SPSBIC 2019

24th – 27th June, Minna Nigeria

2ND SCHOOL OF PHYSICAL SCIENCES BIENNIAL INTERNATIONAL CONFERENCE (SPSBIC 2019)

PROCEEDINGS

THEME:
SUSTAINABLE ENERGY IN CHANGING CLIMATE: THE ROLE OF SCIENCE AND TECHNOLOGY

FEDERAL UNIVERSITY OF TECHNOLOGY
MINNA, NIGER STATE, NIGERIA

PREFACE

This is the second international Conference organized by the school of Physical Sciences of the Federal University of Technology, Minna Nigeria the school is relatively new and comprising of the Departments of Chemistry, Geography, Geology, Geophysics, Mathematics, Physics and Statistics. It was exercised from the former school of Natural and Applied Sciences on the 6th of November 2014.

The school of Physical Sciences 2nd Biennial International Conference is an interdisciplinary forum for the presentation of new ideas, recent developments and research findings in the field of Science and Technology. The Conference provides a platform to scholars, researchers in the academics and other establishments to meet, share and discuss on energy, climate change and sustainable energy use and development. Submissions were received both nationally and internationally and severally reviewed by our international program committee. All contributions are neither published elsewhere nor submitted for publication as asserted by contributor.

We wish to express our gratitude to the school for challenging us to organize the second international conference. Special thanks to the former Dean of the School Prof. A. S. Abubakar who initiated the conference and to the present Dean Prof. Jonathan Yisa for keying into it. The Vice Chancellor Prof. Abdullahi Bala have given immense support to the Conference, thank you sir. Our special appreciation to the keynote speakers for accepting our invitation to give a talk at the conference. Special thanks to all members of the organizing committee and sub-committees for their dedication, determination and sacrifice towards achieving a fruitful and successful conference.

Prof. Kasim Uthman Isah
The Local Organizing Committee Chairman

THEME OF THE CONFERENCE:

Sustainable Energy in Changing Climate: The Role of Science and Technology

SUB-THEMES OF THE CONFERENCE:

- Political, Economic and Technical Challenges in Energy Development;
- Sustainable Energy on Climate and Disaster resilience;
- Energy for Sustainable Development, Benefits and Challenges for Poverty Alleviation;
- Implication of Fossil Divestment and Green Bonds for Financial and Energy Market;
- Energy Use And Environmental Impact for Energy Sustainable Development ;
- Climate Change Through Sustainable and Innovative Energy Technological Development;
- Analysis on Scientific Research in Technology and Energy for Sustainable Development

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KEYNOTE SPEAKERS

Prof. Daniel Ayuk Mbi Egbe

Prof. Daniel Ayuk Mbi Egbe received his BSc in Physics and Chemistry in 1991 from the then University of Yaoundé (now University of Yaoundé 1), Cameroon. In 1992, he moved to Germany where he obtained a MSc and PhD in Chemistry in 1995 and 1999, respectively, from the Friedrich-Schiller University of Jena. He completed his habilitation in Organic Chemistry at the same institution in 2006

Prof. Egbe is a member of Organic Electronics Association (OE-A), and a board member of the World University Service (WUS) in Germany. He is the initiator of the German-Cameroonian Coordination Office, initiator and International Coordinator of the African Network for Solar Energy (ANSOLE), initiator and chairperson of ANSOLE e.V., an institution legally representing ANSOLE, and initiator of the Cameroon Renewable Energy Network (CAMREN). He is also the initiator and coordinates the research platform BALEWARE (Bridging Africa, Latin America and Europe on Water and Renewable Energies Applications). He was part of the team engaged in developing research programs at the Pan African University Institute of Water and Energy Sciences (including Climate Change) (PAUWES) in Tlemcen, Algeria. In 2016 he was appointed the first Distinguished Brian O´Connell Visiting Fellow of the University of the Western Cape, South Africa. He is the director of the VolkswagenStiftung-sponsored Summer Schools on sustainable energetics and on water.

He is presently member of the Institute of Polymeric Materials and Testing (IPMT), Johannes Kepler University Linz, where he researches and lectures. He is a PhD supervisor and visiting lecturer at the African Centre of Excellence in Energy for Sustainable Development (ACE-ESD) of the University of Rwanda in Kigali.

Prof. Egbe's main research interest is the design of semiconducting materials for organic photovoltaics and other optoelectronic applications, has published more than 120 peer-reviewed articles, speaks 5 languages and is father of 4.

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Kazeem Ojoye

Kazeem OJOYE was born on 9 October 1967 in Ibadan, the capital city of Oyo State. He enrolled into the Technical University in Munich where he graduated with a bachelor's degree in Computer Engineering. He worked at several places in Germany Between 1990 to 1997.

He was Project Manager Migration of the Telekom SIP Platform from the (MSP) to the new Telekom Corporate SIP Platform, Project Manager Emergency/Outage Telephony Concept for UniCredit, with UNIFY, T-Systems, Technical Project coordinator Teleopti Upgrade of Version 8. He joined the services of BMW as a logistic specialist. While in BMW he worked in several departments which include communication specialist and customer consultants.

Currently, Kazeem Ojoye is the application manager in charge of ICT at Unicredit direct Services in Munchen, He is the financial secretary of Nigeria in Diaspora organization (NIDO0 in Germany, the principal consultant for multivate consulting, UK and Germany, consultant for renewable energy, Chairman, Youth Empowerment Enlightenment and Self Sustainability Initiative (YEESSI), Project Manager at Bruder-Hilfe among others.

He speaks English, Deutsch and French. He is happily married with children

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CHEMICAL SCIENCES

An Assessment of the Spatial Distribution and Facilities of Public Primary Schools in Shomolu Lga, Lagos State

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Abstract

The research analyzed the spatial distribution of public primary schools and a total of 53 primary schools were identified with the population of pupils at 13,753 across the study area. All the schools in the study area were purposively sampled and used in the study. Most of the attribute data were obtained at the State Universal Basic Education Board (SUBEB) Maryland, Ikeja and also Local Government Education Authority, Gbagada phase II, Somolu. The study also revealed inequality firstly in the distribution of schools in the study area with wards like (Bariga ward D, Somolu ward H etc.) having none, secondly , the Nearest Neighbour Index and Point Density Analysis revealed the cluster pattern of the distribution of schools resulting to inequality in the distribution of schools in the study area. An administrative map of the study area obtained from the Local Government Area was geo-referenced and digitized in ArcGIS 10.3.1 for the base map through digitizing process. An overlay analysis was performed and all the coordinates of the UBE primary schools were displayed on the composite map. A GIS database was created where the spatial and attribute data were encoded and query analysis was carried out.

