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Implementation of a Computerized Educational Administrative Information System
A case study of Bayelsa State Post-Primary Schools Board

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Abstract

The complications encountered due to manual approach used in the regulation of the school activities was investigated. These includes enrollment of students, compilation of student's results and other school activities done manually by the management board. These activities are very tedious and stressful and the inefficiency of man-power admitted into the school management with respect to how in-depth it affects other operational system in the system. The objective of this study is to explore the possibility of designing a computerized system to handle the work with less difficulty for an effective decision-making. In the course of the investigation, an existing system was digested and its deficiencies were detected and emphatically analyzed, after which solutions to the problems were proffered in the new designed computerized system using waterfall methodology, which is reliable and more interactive. The new system terminates all the problems experienced with the existing system, various tools was used to achieved solution to the problem in the new system; HTML, CSS. JavaScript, MYSQL and PHP

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Introduction

Computerized Educational Administration, can be referred as an online means of planning, monitoring, coordinating and supervising most of school activities (Tegegn, 2003), this can be done by an administrator; in this case Bayelsa State Post Primary Schools Board (BSPPSMB). This work investigates on the requirement analysis and specifications from an existing system

Bayelsa State Post-Primary School Management Board implementation of software systems that meets the requirement specification (Naveen,1992). The board under ministry of education set up by the government of Bayelsa State to monitor, supervise, manage and control all state government owned secondary schools in the state (Diksha, 2018). It is made up of different members which involves executive chairman, the office of the permanent secretary, board of directors representing each zone and Head of Departments The board has a headquarters that seats the chairman as the chief executive, Head of departments and office of the permanent secretary. The headquarter administration is made up of nine (9) Departments which are been headed by each member of HOD and each department has its own work to do as regards to students, teachers and staff of the board as well, they see the effective management of school under it. There are eight zones (8) under the board which are the eight-local government of Bayelsa state each of the educational zones are headed by a board of director, and then principal of each school that sees to the day to day running of his school.

The manual method adopted in educational administration in monitoring some school activities undermine other roles like enrolment of students, computation of student's result, examination supervision and making of examination scripts, with regard to the differences created by the manual techniques of school administration, the school management board should set aims and objective for the development of a computerized educational administrative information system

Educational administrator and various views on definition of educational administration, furthermore comparing other existing system modes of educational administration, objective of an educational administrator, overview and analysis of the existing system (Bayelsa State Post-Primary schools board) and what the proposed system can do to the challenges encountered with an existing system (Brookshear, 2013).

The term 'administrator' has been derived from the Latin word 'minister' which means 'service rendered to others for their ware fare'. It takes charge of people work by coordinating and directing them on what's necessary in other to achieve a purpose.

Educational administration is the achievement of a purpose or goal through planning, directing and evaluation of activities performed in schools (Okeke, 1979). Educational administration is also known as educational organization. In this case, the case study come in; Bayelsa State Post-Primary school management board which is an educational organization that plan, direct and control all activities performed in a school ranging from student registration details, students' internal results, teachers nominal roll, staff recruitment etc.

According to Okeke in her view about educational administration as involving the provision and maintenance of the necessary manpower (personnel) and plant (facilities) in order to render useful services to those who teach the students with a view to bring about desired change in behavior (Okeke, 1985). In other word, it is the procurement and maintenance of

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men and materials and channeling them to act effectively in order that learning takes place on the part of the learners.

Eresimadu and Nduka (1987) viewed educational administration as specifically implying the careful arrangement of the resources and programs available for education so that when mobilized they should operate as a unity for the achievement of educational objectives (Michael, 2006).

Okeke (1985) in his point of view pointed out that the educational administration is all about putting more emphasis on bringing men and materials together for effective and functional teaching and learning in schools. This means that educational administration strives to achieve the overall educational objectives of the society by the best possible means. It concerns itself with the management of human and material resources in an organization in order to ensure minimum input with the possible maximum output or productivity in the realm of education (Luther and Lyndall, 1937). Educational administration undertaken by BPPMB and other existing systems are done manually school activities such as student's enrollment, offline recruitment of staff, student's results computation etc. Computerization of educational administration for post-primary school's board is still on a low-level considering Nigeria at large (Shelly *et al*.,2007).

