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Geostatistical Analysis of Accessibility to Secondary Schools in Parts of Benue State

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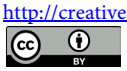

Abstract

This research studied accessibility to secondary schools in some parts of Benue State. The objective of the study was to determine the level of accessibility to secondary school. The study adopted survey, field observation and measurement to obtain the needed data. The study adopted gravity model as the related theoretical framework. GIS and descriptive statistical techniques were employed to map, visualize and analyze the data. The result shows that accessibility to secondary school in the three Local Government Areas is generally low, though it varies between schools, within and between Local Government Areas. This depicts a very stressful schooling condition for the majority of students, and has far-reaching implications in terms of lack of skilled manpower, inadequate facilities and consequently low standards in the educational system. To ensure effective and valid decision-making, and maintain high standards in the system, it was recommended that equitable and systematic distribution of school facilities should be embraced. Furthermore, more schools should be established in the areas which currently have low accessibility to bridge the accessibility gap and encourage active participation and consistent attendance at schools among the students.

Keywords

Accessibility, Distance, GIS, GPS, Service Quality, Transportation Cost

1. Introduction

Accessibility refers to the ability to reach desired goods, services, activities and destinations (together called opportunities) [1]. Accessibility is the ease of reaching some destination, and may include real or perceived costs in terms of time or money, distance travelled, level of comfort, availability and reliability of public transport, or any combination of these [2] [3] [4]. Accessibility, in the context of this study, is the ability to reach a place with respect to another place.

It refers to the ease of reaching destinations. Alternatively, it is the ability to use a service or services. The specific services of interest in this study are the educational services offered in Nigerian secondary schools.

Education is one of the key grounds where disciplines and research fields have tested their epistemological status [5]. The provision of educational facilities is crucial to bringing education to the doorsteps of all [6] [7]. Access to services of general interest, including access to educational services at various levels of education, has been an issue analysed by researchers around the world in a variety of contexts [8]. In the Czech Republic, in spite of the professed value placed on education by national governments, struggles still occur regarding inequalities in access [9]. In Britain, there appear to be areas in which school children are disadvantaged in their educational performance because of their environment. There is also a great deal of spatial variation in school performance [10]. In South Africa, the Department of Public Services and Administration reported that Education facilities are well distributed and located and most children live within 5 km from a school, with most having a choice of school within this distance [11]. However, in many areas, there is a distinct lack of capacity at government-provided schools relative to the number of people living in that area.

In Nigeria, one of the major concerns of successive Nigerian governments since attainment of independence in 1960 is the implementation of strategies for wider accessibility and reduction of inequalities in educational opportunities among the populace [12]. However, the growth of the educational sector is yet to be matched by real development vis-a-vis the removal of all barriers of inequality of educational opportunities among the people. Scholars like; [13] [14] [15] unanimously confirm that there is inequality of educational opportunities across the country. This perfectly agrees with [16], that; Nigeria has some unique characteristics that tend to make development difficult. According to him, industrial location policies are either formulated partially to favour certain non-economic gains or satisfy geo-political lines.

In Benue state, just like [16] stated, the spatial distribution of public educational facilities has been greatly influenced by political, economic and social factors. There is a high rate of inaccessibility due to the increase of inequalities in educational opportunities. In most situations, students travel beyond two kilometers (2 km) walking distance to school. According to [17], this lack of access to secondary education results in a loss of interest and a high dropout rate among students. Thus, the United Nations' Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) emphasize the provision of equal and adequate educational opportunities at all levels.

[18] opines that accessibility is a slippery notion. It is very difficult to identify an approach to accessibility which is the most appropriate from among the range of possibilities available [8]. Different methods have been applied in determining the accessibility of schools. Researchers, depending on the purpose of their projects have proposed different approaches to it [19]. In general, potential accessibility is measured by the number of activities (opportunities) reachable

within a certain distance, time or cost [8]. Consequently, this study analyses accessibility to secondary schools in parts of Benue State based on five accessibility parameters viz; distance, travel time, transportation cost, mode of transportation and service quality.

The novelty of this study lies in the study area and methodology while its findings contribute to the body of knowledge by jointly building literature for the study as well as research area. Other important contributions of this study stem from the mixed methods adopted and its findings on the prevalence of low accessibility to secondary schools in the study area. While there are many other studies on secondary schools in the study area, those addressing accessibility using spatial and statistical methods are very scarce. This study contributes a great deal to filling that gap.

