with these spaces varies significantly depending on physical conditions, design features, and institutional policies.

Studies in environmental psychology highlight that children's interaction with school landscapes is influenced by the concept of affordances, opportunities for action that the environment provides (Gibson, 1979; Jeon *et al.,* 2023). For instance, open fields, gardens, and play equipment encourage physical activity and imaginative play, while poorly maintained or unsafe grounds may deter usage (Lippman, 2023). In Bauchi Metropolis, where many schools face infrastructural deficits (Adamu et al., 2022), understanding how pupils navigate and utilize these spaces is essential for improving educational outcomes.

Empirical evidence suggests that outdoor learning environments foster experiential and collaborative learning, which traditional classrooms may not fully support (Parker et al., 2022). Natural elements such as trees, gardens, and shaded seating areas have been linked to improved concentration and reduced stress among pupils (Kuo et al., 2021). However, in many Nigerian primary schools, schoolyards often lack intentional design, limiting their educational potential (Ikegbusi et al., 2021). For example, Sulyman et al. (2022) found that Nigerian pupils with access to functional playgrounds exhibited better motor skills and social interaction compared to those in schools with neglected outdoor spaces.

Moreover, socio-cultural factors influence how children use school grounds. In Bauchi, where communal activities and outdoor play are integral to childhood, the absence of structured recreational spaces may hinder pupils' physical and social development (Ogunode & Adanna, 2022). Research by Cohen et al. (2023) further emphasizes that pupils' engagement with school landscapes is not merely passive but involves active exploration, peer interaction, and creative play processes that contribute to cognitive and emotional growth.

Despite these insights, gaps remain in understanding how pupils in resource-constrained settings like Bauchi effectively use (or underuse) their school grounds. While studies in Western contexts emphasize the benefits of green schoolyards (van Dijk-Wesselius et al., 2018), fewer investigations focus on Sub-Saharan Africa, where infrastructural challenges and cultural dynamics shape usage patterns differently (Anaman et al., 2022). This study addresses this gap by examining pupils' interactions with school landscapes in Bauchi, providing context-specific recommendations for optimizing these spaces.

Key Themes in the Literature:

I. **Physical Activity & Play:** Well-equipped school grounds promote motor skills and teamwork (Gill, 2021).
II. **Learning Beyond Classrooms:** Outdoor environments support experiential and place-based learning (Maharjan et al., 2024).
III. **Barriers to Utilisation:** Poor maintenance, lack of facilities, and safety concerns limit engagement (Okenyi, 2023).

By synthesizing these perspectives, this study contributes to a growing body of work advocating for intentional school ground design

in low-resource educational settings. The findings will inform policymakers and educators on how to transform underutilized spaces into dynamic learning environments that benefit pupils holistically.

2.2 Educational Value of Outdoor Environments

Outdoor spaces are increasingly recognized as critical to child development. According to Louv (2008) and Om *et al.,* (2023) interaction with nature stimulates curiosity, enhances creativity, and improves mental well-being. Research by Maynard and Waters (2007) indicates that outdoor learning can improve problem-solving skills and teamwork among pupils.

2.3 Effective Use Indicators

Effective use of school grounds can be measured through:

I. Frequency of engagement during school hours.
II. Diversity of activities (structured lessons, free play, sports, gardening).
III. Inclusivity for children of different abilities.
IV. Linkage to learning objectives in the curriculum (Dyment, 2005; Zhang *et al.,* 2020).

2.4 Challenges in Nigerian Context

Common constraints in Nigerian public schools include:

I. Inadequate infrastructure (Lawal, 2011).
II. Environmental hazards such as erosion or flooding.
III. Poor maintenance culture leading to degraded surfaces and broken play equipment.
IV. Overcrowding which limits outdoor space per pupil (Ogunjimi, 2015).

