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Locational Characteristics and Accessibility of Primary Schools in Osogbo Metropolis, Nigeria

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Abstract

Access to quality primary education is crucial for sustainable development, yet disparities in school distribution and accessibility persist in Osogbo Metropolis, Nigeria. This study examines the locational characteristics of primary schools in Osogbo Metropolis, Nigeria, focusing on accessibility, land use compliance, and environmental influences. The research evaluates how school planning, space allocation, and pupils and staff distance travel align with planning standards and how surrounding land uses affect learning environments across the 356 primary schools (51 public and 305 private) using stakeholder interviews, Global Positioning System (GPS) to pick primary schools location coordinates, Geographic Information Systems (GIS) and inferential statistics for analysis. Findings reveal that only 3.4% of schools meet the recommended minimum land area of 4 acres, with public schools (15.7%) faring better than private schools (1.3%). Poor road infrastructure affects accessibility, as only 21.6% of schools are accessible via tarred roads without potholes. Distance to transportation is another challenge, with 34.6% of schools located more than 2,000 meters (2km) from the nearest bus stop, exceeding the recommended 1–2 km walking distance. Furthermore, 56.5% of schools are in predominantly residential areas, while 43.5% are in mixed-use zones, exposing students to environmental hazards like noise and air pollution. The study highlights the need for strategic school siting, improved road networks, and stricter land use enforcement. Integrating GIS -based planning with education policies can enhance equitable access and create safer learning environments, especially for pupils who are just developing their immune systems.

Keywords: School Locational Characteristics, Urban Planning, Educational Infrastructure, Osogbo Metropolis, GIS, Road Networks.

1 Introduction

Education is a vital driver of human and societal development, laying the foundation for economic growth, social stability, and national progress (Ogundahunsi, *et al*., 2018 and Olayode, *et. al*., 2024). Primary education, in particular, is the bedrock of learning, equipping children with essential knowledge and skills for lifelong success (United Nations, 2015). However, achieving universal access to quality education is a persistent challenge in many developing countries, including Nigeria, where disparities in school distribution, infrastructure, and accessibility hinder equitable learning opportunities (UNESCO, 2021).

A critical factor influencing access to primary education is the school location. The location of primary schools plays a crucial role in determining access to education, especially for young children who depend on proximity for ease of attendance. Education is a fundamental human right, as emphasized in the United Nations Sustainable Development Goal 4 (SDG 4), which aims to "ensure inclusive and equitable quality education and promote lifelong learning opportunities for all" (United Nations, 2015). However, the reality in many developing countries, including Nigeria, is that school locations are often unevenly distributed, leading to disparities in access and quality of education.

In Nigeria, the National Policy on Education (Federal Republic of Nigeria, 2013) recognizes that schools should be strategically located to ensure accessibility for all children, particularly in urban and rural areas. Yet, studies have shown that some communities are underserved, forcing children to travel long distances to access education, while others have an oversupply of schools, leading to inefficiencies in resource allocation (Olayode *et al*.,

2022).

The implications of poor school siting include lower enrollment rates, increased dropout rates, and negative impacts on learning outcomes, especially for children from low-income backgrounds who may struggle with transportation costs (Adeyemi *et al*., 2022).

In urban centers like Osogbo, Nigeria, rapid population growth and unplanned development have contributed to the haphazard distribution of educational facilities. Some schools are situated in high-traffic areas, exposing children to safety hazards, while others lack basic infrastructure such as good road networks and public transportation access more importantly some school bus stops are far from the school gate (Ajala & Kilaso., 2018). Geographic Information Systems (GIS) have become valuable tools for assessing the spatial distribution of facilities, helping policymakers and planners identify gaps and make informed decisions to improve accessibility (Olalekan *et al*., 2017).

This study examines the locational characteristics of primary schools in the Osogbo metropolis, Nigeria, using GIS to analyze public and private primary schools' spatial disparities and challenges related to their locational characteristics, the findings provide useful insights for urban planning, education policy, and community development. Ensuring that schools have adequate land space to accommodate educational activities including classrooms, football pitches and other green infrastructure among others, condition of roads abutting the school, land use coverage, distance to the nearest bus stops and the major activities around the school neighbourhoods will not only promote inclusivity but also enhance the overall effectiveness of primary education in Nigeria.

2 Literature Review

The location of schools is a crucial factor in ensuring access to education, particularly for young children who may struggle with long travel distances and poor road conditions. Over the years, scholars have explored how school location, accessibility, environmental factors, and land use pla**nning** impact educational outcomes. This section reviews existing literature on these themes, highlighting key theories, challenges, and recommendations for improving school location planning.

Theories of School Location Planning

Deciding where to place schools is not just a matter of convenience; it follows certain **theories and models** that help urban planners and policymakers determine the best locations.

Central Place Theory

One of the oldest and most relevant theories is Christaller's Central Place Theory (1933), which posits that essential services, such as schools, should be evenly distributed so that people can easily access them. This theory suggests that students should not have to travel long distances to reach a school, as proximity plays a major role in attendance rates (UNESCO, 2021).

However, in many Nigerian cities, including Osogbo, this is not the case; some areas have an excessive number of schools, while others have an insufficient number, leading to overcrowding and inefficiencies (Ajayi *et al*., 2018).

Gravity Model

The Gravity Model (Huff, 1964) helps explain why students tend to enroll in schools that are both close to their homes and of good quality. Parents are more likely to send their children to a nearby school if it has strong academic performance and good infrastructure (Owolabi & Adebayo, 2019). However, when nearby schools are poorly equipped or overcrowded, parents prefer to send their children to distant schools, increasing the demand for transportation and adding stress to both students and parents (Akinpelu, 2020).

Location-Allocation Model

The Location-Allocation Model (Volkan, 2020) is a modern approach used in urban planning to determine optimal locations for schools based on population distribution. This model suggests that schools should be placed where they can serve the highest number of students while minimizing travel time (Volkan, 2020). Many developed countries use Geographic Information Systems (GIS) to apply this model and map out the best locations for schools, ensuring equitable access across cities.

