GEOGRAPHIC INFORMATION SYSTEMS (GIS) AS DECISION SUPPORT TOOL AND DATABASE MANAGEMENT SYSTEM FOR SCHOOL MANAGERS

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ABSTRACT

As the population of the world is drastically increasing, and as the awareness of western education is also being globally felt, school enrolment at all levels are increasing annually. The rapid increase in school enrolment calls for proliferation of schools in nearly every community. Government usually controls these schools in order to check their excesses and to maintain a set standard. Hence decision making based on a reliable data becomes imperative. It is this area of creation of reliable, comprehensive, flexible, cost-effective and user-friendly database for decision making that Geographic Information System (GIS) comes in. This study attempts mapping the spatial distribution of all the primary schools in Mubi, as well as creating a comprehensive database for the schools and each staff in each school, using GIS techniques. GPS (Germin 72) was used to obtain the coordinate of each school location. A standard political map of Mubi Town was carefully digitized using Arcview3.2a. Two sets of questionnaires (school data and staff data) were administered to all the primary schools in the metropolis and only the schools that properly filled their questionnaires were selected. The study revealed that GIS has the capabilities of inventory spatial data, generating digital maps and creating comprehensive and reliable database which are retrievable through spatial searches. It is hoped that this technology will provide up-to-date information on the current state of ICT in our educational sector and will overcome the dearth of authentic and reliable information on ICT needs and application that prevails in the educational process in the country.

KEY WORDS: GIS, Database Management System, Information and Communication Technology (ICT), Decision Support System

Introduction

One of the major problems confronting decision makers in the developing countries today is lack or inadequate information that can be reliably relied upon for decision making. The dearth of information is a direct effect of no comprehensive, reliable, flexible and up-to-date data from the different sectors of the economy. Hence decision-makers are found to be gambling, which allows parochial factor to be in play during resource location and allocation. Most countries especially in the third world countries still depend on records based on filling system that are very difficult to be kept (space problem), not easy to assess, difficult to be maintained or up-dated and most especially, the loss of a single file is the loss the total

information that contained in the file forever. All these problems and many more results to wrong decision making or difficulty in making decision by the managers on assessment, monitoring and evaluation of both natural and cultural phenomena. Different alternative methods have been introduced all over the world to minimize these problems; the most common of these alternatives is the Database Management Systems (DBMS), Smith, et. al., (1987), opined that a DBMS is a set of computer programs for organizing information, at the core of which will be a database. The edge of GIS over all other DBMSs is the ability to integrate both spatial and attribute data as noted by Aronoff, (1989), that the functions that a GIS should be able to perform include data input, storage, management, transformation; analysis and output the data management functions necessary in any GIS to facilitate the storage, organization and retrieval of data using a Database Management System (DBMS). Ayeni (1998), also added that GIS has a good database management subsystem that controls the creation of and access to the GIS data. Furthermore, it is capable of providing storage, integration and manipulation of large volumes of data types at various spatial scales and levels of resolution. In addition, GIS Dbase management function can perform spatial and non- spatial queries. The ability to manipulate and analyse spatial data through appropriate software, is an important characteristics of GIS and thus a major attribute that distinguishes it from computer mapping system. GIS is applicable to all types of real life problems from a very wide range of disciplines that deal with societal organization.

The relevance of GIS to database creation for schools has been demonstrated by several authors. For instance, Musa (2009) applied GIS techniques for building a database for Federal University of Technology, Yola Main Campus and concluded that the traditional system is far too cumbersome, energy sapping and slow for the present jet age. In the same manner, Hite (2008) in his school mapping and GIS in education miro-planning also saw GIS as simply a better, more precise and flexible spatial analysis for representing schools and their physical, social and geo-political contexts.

Aim and Objectives of the Study:

The aim of this paper is to generate a digital map of Mubi metropolis through which the spatial locations of all the primary schools can be assessed and analysed, and also to create a comprehensive database of all the necessary information of each school as well as each of the staff in all the primary schools.

The specific objectives include:

♦ to examine the spatial distribution of all the primary schools in Mubi metropolis.

♦ to demonstrate areal and topographical surveillance of the schools locations for quick decisions that are related to schools'topography.

♦ obtain the attribute data of each primary school and each staff in all the primary schools

♦ to perform spatial searches and queries on the digital map and the database to show the real world capabilities of GIS.

The Study Area

Mubi Metropolis lies between Latitude 10˚14″ and 10˚18″N of the Equator, and Longitude 13˚14″ and 13˚19″E of the Greenwich Meridian. The elevation of the region above main sea levels is generally high compared to other parts of Adamawa state. Mubi metropolis is made up of Mubi North and Mubi South Local Government Areas (LGA). It shares international boundary with Cameroon Republic in the east, song LGA in the west and Maiha LGA in the south. The soil of Mubi is derived from the basement complex, granite, and gneiss that form the ranges of Mandara Mountains. (Adebayo, 2004). Mubi metropolis falls within the Sudan savanna belt of the Nigeria vegetation zones. The month of May to September constitute the wet season in Mubi metropolis. Mean annual rainfall ranges from 900mm to 1050mm. (Adebayo and Dayya 2004). Mubi, the second most populated town in Adamawa state has a total population of 280,009 people, according to the 2006 census figure. That is, Mubi north has a total population of 151,072 people, and 128,937 people in Mubi south. The census indicated average density of 486 people per square kilometer. The major socio-economic activities of the people in Mubi metropolis are trading and agriculture which are mostly subsistence.

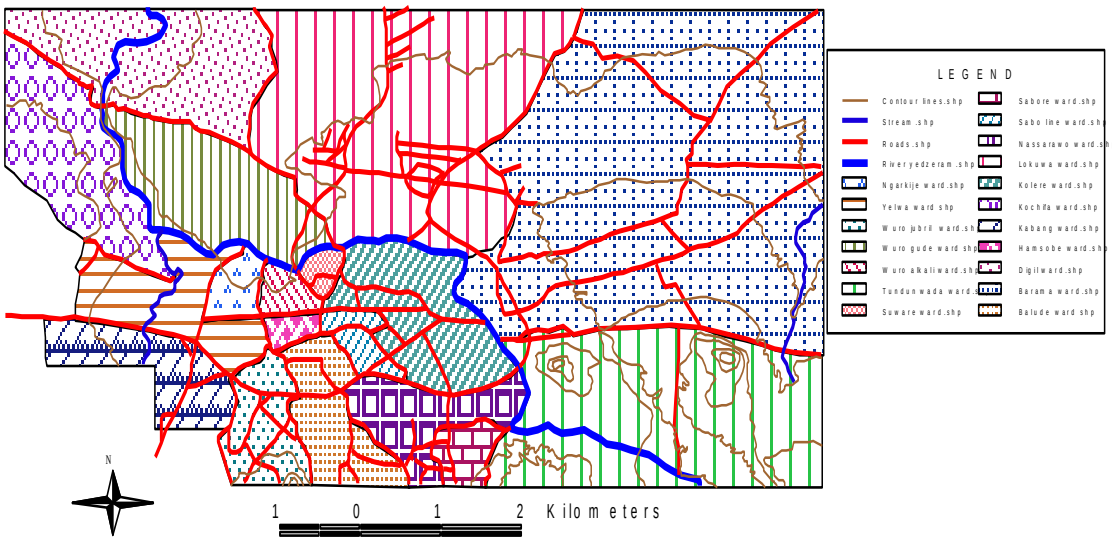


Fig. 1 The Study Area

Materials and Methods

Hardware and Software Requirements:

Three main GIS software were used for this paper, they are: Arcview 3.2a, Ilwis 3.1 Academic, Google Earth and Surfer 7, while CorelDraw 12 and Microsoft Word, 2003 were used as complimentary software. The following hardware were used for data capture and analysis: an HP laptop, Scan express A3 USB and HP 5100 colour printer and GPS Germin 72.