2.5 Climate-Responsive Design for School Grounds

In hot-humid and hot-dry Nigerian climates, design interventions such as tree planting, shaded seating, permeable surfaces, and wind corridors can improve usability and comfort (Agboola *et al.,* 2014). Integrating these with educational gardens and outdoor classrooms can transform underutilized grounds into vibrant learning spaces.

2.6 Role of UBEC and Policy Framework

The Universal Basic Education Commission (UBEC), established as the agency overseeing basic education in Nigeria, plays a pivotal role in shaping school infrastructure through its "Action Plan for School Design (2020-2025)," which emphasizes the integration of functional and safe school grounds to enhance learning environments (UBEC, 2020). This policy document outlines ideal standards, including a minimum of 20% green space allocation per school, provision of age-appropriate play equipment, and safety features such as secure fencing and adequate drainage, aimed at fostering physical activity, social interaction, and environmental learning among primary school pupils (UBEC, 2020). These guidelines provide a benchmark for assessing the effective utilisation of school grounds, particularly in regions like Bauchi Metropolis where educational infrastructure challenges persist, and their incorporation into the study framework will enhance the alignment of proposed optimisations with national educational policies (Adamu et al., 2022).

3. Methodology

3.1 Research Design

The study adopted a mixed-methods approach, combining both quantitative and qualitative techniques to ensure a comprehensive understanding of how pupils use primary school grounds. This approach was chosen because it enables the triangulation of results, allowing the strengths of one method to compensate for the limitations of another (Creswell, 2014).

The research was descriptive in nature, aiming to document existing patterns of use, environmental conditions, and perceived barriers, without manipulating the variables under investigation.

3.2 Study Area

The study was conducted in Bauchi metropolis, the capital city of Bauchi State in northeastern Nigeria as seen figures 1-3 and Table 1. The area is a fast-urbanizing region with a high density of public and private primary schools, many of which were constructed or expanded under the Universal Basic Education (UBE) program.

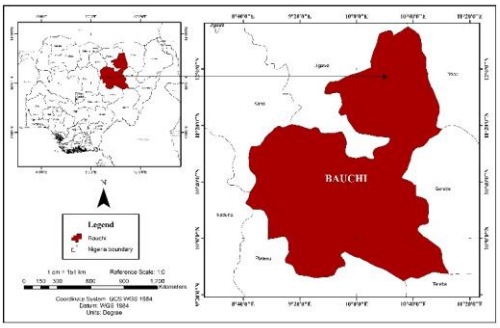

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FIGURE 1: MAP OF NIGERIA SHOWING BAUCHI STATE.
Source: University of Jos GIS Laboratory (2025).

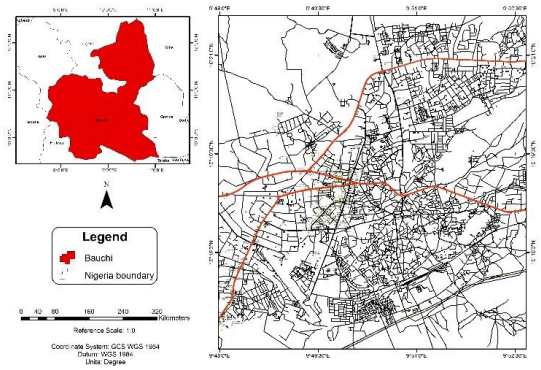

FIGURE 2: MAP OF BAUCHI SHOWING BAUCHI METROPOLIS.
Source: University of Jos GIS Laboratory (2025).

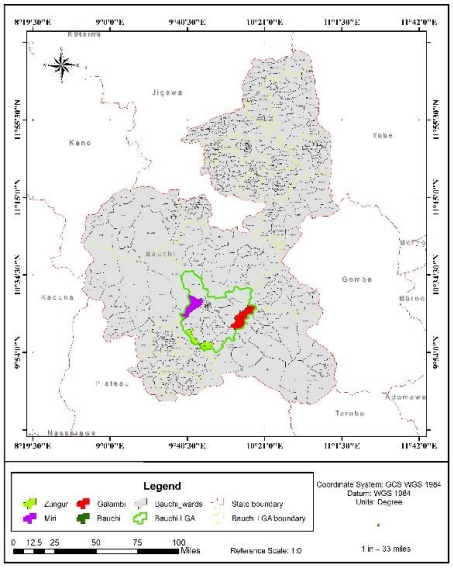

FIGURE 3: MAP OF BAUCHI SHOWING STUDY AREA.
Source: University of Jos GIS Laboratory (2025).