Access to Education and School Distribution

One of the biggest challenges in education planning is ensuring that all children, regardless of their background, have access to a nearby school. According to SDG-4 (Sustainable Development Goal 4), every child should have equal access to quality education (UNESCO, 2021). However, in many Nigerian cities, this goal remains unmet due to poor school distribution, bad road networks, and high transportation costs (Ajayi *et al*., 2018).

Long Distances and Poor Road Networks

Research has shown that when schools are too far from residential areas, many children struggle to attend regularly. In some cases, young students walk for over 3 kilometers to reach the nearest school, which negatively affects their punctuality, safety, and academic performance (Owolabi, *et. al*., 2019). Additionally, bad roads and a lack of public transport make it even harder for children to reach school, especially during the rainy season (Akinpelu, 2020).

Unequal Distribution of Schools

A major problem in school planning is the imbalance between supply and demand. Some areas have an oversupply of schools, leading to competition among private schools, while other areas remain underserved (Ajayi *et al*., 2018). This uneven distribution means that while some schools struggle with low enrolment, others experience overcrowding, which affects learning quality.

Parental Preference for Distant Schools

Many parents prefer sending their children to well-established schools, even if they are far from home. Research by Alimi *et al*. (2012) found that parents are willing to pay extra for transportation if a school offers better teaching quality, better facilities, and a safer environment. However, this preference creates traffic congestion, increases commuting stress for students, and excludes children from low-income families who cannot afford transportation (Owolabi, *et al.*, 2019).

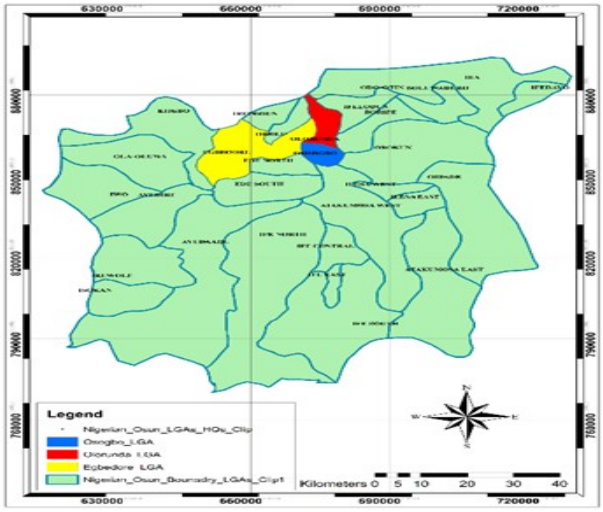
3 The Study Area

Osogbo Metropolis lies between latitudes 7°45′N and 7°57′N and longitudes 4°30′E and 4°37′E, covering an area of approximately 288 km². This includes about 144 km² of Egbedore Local Government Area (LGA), 47 km² of Osogbo LGA, and 97 km² of Olorunda LGA (Osun State Ministry of Lands and Urban Development, 2022). The metropolis is bordered by Ifelodun LGA to the north, Ede North and Ede South LGAs to the west, Atakunmosa LGA to the east, and Odo-Otin LGA to the south. As a key administrative, commercial, and educational hub in Osun State, Osogbo serves as a central point for both economic and social activities.

Figure 1: Osun State within the Context of Nigeria

Source: Olayode et. al. 2024

Figure 2: Osogbo metropolis within the Context of Osun



State

Source: Olayode et. al. 2024

There are 356 primary schools in the metropolis, including 51 public primary schools and 305 private primary schools (Osun State Ministry of Education and Authors Collation, 2023).

Osogbo Metropolis has a mix of public and private primary schools, providing education to thousands of children. While the government operates most of the public schools, private investors have significantly contributed to school provision,

often filling gaps left by inadequate public investment.

For primary data collection, however, a more refined approach was necessary. Using a purpose sampling, principals from each category of schools were sampled for data collection, therefore representing other members of staff and students of the schools.

To analyse the collected data, the spatial data were assessed using overlay operation for data interpolation and spatial configuration of primary school locations in the study area while various statistical tools such as chi-square, Analysis of Variance (ANOVA), Crosstabulation among others were used to assess differences in the locational characteristics of primary schools in the study area. Chi-square analysis was applied to examine relationships between several factors, including school land coverage, the proportion of land utilized, road conditions leading to schools, the distance of schools from the nearest bus stops, and major activities within the school's neighbourhood.

To further validate the significance of these relationships, Analysis of Variance (ANOVA) was conducted alongside chi-square tests. These statistical methods provided a structured approach to organising and interpreting the collected data, ensuring that patterns and variations were accurately identified and analysed.

Discussion of the Finding

Primary Schools' Locational Characteristics

The result from the findings discusses and describes the physical characteristics of public and private primary schools in Osogbo metropolis, Nigeria. The issues examined are land coverage, percentage of land used, conditions of access roads, distance to the school's nearest bus stops, and major activities within the schools' neighbourhoods, among others, with the view to ensuring efficient access to quality education.

Land Coverage of the Schools

For each school surveyed, the property boundary was measured in meters and converted to acres with the view to following the guiding principles for design standards (Onaiwu and Onaiwu, 2020; and Vagale, 1971). Thus, the land coverage of primary schools ranged from 0.03 acres (102 m^2) to 18.94 acres (75,767000 m^2) in Osogbo metropolis.

As presented in Table 1 and Figures 4 and 5, it was observed that 3.4% of the public (15.7%) and private (1.3%) primary schools met the minimum land coverage of 4 acres and above. (In comparison, as much as 96.6% of the public (84.3%) and private (98.1%) primary schools did not meet the set standard, with a mean value of 7.2 and 0.5. Recheck this interpretation, please. It seems confusing

It can be deduced from the findings that public primary schools are more endowed with adequate land area, while private schools are characterised by inadequate land area. In the Osogbo metropolis, primary schools had a shortfall of as much as 1,085.75 acres (439.3 hectares) as presented in Tables 1, 2, 3, and 4, respectively. Furthermore, Figures 4 and 5 show the typical spatial query of the school's land coverage in the study area.
However, many private schools lack sufficient land space, as they are often established within converted residential buildings with limited facilities (UNESCO, 2021).