The study recommends among others, provision of functional facilities (especially the recreational facilities) by the Lagos State Ministry of Education and the Local Government Area of study.

Keywords: Spatial Distribution, Public Primary School, Map, GIS, Analysis, Education, Teachers.

1. Introduction

In regards to public services, Educational services can be said to be one of the most important on the provision list to members of any locality. The efficiency of the educational sector is strongly advocated by both the promoters of social equality, social justice and modern day democracy, who view education as a precondition for advanced development and competitive edge (Taiwo C.O. 1980). So governments are striving to provide educational institutions of all levels (nursery and primary, secondary, universities) in order to accelerate progress and prosperity (Fuende HD et al 2013).

The Universal Basic Education, UBE, came as a replacement of the Universal Primary Education as an innovation to enhance the success of the first nine years (6 years of Primary School, 3 years of Junior Secondary School education) of schooling. This scheme is monitored by the Universal Basic Education Commission, UBEC, and has made it "free", "compulsory" and a right of every child. (Aderinoye, 2007).

World Bank recommended that the following data were needed for rationalizing and drawing up of both the urban and rural school map. Schools which includes physical aspects, site, type of building, usage, capacity, teachers (numbers, qualification, and age), students enrolment in school, individual data on age, sex, previous schools, home, location, mode of transport, time taken in home/school journey, parental background, rural and urban area data which include land use administration map on a large scale, planning reports, settlement patterns etc. The facility also includes classrooms, toilets, furnishings, materials and supplies, fire suppression systems, security, information technology etc. (World Bank, 2014).

1.1 Scope and Limitation

The scope of this research is formal education and it is limited to the distribution of public primary schools in Shomolu Local Government Area, Lagos State. The content scope of the research covered the location, mapping, and generating of geo-database of the primary schools infrastructure in the study area.

1.2 Aim and Objectives

Aim:

The aim of the study is to examine the spatial distribution of public primary educational institutions in Shomolu Local government area in Lagos state, Nigeria and identify the factors associated with the observed pattern.

Objectives:

The specific objectives in achieving the aim of the study include:

- To identify and map the locations of Public Primary Schools in the study area.
- To determine the spatial pattern of public primary educational facilities in Shomolu local government.

- To compare the Teacher to Pupils population ratio with the set standards of UNESCO and UBE.
- To examine the characteristics of the educational facilities (which includes: Type of building, numbers of classrooms, classroom situation, type of toilet, roof condition, play room, playground facilities etc.)
- To create a Web-Based Geo-database for the public primary schools in Shomolu LGA.

1.3 Justification for the study

The primary education level, which acts as a very vital aspect of the nation's educational system that deserves to be handled with great care and caution. Errors committed in the organization and management of this level of education might affect other levels and thus seriously mar the lives of the people and indeed the overall development of the nation. This is one good reason why all the stakeholders must show enough concern for those issues that concern the organizing and managing of our primary system (Durosaro, 2004).

Unavailability of data that shows the distribution pattern of the schools in the study area has made it very difficult for people to see at a glance how these schools are spread. Also, in taking sound decisions on the management of primary education in Nigeria, there is the need to ensure availability of accurate data on the system (FGN/UNESCO/UNDP, 2003). A GIS database provides a comprehensive framework and organization of spatial as well as non-spatial data. Such as a map that will show the distribution pattern of the public primary schools in Shomolu L.G.A of Lagos State

As a step towards improving the standard of public primary schools' education in the study area, it will be necessary to provide the public and decision makers of the state with information such as location, staff strength, available facilities, status of public primary school, to enhance proper planning and decision making. The information provided will enable the government and educationists in policy and decision making such as planning for the future expansion, distribution of materials or facilities among these schools in the study area.

1.4 Study Area

The area known today as Shomolu Local Government area was formerly known as Mushin East Local Government area when it was carved out of the defunct Mushin Town Council in 1976. On December, 1996, Kosofe Area was again carved out and became Kosofe Local

Government while the remaining area retained Shomolu Local Government Which lies between latitude 6º31'12''N and 6º33'36''N and Longitude 3º22'22''E and 3º24'36''E. Bordered by Kosofe Local Government in the north, Lagos Island in the West, Lagos Mainland in the South and Mushin Local Government in the East. The population of Shomolu Local Government according to the 2006 census stands at 402,673 person, with an area of 106.5km^2. The Local Government Headquarters is located at Number 2, Durosinmi Street, Shomolu, off Oguntolu Street. The present Shomolu Local Government comprises areas like the community road, Akoka, areas East of Ikorodu up to Anthony, Oke side interchange, including Somolu Bashua, Bariga, part of Akoka, Igari, Obanikoro, pedro village, Abule Okuta, Seriki village, Apelehin and Ilaje.