Sources of Data:

The political map of Adamawa State which shows all the LGAs and their boundaries, sourced from the Ministry of Works, Mubi North LGA, Mubi, Adamawa State, was digitized as base map to which the database was linked as add event theme. GPS (Germin 72) was used to take the coordinates of all sites where primary schools were located within the metropolis.

Questionnaires were also designed to capture all the necessary information for each primary school and each staff in each primary school in the metropolis. The questionnaires were divided into two parts. The first part which contained data on each primary school consists of information such as the coordinate of the school, name of the school, year of establishment, ward of location, LGA, number of staff, number of female pupils, number of male pupil, total number of pupils and other relevant information. The second part contained data on each staff, it designed like a form in which each staff was expected to fill. The information therein includes; name of staff, age, sex, years of experience, state origin, LGA and so on. The two questionnaires were separately administered; a period of two weeks was given before the retrieval of the questionnaires from each of the schools.

Database Creation

The information generated from questionnaires as well as the coordinates which were obtained through the use of GPS Germin 72 in LATLON but latter transformed into Universal Transverse Macator (UTM) through the transform module of Ilwis 3.0 were used to create the database. It was this UTM values that were used as X and Y coordinates for each of the school's location. The acquired Political map of Mubi metropolis was scanned using Correl-Draw 12, digitized onscreen and imported to Ilwis software where the map was carefully georeferenced. The coordinate values of the four corners of the map were used as tie-points. This process was to make all the acquired points through GPS fall at the exact places on the map. The higher the accuracy of the georeferencing, the more accurate the points will fall on their specific locations. The database was then linked with the georeferenced map of Mubi Metropolis through the add event module of the Arcview. Two tables were generated, the first contained data on each school where items such as the coordinates, name of the schools, year of establishment, ward, LGA, numbers of staff, and other relevant information formed the fields while the specific information on the fields above in each school formed the records. The second table contained data on each staff with the field containing information such as staff name, age, sex, years of experience, state origin and LGAs while the records contained information on each staff on each of the field.

Results and Discussion

Assessment of the area view of the school locations.

School managers are often confronted with deceit, corruption, lies and all sorts of abnormalities from contractors, local government officers, private individuals and organizations to seek for favours from the government. A school located in a town can be claimed to be in a village, a school with only one block can be said to contain five, a school near a big river or under high power tension can be claimed to be on isolated land. It is

also in most cases very difficult to confirm such claims by the managers because of lack/inadequate records or information. Moreover, time factor, distance, inaccessibility of some areas (e g swampy areas without good roads, rugged highland areas, thick forested areas, sandy parts of the Sahel savanna areas etc) and most especially lack of funds have all combined to make confirmation of such claims virtually impossible. This is where the role of GIS comes in, no need to travel to such areas, no need to search through files, no money is needed to confirm such information, all that is needed is just a click on a computer and all the information are automatically displayed. Figs. 2a and 2b show the aerial view of Mundral Schools, one of the most popular private schools in Mubi metropolis. Fig. 2a revealed the actual location of the school as well as other interested features around the school such as Adamawa State University, Federal Polytechnic, roads etc. Fig 2b was a zoomed part of the location of the school from Fig 2a so that the structures of the school through which the size, numbers and arrangement of the buildings are revealed. Moreover, pictures of the physical structures of the schools acquired by hand-held cameras can also be linked to each of the schools, so that a click on the school name revealed the picture of the structures or other relevant information such as the staff of the schools as shown in figs 7&8. The capabilities of GIS as a decision support tools for school managers are clearly revealed through the use of images. The images are real, they cannot be manipulated, and they reveal trends in activities in as much as they are up-dated. A school with only three blocks of classrooms in 2007 for example, but have increased their structures to nine in 2009 revealed exactly the same provided the images of the two years are acquired.

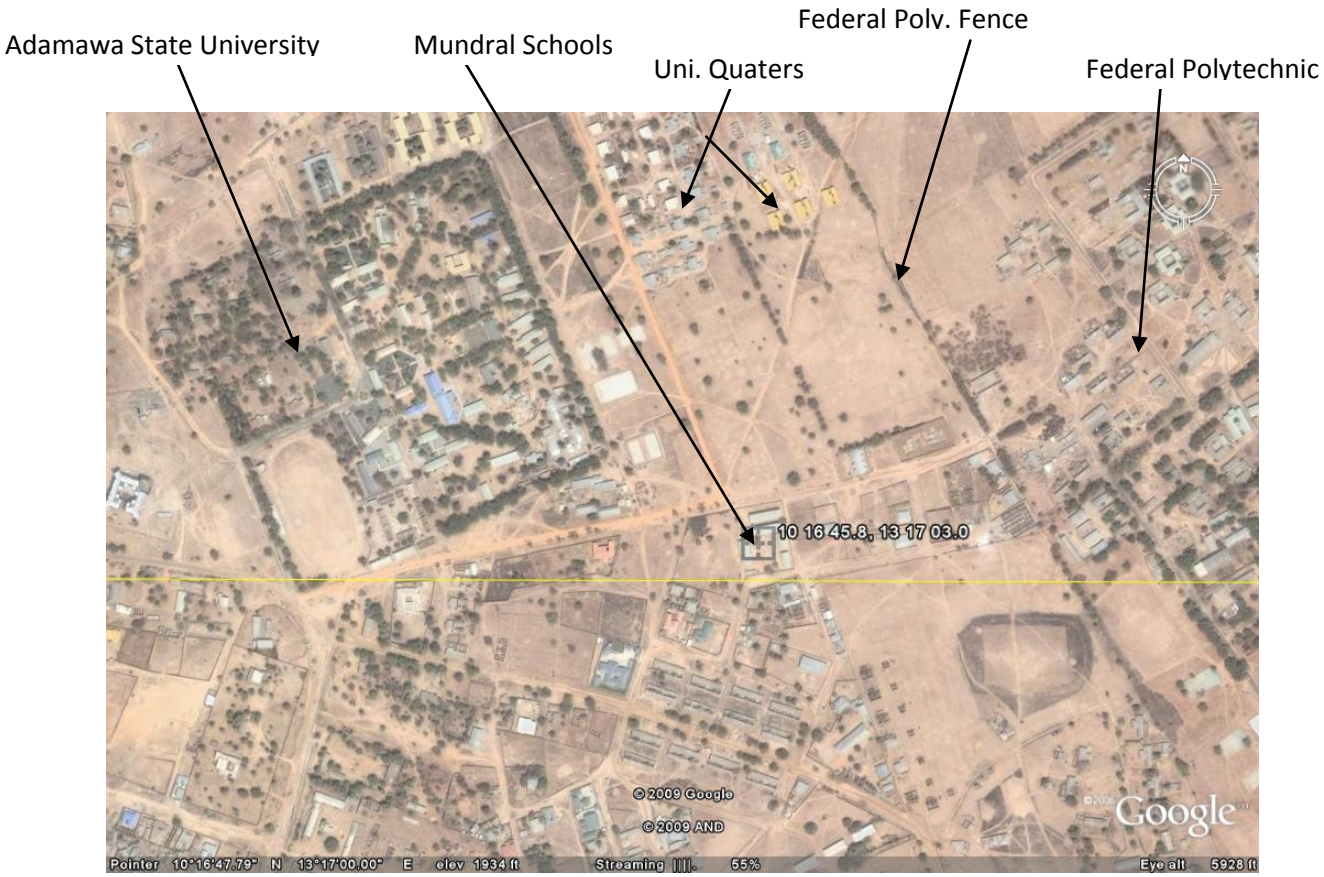


Fig. 2a. The Site of Mundral Schools.

