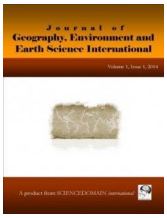

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Creation of a GIS Database for the Assessment of Secondary Schools within Afikpo

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Authors' contributions

This work was carried out in collaboration between both authors. Author AEM produced the map, performed the spatial analysis, wrote the protocol and wrote the first draft of the manuscript. Authors AEM and AFA collected the field data for the study. Both authors managed the literature searches. Both authors read and approved the final manuscript.

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ABSTRACT

Secondary education is a program of public education immediately following primary or elementary schooling. It begins generally at the age of 12 to 14 and continues from four to six years. Some secondary educations, such as vocational schools, is terminal and prepare the student for employment upon graduation. Others lead to advanced training in colleges, universities, or technical schools. Often times, parents and guardians are usually faced with the problem of choice when it comes to the selection of the school they will want their children to attend (especially with the wide gap that exist between public and private school). Some questions that may arise are; should I choose private or public? What facilities have this school? Is the location of this school secure? What is their carrying capacity? This and many more questions are best solved using Geographic Information System (GIS). The aim of this study is to create a GIS database for the management of secondary schools within Afikpo. A satellite imagery of the study area was used as a base map, it was digitized and georeferenced using ArcGIS 9.3 software. Questionnaires were served to principal of secondary schools within Afikpo, some of the questions answered are; name

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of school, average number of students per class, total number of staff, year of establishment, availability of library, availability of chemistry lab, availability of physics lab, availability of Biology lab, availability of fence. The coordinates of position of each schools gotten with a Garmin 76 hand held GPS receiver were plotted using ArcGIS 9.3 software, the non-spatial data (attribute data) generated from the questionnaire was used to create the database in ArcGIS environment. The database created will provide the necessary information needed to guide the government and educational authorities in decision-making and will also be a pointer to areas needing urgent attention.

Keywords: ArcGIS 9.3; database; map; GPS; satellite imagery; secondary school; GIS.

1. INTRODUCTION

Education is one of the most important factors in Nigeria's quest to become one of the largest economies by the year 2020. Education in Nigeria is overseen by the Ministry of Education. Local authorities take responsibility for implementing policy for state-controlled public education and state schools at a regional level. The education system is divided into Kindergarten, primary education, secondary education and tertiary education [1].

Secondary education is a program of public education immediately following elementary schooling. It begins generally at the age of 12 to 14 and continues from four to six years. Some secondary education, such as vocational schooling, are terminal and prepare the student for employment upon graduation. Others lead to advanced training in colleges, universities, or technical schools [2].

Public school is an elementary or secondary school controlled and maintain by civil authority, acting through an official board expanding public money, and open to all local children. Public schools include grade or grammar schools, junior and senior high school, and vocational schools. Private schools are programs of instruction that are created and controlled, operated, and principally financed by private individuals and groups rather than by government. Unlike public elementary and secondary schools, which are free, nearly all private schools charge some form of tuition [2].

The standard of education in Nigeria is deteriorating on a daily basis, most private schools have sacrificed standard for a money driven goal as schools are cited in residential buildings with overcrowded population and no sporting or laboratory facilities. There exist a lacuna between public and private secondary schools. There is therefore an urgent need to balance the structure of secondary education itself, so as to effectively diversify the programme at this level. Reliable and efficient information will facilitate the implementation of educational planning and objectives and promote the efficacy of education [3].

Often times, parents and guardians are usually faced with the problem of choice when it comes to the selection of the school they will want their children or ward to attend. Some questions that may arise are; should I choose private or public? What facilities has this school? Is the location of this school secured? What is their carrying capacity? This and many more questions are best solved using Geographic Information System (GIS).

[4] defined Geographic Information System (GIS) as an organized collection of computer hardware, software, geographic data, and personnel designed to efficiently capture, store, update, manipulate, analyse, and display of all forms of geographically-referenced information. GIS has the capability to handle large volume of data, the data can also be manipulated and analysed in ways that would be too costly or time-consuming or practically impossible to handle by manual methods. GIS is a general-purpose tool for turning large volume of spatial data into useful information and the result can be used to solve specific environmental problems.