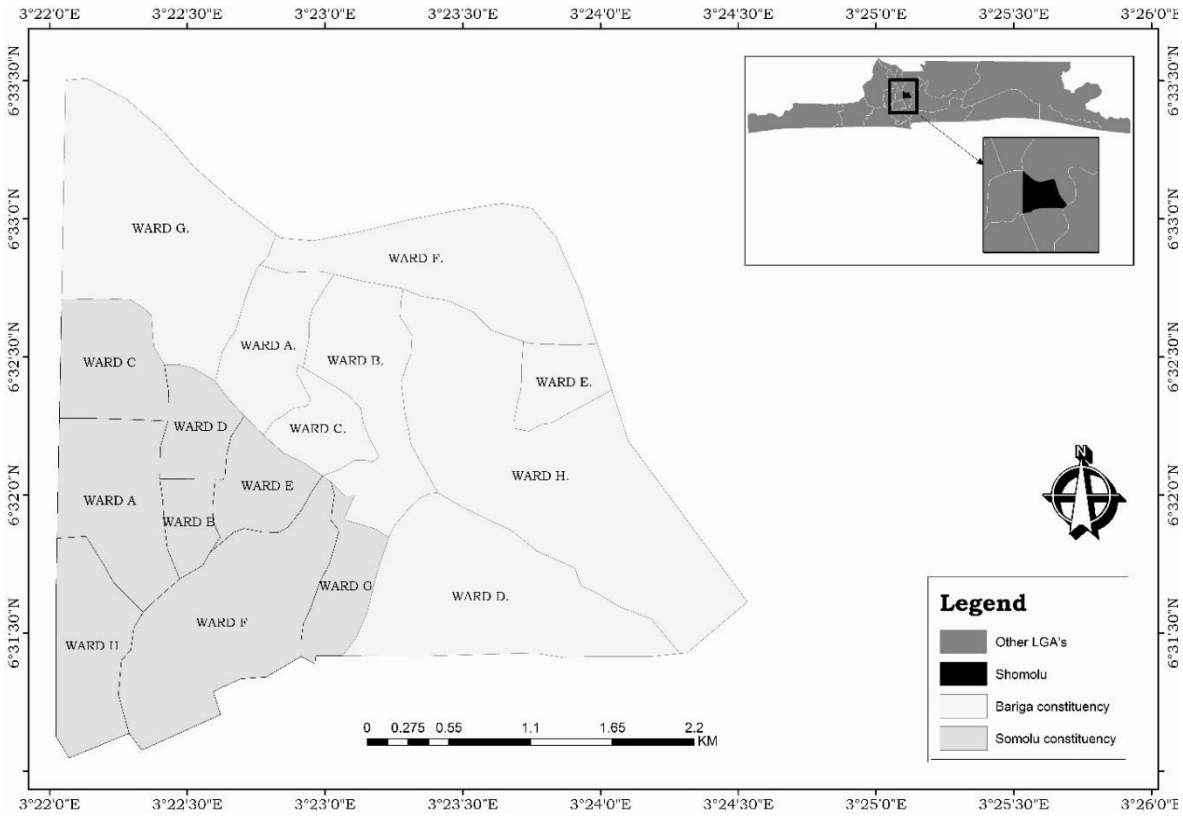

Figure 1. Study area map of Somolu LGA showing the distribution of the wards

2. Literature Review

2.1 Millennium Development Goal

In this priority area the millennium development goal is to ensure that by the year 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling and those girls and boys will have equal access to all levels of education (Susan, 2004).

2.2 Definition of Basic Education

United Nations Economic, Scientific, and Cultural Organization (UNESCO) define basic education as the first nine years of schooling; the first five or six years are often identified as primary education and the rest as lower secondary education. It also includes basic education for youth and adults who did not have the opportunity to complete a full cycle of primary education (Ikpasaja, 2014).

The agency which coordinates the affairs of this sub sector is the Universal Basic Education Commission (UBEC). Other coordinating agencies in this sector include National Commission for Nomadic Education and National Mass Education Commission.

2.3 National Policy on Education

Universal Primary Education (UPE)

Universal Primary Education (UPE) is a goal stated in many national development plans and pursued with vigour by governments of most developing countries. Primary education is seen as the first step in laying the foundation for future educational opportunities and lifelong skills. Through the skills and knowledge imbued, primary education enables people to participate in the social, economic and political activities of their communities to their fullest potential (Globalisation of Education Policies, 2000).

In 1976, the Universal Primary Education (UPE) programme was introduced in the country and was launched on Monday 6th September by the Olusegun Obasanjo Military Administration at Oke Sunna Municipal Primary School, Lagos to provide free and compulsory education to children at the primary school level. Unfortunately, the Scheme was faced with several challenges because structures were hurriedly put in place, teachers were trained haphazardly and there was an inadequate funding of the primary education sector. This however, brought about declining enrolment in public primary school. Teachers to pupil's ratio were high and at the long run, education was meant only for the wealthy children (not for all the children as proposed earlier). Children who are supposed to be in the school learning are outside the street hawking goods for their parents. The vision of Education for All (EFA) regardless of their socio-economic background was ignored (Omotere and Adunola, 2010).

Universal Basic Education (UBE)

Universal Basic Education (UBE) is a reformed programme in Nigeria's basic education delivery (from primary one, all through to junior secondary school class 3) and is to reinforce the implementation of the National Policy on Education (NPE) in order to provide greater

access and ensure quality throughout the Federation as it is free and compulsory (Adomeh et al, 2007).

Nigeria is adopting Universal Basic Education (UBE) and as a process of fulfilling the aim of Education For All (EFA) as endorsed at the World conference on education held in Jomtien, 1990 (Arhedo, 2009). The UBE Programme is a nine (9) year basic educational programme, which was launched and executed by the government and people of the Federal Republic of Nigeria to eradicate illiteracy, ignorance and poverty as well as stimulate and accelerate national development, political consciousness and national integration. Former President Olusegun Obasanjo flagged off UBE on 30th September 1999 in Sokoto State.

According to Omotere and Adunola (2010), Universal Basic Education is broader than Universal Primary Education of the 1970s, which focused on providing educational opportunities for primary school age children. Universal Basic Education stresses the inclusion of girls and women and a number of non-privilege groups: the poor, street and working children, rural and remote populations, nomads, migrant workers, indigenous people, minorities, refugees and the disabled. It also extends to the first level of secondary education (JSS 3).

2.5 Laws and other Basic Regulations Concerning Education in Nigeria

The National Policy on Education was enacted in 1977 and undergone three revisions, the most recent one in 2003. Since 1981, a number of decrees have been passed providing the legal framework of education in the country (International Bureau of Education (IBE) - UNESCO, 2006).

i. The **Decree No. 16** of 1985 places special emphasis on the education of the gifted and talented children within the National Policy on Education.

ii. The National Commission for Mass Literacy, Adult and Non-formal Education, which was established by **Decree No. 17** of 26 June 1990 and formally inaugurated on 5 July 1991, is charged with the responsibility of developing strategies, coordinating programmes, monitoring and promoting literacy and post-literacy programmes nationwide.

iii. In 1993, the National Minimum Standards and Establishments of Institution Amendments **Decree No. 9** was promulgated. It provides for religious bodies, non-governmental organizations and private individuals to participate in the provision of tertiary education.

iv. By a recent decree, all companies operating in Nigeria which have up to 100 employees on their payroll shall contribute 2% of their pre-tax earnings to the Education Tax Fund for the funding of education.

v. The most crucial strategy for sustainable education development in Nigeria is the Universal Basic Education (UBE) Scheme, which was launched in 1999. In May 2004, the Nigerian Legislature passed the UBE bill into law. The **Universal Basic Education Act** represents the most significant reform and addresses comprehensively the lapses of the Universal Primary Education (UPE) and the issues of access, equality, equity, inclusiveness, affordability and quality.