From fig 2a, a lot of information can be generated which can assist decision makers. The image revealed that the school is strategically located to serve the children of the University and the Federal Polytechnic schools; it is connected with many road networks and also on a suitable land since no large river, high mountains etc are found around the area. From the image the actual location of schools are revealed, hence it is difficult for any community or persons to claim for whatever reasons any school that are not within their domain.

Fig 2b revealed the actual structures of the school when the image was zoomed-in to see the real site of the school

Fig. 2b. The Actual Location of Mundral Schools. Source:

Fig 2b shows the structures of Mundral schools in August 2009 when the data was generated. It was revealed from the image that the school had five completed and one uncompleted classrooms blocks at the time the data was generated. The different size of each block was also noticeable. The size of each block may suggest the number of classrooms in each block. Hence, from this image, it is totally impossible to claim wrong numbers of classroom blocks by politicians, contractors, LG officers and other relevant bodies.

Assessment of the Topography of School Sites

It is sometimes necessary to know the nature of the topography of school sites, that is, whether the schools are located in highlands or plain areas. Relief factor is often taken into consideration for decision making

especially in the areas of resource allocation or early warning of environmental hazards such as flood. Fig 3 shows the topography of primary schools sites in Mubi metropolis. This map (fig 3) was generated by the use of Surfer 7 GIS software, which gives automatic location of each school site as well as the topography of such areas represented by the contour lines. All the attributes features such as names of schools, contour lines, contour numbers, school sites etc appear automatically once the coordinates of each school sites are fed into the software.

Fig. 3 revealed that National Academy, Kabang School, Echo School and Demonstration school are all located in highland areas, while all other schools, are located on relatively lowland areas. The importance of this is felt for example if the government wants to establish something that involves installation of communication mast or networking that is expected to be received in all the schools within the metropolis. The best school site for such location is Kabang School (fig 3)

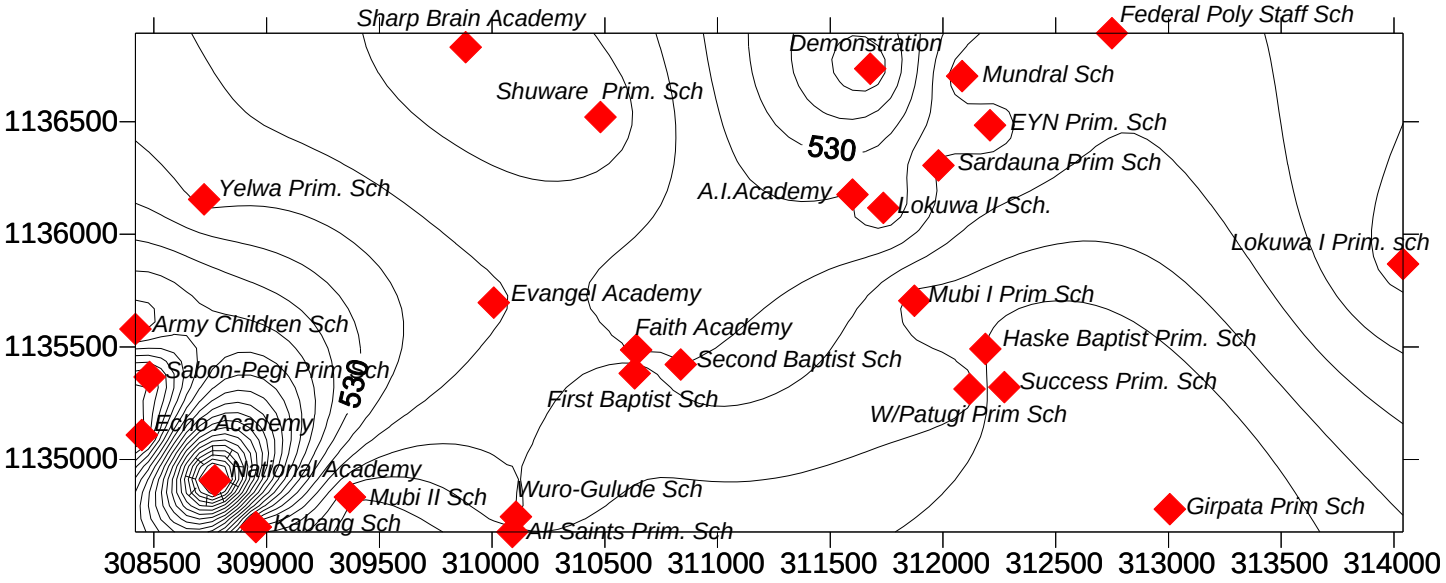


Fig. 3. Topographic View of the School Sites

Assessment of Spatial Locations of Primary Schools in Mubi Metropolis

The importance of deep knowledge in the spatial distribution of schools in any community cannot be overemphasized. It shows the areas that are congested with schools as well as areas that are lacking or provided with very few schools. The data can be compared with other data such as population distribution so as to derive pupils-school ratio. Schools that are located in dangerous places such as floodable places can also be revealed. For instance fig 4 revealed that most of the schools are concentrated at the center of the town which includes such wards as Lokuwa, Wuro Gude and Wuro Patigi. While, newly but rapidly developed wards like Barama, Tundun-Wada, Arhan-Kunu and Nassarawo are provided with few primary schools. This information will definitely guide school managers in the areas where new schools are to be established for even development. Army Children School was found to be too close to River Yedzeram (fig 4) which in the near future may call for relocation, if the lives of the pupils are considered very important.