Overview of Existing System

On the course of research, it was discovered that student's enrollment was done manually and a number of enrollee keeps increasing and the accurate record of all the students in school is never certain and in most cases some files where the names are been stored are torn or forgotten that may lead to students having unknown identity and to the administrators much work load of writing each student name in its particular file respectively and in all together is a waste of materials, time and other resources (Eya, 2001).

Other problems which needs this study includes: the problem of stress faced by teachers due to manual record of all student's data in each particular file, the problem of limited supervision as some schools are inside villages and some across river, there is chance for loss of record of students due to mishandling, there is possibility for error while updating staff and students' information by the board administrator due to complexity of the record details, the problem of students being reluctant to study their books as attributed to non-standard supervision of class test and examination, the problem of teachers not teaching during their period since few numbers of supervisors are sent and not on daily basis, the problem of student not having a sound academic performance due to the over admission of students in one class (Academia, 2019).

The Existing system based its educational administration on manual system such as student's enrollment, result compilation, recruitment of staff, school supervision which are cumbersome workload to teachers, to be able to solve this issue prompted a proposed system.

Research Methodology

The methodology highlights the steps, tools, techniques that were adopted to tackle major challenges on the existing system. It represents the methods of research used in the study, requirements analysis, design phase, coding, testing and maintenance. The development of the System was based on one of system development life cycle below known as water fall methodology. It involved requirement determination, requirement analysis, system design, implementation, testing and validation. This approach below describes the sequence of steps involved (Brameld, 1965).

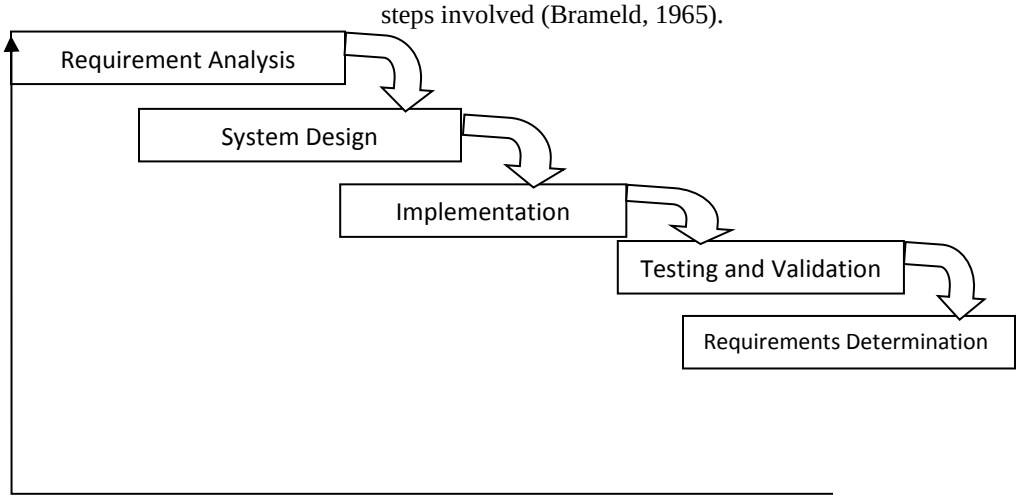

Fig 1.0: System Development Life Cycle

System Study and Analysis: Data collection was done by Interview method and reference to already written text. During the interview conducted in the post-primary school management board Bayelsa State to determine the requirements. The researcher interviewed the director of school supervisor on the nature of duty conducted in schools she had supervised with special reference to the examination coordination and supervision, enrolment ratio for the admission of students in school. The director of administration department was equally interrogated based on the obligation

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and dereliction of the management board towards the growth of education observed in schools with little assistance from some of the staff. The response to the questions

System Design

The system is designed to promote the activity of Board and its mandate. The output design process was divided into logical, conceptual and physical design.