1.1. Statement of Research Problem

Nigeria is a demographically young nation with most of the teenagers in their secondary school age. Without adequate secondary schools in the country, the majority of young people will be unable to grow educationally and in career attainment [20]. [21] [22] emphasize equal and adequate educational opportunities at all levels. However, many studies have shown that Secondary Schools are inadequately supplied and unequally distributed in Nigeria [20] [23]-[28].

This inadequacy and uneven distribution negatively affect accessibility to secondary schools in the country [14] [20] [26]. This limits the chances of some children making transition from primary school to secondary school. It also limits their ability to reach full potential thereby negatively affecting their quality of life. Regardless of the above, one aspect of access to rural services that remains relatively under-researched in Nigeria is the area of distributional pattern and accessibility to secondary schools [20]. Available studies on accessibility to secondary schools in the country are scanty [20] [23] [29].

Similarly, among the many scholarly works done on secondary schools in Benue state, none has either specifically addressed accessibility to secondary schools in the area using GIS techniques. Most of these works either focus on academic achievements of students, school management, the factors affecting schools' distribution and performance, the educational services and/or facilities provided in these schools and stakeholders' contribution to the schools [30]-[36]. This has limited the possibility of making significant analyses of accessibility to secondary schools in the area. The scarcity of knowledge on accessibility to secondary schools in Benue state has necessitated this study.

1.2. Accessibility

Over the past few decades, many fields have undergone a series of profound changes as a consequence of the ontological, epistemological, and methodological shifts produced by accessibility. In a nutshell: once it entered those fields, accessibility often began to produce specific sub-domains within them, which resulted in a gradual movement outside the exclusive sphere of influence of their

respective fields. This steady convergence ultimately led to the birth of Accessibility Studies (AS) as an interdisciplinary research field in its own right [37]. Daudu, Jibril and Yashi identified geospatial techniques and questionnaires as methods used for accessibility studies over time [38]. Access to educational facilities is largely determined by location and distance [39]. When a public facility is unevenly distributed in a region, there is every tendency for such facility to be underutilized or otherwise, and the people to be serviced become disadvantaged in the use of such facility [6]. The general consensus among researchers investigating this relationship is that fewer people are willing to patronize a particular facility as the distance from it increases. They further validated this assertion in their "geospatial approach to evaluation of accessibility to secondary education in Ogun States. They used UNESCO standard of 2 km (walking distance to school) and Network analysis within GIS environment. It was observed that 50.60% of the total number of students in the area travel below 2 km while the remaining 49.40% travel above 2 km to their schools. These they said were informed by several conditions including school facilities, and absence of secondary schools. The implication of these results is that 49.40% of secondary school students in that region have the likelihood of losing interest, playing truancy or even dropping out of secondary school on the basis of inaccessibility due to distance. However, their study failed to consider that, willingness to patronize a particular facility is determined by several other factors besides travel time. For instance, two students in the same class, living on the same street will cover the same distance to school but will arrive at different times depending on the mode of travel e.g. on foot, using bicycle, by bus or private car.

Since every citizen of a country has a right to government amenities, some people have easy access to these social facilities while others experience tremendous difficulties in getting at them due to prohibitive distance and time constraints [40]. The pervasive consequences of the inequality of educational opportunities in Nigeria are quite indeterminable. For instance, [19] carried out a study to access the spatial distribution of government secondary schools in Zaria. It revealed an uneven distribution of the schools in the Zaria area, and consequent inequality, inefficiency and encouraged proliferation of Private Owned Secondary Schools (POSS). This proliferation was observed to have serious consequences on the educational services provided, the quality of education and its standard. Most specifically, they stated; most of these private owned schools are becoming problems instead of a solution to the uneven distribution. In "analysis of accessibility to rural services in Ife region of Nigeria", poor access level to secondary schools consequent of the deficiency in the distribution of public secondary schools in the area was identified [20]. This has the tendency to negatively affect the student's attendance and academic achievement.

2. Theoretical Framework

This study adopts gravity model of population migration. Gravity model of mi-

gration is a model in urban geography derived from Newton's law of gravity, and used to predict the degree of migration interaction between two places. According to the gravity model, "Any two geographical locations attract one another with a force that is proportional to the product of their importance (sizes) and inversely proportional to the square of the distance between them." Size of location or its importance can be measured in terms of population numbers, gross domestic product, or other appropriate variables. The gravity model of migration is therefore based upon the idea that as the size or importance of one or both of the locations increases, there will also be an increase in movement between them. However, the movement between the two locations decreases as the distance between them increases. This phenomenon is known as distance decay. It is in line with the distance decay factor of the gravity model that this study analyses accessibility to secondary schools in parts of Benue State based on five accessibility parameters namely; distance, travel time, transportation cost, mode of transportation and service quality. In line with the gravity model, the size or importance of the locations is represented by the number of secondary schools it has while the five accessibility parameters represent the distance between the students' residences and their respective schools.