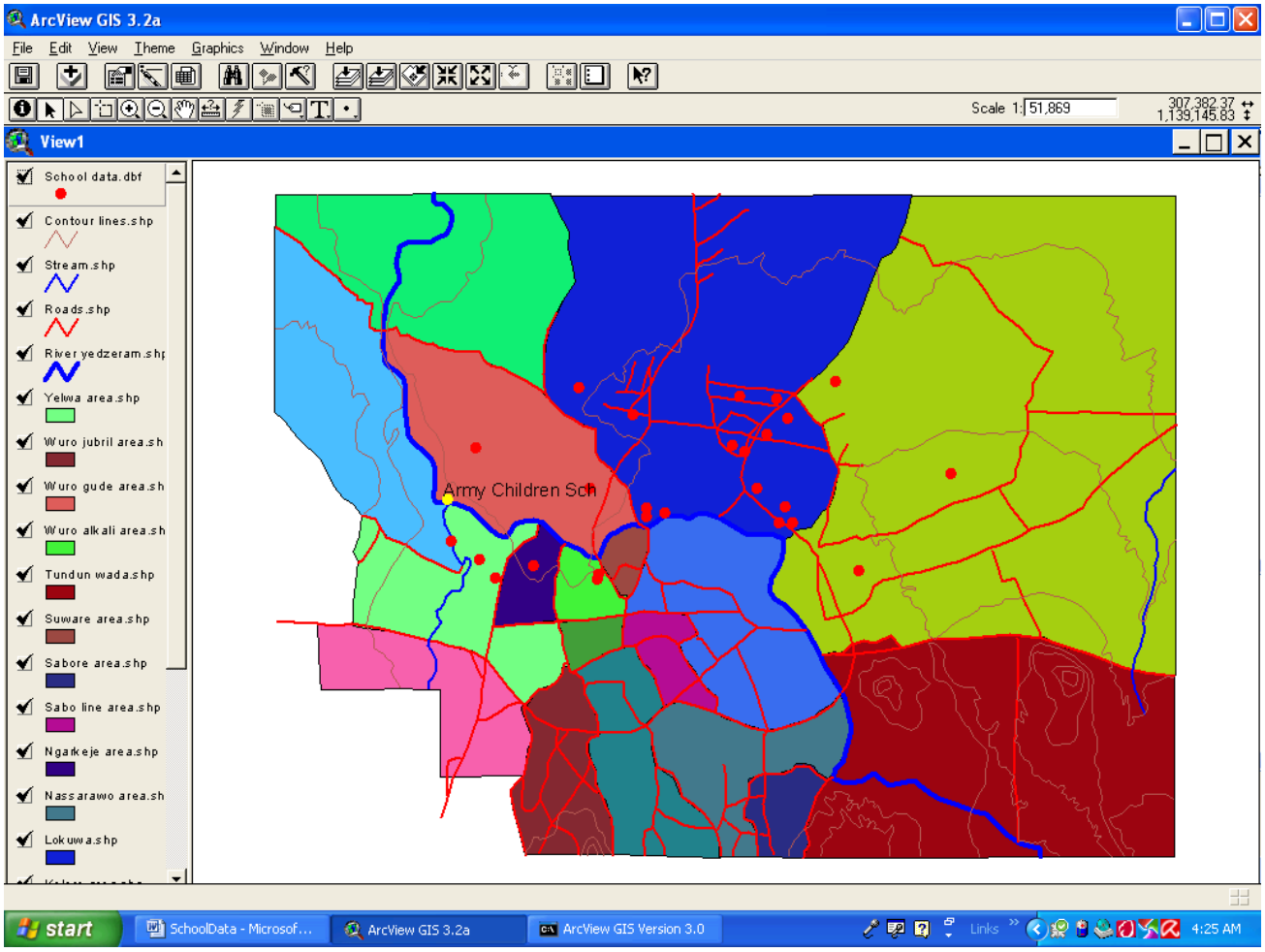


Fig. 4. The Location of Primary Schools in Mubi Metropolis

Using Query Builders for Spatial Searches

Query is one of the prominent capabilities of GIS which distinguishes it from other computer databases. A quick search can be made on the generated digital map to derive useful information or to create another data from the databank. For instance, fig 5 shows the selection of all the public schools (yellow colour points) from all the primary schools in the metropolis and auto-label was applied to quickly label the selected public schools. All these were achieved with just a click on the computer; no doubt the problem of filing method is defeated with this technique. Other searches such as selection of schools established in a particular or within the range of particular years, within a population range, with a particular Headmaster's name etc can also be performed. Finally, a click on any selected feature using the identify module, instantly revealed all the necessary information such as school name, year of establishment, ward, LGA, school owner, numbers of boys, numbers of girls, total numbers of pupils, total male staff, total female staff, total number of staff, all the data of the headmaster/headmistress etc of that school. The point of location of Yelwa primary school was clicked, and the whole information of the school was revealed as shown in fig 5

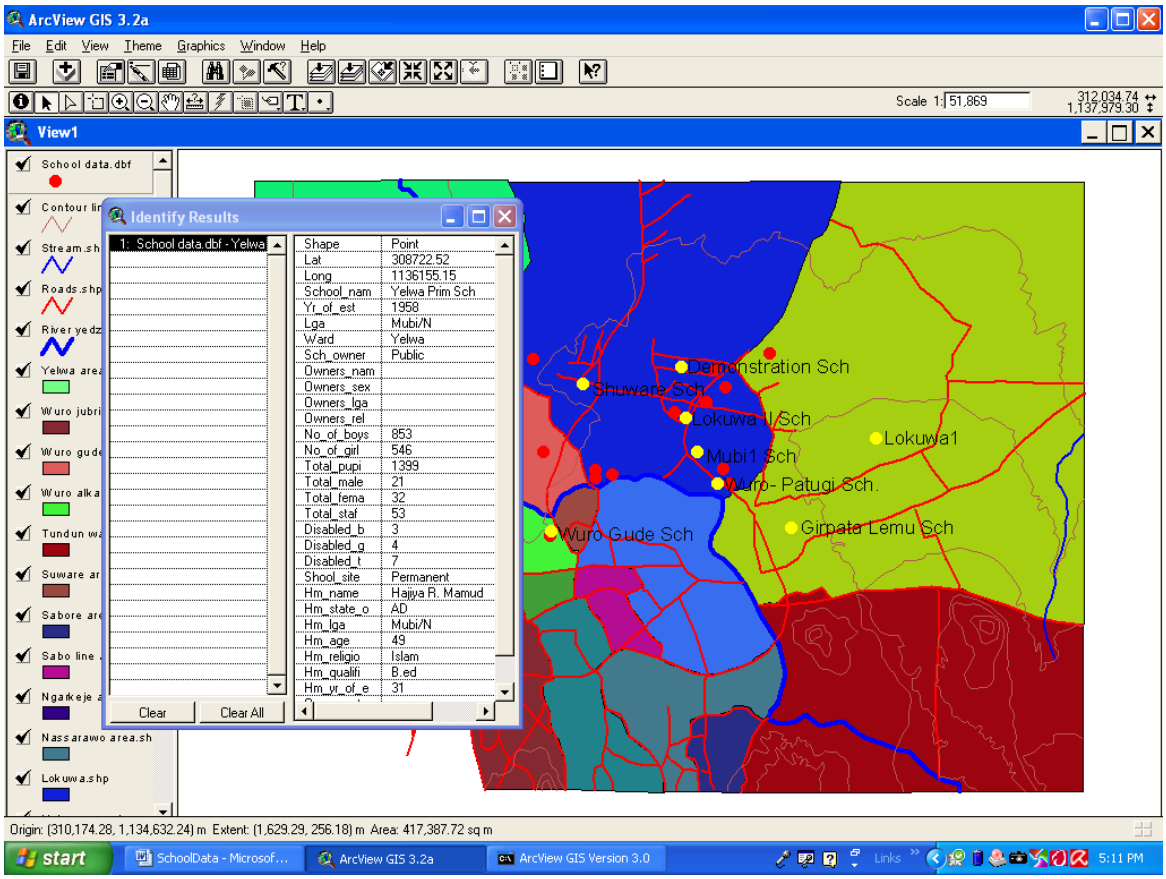


Fig. 5. Spatial Searches of Schools in Mubi Metropolis

Buffering is another form of spatial search that can be performed on digital maps. Buffering involves creating an area of interest with a desired distance from a given point. For instance, vocational centers such as home economic center, computer center, trade apprenticeship center etc are often established in selected schools from which other schools within the selected ones are expected to benefit. For instance, assuming a computer center is to be established at the Demonstration school, and only the schools within one kilometer radius from the Demonstration school are expected to benefit. The computer could easily select the main center in yellow colour, create the buffer zone of 1km in form of a ring round the selected school and finally labeled all the schools within the ring as demonstrated in fig. 6.