Table 1 Public and Private Primary Schools in Bauchi Metropolis

S/N	District	Wards	Public Primary School	Private Primary School
1	Bauchi	Majidadi A	3	2
		Dan iya	11	91
		Majidadi B	2	6
		Dankade	4	16
		Dawaki	2	7
		Hardo	2	11
		Makama A	4	27
		Makama B	6	20
		Tirwun	1	1
2	Galambi	Tirwun	22	14
		Galambi	40	4
		Kangere	31	7
		Gwaskwaram	8	
3	Miri	Birshi	22	45
		Miri	29	11
		Dan danko	12	4
		Kundum durum	19	4
		Liman katagum	1	10
4	Zungur	Liman katagum	16	1
		Yamrat	27	2
		Zungur	19	2
		Mummunsal	25	3
	TOTAL	4	617	288

Bauchi is located within the Sudano-Sahelian ecological zone, characterized by:

1. Semi-arid climate
2. Predominantly flat terrain interspersed with rocky outcrops
3. Seasonal rainfall (May–September) and high daytime temperatures

These environmental factors play a significant role in determining the durability, usability, and safety of outdoor school grounds.

3.3 Population and Sampling

The target population comprised pupils and teachers from public primary schools in the study area. A multi-stage sampling procedure was employed:

I. **Stage One – School Selection:** Twelve schools were purposively selected to capture variability in size, location (urban, peri-urban, rural), and available outdoor facilities.

II. **Stage Two – Respondent Selection:** From each school, 25 pupils were randomly selected across upper and lower primary levels, resulting in a total of 300 pupils. In addition, all head teachers and at least two teachers per school (n = 36) participated in the survey and/or interviews.

3.4 Data Collection Instruments

3.4.1 Structured Observation Checklist

This instrument captured data on:

I. Physical layout of school grounds.
II. Condition and quantity of play and learning equipment.

III. Patterns of space usage during school hours (morning assembly, break periods, after school).

3.4.2 Pupil Questionnaire

Designed in simple, age-appropriate language, the questionnaire assessed:

I. Frequency and type of outdoor activities.
II. Preferred spaces within the school grounds.
III. Perceptions of safety and comfort.

3.4.3 Teacher/Head Teacher Interviews

Semi-structured interviews provided deeper insights into:

I. Historical changes in ground use.
II. Perceived challenges in managing outdoor spaces.
III. Ideas for improvement.

3.5 Data Collection Procedure

In the course of this study, research assistants visited each school over a two-week period. Observations were conducted at three intervals during the day—morning, mid-day, and afternoon to capture variations in space usage. Pupil questionnaires were administered during free periods under teacher supervision. Interviews with staff lasted between 20–30 minutes and were audio-recorded for later transcription.

3.6 Data Analysis

I. **Quantitative Data:** Coded and analyzed using SPSS version 26 to generate descriptive statistics (frequencies, percentages, means) and cross-tabulations comparing different school types and sizes.
II. **Qualitative Data:** Thematic analysis was conducted on interview transcripts and open-ended questionnaire responses, following Braun and Clarke's (2006; 2023) six-step process to identify recurring themes on usage patterns and constraints.
III. **Integration:** Results from both strands were compared and integrated to produce a holistic interpretation of how effectively pupils use their school grounds.

3.7 Ethical Considerations

Ethical clearance was obtained from Abubakar Tafawa Balewa University, Faculty of Environmental Technology Ethics Committee. Permission to conduct research was granted by the State SUBEB. Written informed consent was obtained from teachers and head teachers, while parental consent and pupil assent were secured for all participating children. Measures were taken to protect the anonymity of respondents by using coded identifiers.