3. Materials and Methods

The study area is Logo, Gboko and Obi Local Government Areas in Benue State of Nigeria (**Figure 1**). The three Local Government Areas are located in middle belt of Nigeria in the River Benue basin and the lower Benue trough. These Local Government Areas lie between Latitudes 6˚55'54" and 7˚9'34" North of the Equator and Longitudes 7˚59'20" and 9˚56'18" East of the Greenwich Meridian respectively. Logo, Gboko and obi cover land areas of about 1388.908 km^2, 183.405 km^2 and 397.016 km^2 respectively. The climate of the area in general is of the tropic wet and dry climate (Aw) according to Koppen classification scheme. The relief is generally low-lying ranging from below 90 to 150 m on the average. The geology of the study area is principally of sedimentary formation with pockets of basement complex. This is made of sandstones, mudstones and limestone that influence both surface and groundwater availability [41] [42]. Basement complex rocks occupy majority of the area leaving a little portion for volcanic rocks. It is situated within the guinea savanna vegetation zone.

The target population includes all the secondary schools in the study area while the sample size is all the secondary schools in the sampled Local Government areas. The sampling procedure is multi-staged. First, the stratified sampling technique was used to stratify the state into three senatorial zones (A, B and C). This is because membership of each stratum is mutually exclusive. Secondly, simple random sampling technique was used to select one Local Government Area in each stratum. The choice of stratification for this study is in accordance with [43] who said that stratification will not have to be only according to numbers, it also applies to spatial association. Thirdly, simple random sampling technique was used to select 10% of the students in each school.