Osogbo Metropolis faces significant educational infrastructure and accessibility challenges due to poor school distribution, inadequate roads, and a lack of proper planning. The city's demographic growth, coupled with urban sprawl, demands a more strategic approach to school location planning, ensuring that primary education is equitably accessible to all children. This study seeks to provide insights that will guide policy recommendations for improving school locational distribution and infrastructure development in the metropolis.

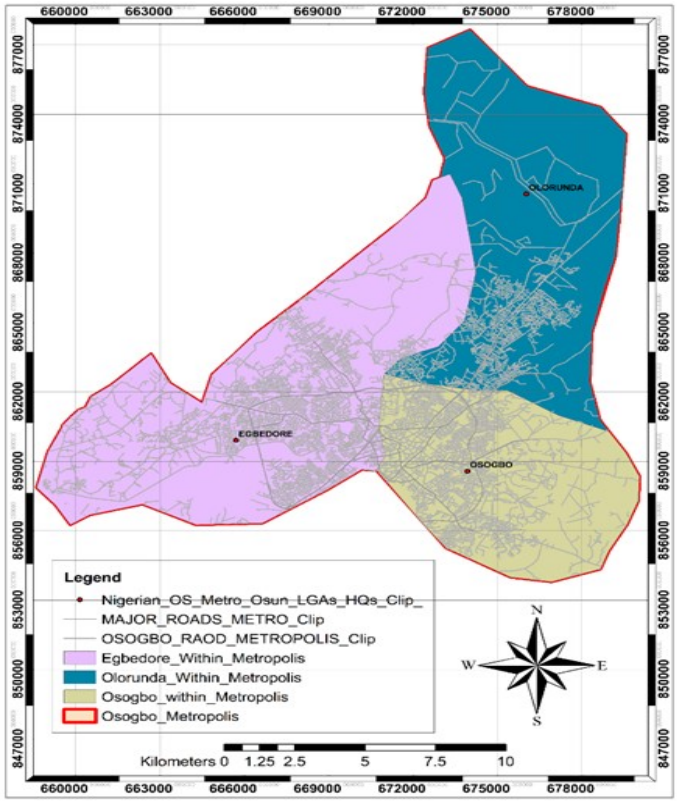


Figure 3: Osogbo Metropolis Map
Source: Olayode *et. al*. 2024

4 Methodology

This study employs a mixed-methods approach, combining geospatial and qualitative research methods to examine the locational characteristics of primary schools in Osogbo Metropolis. Primary data was obtained through questionnaires administered to principals across the public and private primary schools, as well as school stakeholders, including parastatals and associations in charge of educational quality and regulations in Osun State. These responses provided first-hand insights into the locational characteristics and attributes of primary schools, while the Global Positioning System (GPS) was also used to capture the spatial coordinates of all the primary schools' locations in Osogbo Metropolis. To complement this, secondary data was sourced from institutional and government records, particularly from the Osun State Ministry of Education.

These records included key attribute information and locational data, which helped in identifying school location addresses relevant to school planning. Additionally, existing literature on spatial planning in educational locational characteristics was reviewed to provide a broader academic perspective and strengthen the study's foundation.

A purposive sampling approach was adopted to ensure that the data collected was representative of the population, thus principals, and stakeholders including all Nigeria Confederation of Principals of Secondary Schools (ANCOPSS), Osun State Chapter, National Association of Proprietors of Private Schools (NAPPS) Osun State Chapter, Nigeria Union of Teachers (NUT) Osun State Chapter and Osun Education Quality Assurance and Morality Enforcement Agency and direct field observation was carried out across the selected schools to acquire both physical and spatial data, hence, the results are more likely to reflect the overall population and reality of the studied primary schools accurately.

In line with this, the research combined elements of both spatial and non-probability sampling techniques, allowing for a balanced and inclusive selection process. This approach ensured that the study captured diverse perspectives while maintaining exploratory scientific rigour in data collection.

The study focused on a total of 356 public (51) and private (305) primary schools in the study area. Rather than attempting to survey the entire population using probability sampling, the study opted for total enumeration when collecting spatial data. This ensured that every school within the study area was accounted for in this part of the research.

Table 1: Primary Schools Land Coverage in Osogbo Metropolis

Land Area of Primary Schools	School Type	Study Area		Study Area
	Public	Public	Private	
< 4 Acres	Count	43	301	344
	%	84.3	98.7	96.6
	Maximum	3.67	3.213	3.67
	Minimum	0.42	0.026	0.026
	Sum	80.2	98.5	178.7
	Mean	1.9	0.3	0.5
	Standard Deviation	0.9	0.386	0.708
> 4 Acres	Count	8	4	12
	%	15.7	1.3	3.4
	Maximum	9.8	18.9	18.9
	Minimum	4.12	4.23	4.12
	Sum	50.44	35.67	86.11
	Mean	6.3	8.9	7.2
	Standard Deviation	2.087	5.933	4.019
Total	Count	51	305	356
	%	14.3	85.7	100