Logical design

The logical design was developed to indicate the vital procedure that the system went through. In this, the researcher used case tools like flow charts and data flow diagrams. These models were vital in the development of the system. This stage included the input design in which the user inputs in data, the output design which displays the results of what a user will have entered, and database design where data is stored for easy management. These designs provided the technical blueprint from which the system was built. A combination of layout tools such as hand sketches and CASE tools were used to come up with both input and output designs. Database design was based on the Relational data model and the database management system employed was MySQL.

Entity Relationship Symbol Diagram Description

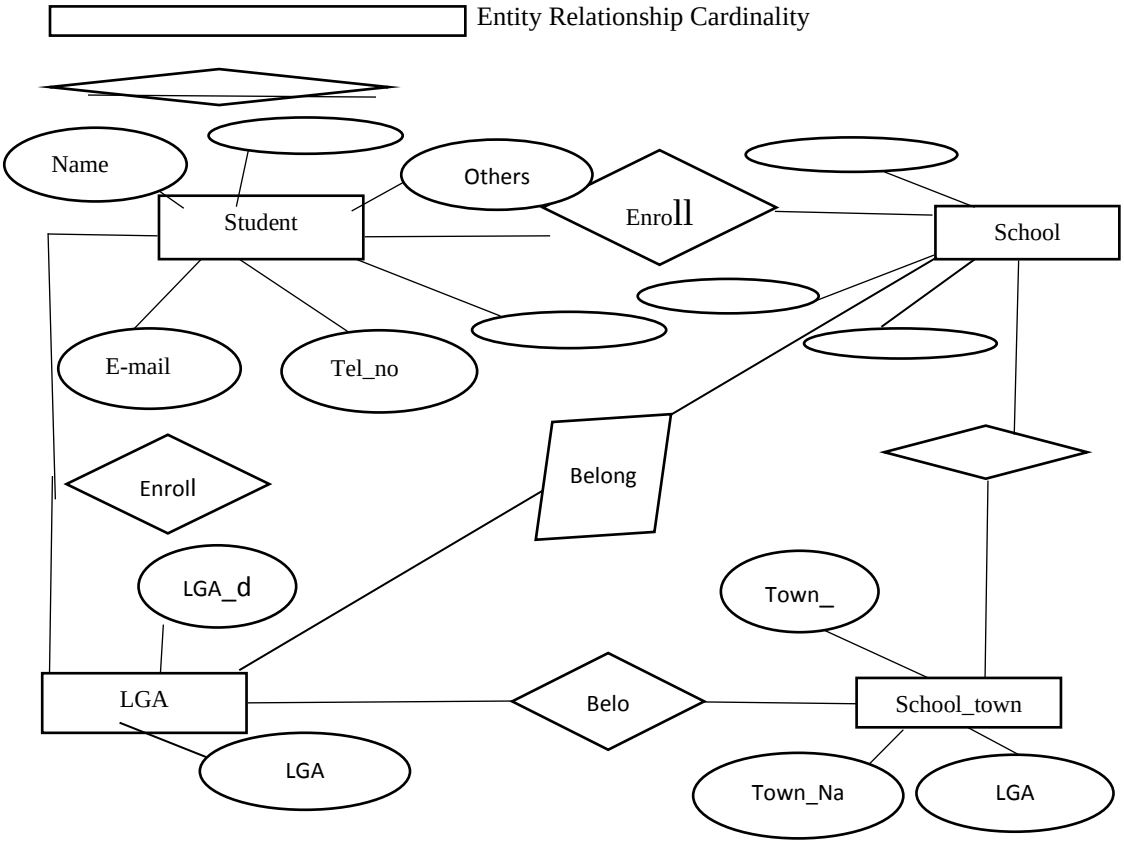

Fig 2: Entity relationship diagram for student Online Enrolment System

Conceptual Design

This was a description of the proposed system in terms of a set of integrated ideas and concepts about what it should do, behave, and look like, that will be understandable by the users in the manner intended. The process begun with identifying the entities required for the proposed system and then identifying all the important relationships that exist between the entities.

Physical Design

This was the visual representation of logical design using tables, forms which were created and relationships defined among these tables and security constrains set. During the physical design the researcher translated the expected schemas into actual database structures and at this time.