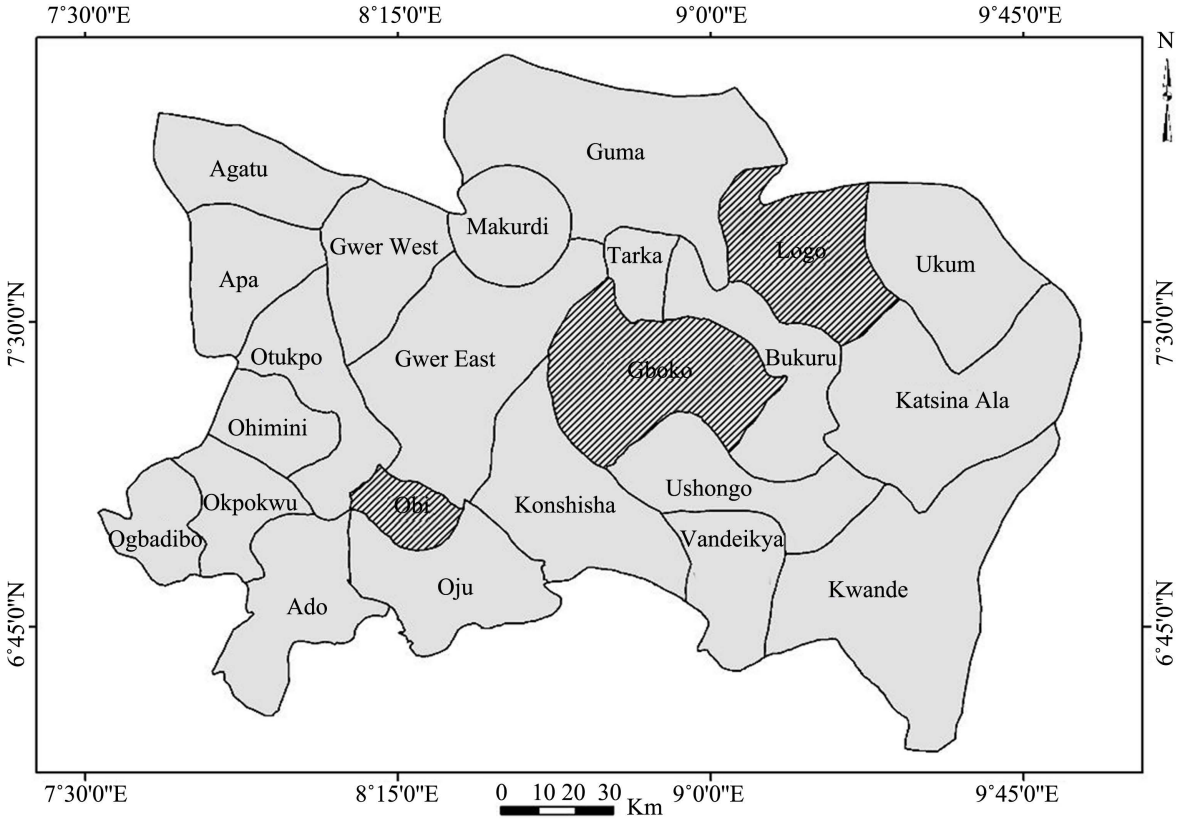

Figure 1. Map of Benue State showing all the LGAs and the Study Areas. Source: National Centre for Remote Sensing, Jos (2015).

Fieldwork was carried out using handheld GPS to collect point data from each school in the sampled area. Questionnaires and interviews were used to obtain attribute data from students, selected heads of government ministries and educational institutions. Altogether three (3) Area Education Officers (AEO) and 120 principals or their representatives were interviewed while 8323 questionnaires were administered. 120 secondary schools were identified and mapped in the three senatorial zones altogether; 19 secondary schools in Logo Local Government Area, 83 secondary schools in Gboko Local Government Area and 18 secondary schools in Obi Local Government Area.

Questionnaire administration was done by randomly selecting 10% of the total students' enrolment in each school to ensure fair and adequate representation of the total student population in each school. The students were guided to answer the questionnaire under strict supervision of the researchers and teachers. 8323 students were sampled altogether; 1463 students in Logo LGA, 5625 students in Gboko LGA and 1235 students in Obi LGA. Simple descriptive statistical tools were used to quantify the data. Five (5) accessibility parameters namely distance, transportation cost, mode of transport, travel time and quality of service received in the schools were adopted. Five accessibility levels (A. L) ranging from very high, high, moderate, low to very low were determined for each accessibility parameter (Table 1).

Table 1. Parameters of accessibility to secondary schools.

Accessibility Level	Distance (KM)	Transport Cost (₦)	Travel Time (Min)	Transport Mode	Service Quality
Very High	0.1 - 1.0	0 - 50	0 - 30	Foot	Adequate: T, CR, S, L, H, & Li
High	1.1 - 2.0	51 - 100	31 - 60	Bicycle	Only five adequate
Moderate	2.1 - 3.0	101 - 150	61 - 90	Motorcycle	Only four adequate
Low	3.1 - 4.0	151 - 200	91 - 120	Public/sch.bus	Only three adequate
Very Low	4.1 above	200 above	121 above	Private vehicle	Two or less adequate

Note: T: Teachers, CR: Class Rooms, S: Subjects, L: Laboratories, H: Halls, Li: Libraries. Source: Researcher's fieldwork (2015).

The data generated from GPS was entered into ArcGIS 10.1 software to produce map of the spatial distribution of schools in the study area. The data generated from the questionnaire was collated and quantified to allow for easy handling and usage in statistical software. The analyses were carried out using descriptive statistics, which include frequency counts, percentages and tables. Results of the analyses were presented in tables as appropriate. These results were used to determine the levels of accessibility to secondary schools in the area.

4. Results

4.1. Level of Accessibility to Secondary Schools in Logo Local Government Area

ArcGIS 10.1 software was used to produce map of the spatial distribution of schools in the study area (Figure 2). Results of the questionnaire analyses were presented in tables as appropriate (Tables 2-4). These results were used to determine the levels of accessibility to secondary schools in the area as follows.

4.1.1. Accessibility by Distance

Analysis of accessibility by distance shows that distance to secondary school varies directly proportional to accessibility levels in Logo Local Government Area. However, there are no schools within very short distance and the number of schools decreases at very long distances (Table 2). This implies that a very large number of the secondary schools in the study area are quite far away from the students. Perhaps this result is a function of the effects of service quality on accessibility to the schools. Alternatively, it may have resulted from unavailability of secondary schools within nearer distances. This indicates that accessibility to secondary schools in the study area by distance is generally low.

Table 2. Accessibility in logo local government area.