Source: Author's Fieldwork, 2023

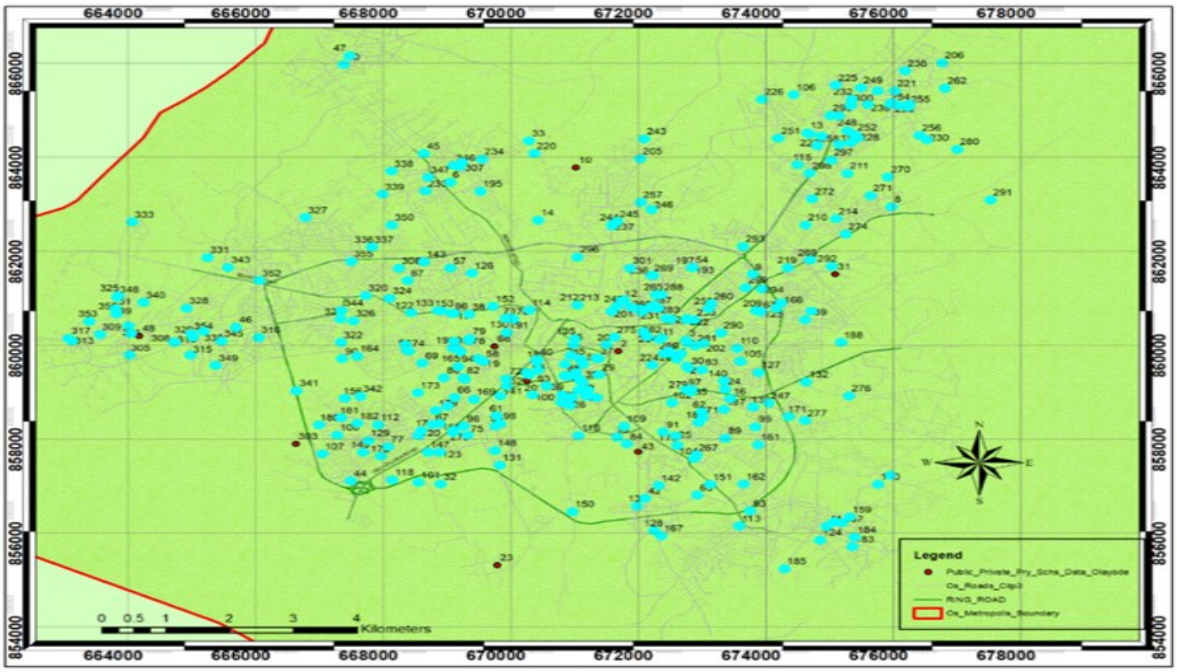


Figure 4: Public and private primary schools that have land area below four (4) acres in Osogbo metropolis, Nigeria.
Source: Author's Fieldwork, 2025

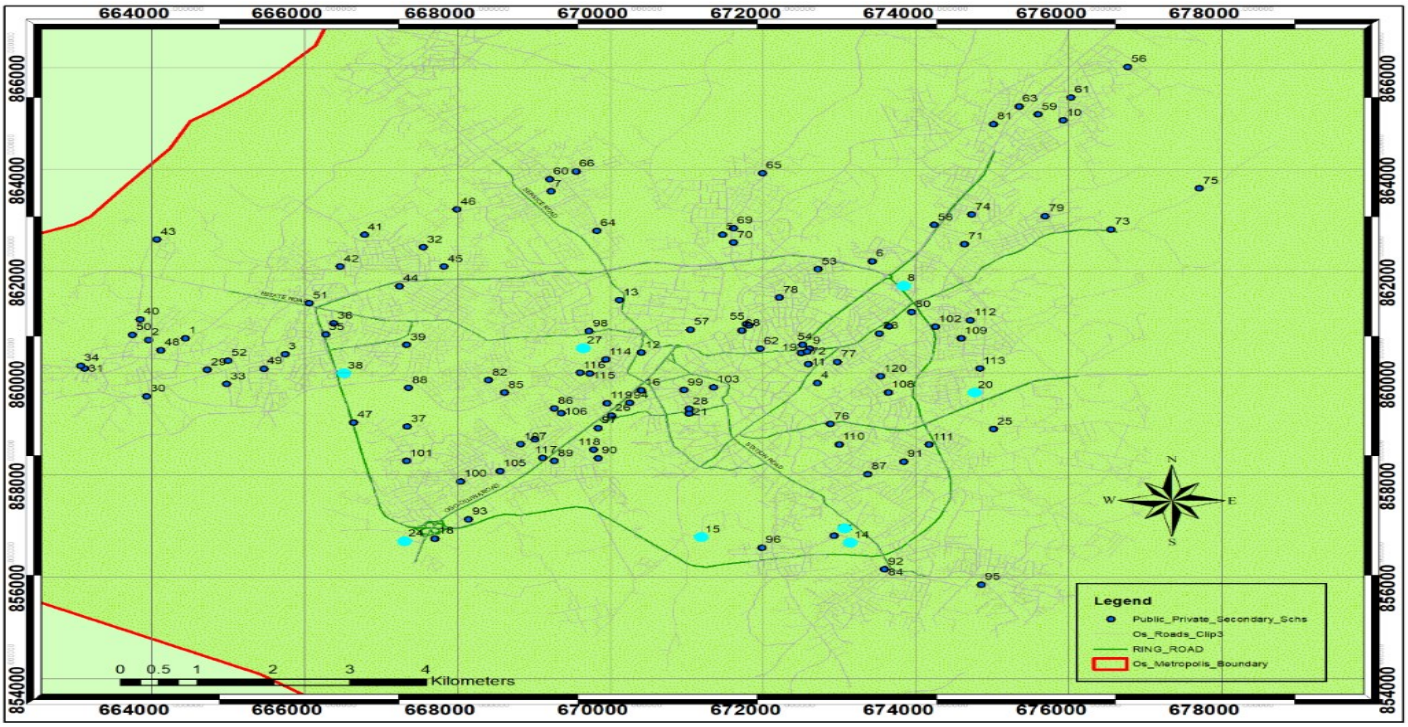


Figure 5: Public and private primary schools that have land area above four (4) acres in Osogbo metropolis, Nigeria
Source: Author's Fieldwork, 2025

Analysis of Variance (ANOVA) of the Location Characteristics of Primary Schools in Osogbo Metropolis

In a bid to examine the variation of the locational characteristics of private and public primary schools in the Osogbo metropolis, variables such as primary schools percentage of land used, condition of school roads, distance to the nearest bus stop and major activities within the school neighbourhoods across the schools were subjected to ANOVA, the results is therefore tested and presented in Table 2.