A Database is a structured collection of records or data that is stored in a computer system. The structure is achieved by organizing the data according to a database model. This logical data model contains all the needed logical and physical design choices and physical storage parameters needed to generate a design in a Data Definition Language, which can then be used to create a database. The model in most common use today is the relational model. Other models such as the hierarchical model and the network model use a more explicit representation of relationships [5].

The aim of this study is to create a GIS database for the management of secondary schools within Afikpo. The database created will provide the necessary information needed to guide the government and educational authorities in decision making and will also be a pointer to areas needing urgent attention. It will guide parents to know which school is best for their children from available information on infrastructures and facilities captured in the database.

The study area is in Afikpo in Ebonyi State, it has a population of approximately half a million people and growing, its area is approximately 164 Sq Km in size. It lies between Latitude 7º 55' 17.4"N - 7º 56' 35.4"N and Longitude 5º 53' 12"E - 5º 53' 59.4"E. It is bounded to the north by the town of Akpoha, to the south by Unwana and Edda in Ubeyi and Afikpo South Local Government Areas respectively, to the East by the Cross River and to the West by Amasiri [6].

2. MATERIALS AND METHODS

The list of secondary schools (both private and public) within Afipko was acquired from Secondary Education Board (SEB) in Afikpo. A satellite imagery of the study area was acquired to serve as a base map. This imagery was imported into the ArcGIS 9.3 environment from where different layers were created using the ArcCatalog in ArcGIS 9.3 software, it was georeferenced and thereafter digitised using the ArcMap in ArcGIS 9.3 software.

A questionnaire was prepared and served to principals of secondary schools within Afipko, some of the questions answered are; name of school, average number of students per class, total number of staff, year of establishment, availability of library, availability of chemistry lab, availability of physics lab, availability of Biology lab, availability of fence, year of establishment. A handheld Global Positioning System (GPS) receiver (Garmin 76) was used to acquire the position coordinates of each schools for the purpose of plotting. The Database of the schools was created in the ArcGIS environment using the attribute information gathered from the questionnaires. A map showing the distribution of the schools was produced and different queries were created.

3. RESULTS AND ANALYSIS

Eleven Secondary schools within Afikpo Central were involved in this study (four are private and seven are public schools). Out of the eleven schools, four of them are boarding schools, two run both day and boarding school, while five are day school. These schools are spread within an area of 2861.515 ha. Fig. 1 shows a screen shot (in ArcGIS software) of the attribute table containing the name of schools, total number of students in a school, Average number of student