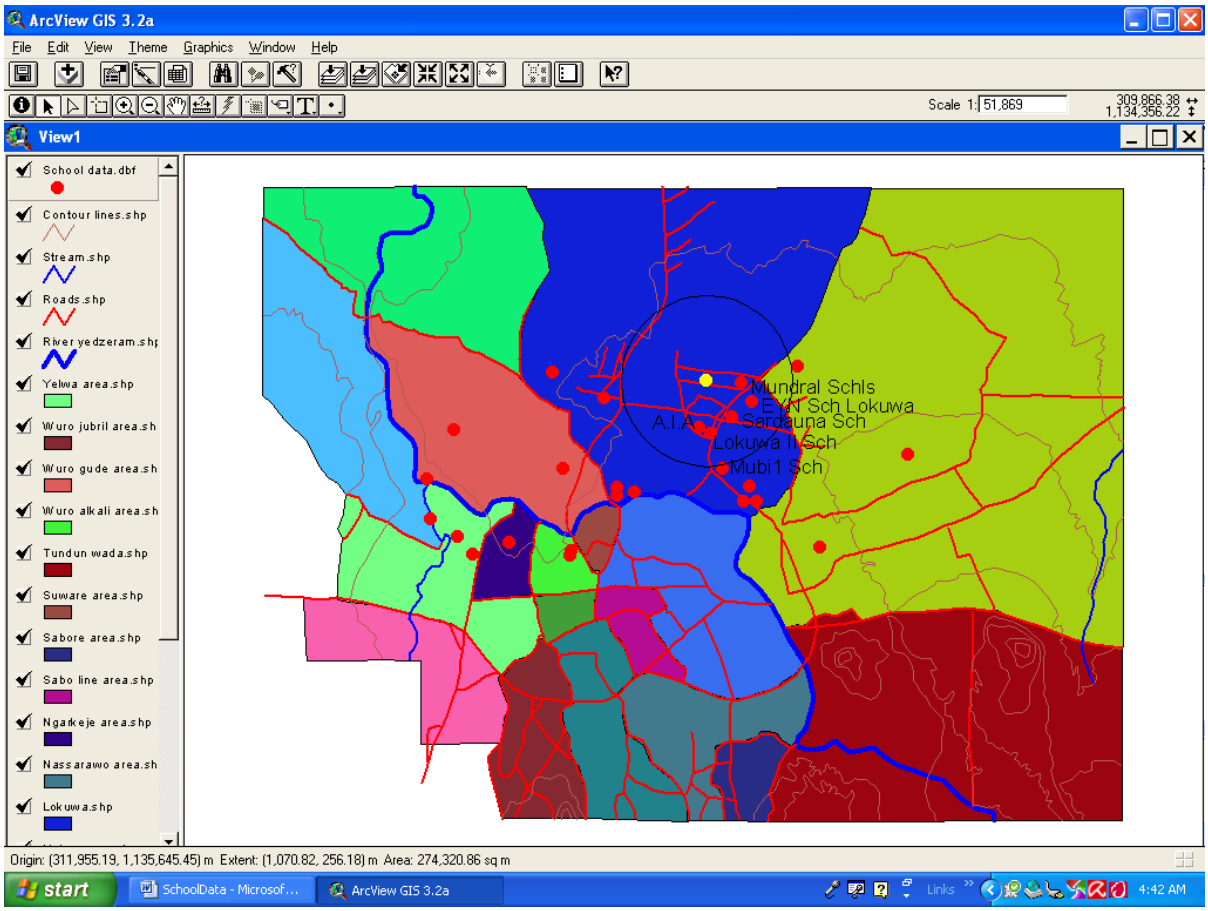


Fig. 6. Buffering around a Selected School

Fig 6 revealed the seven beneficial schools and their names as selected. This technique surely saves time and generates quick information for decision making. For instance, traditionally, before such decisions can be made the services of land surveyors would be required which may take months before the required information are derived. Beside it is cheaper, once the digital map is created. Finally, it eliminates the problems of power play and lobbying by communities, administrators and other stake holders since all the required decisions by the school managers are backed by the information generated from the computer which can be assessed by all the users.

The physical appearance of the school buildings as well as the pictures of the staff or any interested feature can also be assessed by a click on the interested theme as shown in figures 7 and 8. In Figure 7, a click on Mundral School's point location brings up the picture of the entrance of the school, while figure 8 shows the picture of the staff members of the school.