Findings established that locational characteristic of primary schools in Osogbo metropolis were statistically varied, thus the F-ratios were found to have yielded a p -value that is less than 0.05 ($p < 0.05$) significance level on the following variables: percentage of land utilised (0.000), distance to the nearest bus stop (0.000) and major activities within the school neighbourhoods (0.002) while, condition of school roads established a low (0.08) variation across the primary schools in Osogbo metropolis $p > 0.05$. Findings therefore revealed a statistically significant variation in the locational characteristics across public and private primary schools in the Osogbo metropolis , Nigeria.

Land Use Coverage of Primary Schools in Osogbo Metropolis

Setting standards of maximum land use or permissible land allocation in planning is an attempt to ensure that adequate spaces are provided for educational purposes.

These spaces are provided to serve as parking, setback, greenery, airspace, and ventilation, among others, which determine effective decision making on site for different physical developments. . (Volkan, 2020). This section further used the standard of a maximum 40% usable area for primary schools as postulated by Vagale (1971. Based on this provision, the study limited the range of percentages to below 40% and above 40% land use for primary school types. Findings as presented in Table 3 reveals that of all the primary schools, 88.2% disaggregated into 8.7% public owned and 79.5% privately owned built above the stipulated 40% while the remaining 11.8% made up of 5.6% public and 6.2% private owned schools built below the standard. The trend in the data shows that public primary schools tend to obey the coverage regulations while private schools tend to disobey, probably due to inadequate monitoring and standard enforcement. Further analysis with the use of chi-square reveals a significant

difference in the percentage of land used in public and private primary schools of the study area (p = 0.000) (Table 3).

Table 2: Analysis of Variance (ANOVA) of the Locational Characteristics of Primary Schools in Osogbo Metropolis

Items		Sum of Squares	df	Mean Square	F	Sig.
Primary Schools Percentage of Land Used	Between Groups	5.736	2	2.868	33.147	.000
	Within Groups	30.542	353	.087		
	Total	36.278	355			
Condition of School Roads	Between Groups	8.208	3	2.736	2.264	.080
	Within Groups	570.454	472	1.209		
	Total	578.662	475			
Distance to the Nearest Bus Stop	Between Groups	51.988	3	17.329	17.020	.000
	Within Groups	480.567	472	1.018		
	Total	532.555	475			
Major Activities within the School Neighbourhoods	Between Groups	3.746	3	1.249	5.205	.002
	Within Groups	113.235	472	.240		
	Total	116.981	475			

Source: Author's Fieldwork, 2025

Table 3: Land Use Coverage in Primary Schools in Osogbo Metropolis

Primary Schools		Primary School Type		Total
		Public	Private	
Below 40%	Count	20	22	42
	%	47.6	52.4	100.0
	% of Total	5.6	6.2	11.8
Above 40%	Count	31	283	314
	%	9.9	90.1	100.0
	% of Total	8.7	79.5	88.2
Total	Count	51	305	356
	%	100.0	100.0	100.0
	% of Total	14.4	85.6	100.0

$X^2 = 44.624$; df = 1; p = 0. 000 < 0.05 (S)

Source: Author's Fieldwork, 2025

Condition of Roads in the Schools

The condition of roads in the primary schools was assessed in the study area to determine their motorability level. Findings as presented in Table 4 established that 3.3% of public primary and 18.3% of private primary schools were accessible by tarred roads. For both categories, the roads had potholes, which affected the quality of access to primary schools in the study area. Also, 28.9% of the schools, made up of 4.5% public primary and 24.4% private primary schools, were accessible by tarred roads with potholes, while the remaining 5.3% were accessible with untarred roads without potholes. Overall, 5.3% of the schools disaggregated into 0.3% of public primary and 5.1% of private primary, were accessible by unpaved roads without potholes.

It can be deduced from the findings that the condition of roads leading to the schools did not favour ease of access, especially taking into consideration that only 21.6% of the roads were tarred and without potholes. Due to the nature of the roads, some staff and students reported during focused interviews that they had to resort to procuring the service of commercial motorcycles (popularly called *okada*) to gain access to the schools. It should be noted that the *okada* service had unenviable safety issues, which become more alarming when one considers the fact that children are involved.

Stakeholders' Response on the Condition of Road Networks Abutting Schools

Stakeholders in the education sector were also interviewed to have their views on the condition of roads to various schools in the Osogbo metropolis.

Findings corroborated by the stakeholders established that not all roads abutting schools in the Osogbo metropolis are in good condition, which substantiates findings from personal observation as indicated in Table 4 that the majority of the roads were tarred but currently characterised by potholes, thus, most of the road networks are in a deplorable condition. Further findings, as shown in plates 1, 2, 3, and 4, established the conditions of roads abutting primary schools in the Osogbo metropolis to include the roads that are tarred with potholes, tarred without potholes, untarred with potholes, and untarred without potholes.

Table 4: Condition of School Roads in Osogbo Metropolis

Condition of School Roads		Primary School Types		Total
		Public	Private	
Tarred road without potholes	Count	12	65	77
	%	23.5	21.3	44.8
	% of Total	3.3	18.3	21.6
Tarred road with potholes	Count	22	135	157
	%	43.1	44.3	87.4
	% of Total	6.2	37.9	44.1
Untarred road without potholes	Count	1	18	19
	%	2	5.9	7.9
	% of Total	0.3	5.1	5.3
Untarred road with potholes	Count	16	87	103
	%	31.4	28.5	59.9
	% of Total	4.5	24.4	28.9
Total	Count	51	305	356
	%	100.0	100.0	100.0
	% of Total	14.3	85.7	100.0

$X^2 = 10.923$; df = 9; p = 0. 281 > 0.05 (NS)
Source: Author's Fieldwork, 2025

Plate 1: A typical untarred road without potholes at Okanlawon Nursery and Primary School, Alekunwodo, Osogbo metropolis
Source: Authors' Fieldwork, 2025

Plate 2: A typical untarred road with potholes abutting Oroki Primary School, Agunbelewo, and Community Primary School, Agunbelewo, Osogbo metropolis
Source: Authors' Fieldwork, 2025

Plate 3: A typical tarred road without potholes abutting Ebunoluwa School, Ofatedo, Osogbo metropolis
Source: Authors' Fieldwork, 2025

Plate 4: A typical tarred road with potholes abutting Anthony Idofia Primary School, along Ede–Iwo road, Osogbo metropolis

Distance of Schools to the Nearest Bus Stops in Osogbo Metropolis

One of the critical areas of concern in education policy across the globe, especially with regard to primary schools, is the distance travelled by students and staff, which informs accessibility. In view of this, this study also examined the distance of schools to the nearest bus stop in the study area. Access to education is significantly influenced by the ease of reaching school facilities, and one of the most critical factors in this regard is proximity to transportation networks. The findings from this study indicate that the distance between primary schools and the nearest bus stops varies widely, with some schools located within 500 meters of a bus stop, while others are as far as 2,500 meters away.