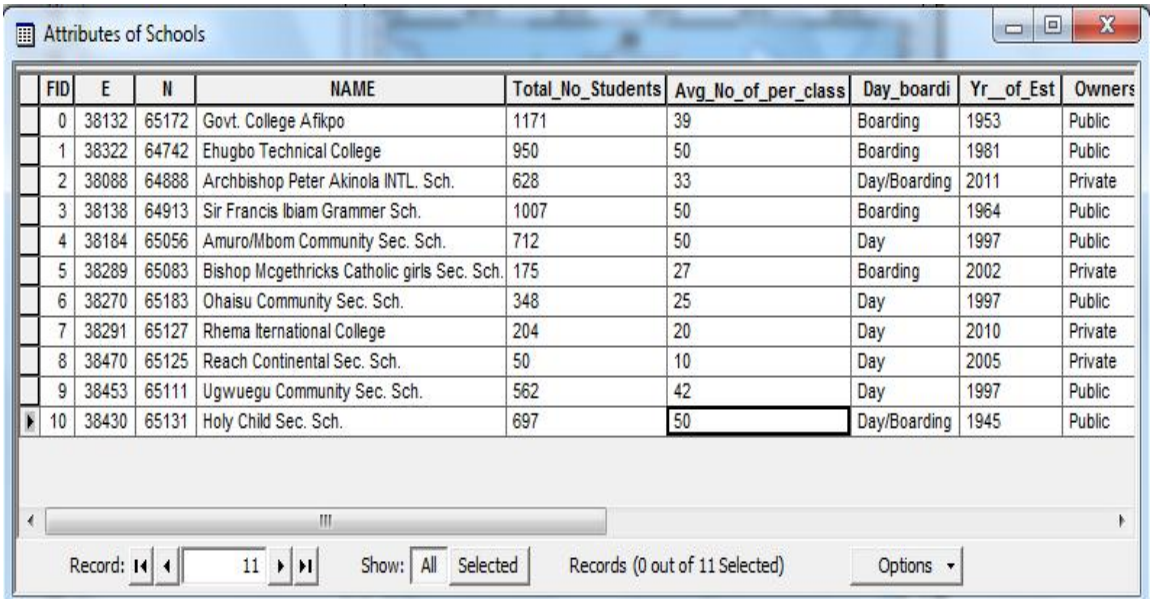
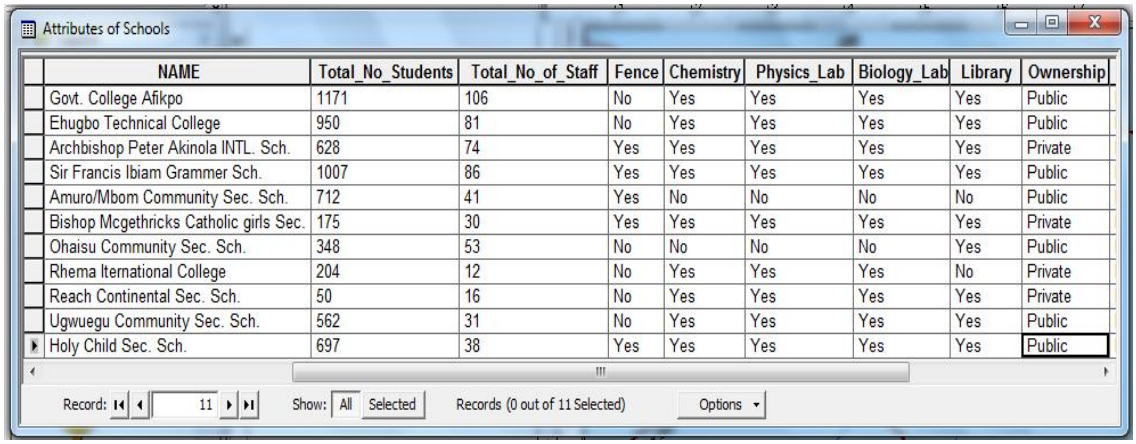


Fig. 1. Screen shot attribute table showing the names of secondary schools within Afikpo



Attributes of Schools

NAME	Total_No_Students	Total_No_of_Staff	Fence	Chemistry	Physics_Lab	Biology_Lab	Library	Ownership
Govt. College Afikpo	1171	106	No	Yes	Yes	Yes	Yes	Public
Ehugbo Technical College	950	81	No	Yes	Yes	Yes	Yes	Public
Archbishop Peter Akinola INTL. Sch.	628	74	Yes	Yes	Yes	Yes	Yes	Private
Sir Francis Ibiam Grammer Sch.	1007	86	Yes	Yes	Yes	Yes	Yes	Public
Amuro/Mbom Community Sec. Sch.	712	41	Yes	No	No	No	No	Public
Bishop Mcgethricks Catholic girls Sec.	175	30	Yes	Yes	Yes	Yes	Yes	Private
Ohaisu Community Sec. Sch.	348	53	No	No	No	No	Yes	Public
Rhema Iternational College	204	12	No	Yes	Yes	Yes	No	Private
Reach Continental Sec. Sch.	50	16	No	Yes	Yes	Yes	Yes	Private
Ugwuegu Community Sec. Sch.	562	31	No	Yes	Yes	Yes	Yes	Public
Holy Child Sec. Sch.	697	38	Yes	Yes	Yes	Yes	Yes	Public