A. L	Distance		T. P Cost		T. P Mode		Travel Time		Service Quality	
	Sch	%	Sch	%	Sch	%	Sch	%	Sch	%
V. High	0	0	1	5.3	1	5.3	1	5.3	0	0
High	2	10.6	1	5.3	1	5.3	0	0	6	31.7
Moderate	5	26.3	4	21	5	26.3	4	21	4	21
Low	7	36.8	7	36.8	8	42.1	9	47.4	5	26.3
V. Low	5	26.3	6	32.6	4	21	5	26.3	4	21
TOTAL	19	100	19	100	19	100	19	100	19	100

NB: A. L: Accessibility Level. T. P: Transportation. Source: Researcher's fieldwork.

Table 3. Acessibility in Gboko local government area.

A. L	Distance		T. P Cost		T. P Mode		Travel Time		Service Quality	
	Schs	%	Schs.	%	Schs	%	Schs	%	Schs	%
V. High	6	7.2	7	8.4	6	7.2	5	6	7	8.4
High	13	15.6	16	19.3	19	22.9	17	20.5	5	6.0
Moderate	21	25.3	22	26.5	20	24.1	23	27.7	23	27.7
Low	32	38.6	25	30.1	26	31.3	22	26.5	27	32.6
V. Low	11	13.3	13	15.7	12	14.5	16	19.3	21	25.3
TOTAL	83	100	83	100	83	100	83	100	83	100

NB: A. L: Accessibility Level. T. P: Transportation. Source: Researcher's fieldwork.

Table 4. Accessibility in obi local government area.

A. L	Distance		T. P Cost		T. P Mode		Travel Time		Service Quality	
	Schs	%	Schs.	%	Schs	%	Schs	%	Schs	%
V. High	3	16.7	2	11.1	2	11.1	1	5.6	3	16.7
High	2	11.1	2	11.1	3	16.7	3	16.7	1	5.6
Moderate	3	16.7	5	27.8	5	27.8	3	16.7	6	33.3
Low	6	33.3	5	27.8	4	22.2	8	44.3	4	22.2
V. Low	4	22.2	4	22.2	4	22.2	3	16.7	4	22.2
TOTAL	18	100	18	100	18	100	18	100	18	100

NB: A. L: Accessibility Level. A. I: Accessibility Index. T. P: Transportation. Source: Researcher's fieldwork.

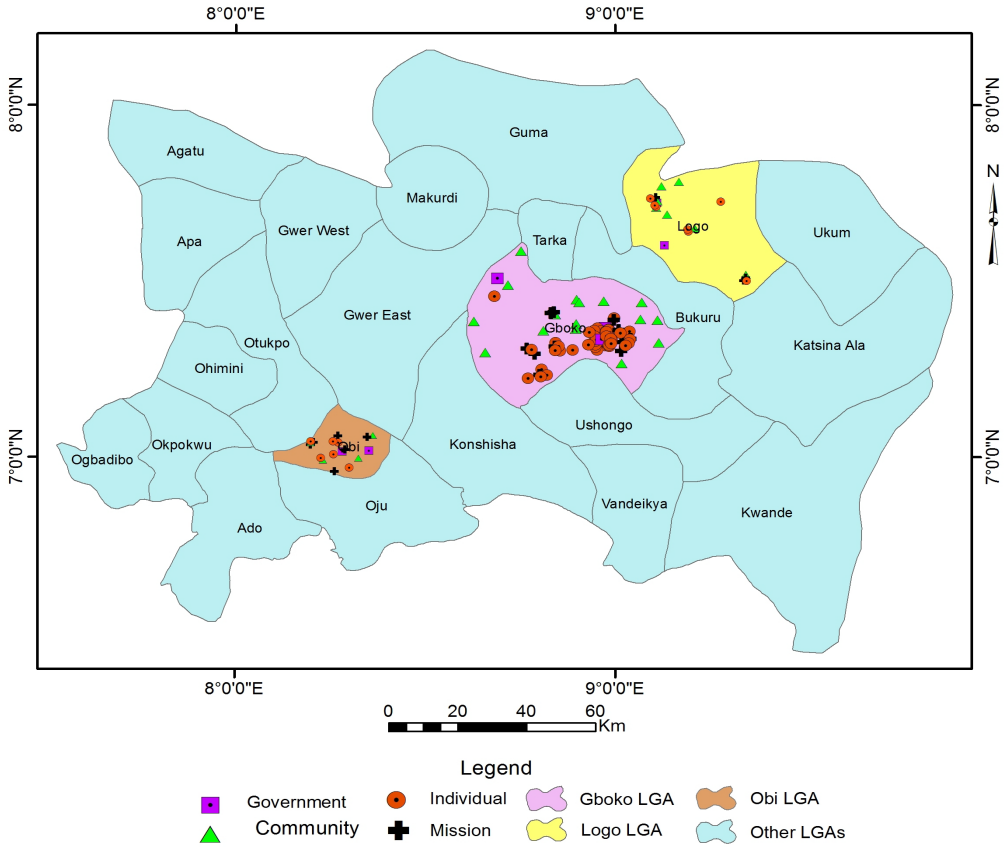

Figure 2. Benue state showing LGAs and schools. Source: Researchers' fieldwork.