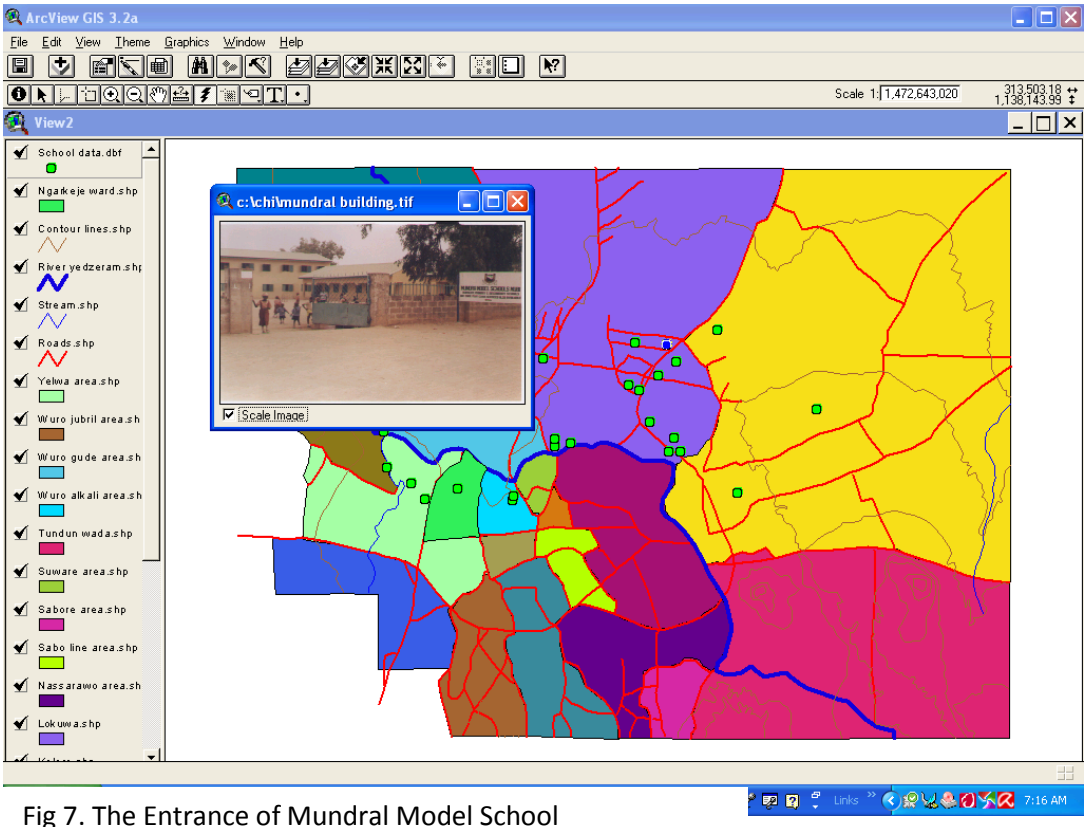


Fig 7. The Entrance of Mundral Model School

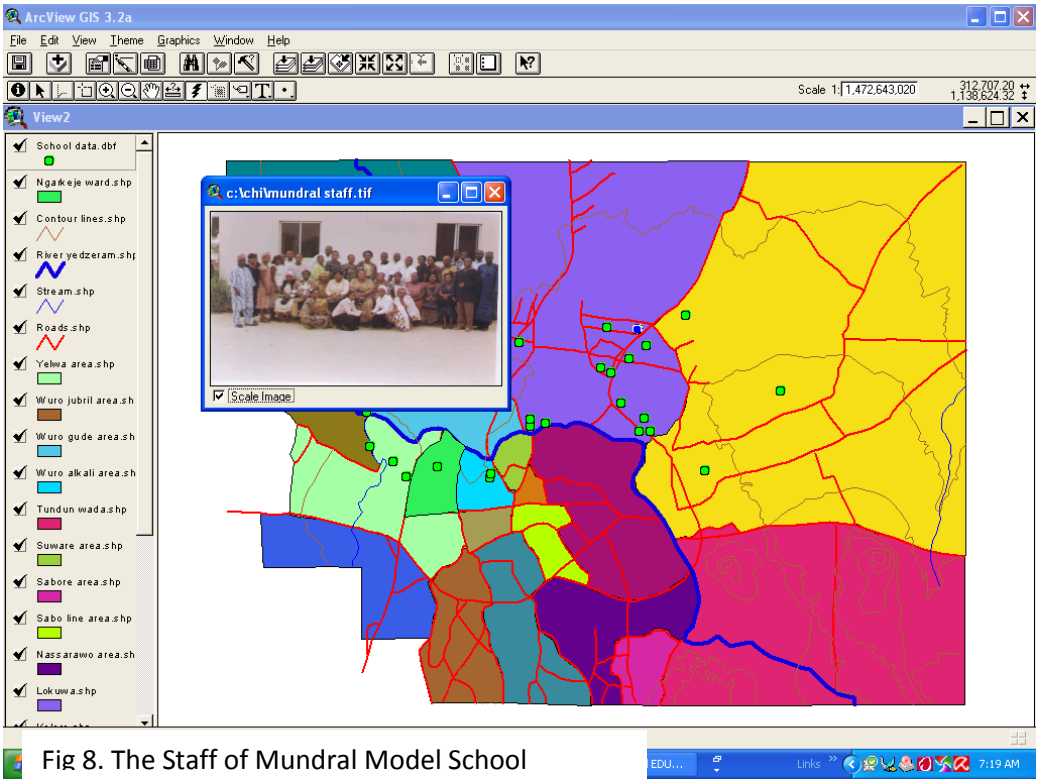
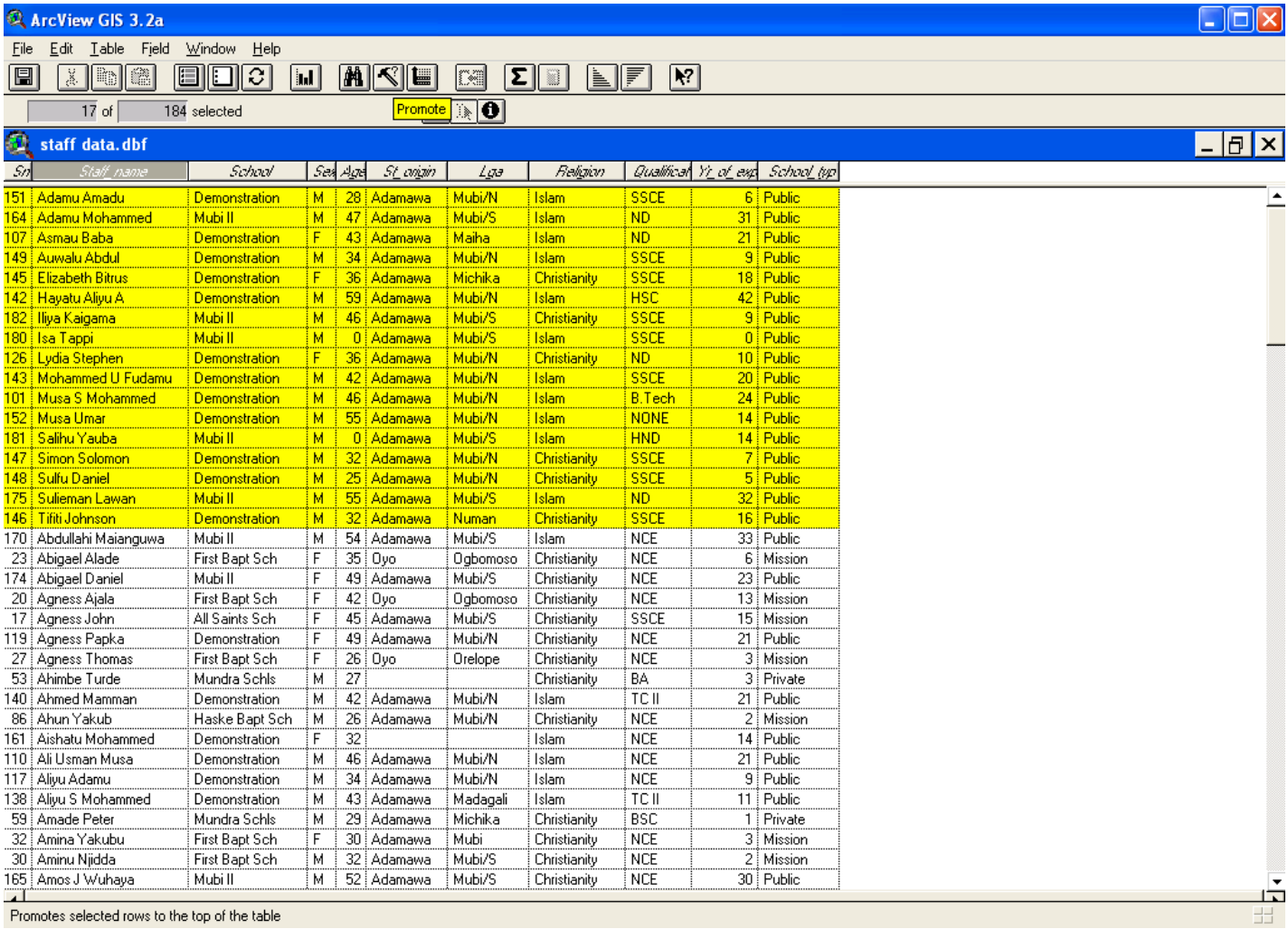


Fig 8. The Staff of Mundral Model School

Using Query Builders for Searching the Database

The database in table format is another reliable means of generating information for decision making. Like the digital map, the find or the query modules can be used to identify records on the database. Complex decisions can also be achieved through the use of the database. For example, assuming the government is interested in laying off all the staff that have no basic education certificates (TC II, NCE and BED) in only the public schools (that is, private and mission schools not affected) and the final output of the selected candidates to be arranged in alphabetical order. If this is to be done manually, it will require sending staff to each school to obtain the necessary information; moreover, long period of time is necessary to collate all the collected data. GIS database can give out the result within few minutes provided a database of such has been created; such database must also be updated periodically. The output of the selected staff without certificate in education is shown in fig 9.