System Implementation

This involved putting together or building various elements of a system for example MYSQl for database Xamp Server, a local-host server that allows to run the designed software system to check errors before hosting it into World Wide Web. This stage involves the writing of programs, creation of data files, and development of database. This is the stage in which the actual system was recognized. The technical architecture defined in the design stage was the baseline for developing the

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system. The user interface was designed using HTML and Java script languages. This is because these languages provided tremendous friendly user interfaces; that is easy to learn and affordable. The database was designed in MYSQL basing on Xamp Server software. MYSQL provides a high level of security to the database, that is, authentication which can either be during the logging in to the database, it also reduces redundancy.

System Testing

This involved testing the system in order to correct errors or remove any defects. This stage involved testing the source code to make sure that it produced the expected and desired results when subjected to a set of predefined conditions three kind of testing was done, that is, unit testing, system testing and user acceptance testing.

Under unit testing, specific parts of the source code were tested. Emphasis was put on the website-database connections to ensure that information sent by a user from the web page form reaches the systems database.

System testing involved putting the entire software to test in order to find out whether or not the functional requirements of the system had been efficiently and effectively integrated and satisfied

Finally, User acceptance testing was done; this was a key factor for the success of the system performance. The system under consideration was tested for user acceptance by constantly keeping in touch with the system users that is, the airline customers and staff.

Database structure

The system was used by students to enroll into the school of their choice, it all requires them selecting their school of preference, school town and the local government from the form without leaving any field unfilled, it also add additional function to staff by allowing them do their recruitment online. Following are database that was created;

Student registration: It stores student's data, all the information retrieved from the student are stored inside the database, under the student registration, another database was created; school of preference, school town and local government where each of the school is located, the data has already been stored in a database and only requires student to select any of their preference.

Staff database: It stores information retrieved from staff that apply for recruitment into the board.

Message database: Stores students and other client's feedback.

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	STUDENT_ID	int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	NAME	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
3	GUARDIAN_NAME	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
4	GENDER	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
5	DOB	date			No	None			Change Drop More
6	ACADEMIC_CLASS	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
7	HEALTH_CONDITION	varchar(11)	latin1_swedish_ci		No	None			Change Drop More
8	EMAIL	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
9	ADDRESS	text	latin1_swedish_ci		No	None			Change Drop More
10	STATE_ORIGIN	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
11	SCHOOL_NAME	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
12	PINCODE	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
13	TOWN	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
14	SCHOOL_LGA	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
15	CONTACT_1	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
16	CONTACT_2	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
17	TRANSFER	text	latin1_swedish_ci		No	None			Change Drop More
18	TRANSFER_GROUP	text	latin1_swedish_ci		No	None			Change Drop More
19	NEW_STUDENT	varchar(150)	latin1_swedish_ci		No	None			Change Drop More

Fig 3 : Database structure for student enrollment

#	Name	Type	Collation	Attributes	Null	Default	Comments	Extra	Action
1	ID	int(11)			No	None		AUTO_INCREMENT	Change Drop More
2	NAME	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
3	GENDER	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
4	SUBJECT_INTEREST	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
5	GRADUATION_YEAR	int(11)			No	None			Change Drop More
6	BANK_DETAILS	text	latin1_swedish_ci		No	None			Change Drop More
7	STATE_ORIGIN	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
8	PIN	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
9	QUALIFICATION	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
10	BIRTH_DATE	date			No	None			Change Drop More
11	NATIONALITY	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
12	CADDRESS	text	latin1_swedish_ci		No	None			Change Drop More
13	EMAIL	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
14	CON1	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
15	CON2	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
16	HEALTH_STATUS	text	latin1_swedish_ci		No	None			Change Drop More
17	PIC	varchar(150)	latin1_swedish_ci		No	None			Change Drop More
18	STATUS	int(11)			No	None			Change Drop More
19	CDATE	date			No	None			Change Drop More

Fig 4. Database structure for staff Recruitment

Web Development

Front End Design

Front-end design runs in the user's browser and create the user interface is also known as client-side (Presentation of Information) development is the practice of producing HTML, CSS and JavaScript for a website or Web application so that a user can see and interact with them directly.