2.6 The State of Education in Nigeria of the Nation

The federal government reported that the falling standard of education in Nigeria is caused by "acute shortage of qualified teachers in the primary school level." It is reported that about 23% of the over 400,000 teachers employed in the nation's primary schools do not possess the Teachers' Grade Two Certificate, even when the National Certificate of Education (NCE) is the minimum educational requirement one should possess to teach in the nation's primary schools (Africa Economic Analysis (2008). Due to lack of teachers, however, holders of the Teacher's Grade II Certificates (TC II) are still allowed to teach in some remote primary schools (Better Future Foundation Amodu (BFFA) – Nigeria, (2014).

2.7 Standards

Standards are set of yardsticks in the units of measurement of variables which appear in the statement of principles. Standards are not absolute but relative and are more or less a form of guides.

Standards for Setting of Public Primary School:

i. United Nations Education Scientific and Cultural Organization (UNESCO) standard (1996): (UNESCO) prescribed the ratio of 1:25 in public primary schools. (Chukwu, 2011).

ii. Universal Basic Education Plan, (2010-2019): reveals that, for effective teaching and learning, the teacher/pupils ratio shall be 1.35 in primary schools (Kakuri, nd), and with the walking distance (3-4km) for all learners of primary school-going age Federal Ministry of Education - FMoE (2009).

2.8 School Mapping (SM)

It bothers on availability as relates to even spread (as stated by the Federal Ministry of Education (1999) is developing in the entire citizenry a strong consciousness for education and a strong commitment to its various promotion. It is quite obvious from the above phenomenon that the objective of developing the entire citizenry cannot be achieve unless the public education facilities are evenly distributed over the country's landscape. (Hite J. 2008).

School Mapping (SM) also helps to investigate and ensure the efficient and equitable distribution of resources within and between school systems when large-scale reform or significant expansion of an educational system takes place (Caillods, 1983).

Hite (2004) explained that, school mapping as a technical exercise has become a relatively normalized and institutionalized practice in education's planning. More than simply being a tabular, graphical or cartographical representation of a particular space or place, school mapping involves the consideration and inclusion of various forms of technical data that impact and populate the physical and social context of analysis. School mapping comprises physical location analysis of schools. In order for this to be accomplished knowledge of the settlements and population of the area is required.

2.9 Geographic Information System (GIS)

Geographic Information System is a better, more precise, and flexible spatial analysis tool for representing schools and their physical, social and geopolitical contexts. It also provides a different way to understand and plan those contexts geospatially (Hite J. 2008).

Geographic Information System is a discipline for capturing, storing, analysing, managing and presenting data and associated attributes which are spatially referenced to Earth. The use of GIS in Education involves combining statistical inferences to geographic information. Statistics in education might be used with GIS to present a clear picture of educational facilities and activities such as ratio of students to teacher, number of students in a class and student density in school and schools distribution in district (Eray, 2012).

2.10 Related Studies

In the study of Sule, Abdullahi and Bungwon (2012), private primary school locations in Kaduna metropolis were determine by the use of handheld GPS receiver. Thematic map, nearest neighbour and Buffer zone analysis reveals that, the schools are not evenly distributed as some areas have the schools concentrated at particular places while some areas have none, and some settlements are deficient in private schools while others have excess.

Akpan and Njoku (2013) identified the educational facilities in Ikot Ekpene LGA including their geometric properties and created a GIS database for both the public and 21 private schools in the study area. The authors observed that spatial location of schools in the LGA is uneven and almost randomly distributed such that some wards were essentially educationally deprived making children to trek long distances to schools.

Another study by Olamiju and Olujimi, (2011) analyzed the locations of public educational facilities in Akure, Nigeria. They found out that population figures were not considered in allocation of educational facilities in the region. This trend shows that there is no equitable distribution of educational facilities in Akure area. Ibrahim (2009) studied the spatial analysis of the distribution of social facilities in Sabon Gari LGA, Kaduna State, and found out that there is an uneven distribution of social facilities in Sabon Gari LGA of Kaduna State.

In another study in Yola North LGA, Adamawa state by Aliyu (2013) clearly depicts the process of using thematic map and nearest neighbour analysis in determining the distribution pattern of the post-primary schools. The study reveals how the schools were located on digital map and shows that random pattern of distribution exists within the study area. The potentials of GIS technology in database design and creation has been demonstrated and found to be more efficient than the manual approach.

The use of GIS for analyzing the distribution of facilities is not new in Kano State, like the study of Ahmed M. et al (2013) where thematic map and nearest neighbourhood analyses were used and found out that the pattern of distribution of Police Stations in Kano Metropolis is generally random and uneven, with a little clustering at the center. One and two kilometre buffer zones were generated and the result shows that the old city of Kano and the eastern part of the metropolis were fully served while the west and southern part were underserved.

Also, in another research conducted by, Kibon and Ahmed (2013), where they made use of thematic map and nearest neighbour analysis shows that, the distributions of Health facilities in Kano Metropolis are in clustered.

The study of Olubadewo, Abdulkarim and Ahmed (2013), indicates the use of technology (GIS) for education planning have proved to be very important in the decision making in Fagge L.G.A by providing the planners integrated geographic scenario of location of school. The Thematic map and nearest neighbour analysis shows that the distribution of primary schools in the area is more concentrated than other areas, while the buffer zones show that schools are closer to roads and Markets. The database shows there are 222 classrooms, 12,693 pupils and 558 teachers in the areas at which the result shows a perfect significant relationship between

the number of teacher and pupils. The tool of the analysis (Nearest Neighbour) was used to analyze the pattern of the distribution and the result shows the schools are dispersed.

2.11 Distribution of Schools

Findings derived from Al-zeer (2005), Akpan and Njoku (2013), Olamiju and Olujimi, (2011), Aderamo and Aina, (2011) among others, have shown that educational infrastructures are unevenly distributed within a region and majority of the people struggle to gain access to infrastructures in order to improve their quality of live.