4.1.2. Accessibility by Cost of Transportation

It costs more than N800 to transport to 32.8% of the schools per day (Table 2). This implies that the cost of transportation to secondary schools in the area is generally expensive. Notwithstanding, transportation cost analysis shows a direct relationship between accessibility and cost of transportation to school, indicating increasing costs of transportation at longer distances and vice versa. However, the result shows that 5.3% of the schools in the area have very high accessibility. This means that there still exist a few schools in the study area that are accessible with very little transportation cost. Unlike the situation with distance, it is unpresumptuous that some secondary schools are found within nearer distances. A greater percentage (69.4%) of the schools is within low accessibility levels. Generally, the resultant effect is low accessibility to secondary schools by cost of transportation.

4.1.3. Accessibility by Mode of Transportation

The result shows a direct relationship between mode of transport and level of accessibility to secondary schools (Table 2). This means that only few secondary schools in the area are within walking distances from the students' homes. A greater number of the schools are accessible by other modes of transportation, and every other mode of transportation has financial implications on the students. Farther distances are more expensive than their shorter counterparts.

Consequently, a greater percentage of the schools are inclined to low accessibility. This is indicative of a generally low level of accessibility by mode of transportation in the area.

4.1.4. Accessibility by Travel Time

Table 2 shows a wavy trend of accessibility in relation to the time of travel to school. This confirms the existence of a disproportionate relationship between travel time and level of accessibility. Generally, a greater percentage (73.7%) of the schools is inclined to low accessibility. This means that very few secondary schools in the area are within 30 minutes travel distance from the students while majority of the secondary schools are about 2 hours or farther away from the students. This shows that accessibility to secondary schools in the area is time inefficient and stressful.

4.1.5. Accessibility by Service Quality

Table 2 shows inharmonious relationship between service quality and level of accessibility to secondary schools in Logo Local Government Area. Like the situation in travel time, this relationship is depicted by a wavy trend. The result shows that, no secondary school in the area has all of these services in adequate measures. However, a greater percentage (47.3%) of service quality turns towards low levels of accessibility. This guarantees the conclusion on prominence of low service quality among the secondary schools in Logo Local Government Area.

4.2. Level of Accessibility to Secondary Schools in Gboko Local Government Area

4.2.1. Accessibility by Distance

In Gboko Local Government Area, the distance to secondary school is in direct proportion to the schools' levels of accessibility (Table 3). Distant schools are highly accessible while nearer schools have low accessibility. However, an incongruous relationship is manifested at very low levels of accessibility. Holistically, a greater percentage (51.9%) of the schools has inexplicable inclination towards low accessibility levels. This means that a very large number of the secondary schools in the study area are quite far away from the students. Perhaps this result is a function of the effects of service quality on accessibility to the schools. Alternatively, it may have resulted from unavailability of secondary schools within nearer distances. This affirms the prominence of low accessibility to the secondary schools by distance in the area.

4.2.2. Accessibility by Cost of Transportation

The result for cost of transport assessment reveals a direct relationship between cost of transportation to school and levels of accessibility. However, there is discontinuance at very low levels of accessibility (Table 3). A large percentage (45.8%) of the schools is inclined towards low levels of accessibility. It is obvious from the foregoing that, accessibility to secondary schools in Gboko Local Gov-

ernment Area by cost of transportation is low.

4.2.3. Accessibility by Mode of Transportation

The mode of transportation varies directly as the levels of accessibility. However the trend deviates at very low levels of accessibility (Table 3). Specifically, a large percentage (45.8%) of the schools is inclined towards low levels of accessibility. Comparatively however, a larger percentage of the schools is inclined to low accessibility than it does to high and moderate levels of accessibility. This supports the assertion that the secondary schools in the study area have low accessibility by mode of transportation.