4. Results

4.1 Overview of Observed School Ground Characteristics

Observation across the twelve sampled schools revealed significant variation in the size, layout, and facilities available in the school grounds.

I. **Ground Size:** Ranged from less than 2,000 m² in densely built-up urban locations to over 8,000 m² in rural schools.
II. **Surface Type:** Predominantly bare earth (75% of schools), with only 3 schools (25%) having partial grass cover.
III. **Facilities Present:**
i. Assembly grounds (100%)
ii. Open play fields (83%)
iii. Sports markings (netball, football) (41%)
iv. Shaded sitting areas (17%)
v. Outdoor learning spaces such as gardens or teaching shelters (8%)

These physical conditions influenced the range and quality of pupil activities observed during the study.

4.2 Patterns of Pupil Ground Usage

4.2.1 Frequency and Duration of Outdoor Engagement

I. **Break Time Usage:** All schools recorded high outdoor activity during mid-morning breaks, with between 80–95% of pupils outside during this period.
II. **Learning-Linked Usage:** Only 2 schools (17%) reported regular outdoor lessons, and these were mostly for environmental science or physical education.
III. **Before/After School:** Minimal use was recorded, with only rural schools showing moderate after-school engagement (sports practice, informal games).

4.2.2 Types of Activities Observed

I. **Unstructured Play:** Predominant activity across all school's tag, running, ball games (not necessarily linked to structured sport).
II. **Sports:** Limited to schools with basic facilities; football was the most common organized sport.
III. **Socializing:** Pupils often congregated in shaded areas (trees, verandahs) to chat or rest.
IV. **Educational Use:** Gardening, nature observation, or teacher-led outdoor activities were rare (<10% of total observed ground use).

These findings align with studies by Dyment (2005) and Hussein (2012), which indicate that unstructured play dominates when school grounds are not intentionally designed for diverse use.

4.3 Barriers to Effective Use Identified by Pupils and Teachers

From pupil surveys and teacher interviews, four key themes emerged:

I. **Environmental Discomfort**

i. Excessive heat and lack of shade were reported as major deterrents to prolonged outdoor activity (reported by 68% of pupils; 75% of teachers).

ii. In hot-dry months, teachers avoided outdoor teaching due to pupil discomfort.

II. **Lack of Facilities and Equipment**

i. 83% of pupils expressed a desire for play equipment such as swings, slides, and climbing frames.

ii. Teachers noted that sports equipment was often donated but not replaced when damaged.

III. **Poor Maintenance**

i. Bare, uneven grounds caused dust problems in dry seasons and mud during rains.

ii. Two schools had unused areas overgrown with weeds, reducing usable space.

IV. **Safety Concerns**

i. Teachers in 3 schools cited injuries from rough play due to lack of designated play zones.

ii. Inadequate fencing in rural schools led to occasional intrusion by livestock or community members.

4.4 Pupils' Preferences for Outdoor Spaces

Survey responses showed that pupils favored areas with shade and open space:

I. **Shaded trees**: 45%

II. **Open play fields**: 38%

III. **Verandahs/corridors**: 12%

IV. **Gardens/flower beds**: 5%

Interestingly, while gardens ranked lowest in preference, pupils in the two schools with functional gardens expressed curiosity and willingness to participate in gardening if encouraged, echoing findings from Maynard and Waters (2007) on the educational potential of outdoor spaces.

Table 2: Comparative Analysis Across Urban and Rural Schools

These differences as seen in Table 2 suggest that while both contexts face infrastructure deficits, rural schools benefit from more natural vegetation, which provides some comfort advantage.