According to Abbas (2009), he stated that issues of centrality, location and accessibility have a vital role to play in the utilization of education infrastructure by the people. However, Green *et al*. (2008) stressed that achieving equitability is possible only if the areas that are under or overprovided are identified and corrective action is applied through appropriate planning and implementation. Determining the spatial mismatch between supply and demand is established by: deciding on suitable standards pertinent to a specific facility, which will be related to the demand (the population who will use the facility); acceptable travel costs (time or distance) to the facility and the capacity of existing facilities (based on size and functionality), (Green *et al*., 2008).

Distribution of educational facilities or schools have an effect on the participation rate in school education geographic location of primary schools as indeed public facilities in Nigeria has not taken into account inequalities among region, different social groups and geographical area (Ikpasaja, 2014).

3. Methodology

3.1 Data

Data needed for this study were collected from both primary and secondary sources.

Primary Sources of Data:

GPS Survey: It was used to acquire the coordinates of each public primary school.

Interview: An inventory of some of the public primary school infrastructures and their characteristics alongside the pupils and teachers characteristics were obtained through oral interview. An inventory check list was designed and used to identify and take records of the attributes of these infrastructures. The essence of the interview was to seek for primary information on the condition of the infrastructures available.

Secondary Sources of Data:

A list showing the names of all the public primary schools and their addresses in the study area was acquired from the Local Government Education Secretariat alongside the administrative boundary map of Somolu LGA. The attributes of the public primary schools which include the data on teachers, students and the facilities were obtained from State Universal Basic Education Board (SUBEB) Maryland, Ikeja and also Local Government Education Authority, Gbagada phase II, Somolu. Existing literatures including journals, textbooks, conference proceedings, seminar papers, theses, reports and web references were equally made use of.

3.2 Data Analysis

The analysis of the data employed both the descriptive and overlay analysis. Appropriate maps/diagrams and tables were used to illustrate the distribution of the available infrastructures in the study area. Identification and mapping of the public primary schools and their available facilities in the study area was achieved by using the name and address of each school to identify each primary school in the study area. The Handheld GPS Receiver captured the actual coordinate of the schools. The coordinates and other attributes of the schools were copied to Microsoft excel and saved as CSV (comma delimited) format, then imported into ArcGIS 10.3.1 using the add XY option at the sub-section of the file option in the tools menu. This procedure overlaid the points (coordinates) on the geo-referenced administrative map of the study area. The spatial distribution of primary schools in the study area was analyzed by using the location of each school which was used to determine the general spatial distribution of schools within the administrative wards in the study area. This was done by overlaying the coordinates of the schools on the base map of the study area. The digitized features was overlaid with the schools coordinates to form composite maps showing the primary schools. Point density analysis was performed and the density of the public primary schools by measuring the quantity of each location and derives a spatial relation of the locations with the measured quantities. To develop a geo-database for the primary schools in the study area, the following data were collected and used in the development of the database.

i. The study area map

ii. List showing Primary schools names and addresses.

iii. Geographical coordinate of Primary Schools.

iv. All the necessary attributes for each Primary school were entered into its layer's/theme's attribute table.

This was done by adding required number of fields (columns) to the table and entering the data for all the Primary school in their corresponding records (rows). Attributes collected included; school name, address of school, year of establishment, number of teachers, Type of building, numbers of classrooms, classroom situation, type of toilet, roof condition, play room, recreational facilities, Furniture facilities, water and power supply. The coordinates and attributes of the UBE Primary school were copied to Microsoft Excel and saved as CSV (comma delimited) format which is recognizable and accepted by the ArcCatalog extension of ArcGIS. This file was later imported into Arc Map environment using the add XY, Command at the tools menu. The system can be updated to reflect changes in any school attributes as well as appending more attributes in ArcGIS interface by an authorized ArcGIS application user. To assess the characteristics of the primary education infrastructure, queries were carried out on the database using both the query builder to assess the characteristics of some of these available infrastructures in the schools and Microsoft Excel (Pivot Table command) to analyze attribute characteristics based on the wards distribution.

Also, an account was created online with the ArcGIS online platform (maps.arcgis.com). The shapefiles used containing the boundary details and coordinate of the wards with their attributes were compressed to a ZIP format (.zip extension) then exported to the web map platform. The web map was created and also shared followed by the creation of the web application. The web application was designed with the web application builder using a new template, widgets were added (some includes summary, print, share, about, my location, chart, bookmark, stream etc.) then the application was saved and also shared.

4. Results and Discussions

4.1 Spatial Distribution of Public Primary Schools

Primary school provides the foundation for educational journey of any child. A total of 53 primary schools were identified to cater for 13,753 students across the study area. The geographic coordinates of each of these primary schools were collected and the concept of point on polygon overlay analysis was used to map the primary schools in the study area. See Appendix II. Identifying geographic patterns is important for understanding how geographic phenomena behave. One can get a sense of the overall pattern of features and their associated

values by mapping them. Table 1 gives the pattern of distribution of primary schools among the various wards in the study area.

A total of 53 primary schools were identified to cater for 13,753 students across the study area. Table 1 and figure 2 shows that, there are fifty three (53) public primary schools in Somolu Local Government Area, Lagos State. The local government is divided into two LCDA's, Somolu and Bariga LCDAs. They both have 8 wards each labelled alphabetically illustrated in Table 1 and Figure 2. Figure 3 shows a presentation of the variations of the numbers of schools in each ward.

Table 1. Distribution of Public Primary Schools (2017)

	Wards	No of Schools	AK	Wards	No of Schools
Bariga	Bariga Ward A	1	**Somolu**	Somolu Ward A	4
	Bariga Ward B	1		Somolu Ward B	0
	Bariga Ward C	1		Somolu Ward C	2
	Bariga Ward D	0		Somolu Ward D	3
	Bariga Ward E	1		Somolu Ward E	0
	Bariga Ward F	8		Somolu Ward F	9
	Bariga Ward G	9		Somolu Ward G	0
	Bariga Ward H	14		Somolu Ward H	0
				Grand Total	53