4.2.4. Accessibility by Travel Time

Travel time is directly proportional to the levels of accessibility in Gboko Local Government Area. However, there is a deviation at low levels of accessibility. Table 3 shows that a greater percentage (45.8%) of the schools has low accessibility by travel time as compared to high and moderate levels of accessibility. This situation assures the prevalence of low accessibility to secondary schools by travel time in the education system. This shows that accessibility to secondary school in the area is temporally inefficient.

4.2.5. Accessibility by Service Quality

Service quality has a direct relationship with accessibility levels in Gboko Local Government Area. However, this relationship is disproportionate at very high level and very low level of accessibility (Table 3). A greater percentage (45.7%) of the schools is tilted towards low accessibility by service quality. This situation is evident of the prevailing inadequacy of the educational services available in secondary schools in Gboko region. It also means that only a little percentage (8.4%) of the secondary schools in the area have all of these services in adequate measures.

4.3. Level of Accessibility to Secondary Schools in Obi Local Government Area

4.3.1. Accessibility by Distance

In Obi Local Government Area, an unparalleled relationship exists between the distance to school and their corresponding accessibility levels (Table 4). A closer observation of the relationship reveals that a greater percentage (55.5%) of the schools is inclined to low accessibility. This means that majority of the secondary schools in Obi Local Government Area lack good accessibility by distance. Alternatively, it means that most of the secondary schools in that location are quite far away from the students' homes. This implies a stressful schooling condition for the students, and a tendency of the students to be truant or drop out of school.

4.3.2. Accessibility by Cost of Transportation

The cost of transportation to school varies directly as the corresponding accessibility levels. Besides been incongruous with the gravity model, the trend deviates

at very low accessibility levels (Table 4). Generally, a greater percentage (50%) of the schools in the area is inclined towards low levels of accessibility. This implies that transportation to secondary schools in the area is quite expensive.

4.3.3. Accessibility by Mode of Transportation

The result shows a direct relationship between the modes of transportation and their corresponding accessibility levels (Table 4). Generally, a greater percentage (44%) of the schools in this region is tilted towards low levels of accessibility as compared to the 27.8% of the schools in high and moderate levels of accessibility respectively. This shows that only few secondary schools in the area are within walkable distances from the students. Obviously, this is a very expensive schooling situation.

4.3.4. Accessibility by Travel Time

Travel time is directly proportional to the corresponding accessibility levels in Obi Local Government Area. However, a slight deviation occurs at very low levels of accessibility. Generally, a greater percentage (61%) of the schools is inclined to low levels of accessibility. This is relatively higher than the 23.3% of the schools that is tilted towards high accessibility levels and 16.7% of the schools that is tilted towards moderate accessibility. The implication is that students take longer time to travel to secondary school in that geographical location. This verifies the opinion that going to secondary school in Obi Local Government Area is time inefficient.

4.3.5. Accessibility by Service Quality

A wavy relationship exists between service quality and accessibility levels at very high, high and moderate accessibility levels. This relationship is constant at low and very low levels of accessibility (Table 4). The relationship is more inclined to the low levels of accessibility than it does to the moderate levels. Although there are some inclinations to the high levels of accessibility, the relationship is comparatively weaker at that level. Majority (44.4%) of the schools have low service quality while a reasonable percentage (33.3%) of the schools has moderate service quality. Generally, only 16.7% of the secondary schools in the area have all of these services in adequate measures. This is evident of the prevalence of low service quality among the secondary schools in the Obi LGA but relatively higher service quality among the schools in the three Local Government Areas.

5. Discussion of Findings

To determine the level of accessibility to secondary school, distance, transportation cost; mode of transport; travel time and quality of service received in the schools were adopted as the accessibility parameters for the study. This strongly agrees with previous studies that have examined the spatial configuration, temporal characteristics and characteristics of service delivery system along with a broad range of quality measures associated with particular services as the factors affecting accessibility [20] [36]. The study also adopted the gravity model as the

related theoretical framework to interpret the result.

The data was analysed based on the assumptions that inter-locational flows are directly proportional to the sizes of the included locations and are inversely proportional to the physical distance between them. The results in all the accessibility parameters across the three local Government Areas are logically incompatible with the postulations of the gravity model. Perhaps the deviations have resulted from varying service quality among the secondary schools in the areas. Alternatively, the incongruous nature of the relationship is perhaps consequence of the varying accessibility parameters and the undefined locational sizes. Generally, alternating accessibility trends are characteristics of regions with heterogeneous accessibility levels. These levels of accessibility may have resulted from the multiple options available in the regions. It is proportionally a unique regional character, purportedly evident of a large indeterminate number and theoretically limitless quality. A situation where accessibility is not only defined by distance and service quality since personal opinions play major roles in defining value and making choices.