Sn	Staff_name	School	Sex	Age	St_origin	Lga	Religion	Qualificat	Yr_of_exp	School_typ
151	Adamu Amadu	Demonstration	M	28	Adamawa	Mubi/N	Islam	SSCE	6	Public
164	Adamu Mohammed	Mubi II	M	47	Adamawa	Mubi/S	Islam	ND	31	Public
107	Asmau Baba	Demonstration	F	43	Adamawa	Maiha	Islam	ND	21	Public
149	Auwalu Abdul	Demonstration	M	34	Adamawa	Mubi/N	Islam	SSCE	9	Public
145	Elizabeth Bitrus	Demonstration	F	36	Adamawa	Michika	Christianity	SSCE	18	Public
142	Hayatu Aliyu A	Demonstration	M	59	Adamawa	Mubi/N	Islam	HSC	42	Public
182	Iliya Kaigama	Mubi II	M	46	Adamawa	Mubi/S	Christianity	SSCE	9	Public
180	Isa Tappi	Mubi II	M	0	Adamawa	Mubi/S	Islam	SSCE	0	Public
126	Lydia Stephen	Demonstration	F	36	Adamawa	Mubi/N	Christianity	ND	10	Public
143	Mohammed U Fudamu	Demonstration	M	42	Adamawa	Mubi/N	Islam	SSCE	20	Public
101	Musa S Mohammed	Demonstration	M	46	Adamawa	Mubi/N	Islam	B.Tech	24	Public
152	Musa Umar	Demonstration	M	55	Adamawa	Mubi/N	Islam	NONE	14	Public
181	Salihu Yauba	Mubi II	M	0	Adamawa	Mubi/S	Islam	HND	14	Public
147	Simon Solomon	Demonstration	M	32	Adamawa	Mubi/N	Christianity	SSCE	7	Public
148	Sulfu Daniel	Demonstration	M	25	Adamawa	Mubi/N	Christianity	SSCE	5	Public
175	Sulieman Lawan	Mubi II	M	55	Adamawa	Mubi/S	Islam	ND	32	Public
146	Tifiti Johnson	Demonstration	M	32	Adamawa	Numan	Christianity	SSCE	16	Public
170	Abdullahi Maianguwa	Mubi II	M	54	Adamawa	Mubi/S	Islam	NCE	33	Public
23	Abigael Alade	First Bapt Sch	F	35	Oyo	Ogbomoso	Christianity	NCE	6	Mission
174	Abigael Daniel	Mubi II	F	49	Adamawa	Mubi/S	Christianity	NCE	23	Public
20	Agness Ajala	First Bapt Sch	F	42	Oyo	Ogbomoso	Christianity	NCE	13	Mission
17	Agness John	All Saints Sch	F	45	Adamawa	Mubi/S	Christianity	SSCE	15	Mission
119	Agness Papka	Demonstration	F	49	Adamawa	Mubi/N	Christianity	NCE	21	Public
27	Agness Thomas	First Bapt Sch	F	26	Oyo	Orelope	Christianity	NCE	3	Mission
53	Ahimbe Turde	Mundra Schls	M	27			Christianity	BA	3	Private
140	Ahmed Mamman	Demonstration	M	42	Adamawa	Mubi/N	Islam	TC II	21	Public
86	Ahun Yakub	Haske Bapt Sch	M	26	Adamawa	Mubi/N	Christianity	NCE	2	Mission
161	Aishatu Mohammed	Demonstration	F	32			Islam	NCE	14	Public
110	Ali Usman Musa	Demonstration	M	46	Adamawa	Mubi/N	Islam	NCE	21	Public
117	Aliyu Adamu	Demonstration	M	34	Adamawa	Mubi/N	Islam	NCE	9	Public
138	Aliyu S Mohammed	Demonstration	M	43	Adamawa	Madagali	Islam	TC II	11	Public
59	Amade Peter	Mundra Schls	M	29	Adamawa	Michika	Christianity	BSC	1	Private
32	Amina Yakubu	First Bapt Sch	F	30	Adamawa	Mubi	Christianity	NCE	3	Mission
30	Aminu Njidda	First Bapt Sch	M	32	Adamawa	Mubi/S	Christianity	NCE	2	Mission
165	Amos J Wuhaya	Mubi II	M	52	Adamawa	Mubi/S	Christianity	NCE	30	Public

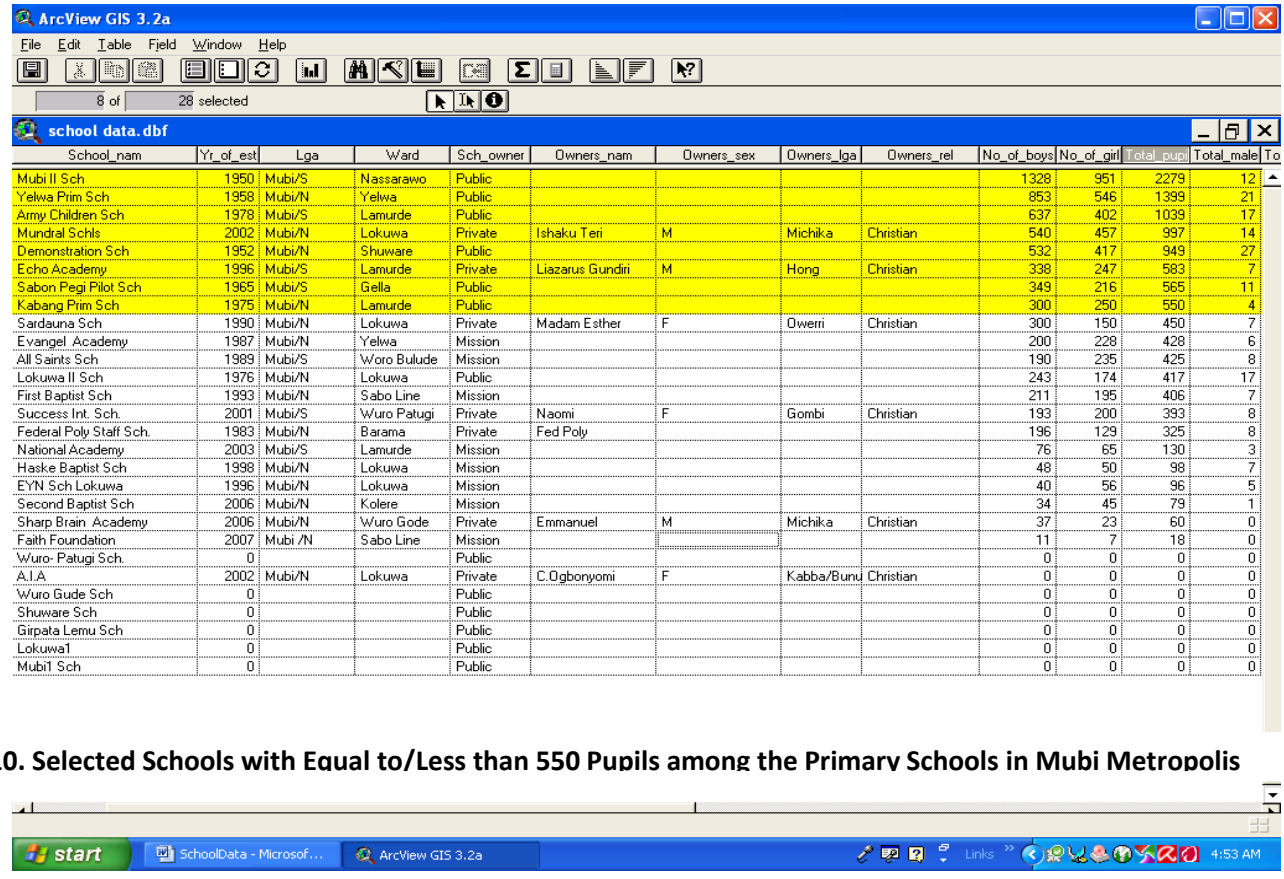
Fig. 9. Selection of Staff without Education Certificates among the Public Schools in Mubi Metropolis

The result of the queries revealed that seventeen staff from the public school would be laid-off. First on the list was Adamu Ahmadu with file number 153 from Demonstration school, a 28years male staff from Mubi LGA in Adamawa state, an SSCE qualification and 6years teaching experience.. Hence if the database is carefully created the result is always

free from unnecessary human errors as none of the selected people in fig 9 has certificates in education.

Assuming the government wants to share a particular resource to all the primary schools with equal to or more than 550 pupils in Mubi metropolis irrespective of the owner of the school. The schools that meet the condition are shown in fig 10.