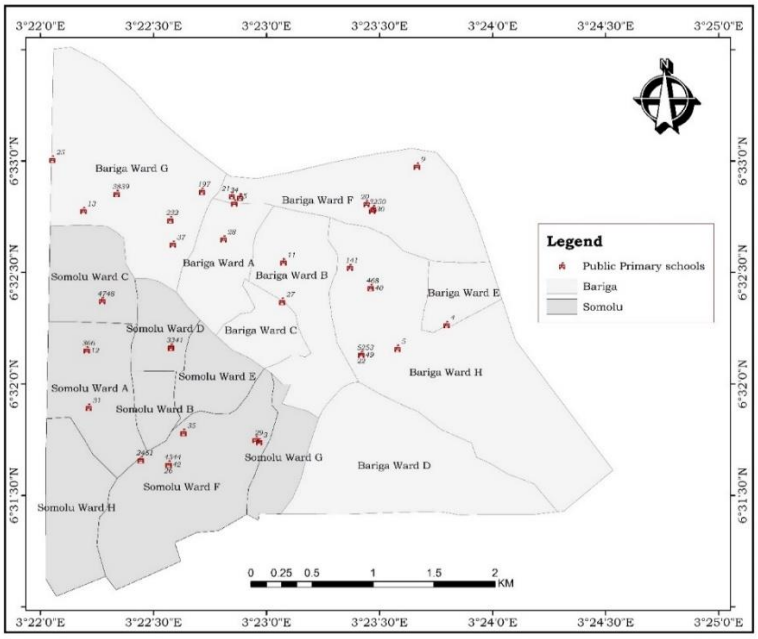

Figure 2. Distribution of Public Primary Schools (2017)

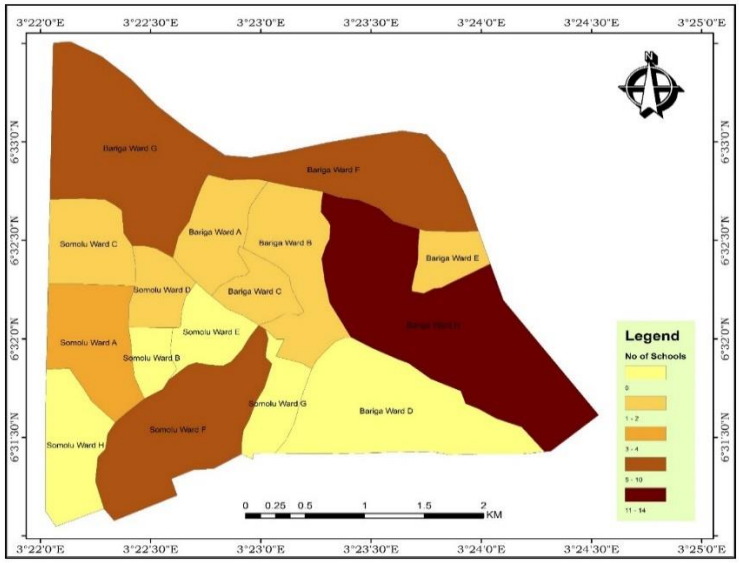

Figure 3. Number of Public Primary Schools in each Ward(2017)

4.2 Nearest Neighbour Index Summary

The result of the Nearest Neighbour Summary (figure 4.) showed that the Observed Mean Distance was 81.7603 Meters, the Expected Mean Distance: 192.4746 Meters, the Nearest Neighbour Ratio: 0.424785, the z-score: -8.011231, the p-value: 0.000000.

Given the z-score of -8.01123058131, there is a less than 1% likelihood that this clustered pattern could be the result of random chance.

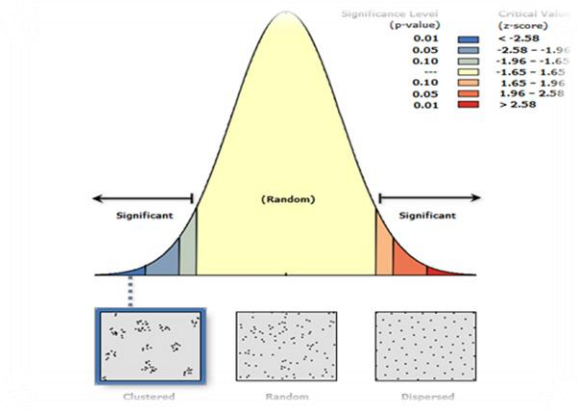

Figure 4. Nearest Neighbour Summary Result

4.3 Point Density Analysis Summary

The point density analysis shows vividly the clustered and uneven distribution of schools in the study area. It also further established and exposed the facts that wards with larger numbers of schools (Bariga Ward H, Somolu Ward F amongst others) when compared with the others are unevenly distributed within the wards. Generally, the public primary schools are concentrated and clustered within the central part of the study area as identified in figure 5..

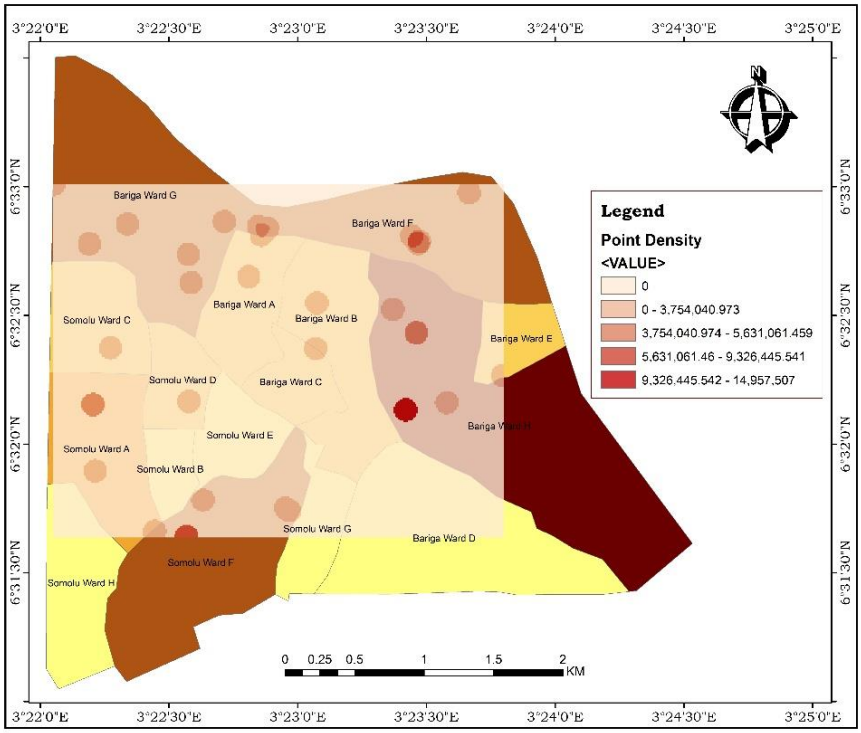

Figure 5. Point Density Analysis

The pattern of distributions of the Primary Schools in the study area also reveals the inequality firstly in terms of the distribution of the public schools in each ward compared to other wards. For example, (Bariga ward H, Somolu ward F) with 10 or more schools while some others (Bariga ward D, Somolu ward H, Somolu ward B etc.) have none.