The average distance recorded in the study area is 1,400 meters, which exceeds the recommended maximum walking distance for primary school students set by international urban planning and education agencies (UNESCO, 2021).

Findings revealed that the minimum distance travelled from schools to the nearest bus stop was less than 500m, the maximum being 2500m, and the average distance is 1400m in the study area. As presented in Table 5, it was observed that 16.0% of all the schools disaggregated as public primary (3.9%), private primary (12.1%) were located less than 500m to bus stop, 28.7% of the schools broken down as public primary (7.3%), private primary (21.3%), were located between 501-1000m. In addition, 32.0% of the schools, made up of public primary (2.2%), private primary (29.8%), were located between 1001-1500m. Also, 21.6% of the schools, which included public primary (0.8%), private primary (20.8%), were located between 1501-2000m, while the remaining 1.7% were the primary schools located above 2000m from the nearest bus stop in Osogbo metropolis. Further findings revealed a significant difference in the distance travelled by students and staff to the nearest bus stop, as the P-value of 0.000 is < 0.05.

Table 5: Distance to the Nearest Bus Stop in Osogbo Metropolis

Distance to the Nearest Bus Stop in Metres (m)		Primary School Types		Total
		Public	Private	
< 500m	Count	14	43	57
	%	27.5	14.1	41.6
	% of Total	3.9	12.1	16.0
501-1000m	Count	26	76	102
	%	51	24.9	75.9
	% of Total	7.3	21.3	28.7
1001-1500m	Count	8	106	114
	%	15.7	34.8	50.5
	% of Total	2.2	29.8	32.0
1501-2000m	Count	3	74	77
	%	5.9	24.3	30.2
	% of Total	0.8	20.8	21.6
> 2000m	Count	0	6	6
	%	0.0	2.0	2.0
	% of Total	0.0	1.7	1.7
Total	Count	51	305	356
	%	100.0	100.0	100.0
	% of Total	14.3	85.7	100.0

$X^2 = 61.173$; df = 12; p = 0. 000 < 0.05 (S)

Source: Author's Fieldwork, 2025

Major Activities within the School's Neighbourhoods

Research has revealed that surrounding activities are among the critical factors to be considered in the location of educational facilities, which could influence the level of users' age, learning environment, environmental safety, and many more (Alimi *et al.*, 2012, and Xaba, 2012). Findings from this study, as presented in Table 6, found that 56.5% of the schools in Osogbo Metropolis are located in predominantly residential areas, while 43.5% are situated in mixed-use environments that include residential, commercial, institutional, and green spaces. The Chi-square analysis conducted in this study further confirms that there is a statistically significant difference in the types of land uses surrounding schools, emphasizing the need for strategic school location planning to enhance educational accessibility and quality.

Table 6: Major Activities in the School Neighbourhoods

Major Activities		Primary School Types		Total
		Public	Private	
Residential	Count	19	183	202
	%	37.3	60.0	56.5
	% of Total	5.3	51.4	56.7
Mixed	Count	32	122	154
	%	62.7	40.0	43.5
	% of Total	9.0	34.3	43.3
Total	Count	51	305	356
	%	100.0	100.0	100.0
	% of Total	14.3	85.7	100.0

$X^2 = 15.243$; df = 3; p = 0.002 < 0.05 (S)
Source: Author's Fieldwork, 2025

Discussion of the Findings

The findings of this study highlight critical issues related to school location, accessibility, infrastructure, and environmental suitability in Osogbo Metropolis. These findings align with previous research on educational planning, urban development, and school accessibility in developing cities, which influence efficient urban governance. This section provides a detailed discussion of the findings, drawing inferences and supporting them with relevant literature.

a. Uneven Distribution of Schools and Accessibility Issues

One of the major findings of this study is the unequal walking distance for both students and staff of primary schools in the study area. The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2021) recommends that primary schools should be within 1–2 kilometers of walking distance from students' homes to encourage school attendance, yet this study found that many children in Osogbo exceed this limit.

The impact of long travel distances on education has been well documented. A study by Ajayi *et al*. (2018) in Nigerian cities found that students who travel more than 2 kilometers to school often experience higher rates of absenteeism and lateness, which negatively affects academic performance. This aligns with findings from this study, which reveal that students in underserved areas struggle with transportation costs and travel fatigue, ultimately leading to reduced school attendance rates.

Moreover, the uneven distribution of schools has created congestion in some public schools, particularly in areas where private schools are few in number. This problem has been reported in other studies as well. Akinpelu (2020) observed that in many Nigerian cities, public schools experience overcrowding due to rapid urbanization and inadequate school expansion policies, making it difficult for students to receive quality education in a conducive environment.

The lack of proper planning in school locations has resulted in disparities in access to education, with some children having too many options while others have too few in their study area. To address this, spatial planning policies must prioritize school expansion in underserved areas, ensuring that students do not have to travel excessively long distances to access basic education.

b. Poor Road Networks and Transportation Challenges

Another major finding of this study is the poor condition of roads leading to many primary schools in Osogbo Metropolis. The study revealed that only 21.6% of schools are accessible via tarred roads without potholes, while a significant number are located along untarred or poorly maintained roads. This finding is in line with Owolabi & Adebayo (2019), who reported that inadequate road infrastructure is one of the biggest challenges affecting school accessibility in Nigerian cities.