	Urban Schools	Rural Schools
Unstructured play	High	High
Outdoor lessons	Very low	Low–moderate
Sports participation	Low	Moderate–high
After-school ground usage	Minimal	Moderate
Access to shaded areas	Limited (due to sparse trees)	Moderate (natural shade from trees)

4.5. Thematic Analysis of In-Depth Interviews

4.5.1. Familiarisation with Data

All interview recordings with teachers and head teachers were transcribed verbatim. The transcripts were read multiple times to gain a full understanding of the content and to note recurring concepts related to pupil ground usage.

4.5.2. Step 2: Coding

Initial codes were assigned to segments of text that related to:

I. Frequency of outdoor use

II. Types of activities

III. Environmental comfort

IV. Infrastructure adequacy

V. Safety and accessibility

VI. Teacher perceptions of outdoor learning potential

4.5.2. Theme Development

From the codes, four main themes emerged, each with subthemes:

Theme 1: Predominance of Unstructured Play

I. **Subtheme 1.1:** Break-time as the primary use window
"The children only really go outside during break time. Apart from sports days, there's no organized activity outside." (Teacher, School 4)

II. **Subtheme 1.2:** Lack of structured outdoor learning
"We could use the field for science or drawing lessons, but there's no plan for that and it's too hot sometimes." (Head Teacher, School 9)

Interpretation: Pupils' outdoor engagement is largely recreational and spontaneous, with minimal teacher-led integration into academic subjects.

Theme 2: Environmental Discomfort and Climate Constraints

I. **Subtheme 2.1:** Excessive heat and lack of shade
"By noon, the sun is unbearable. We cannot keep the children outside for too long." (Teacher, School 2)

II. **Subtheme 2.2:** Seasonal usability issues
"During rainy season, the ground becomes muddy and slippery, so pupils stay indoors." (Head Teacher, School 7)

Interpretation: Climate factors significantly influence when and how pupils use outdoor spaces, pointing to the need for climate-responsive design.

Theme 3: Infrastructure and Equipment Deficiency

- **Subtheme 3.1:** Inadequate play facilities
"We have a field, but no swings or slides; the children just run around." (Teacher, School 6)
- **Subtheme 3.2:** Poor maintenance culture
"We once had a donated goalpost, but it's broken and no one has fixed it." (Head Teacher, School 1)

Interpretation: The absence and deterioration of facilities limit the diversity of activities and reduce sustained engagement.

Theme 4: Safety and Management Concerns

I. **Subtheme 4.1:** Injury risks from unsuitable play zones
"Sometimes children fall and hurt themselves because the ground is uneven." (Teacher, School 11)

II. **Subtheme 4.2:** Boundary security issues
"Without fencing, goats and strangers sometimes enter, which disturbs activities." (Head Teacher, School 8)

Interpretation: Safety hazards, both environmental and security-related, discourage prolonged or varied use of outdoor grounds.

4.6. Discussion

The findings of this study reveal a consistent pattern: primary school grounds in the study area are used predominantly for unstructured play, with minimal integration into the formal teaching and learning process. This aligns with observations in similar contexts reported by Dyment (2005) and Hussein (2012), where outdoor spaces were underutilized due to inadequate infrastructure and lack of deliberate planning for educational purposes.

4.6.1 Implications for Learning and Development

The limited use of school grounds for structured educational activities suggests a missed opportunity to enhance experiential learning. Research by Malone (2016) demonstrates that access to well-designed outdoor learning spaces improves student engagement, fosters creativity, and supports physical and social development. In the present study, only 17% of schools regularly used outdoor spaces for lessons, and even then, these activities were restricted to specific subjects such as environmental science and physical education. This reflects a narrow perception of outdoor learning potential among teachers.

Moreover, the dominance of unstructured play, while beneficial for physical activity and social interaction (Pellegrini & Smith, 1998; Bers, 2020), may not fully exploit the pedagogical possibilities inherent in outdoor spaces. The findings highlight the need for multi-functional school grounds that accommodate both free play and structured, curriculum-linked activities.