4.4 Teachers and Facilities Distribution Analysis

Table 2 and Table 3 Number of Teachers for each qualification in the public primary schools in the study area and Distribution of building conditions of the public primary schools in each ward.

Table 2. Total Number of Teachers and their Qualifications.

Qualifications	No(s) of Teachers
HIGHER DEGREE WITH TEACHING QUALITY	14
HIGHER DEGREE WITHOUT TEACHING QUALITY	1
FIRST DEGREE WITH TEACHING QUALITY	184
FIRST DEGREE WITHOUT TEACHING QUALITY	27
HND WITH TEACHING QUALITY	3
HND WITHOUT TEACHING QUALITY	7
N.C.E	241
DIPLOMA IN EDUCATION	19
O.N.D	23
ACE,ACIE OR EQUIVALENT	4
TC 11 OR EQUIVALENT	7
TC II REFERRED	2
BELOW TC 11	82

Table 3. Building Conditions of the Public Primary Schools in each Ward.

WARDS	NO AVAILABLE	NO IN USE	NO REQUIRE	GOOD	MINOR REPAIR	DILAPIDATED
Bariga Ward A	0	15	15	0	0	0
Bariga Ward B	18	8	0	6	12	0
Bariga Ward C	0	0	0	0	0	0
Bariga Ward D	0	0	0	0	0	0

Bariga Ward E	14	13	6	14	0	0
Bariga Ward F	88	73	7	30	48	0
Bariga Ward G	96	67	15	70	39	10
Bariga Ward H	157	123	22	106	15	14
Somolu Ward A	50	40	13	30	0	0
Somolu Ward B	0	0	0	0	0	0
Somolu Ward C	22	21	34	0	0	15
Somolu Ward D	18	18	18	11	12	0
Somolu Ward E	0	0	0	0	0	0
Somolu Ward F	71	42	19	23	13	15
Somolu Ward G	0	0	0	0	0	0
Somolu Ward H	0	0	0	0	0	0
Grand Total	**534**	**420**	**149**	**290**	**139**	**54**

Most of the public primary schools met with the UNESCO standard (1996) which put the classroom capacity to one teacher to twenty five pupils in a classroom (1:25), though the total pupils/teachers ratio meets the standard (teacher - pupils ratio of 1:20). The classroom/Teacher ratio of the public primary schools is up to the UNESCO standard of (1:25). More than half of the total classrooms (54.3%) are in good condition and 26% in need of minor repairs, which makes a considerable amount of usable classrooms available, though there are still some cases of dilapidated classrooms which accounts for 10.3% of the available classrooms.

Secondly in terms of facilities, inequality in distribution also exist between the various wards that make up the study area. From the result generated in the study, Conditions among distribution of facilities whereby some Schools have excess in a particular facility alongside scarcity in others of the same facility. Although when seen generally as a whole, the standard of the facilities are sufficient or considerably enough except for the recreational facilities. The percentage of available recreational facility is 17.4% of the total required for the study area which shows a reduction in keeping the health and the enhancement of the teaching-learning process that is generated with the presence of sufficient recreational facilities.

4.5 Web Based Geo-database of Public Primary Schools

A Web Application was created using the ArcGIS online platform after exporting the shapefiles using the web map interface.

The images below (figure 6. shows some of the stages in the web map and afterwards the web map application created.

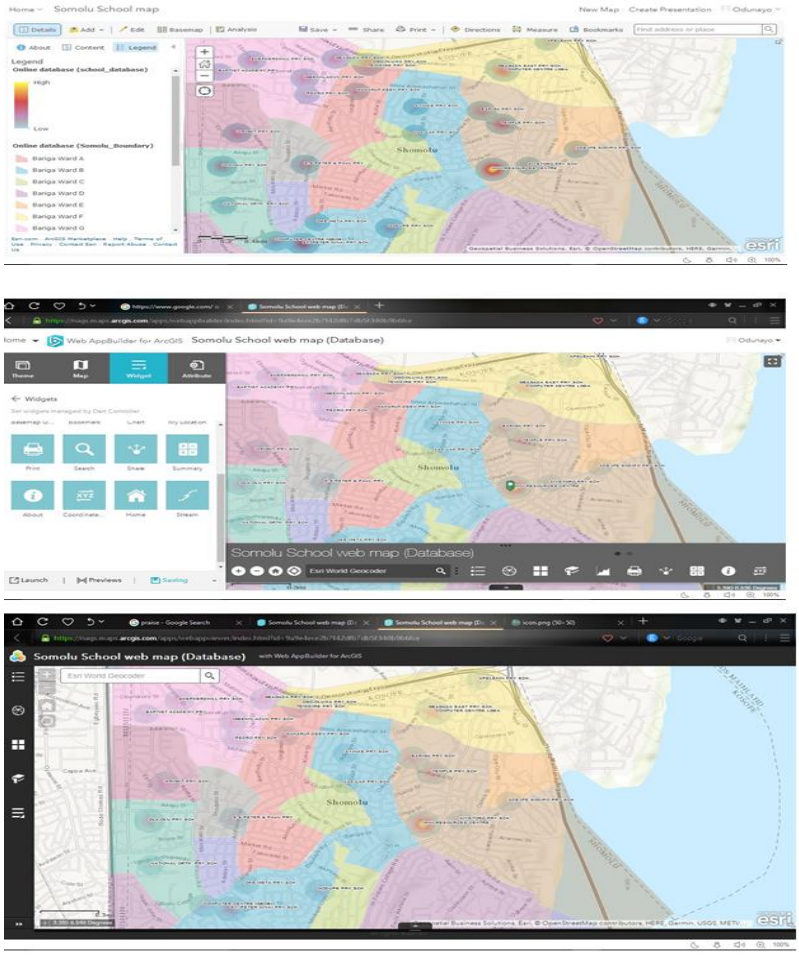

Figure 6. Web Application Previews.