The impact of poor road networks on school accessibility has also been observed in other parts of Africa. Xaba

(2012), in a study on school access in South Africa, found that students in areas with bad roads were more likely to miss school during the rainy season, which significantly affected their academic progress. The findings of this study corroborate this, as many stakeholders reported that poor road conditions often prevent students from attending school during heavy rains.

The inadequate transportation infrastructure in Osogbo Metropolis negatively impacts primary school accessibility, leading to poor attendance, safety concerns, and additional financial burdens on parents. To resolve this, government agencies must prioritize the construction and maintenance of roads leading to schools, ensuring that students can commute safely and efficiently.

c. Land Use Violations and Inadequate Infrastructure in Private Schools

This study found that many private primary schools in Osogbo do not meet the recommended land coverage standards. Planning guidelines require that primary schools should occupy at least 4 acres (1.6 hectares) of land to provide adequate space for classrooms, playgrounds, and administrative facilities (Vagale, 1971). However, findings show that many private primary schools operate on significantly smaller plots, often in converted residential buildings that lack essential school infrastructure.

This finding is consistent with Owolabi (2019), who observed that land constraints and high property costs in Nigerian cities have led many private school owners to establish schools in inappropriate locations with limited space. Similarly, Akinpelu (2020) reported that private schools in fast growing urban centers often violate planning laws, prioritizing profits over infrastructure development, which results in poor learning environments for students.

Additionally, this study found that public schools generally have larger land areas but are often overcrowded, making it difficult for students to learn effectively. This aligns with Volkan (2020), who found that while public schools in urban areas tend to follow land allocation policies, high enrollment rates often exceed available space, reducing the effectiveness of infrastructure planning.

The lack of regulatory enforcement in school siting has led to private schools being established in unsuitable locations, compromising educational quality and student welfare. Stricter enforcement of planning laws is needed to ensure that both public and private schools meet land and infrastructure standards, providing a safe and conducive learning environment for students.

d. Environmental Challenges Affecting Schools

Another key issue identified in this study is that many primary schools are located in areas with environmental hazards. About 43.5% of schools are situated in mixed-use areas, meaning they are surrounded by commercial activities, industrial operations, and high-traffic roads. This poses serious health and safety concerns for students, as exposure to noise pollution, air pollution, and traffic hazards negatively affects learning outcomes.

This finding is supported by Xaba (2012), who found that schools located near busy roads and industrial areas experience higher student dropout rates due to distractions, noise, and exposure to pollutants. Similarly, Alimi *et al*. (2012) reported that air and noise pollution in school environments can lead to lower student concentration and academic performance.

Additionally, this study found that some schools in Osogbo are located in flood-prone areas, making them inaccessible during the rainy season. Volkan (2020) highlighted a similar issue, noting that schools in poorly planned urban areas often face seasonal flooding, which disrupts school activities and damages infrastructure. Poor zoning regulations have allowed schools to be established in hazardous environments, compromising student safety and academic performance. Urban planning authorities must enforce zoning laws to ensure that schools are located in safe, quiet, and environmentally friendly areas.

The findings of this study align with previous research, confirming that school governance, accessibility, infrastructure quality, and environmental conditions are key determinants of educational success.

- The lack of proper planning in school location and road infrastructure continues to create barriers to education in Osogbo Metropolis. However, strategic planning, stricter land use enforcement, and improved infrastructure investments can help address these issues. By ensuring that schools are equitably distributed, properly located, and accessible via good roads, policymakers can create a more inclusive and efficient education system that benefits all students.

Stakeholders' Response on the Location Challenges with Availability and Provision of Educational Facilities

As presented in Table 7, stakeholders were inter-

viewed on the location (area/community/ neighbourhood) of the metropolis that needs the establishment of schools and is challenged with inadequate schools , as well as which of the providers has provided schools the most between the public and private schools. Responses from the officials interviewed include:

The Non-Governmental Organizations have provided more schools compared to the government-provided schools. or instance, from *Dele Yes Sir* roundabout to Africa junction (6.3km distance), there were five (5) private schools with non-availability of public schools at all.

However, the government provided schools are almost free for all students, furthermore, places including Kobongbogboe, Okonfo, Ayekale, Owode Ilesa, Owo Eba, Sadiat, Amulegbaro Fountain Oke-Osun Ibikunle Estate, Bafoo, Ifeoluwa, Okinni, Alaba-Meta, Onibu-Eja, Alabameta, Ogo-Oluwa, Onward, Dada Estate, Oba road, Halleluyah Estate, Adeleke Estate, Adetunji Estate among others are challenged with access to educational facilities within their neighbourhood. Users from these locations had to travel farther to access educational facilities, others are challenged with inadequate schools (Table 7)…

Findings established that the government is the most contributing stakeholder to school provision, more importantly, the less expensive schools provided to ensure that everyone have access to education at affordable or zero cost areas not adequately available within coverage distance, however, the government schools are almost evenly distributed to ensure equal distance coverage by the users in the metropolis (Table 7).

It can be deduced from stakeholders' findings as indicated in Table 5 (mentioning Table 5 after reference has been made to Table 7 indicates disjointed discussion. Please rearrange your presentation) that schools were more provided by private individuals complementing government efforts in school provisions, despite this effort, some places were also listed to be underserved with the provision of educational facilities in the study area.