The objective of designing a site is to ensure that when the user open up the site, they see the information in a format that is easy to read and relevant

A front-end developer architects develop websites and application using web technologies like HTML, CSS, bootstrap and JavaScript which runs on web platform known as web browser.

A web browser is a software used to retrieve, present, and transverse information on www.

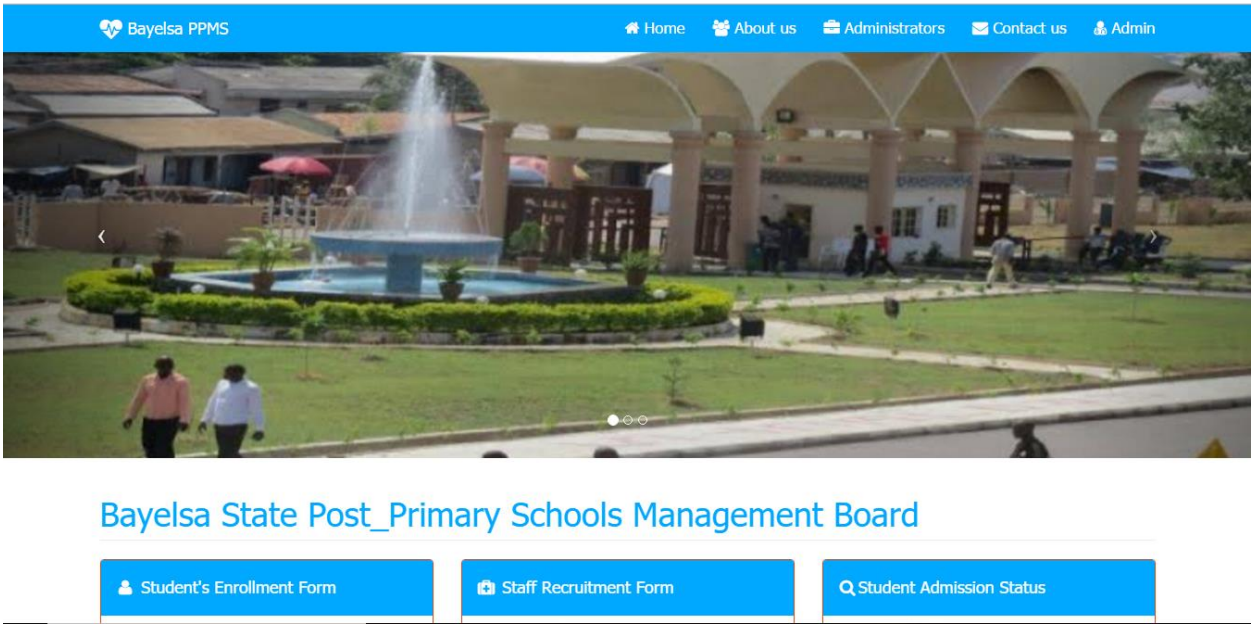

Fig 5. Screenshot of Front-end Design

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Backend Design

Back-end or server-side (storage and Processing of Information) design is a code that runs on the server that receives request from clients and contains the logic to send the appropriate data back to the client, backend also include database, which will persistently store all of the data for the application. Backend comprises of server; a system that listens to incoming requests, the Application which runs on the server listens for requests, retrieves information form database and sends a response, and a database which are used to organize and store data. The tools used to design backend are PHP which is a programming language to add restrictions to the web page, MYSQL, a database to store client's data and Xamp a local server to test the system designed.