Record: 11 Show: All Selected Records (0 out of 11 Selected) Options

Fig. 2. Screen shot of an attribute table showing learning facilities

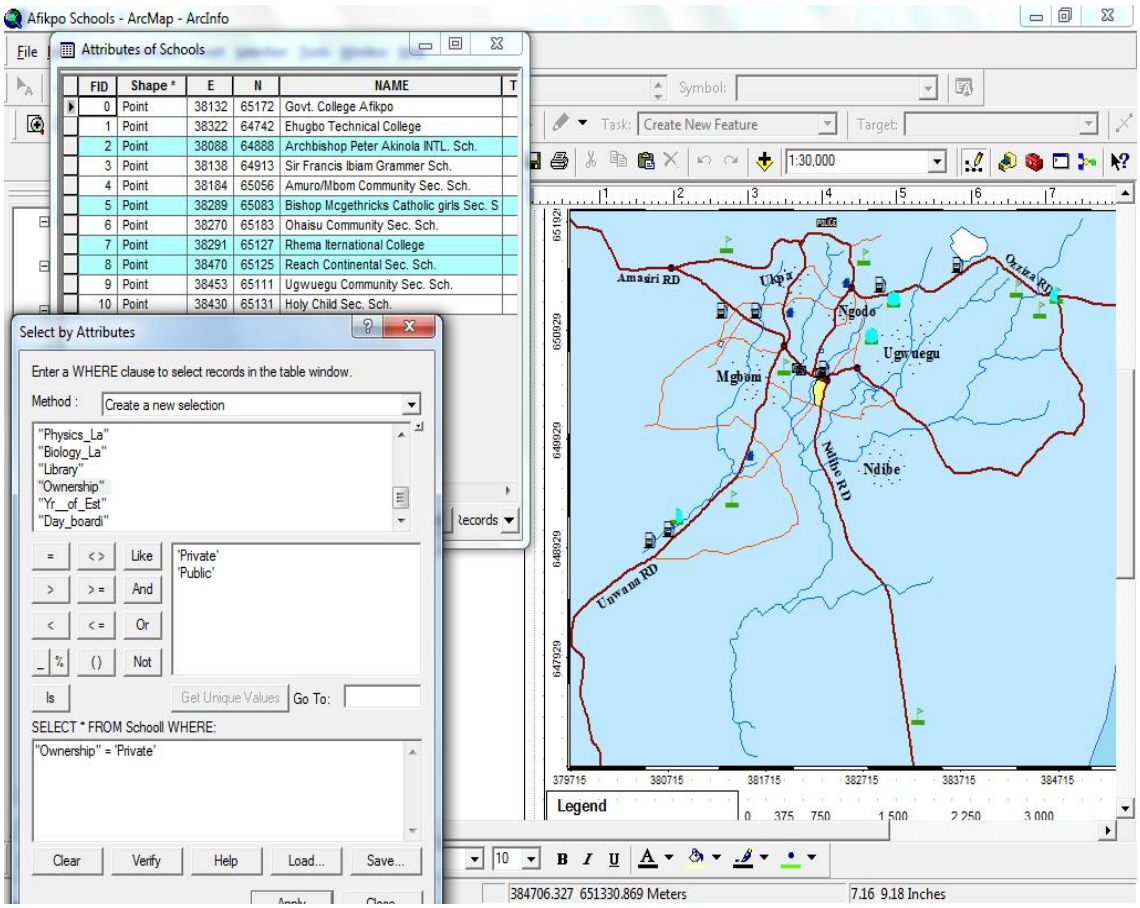


Fig. 3. Result of a querry for private secondary schools within Afikpo

in a class, year of establishment, ownership (whether public or private). Fig. 2 is a screen shot (in ArcGIS software) of the attribute table showing the learning facilities. Fig. 3 shows the result of a querry for private secondary schools within Afikpo. In Fig. 4, is a Map showing the secondary schools within Afikpo. Fig. 5 shows the number of classrooms for each secondary schools.