The link of the Web Map application is:
https://nags.maps.arcgis.com/apps/webappviewer/index.html?id=9a9e4ece2b7f42dfb7db5f340b9b6fce

4.6 Discussion of Result Summary

This study of the Public Primary Schools in Somolu Local Government Area, Lagos State, Nigeria using Geographic Information System Technique identified and located a total of 53

Primary schools in the study area and these schools are supervised and monitored by two major organization bodies which are the State Universal Basic Education Board (SUBEB) Maryland, Ikeja and also Local Government Education Authority, Gbagada phase II, Somolu.

The results from the study shows a clustered pattern of distribution of public primary schools exists in the study area and the study also successfully mapped out all the Public Primary schools and displayed their spatial location over the entire study area.

The study shows that the standards set by UNESCO for the public primary schools in the study area were met as a whole when all public primary schools are considered. More and less in different standard categories such as: Numbers of Teachers, Teachers Qualification, Numbers of Classrooms, Classroom qualities etc. results to deficiencies amongst some schools in the study area. There is inequality in the distribution of educational facilities in all the ten wards comprising the study area and most of the educational infrastructure such as classrooms, Building conditions, Toilets, Recreational facility, furniture, Water and Power sources are inadequate

5. Conclusion

Generally, the quality of education that children receive bears direct relevance to the availability or lack, of physical facilities and overall atmosphere in which learning takes place. Therefore, this study analyzed the spatial distribution and generated a database for public primary schools in Somolu LGA, Lagos State. The study has conclusively shown that there is inequality in the distribution of educational facilities in all the ten wards in the study area. This study has effectively showcased the capability of GIS as a veritable tool for decision support system for planning and management of the Universal Basic Education facilities. It is a cost effective and fair method of tracking the status of the necessary infrastructure to ensure an effective teaching–learning to take place and it should be encouraged and adopted for policy making and implementation. The aim of this project was achieved as all the public primary schools were identified and mapped and a GIS database for public primary schools facilities in Somolu Local Government area alongside a web application has been developed. The spatial distribution of the schools was analyzed. The database provides users with a working environment for data management. It also allows for efficient query of information needed for school administration and management.

The following recommendations are hereby made based on the data analysis, research findings and conclusion of the research:

Firstly, the deficiency in the availability of recreational facilities across the public primary schools needs to be adequately addressed to make up the shortfalls in the existing facilities.

Secondly, public primary schools with inadequacies in the necessary facilities should be provided for, to improve the teaching-learning process.

Thirdly, periodic upgrade of existing facilities should be carried out to meet up with the growing population.

6. References

Aderinoye, R. A. (2007*). Mass Literacy in Nigeria: Efforts and Challenges*. in Journal of the Community and Adult Education Society of Nigeria. Vol. 5, No 1

Adomeh, I.O.C, Arhedo, A. and Omoike, D. (2007). *Comtemporary issues in history of education in O.O. Aluede and D.Omoike (eds): trends in history of eduction in Nigeria* (pp 221-139) Agbor: Krisbec Publications 121-139

Ahmed, M. N., M. U. Mohammed and Y. IDRIS (2013). A GIS-Based Analysis of Police Stations Distributions in Kano Metropolis. *IOSR Journal of Computer Engineering (IOSR-JCE),* Vol. 8**,** pp72-78.

Akpan P. E. and Njoku E. A. (2013). *Towards a Sustainable Distribution and Effective Management of School Facilities in Ikot Ekpene LGA of Akwa Ibom State*: A Geographic Information Systems Option MCSER-Mediterranean Center of Social and Educational Research Vol 4.15

Aliyu A., M. A. Shu'aibu and R. M. Aliyu (2013). Mapping and Spatial Distribution of Post Primary Schools in Yola North Local Government Area of Adamawa State, Nigeria. *International Journal of Science and Technology,* 2.

De La Fuente H, Rojas C, Salado M, Carrasco J, Neutens T (2013*). Socio-spatial inequality in education facilities in the Concepcion metropolitan area (Chile)*. Current Urban Studies 1(4):117-129.

Caillods, F. (1983). *School Mapping and micro-planning in education,* Module I: *Training materials in educational planning, administration and facilities.* IIEP/UNESCO 7 - 9, rue Eugene - Delacroix, 75116 Paris, France.

Durosaro, D. O. (2004), *Resource Allocation and Utilization for University Education in Nigeria, Trends and Issues,* in: E. G. Fagbamiye and D. O. Durosaro, eds., *Education and Productivity in Nigeria* (NAEAP) 51-67.

Eray, Okan (2012). Application of Geographic Information System (GIS) in Education, *Journal of Technical Science and Technologies*.

Federal Ministry of Education - FMoE, Nigeria (2003): Education Sector Status report, Nigeria.

Federal Ministry of Education - FMoE, Nigeria (2006): Strategic Plan for Educational Enhancement and Development. Nigeria.

FGN/UNESCO/UNDP, 2003. A Decade of Basic Education data in Nigeria (1988 – 1998).

Federal Ministry of Education, - FMoE, Nigeria (2009). Roadmap for the Nigerian Education Sector.

Globalisation of Education Policies (2000): *Extent of External Influences on Contemporary Universal Primary Education Policies in Papua New Guinea* - excerpts are from the complete text of Thomas Webster - book from the University of Papua New Guinea Press.

Hite, J. S. (2008). *School Mapping and GIS in Educational Micro-Planning*. International Institute for Education Planning. United Nations Educational, Scientific and Cultural Organization (UNESCO), Paris, France.

Ikpasaja, Ernest (2014): *Spatial Distribution and Accessibility to Public Primary School in Akwa-Ibom State: A case study of Uyo Local Government Area*. Unpublished MSc project report, Regional Centre for Training in Aerospace Survey (RECTAS) Library, Ile-Ife,Osun State, Nigeria.

International Bureau of Education (IBE) – UNESCO, (2006): Laws and other basic regulations concerning education.

Olamiju Isaac Oluwadare and Olujimi Julius (2011). *Regional Analysis of locations of Public Educational Facilities in Nigeria: The Akure region experience.* Journal of Geography and Regional Planning. Vol. 4(7), pp. 431.