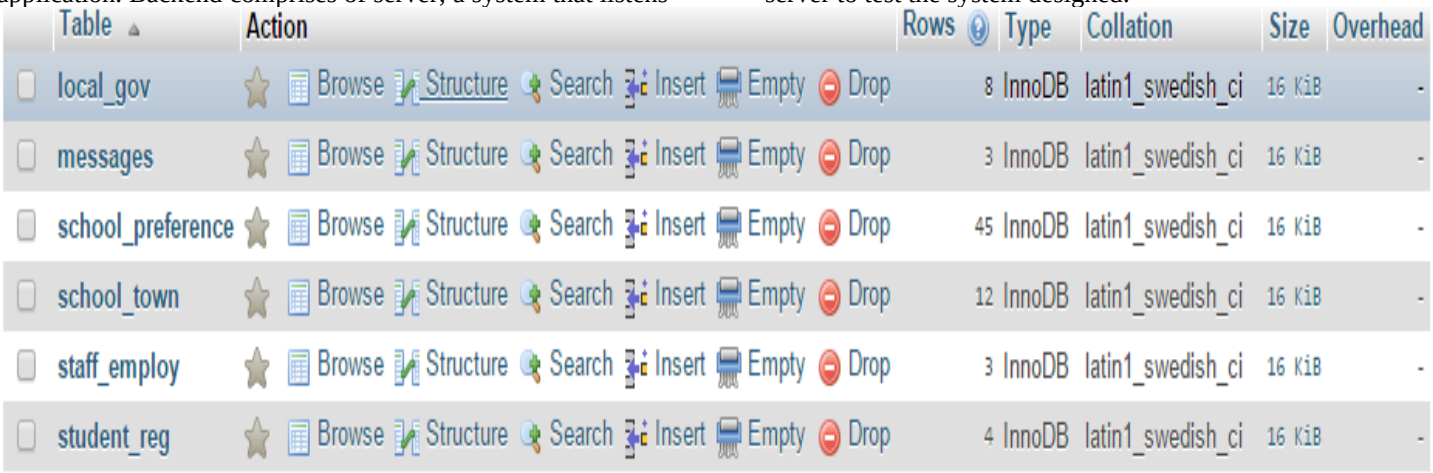

Fig 6: Screen shot of MYSQL Environment

Justification for The New System

With the computerization of these processes a lot of problem weren't in the current system will either be overcome or minimized. Below are some other justified reasons (scribd.com 2017).

Time: - The speed of a computer's central processing unit measured in millions of instructions per second (MIPS). This implies that information for management as regard to educational administration can be produced faster and this enhances the decision-making process at the various level of administration. It reduced the time used during fraction calculation.

Overload: -In terms of overload, it saves the staff from the hard labor. Huge data or record can be shifted through and summarized in short period of time.

Storage Device: - Files and records can be stored in magnetic tapes or disks. It is from this storage of files and records that the security is enhance and save some file when there is a fire disaster.

Versatile: It is versatile because it can cope more readily than manual system with increased work-loads which occurs when results are being worked out immediately after examination as long as input can be made available and the output is dealt with. It is therefore said to be flexible.

Reliable and Diligent: Computer is reliable and diligent because it will not absent itself from duty due to illness and will not arrive late or spend lengthy lunch-hours over a bottle of wine. Once a program is running, operation is automatic and no further human intervention is necessary and execution is accurate.

Computerization create avenue for random enquires to be easily performed on stored data. It de-personalizes some processes and services.

Computerization would equally give the staffs and the school administrators the joy and satisfaction of being a part of the computer age and technology.

Implementation

The designed system (online enrollment system) for Bayelsa State Post-Primary school's student is implemented in line with the analysis and methodology explained already. Steps that must be observe in the implementation of a proposed system are describe in the chapter below;

System Implementation Requirement

For the system to function properly four forms of requirements are need they include hardware, software, people ware (personnel) and environmental requirements are essential.

System Users

Designed system comprises of two personnel; the administrator, who have access to the backend design and have the responsibility of updating system content and the clients which include students, teachers, staff etc. accesses the system from user point of view.