Table 7: Stakeholders' Response on Locations in Osogbo Metropolis, Nigeria

S/N	QUESTIONS	EDUCATIONAL STAKEHOLDERS INTERVIEWED RESPONSE			
		ANCOPSS	NAPPS	NUT	OEQAMEA
1.	Which area/community/ neighborhood of the metropolis do you feel needs the establishment of school (s), or is challenged with inadequate schools?	Kobongbogboe area, Okonfo area, Ayekale area, Owode Ilesa, Owo eba, Sadiat, Amulegbaro, Fountain Oke-Osun	Alabameta, Ogo-Oluwa, Onward area, Dada Estate, Ibikunle, and many more	Oba road, Kobongbogboe, Bonlanle area, Halleluyah Estate, Adeleke Estate, Adetunji Estate	Ibikunle Estate, Bafoo area, Ife-Oluwa area, Okinni, Alaba-Meta, Onibu-Eja, Ido-Osun
2.	From your experience, which of the educational providers (private and public) has provided many schools in the metropolis, and kindly give examples	Public because it's almost free for all students.	Private school providers	The number of private schools is outrageous in the metropolis for instance, from Dele Yes Sir roundabout to Africa, we have five (5) private schools with no public school at all.	Private School providers, however, Public school are more spatially located within the metropolis as against private schools that is located more close to themselves
3.	Briefly assess the condition of the road abutting schools in the Osogbo metropolis.	Depends on the location of schools, which are mostly accessible by road, though the conditions may be poor.	It depends, while some are good, others are poor	It varies depending on the location of the schools; some places enjoy good roads while some enjoy poor road conditions	Roads are motorable and fairly accessible to users.
4.	In your opinion, what distance do you feel pupils/ students should cover to have access to education facilities? Please with reason	A short distance to school will reduce the cost of mobility and aid punctuality.	Maximum of 2kilometer	Creche and kindergarten children a maximum of 2km, and secondary school 5km	Trekkable distance of at most 2km

Source: Author's Fieldwork, 2025

Summary of Findings and Inferences

The study on the locational characteristics of primary schools in Osogbo Metropolis has revealed several critical issues affecting access to education, school infrastructure, and overall learning environments. The study also examined land use compliance among schools, particularly regarding the minimum space required for a functional learning environment. According to planning guidelines, primary schools should occupy at least 4 acres of land to allow for classrooms, playgrounds, administrative buildings, and other essential facilities. However, a major issue uncovered in this study is that many private schools operate in spaces far smaller than the required standard. Some of these schools are housed in converted residential buildings, lacking proper playgrounds, ventilation, and other necessary amenities. On the other hand, public schools generally have larger land areas, but they often suffer from overcrowding, which affects the quality of education.

Environmental factors also play a role in school accessibility and student welfare. The study found that a large percentage of primary schools in Osogbo metropolis are located in mixed-use areas, meaning they share their surroundings with markets, industries, and busy commercial centers. While this might be convenient for some parents, it introduces challenges such as noise pollution, air pollution, and increased traffic hazards, all of which negatively affect student concentration and safety. Furthermore, some primary schools are situated in flood-prone areas, which means they become inaccessible during heavy rains. These environmental challenges indicate a lack of zoning enforcement in school planning, as primary schools should ideally be placed in safe, quiet, and spacious environments conducive to learning.

Stakeholder perspectives were also explored in the study for effective educational governance, particularly on the issue of who provides primary schools and how well they are distributed. Government efforts to establish public schools have ensured that they are relatively evenly spread across Osogbo metropolis, but due to population growth and high enrollment rates, many of these primary schools are overcrowded. In contrast, private primary schools have helped bridge the gap in educational provision, but their establishment is often driven by profit motives rather than planning standards, leading to issues like poor land allocation, lack of recreational facilities, and substandard infrastructure. Stakeholders also pointed out that some neighborhoods still lack provision of primary schools entirely, forcing students to travel unreasonable distances, which contradicts best practices in urban governance and educational planning.

The findings show that in many cases, students in underserved areas travel beyond the recommended 1 -2 kilometers to reach their nearest primary school, a situation that discourages school attendance, especially for younger children.

Conclusion and Recommendations

This study has highlighted critical gaps in the location, governance, accessibility, and planning of primary schools in the Osogbo Metropolis. The challenges of schools' non compliance with the standard land coverage, poor road conditions, inadequate infrastructure, and weak land use enforcement all contribute to difficulties in education accessibility and quality. However, with better urban planning, stricter enforcement of regulations, and improved infrastructure investments and urban governance, these issues can be addressed.

Therefore, a data-driven approach, using tools like Geographic Information System (GIS) for school planning, and ensuring that schools are placed in safe, accessible, and well-equipped locations while the school land are not overused, in Osogbo metropolis would create a more inclusive and equitable primary education system. In view of achieving a serene, accessible, lucrative and aesthetically pleasing educational environment, policymakers, urban planners, and education stakeholders must work together to ensure that every child has the opportunity to receive quality primary education without unnecessary barriers.

Recommendations

The findings of this study have several implications for education planning, urban governance and development, and policy formulation, which therefore inform the recommendations for this study. First, the Osogbo metropolis needs a more strategic approach to education planning. Instead of allowing schools to spring up randomly based on private investment initiatives, there should be deliberate planning efforts to ensure that new schools are located where they are most needed. The government and urban planners must identify underserved areas and prioritize school

expansion in those locations to ensure equitable access to education. Also, road infrastructure and transportation networks need to be improved to ensure safe and easy access to primary schools in the Osogbo metropolis. Many schools are currently difficult to reach due to bad roads and long travel distances, which negatively impact students' ability to attend school regularly. The government should invest in road rehabilitation around school zones and integrate safe, affordable school transport services into urban planning.

Additionally, there is an urgent need for stronger land use enforcement to ensure that private schools comply with planning standards. Primary schools should have adequate land for classrooms, play areas, and future expansion , rather than being crammed into small spaces that were originally meant for residential use.

The Ministry of Education and urban planning authorities must work together to set stricter guidelines for primary schools' approval and regularly monitor existing primary schools' development for compliance.

Furthermore, environmental factors must be considered when siting educational facilities. Primary schools should not be located near markets, busy highways, or industrial zones, as these environments expose children to dangerous levels of noise, pollution, and traffic hazards. Finally, while private primary schools play an important role in education delivery, they should not be allowed to operate without meeting basic planning requirements. The government should also consider public-private partnerships (PPPs) to develop well-structured primary schools in underserved areas, ensuring that all children, regardless of their background, have access to a quality learning environment.

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