4.6.2 Environmental Comfort as a Determinant of Use

A recurring theme from both observations and interviews was environmental discomfort, particularly excessive heat during midday periods. This echoes Agboola *et al* (2014) assertion that climate-responsive design is critical for school grounds in tropical climates. In the absence of adequate shading, even teachers avoided outdoor teaching.

The difference between urban and rural schools in terms of natural shade points to the role of vegetation as an affordable, low-maintenance intervention. Rural schools benefited from naturally occurring trees, whereas urban schools, often constrained by space, had sparse greenery and higher levels of heat discomfort.

4.6.3 Infrastructure and Equipment Gaps

The near absence of play and learning equipment in most schools aligns with Lawal's (2011) observations on the chronic underfunding of outdoor learning resources in Nigerian public schools. Pupils' expressed desire for swings, slides, and climbing frames indicates a demand for active play infrastructure that is currently unmet.

While some equipment was reportedly donated, the lack of maintenance and replacement plans rendered these facilities short-lived. This points to a systemic challenge: investment in outdoor infrastructure must be coupled with a maintenance culture if benefits are to be sustained.

4.6.4 Safety and Accessibility Concerns

The issue of safety both in terms of injury risks from rough play and intrusion from outside the school grounds mirrors findings by Motsatsi (2015), who noted that poor zoning and inadequate fencing can compromise the usability of outdoor spaces. Without designated play areas, pupils engage in high-energy activities in unsuitable zones, increasing the risk of accidents.

In rural areas, the lack of perimeter fencing also allowed livestock intrusion, disrupting activities and creating hygiene concerns. Addressing these safety challenges requires both design and administrative interventions.

4.6.5 Integrating Pupil Preferences into Design

Pupil preferences for shaded trees and open play fields suggest that any redesign of school grounds should prioritize comfort and open space accessibility. Interestingly, the relatively low preference for gardens contradicts findings in Western contexts (Maynard & Waters, 2007; Kiviranta *et al.*, 2024), where school gardens are highly valued. This difference may be due to limited exposure in the two schools with functional gardens, pupils showed curiosity and willingness to participate. This indicates that exposure and programmatic integration can shift attitudes toward alternative outdoor spaces.

4.6.6 Urban–Rural Differences and Design Implications

While both urban and rural schools faced similar challenges, rural schools' access to more natural shade and larger grounds suggests potential for quicker improvements through low-cost landscaping interventions. Urban schools, on the other hand, may require more creative space optimisation strategies—such as vertical gardens, shaded courtyards, or multipurpose paved areas—to overcome space constraints.

These findings reinforce the argument by Sanoff (2001) that school design must be context-specific, responding to local environmental, cultural, and resource realities.

4.6.7. Cross-Theme Insights

The themes reveal an interlinked set of factors: environmental discomfort reduces learning-related use, inadequate infrastructure limits activity diversity, and safety concerns further constrain engagement. Teacher attitudes toward outdoor learning also appear shaped by these constraints, reinforcing a cycle of underutilisation.

4.5.8. Implications for Design and Policy

This thematic analysis suggests that for pupils to use school grounds more effectively, improvements must target:

I. **Shade provision** and weather-responsive ground surfacing
II. **Multi-purpose play and learning zones** with durable equipment
III. **Clear maintenance strategies** for outdoor infrastructure
IV. **Perimeter security** to ensure safe use

4.6.9 Comparative Analysis with UBEC Standards

A comparative analysis was conducted to evaluate the existing conditions of the 12 selected primary schools in Bauchi Metropolis against the UBEC "Action Plan for School Design (2020-2025)" standards, revealing significant disparities. For instance, only 3 out of the 12 schools (25%) met the 20% green space requirement, with an average of 12% observed across the sample, while safety features such as secure fencing were present in 5 schools (42%), falling short of the universal standard, as documented in the field observation data. Design elements like age-appropriate play equipment were available in 4 schools (33%), and drainage issues were noted in 7 schools (58%), contrasting with UBEC's mandate for fully functional infrastructure, indicating a need for targeted interventions to align with national benchmarks and improve learning outcomes (UBEC, 2020; Cohen et al., 2023).