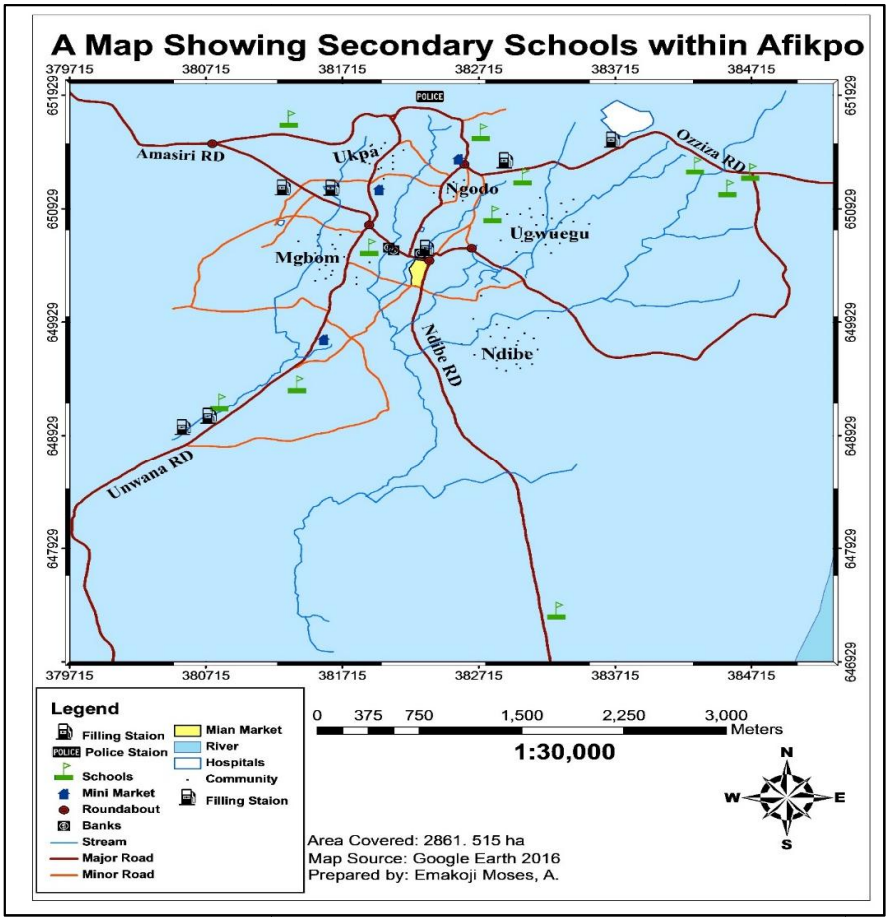


Fig. 4. Secondary schools within Afikpo

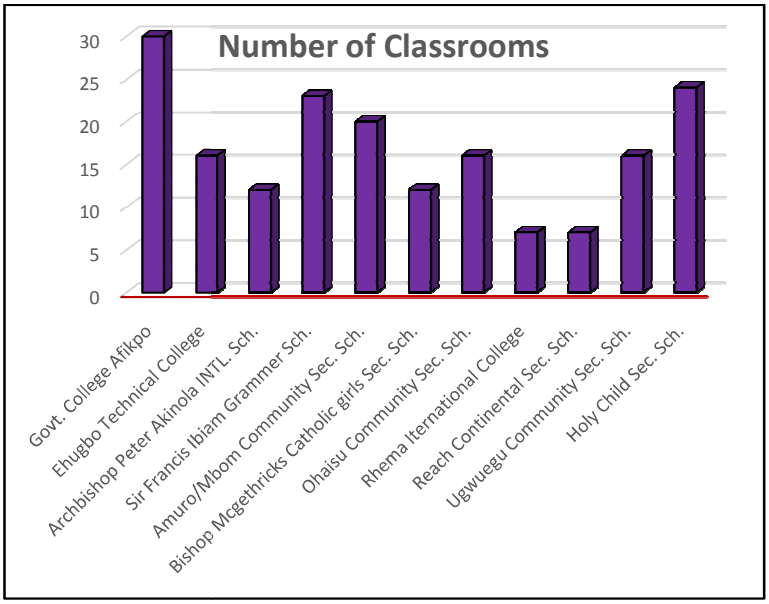


Fig. 5. Number of classrooms for each schools

4. CONCLUSION AND RECOMMENDATIONS

This study has further demonstrated the role of a surveyor to virtually solve all environmental problems through the effective use of GIS as a tool to capture, store analyse and display and manage geographic and non-geographic related data. The map produced shows the spatial distributions of Secondary Schools within Afikpo.

i. There is an urgent need for more support from government, cooperate bodies and individual in the provision of modern and sufficient learning facilities especially to schools that lack facilities such as library, computer lab, physic lab, chemistry lab, biology lab, etc. in order for such schools to meet up with acceptable standard.

ii. There is need for a workable and an up-to-date GIS database of schools an area so as to effectively manage and assess the level of educational growth within such area.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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