Fig. 10 revealed that Mubi II School which was established in 1950 has the highest population with 2279 pupils. Altogether, only eight schools have up to 550 pupils, and from this eight, six of them are public schools, while the remaining two are private schools. It was also revealed from the figure that the fasted growing school in Mubi Metropolis is Mundral School because the school was only established in 2002 but is now 4th on the list with 997 pupils. Another vital information from fig. 10 is that public schools are more populated in Mubi metropolis than private or mission schools. The implication of this is that government needs to have a proper plan on the public schools which house most of their pupils if the futures of the children are put into consideration.



School_nam	Yr_of_est	Lga	Ward	Sch_owner	Owners_nam	Owners_sex	Owners_lga	Owners_rel	No_of_boys	No_of_girl	Total_pupi	Total_male	To
Mubi II Sch	1950	Mubi/S	Nassarawo	Public					1328	951	2279	12	
Yelwa Prim Sch	1958	Mubi/N	Yelwa	Public					853	546	1399	21	
Army Children Sch	1978	Mubi/S	Lamurde	Public					637	402	1039	17	
Mundral Schls	2002	Mubi/N	Lokuwa	Private	Ishaku Teri	M	Michika	Christian	540	457	997	14	
Demonstration Sch	1952	Mubi/N	Shuware	Public					532	417	949	27	
Echo Academy	1996	Mubi/S	Lamurde	Private	Liazarus Gundiri	M	Hong	Christian	338	247	583	7	
Sabon Pegi Pilot Sch	1965	Mubi/S	Gella	Public					349	216	565	11	
Kabang Prim Sch	1975	Mubi/N	Lamurde	Public					300	250	550	4	
Sardauna Sch	1990	Mubi/N	Lokuwa	Private	Madam Esther	F	Owerri	Christian	300	150	450	7	
Evangel Academy	1987	Mubi/N	Yelwa	Mission					200	228	428	6	
All Saints Sch	1989	Mubi/S	Woro Bulude	Mission					190	235	425	8	
Lokuwa II Sch	1976	Mubi/N	Lokuwa	Public					243	174	417	17	
First Baptist Sch	1993	Mubi/N	Sabo Line	Mission					211	195	406	7	
Success Int. Sch.	2001	Mubi/S	Wuro Patugi	Private	Naomi	F	Gombi	Christian	193	200	393	8	
Federal Poly Staff Sch.	1983	Mubi/N	Barama	Private	Fed Poly				196	129	325	8	
National Academy	2003	Mubi/S	Lamurde	Mission					76	65	130	3	
Haske Baptist Sch	1998	Mubi/N	Lokuwa	Mission					48	50	98	7	
EYN Sch Lokuwa	1996	Mubi/N	Lokuwa	Mission					40	56	96	5	
Second Baptist Sch	2006	Mubi/N	Kolere	Mission					34	45	79	1	
Sharp Brain Academy	2006	Mubi/N	Wuro Gode	Private	Emmanuel	M	Michika	Christian	37	23	60	0	
Faith Foundation	2007	Mubi /N	Sabo Line	Mission					11	7	18	0	
Wuro- Patugi Sch.	0			Public					0	0	0	0	
A.I.A	2002	Mubi/N	Lokuwa	Private	C.Ogbonyomi	F	Kabba/Bunu	Christian	0	0	0	0	
Wuro Gude Sch	0			Public					0	0	0	0	
Shuware Sch	0			Public					0	0	0	0	
Girpata Lemu Sch	0			Public					0	0	0	0	
Lokuwa1	0			Public					0	0	0	0	
Mubi1 Sch	0			Public					0	0	0	0	

Fig. 10. Selected Schools with Equal to/Less than 550 Pupils among the Primary Schools in Mubi Metropolis

Conclusion and Recommendation

The significance of the use of GIS based database is specifically seen in the area of the provision of spatial distribution of all the existing educational institutions in the metropolis which assists policy makers in the targeting of interventions or developmental programes having known what is where from the database. As has already been mentioned, the proper allocation of resource has been the backbone for sustainable development and conflict resolution. Proper allocation of resources, especially education resources requires (Adeniyi, 1997), spatial and temporal information about their location, extent, quality and capacity: analysis tools for integrated analysis and

their potentials; and establishment of alternatives and their impacts. GIS technique has undergone unprecedented improvement in the collection of relevant spatial and temporal data for virtually all environmental, natural and cultural sectors. GIS has the capabilities of creating database for all the educational levels in a single database and yet, perform all the necessary spatial searches for each staff or each school as has been demonstrated in this paper. Nyerges (1992), summarized the capabilities of GIS that GIS is a tool which is based on technological developments that facilitates the processing of all types of digital spatial information and capable of displaying the results cartographically and otherwise. The use of this technique saves time and is very reliable (Ikusemoran, (2009). Using outdated techniques such as filing method is gradually becoming unnecessary in as much as the needed data are available.

It is hoped that this technology will provide up-to-date information on the current state of ICT in our educational sector and will overcome the dearth of authentic and reliable information on ICT needs and application that prevails in the educational process in the country. Staff of all the ministries of education and their parastatals should be encouraged to welcome this technology as well as to receive training on the operations. It is also hoped that the implementation of this system will be a departure from the haphazard efforts of database creation in Nigeria. Finally, the study will help the policy makers to re-appraise their policy drive about ICT integration in the educational process for better administrative strategies.

REFERENCES

Adebayo A.A. (2004). *Mubi Region; A Geographical Synthesis"* Paraclete Publishers, Yola; Nigeria. P61

Adebayo A.A. (1999), *Adamawa State in Map*. Paraclete Publishers, Yola; Nigeria. P36

Adebayo, A.A. and Dayya, S.V. (2004), "Geology, Relief and Drainage" in *Mubi Region; A Geographical Synthesis"* Paraclete Publishers, Yola; Nigeria. P61

Adeniyi P.O. (1997). Making Remote Sensing and GIS work for sustainable Agriculture and Rural Development in Sub-Sahara Africa. Proceedings of a CTA Seminar. Enschede, Netherlands, 23-26 September, 1997. PP 26-50

Aronoff, S. (1989), *Geographic Information Systems: A management Perspective.* WDL Publications, Ottawa. P53

Ayeni, B. (1998). Training Manual Workshop on Geographical information System (GIS) and Environmental. University of Ibadan.

Burrough, P. A. (1986), *Principles of Geographical Information System for Land Resources Assessment*, Clarendon Press, Oxford. P123.

Heywood, I. Cornelius, S. and Carner, S. ((1998), *An Introduction to Geographic Information Systems.* Addision Wesley Longman Limited, Essex, England. P48

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

Ikusemoran Mayomi (2009). Integration of GIS and GPS for Inventory and Creation of Database for Water Supply in Mubi Metropolis. African *Journal of Environmental Studies,* Unversity of Calabar

Musa, A.A. (2009). Building a GIS Database for a Typical Urban Setting. (A Case Study of the F.U.T. Yola Main Campus. *Global*

Journal of Environmental Sciences. Vol. 8 No 2.

Nyerges, T. L. (1992). Coupling GIS and Spatial Analytical Models. Proceedings, Fifth International Symposium on Spatial Data Handling. San-Fransisco. 12-15th May, 1992. P 534

Smith, T.R. Menon, S. Star, J.L.,Estees, J. E. (1987). Requirements and Principles for the Implementation of Large Scale Geographic Information Systems. *International Journal of Geographical Information System 1 (1)* p34.

Sofowora, O.A. and Jajua, M.A. (2008). An Assessment of the Information and Communications Technology (ICT) Skills, Knowledge and Training Needs of Secondary School Teachers in Osun State. A Paper Presented at the International and National Conference of the Nigerian Association of Educational Media Technology, Lagos State University, Lagos. 9-12 Sept; 2008