The analysis revealed that accessibility to secondary schools in the three Local Government Areas is generally low but not uniformly low. **Tables 2-4** show that accessibility varies within and between schools and Local Government Areas. Some few schools and local Government Areas either have very high or very low access to secondary school, few others have high, moderate or low access to secondary school. This conforms to the findings of previous studies [14] [20] [26].

Comparatively, Logo and Obi Local Government Areas have accessibility similarities by distance with some students having to cover long distances to school. The situation slightly differs in Gboko Local Government Area where a good number of students have moderate distances to cover to school. In terms of accessibility by cost of transportation to school, all the students in the three LGAs suffer high cost of transportation. However, a good number of students in Gboko LGA still have moderate cost of transportation to school. Whereas the schools in the three LGAs are generally out of reach for students by walking distances, the situation is more similar in Gboko and Obi LGAs. On the basis of time, it generally takes longer time going to school in Logo and Obi LGAs. Gboko LGA has a more time efficient accessibility. Obi LGA has the highest accessibility by service quality, followed by Gboko LGA while logo LGA has the poorest quality of service relatively. Summarily, Logo and Obi Local Government Areas have accessibility similarities in terms of all the parameters except service quality. Gboko and Obi Local Government Areas have similar service quality accessibility. However, Obi Local Government Area has the highest service quality among the three Local Government Areas. Generally, however, all the three Local Government Areas have low accessibility to secondary school.

The implications of low accessibility are that majority of the students in these areas either travel up to 6.2 km or more to school daily, spend at least N302 on transportation to school daily or travel up to 182 minutes or more to school dai-

ly. It also implies that most of the schools in the area either do not have enough teachers, classrooms, halls, laboratories and libraries or at most they have only three of these services in adequate measures. These walking distances or time and transport costs are capable of scaring most students away from school. The resultant effects are high dropout rate, overwhelming daily inconsistent attendance, high daily truancy ratio and general lateness to school. These together with the available quality of services could negatively affect the students' comprehension abilities and performances. Most students would find it stressful travelling through long distances to school and either play truant or drop out of school. This depicts a very stressful schooling condition of majority of the students, and has far reaching implications in terms of lack of skilled manpower, inadequate facilities and consequently low standards in the educational system. These corroborate the findings of [14] [20].

Based on the implications of the resultant accessibility on secondary education in the study area, either relocation of some schools from the most clustered areas to the disadvantaged areas or provision of additional schools in the disadvantaged areas is suggested. This will reduce the negative impact of unnecessarily long distances on the students generally. The service quality in the schools can be improved by individual or community efforts. This is possible if the rich individuals, the business or civil society organisations in the areas will volunteer to either provide scholarship schemes for the less privileged students, donate classrooms, buses, ICT gadgets, laboratories and libraries, sponsor the employment and maintenance of some teachers, or even provide schools in the less advantaged areas. Also, connecting communities and creating programs designed for remote learning can help improve access to education for all. Therefore, school managements can record lessons or engage live streaming features to bring the classroom to students who may have difficulty getting there in time. These can enable the students to not only attend classes even if they can't always be physically present but also participate remotely, just as if they were physically present in class. This may be relatively expensive. However, it is critical for effective service delivery in the education system to ensure equal access to educational services and sustainable development.

6. Conclusion and Recommendations

This study examines accessibility to secondary schools in Logo, Gboko and Obi Local Government Areas of Benue state. The results revealed the prevalence of low accessibility to secondary school in the area. This was discovered to have adversely affected the students' enrolment, attendance and academic performance. Based on the results, it was recommended that:

1) Equitable and systematic distribution of school facilities should be embraced to ensure effective and valid decision making, and maintain high standards in the system.

2) More schools should be established in the areas which currently have low accessibility to bridge the accessibility gap and encourage active participation

and consistent attendance to schools among the students.

3) Further research should be carried out to show the relationship between accessibility to secondary schools in the urban and rural communities of Benue State.

4) Further research should be conducted to assess the impact of minimum standards of school location on the spatial distribution of secondary schools in the study area.

5) Further research should focus on the impacts of spatial accessibility to secondary schools on the secondary school age children in the study area.

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Conflicts of Interest

The authors report that there is no interest to declare.

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