4.7 Observational Checklist Results

The observational assessment focused on design features such as visual appeal, flexibility of space, integration with nature, outdoor learning areas, signage, and creative play structures across ten sampled schools as shown in Table 3.

Table 3: Summary of Observational Checklist on Design Conditions

Design Feature	Adequate (n)	Moderate (n)	Inadequate (n)	Comments
Visual aesthetics (color, layout)	2	4	4	Most schools lack deliberate color and spatial organization
Outdoor learning spaces	1	3	6	Only one school had designated outdoor classrooms
Green space integration	2	3	5	Green elements were sparse in public schools
Functional zoning	3	5	2	Most private schools had better zoning for play/learning
Safety design elements	4	3	3	Fencing, pathways, and traffic demarcations were inconsistent
Creativity in play spaces	1	3	6	Most grounds lacked interactive and imaginative play areas

5.0. Summary

This study set out to assess the effective use of primary school grounds in the study area, focusing on patterns of pupil engagement, environmental comfort, infrastructural adequacy, and barriers to optimal utilisation. Using a mixed-methods approach, data were collected from 300 pupils, 36 teachers, and structured observations in 12 public primary schools.

The results revealed that:

I. Unstructured play dominated outdoor activity, with minimal integration of school grounds into formal teaching.

II. Environmental discomfort—especially excessive heat—discouraged both pupils and teachers from prolonged outdoor engagement.
III. Most schools lacked adequate play and learning equipment, with maintenance challenges leading to the deterioration of available facilities.
IV. Safety concerns, such as inadequate zoning and lack of secure fencing, reduced the usability of some outdoor areas.
V. Pupils preferred shaded and open spaces, indicating the importance of comfort in outdoor design.

While rural schools benefited from larger spaces and natural shade, urban schools faced greater constraints on space and greenery. Across both contexts, there was a clear gap between the potential and actual use of school grounds for holistic education.

5.2. Recommendations

Based on the findings, the following recommendations are proposed:

5.2.1 Design and Infrastructure Improvements

1. **Climate-responsive landscaping:** Increase tree planting and shaded areas to improve comfort in hot weather (Agboola *et al.,* 2014).
2. **Multi-functional zones:** Create designated spaces for sports, play, outdoor learning, and quiet reflection, ensuring flexibility for varied uses.
3. **Equipment provision and maintenance:** Introduce durable play structures suited to local conditions, coupled with maintenance schedules and community involvement.

5.2.2 Policy and Administrative Actions

4. **Integrate outdoor learning into curriculum:** Encourage teachers to use school grounds for diverse subjects, with training on outdoor pedagogy.
5. **Safety upgrades:** Install perimeter fencing where absent, and design safe, injury-minimized play zones.
6. **Community partnerships:** Engage local organisations, PTAs, and NGOs in funding, maintaining, and improving school grounds.

5.2.3 Context-specific Strategies

7. **Urban schools:** Focus on space optimisation—vertical gardens, shaded courtyards, and multipurpose paved areas.
8. **Rural schools:** Enhance existing natural assets by planting more trees, developing gardens, and creating outdoor classrooms.

5.4. Conclusion

School grounds are more than just spaces between buildings—they are potential arenas for learning, physical development, and social growth. This study highlights the underutilisation of such spaces in the study area, pointing to a combination of environmental, infrastructural, and programmatic factors as limiting their effectiveness.

Improving the design and use of school grounds in Nigerian primary schools requires an integrated approach: one that is climate-responsive, inclusive, and aligned with the educational mission of the institution. By adopting context-sensitive design interventions, training teachers in outdoor pedagogy, and fostering community involvement, school grounds can be transformed into vibrant, multi-purpose learning environments. These findings reinforce the call for policymakers, educators, and designers to view outdoor spaces not as incidental, but as essential components of the educational landscape—particularly in climates and contexts where indoor learning is challenged by overcrowding, heat, and resource scarcity.

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