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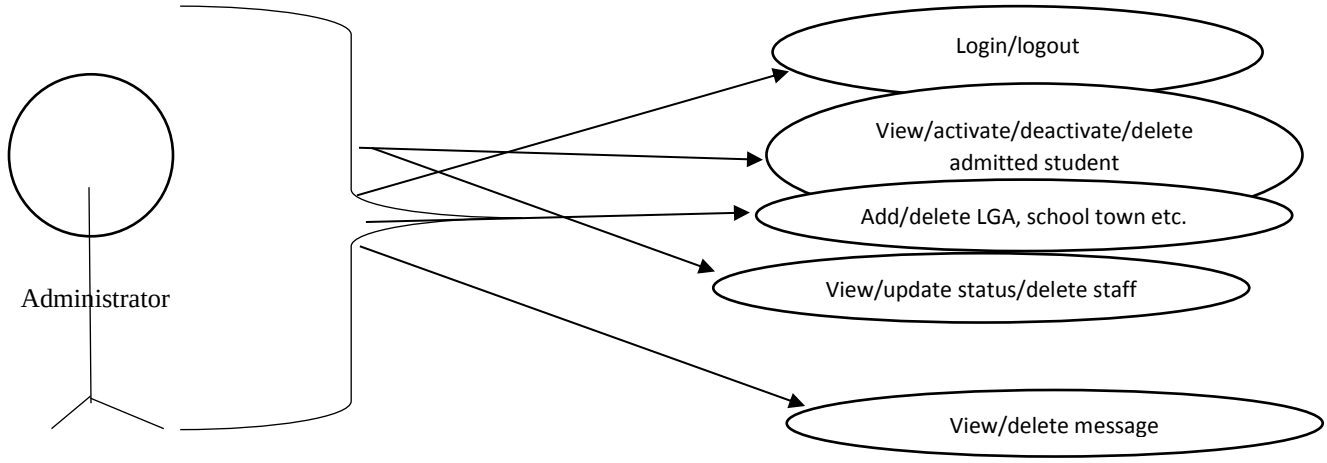

Fig 7: Admin use case diagram

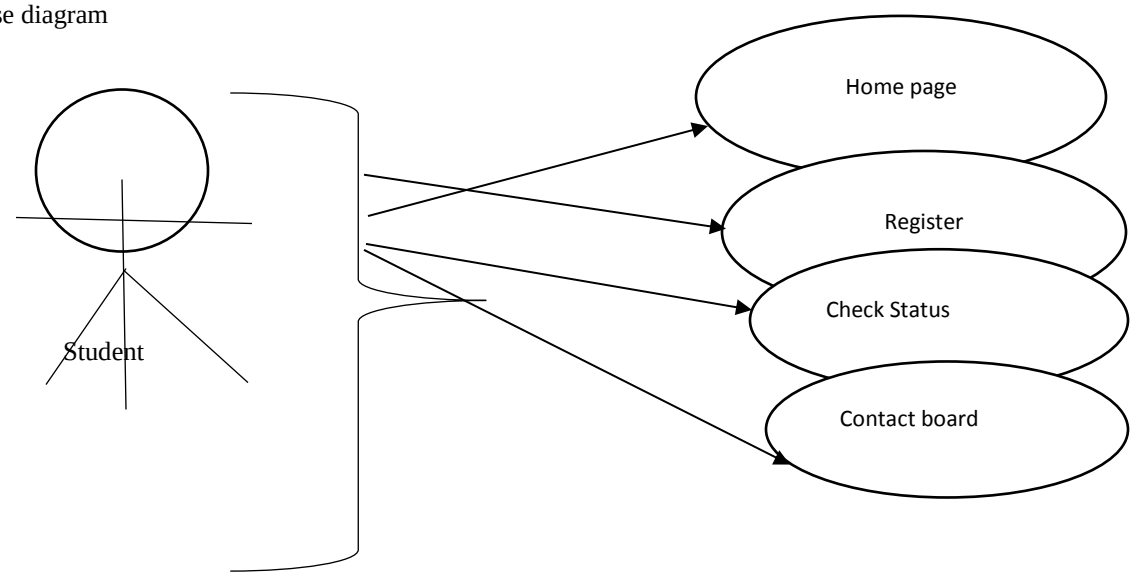

Fig 8: Student use case diagram

Execution sequence of the new system: This is divided into two, User's environment and Administrator environment.

User Environment
This appears when the URL of Bayelsa State PPMB is typed in any browser. While on this page customers can choose to view information about the board (Roger, 1994), enroll to any school of preference or send feedback only about educational matters. However, for a student to be considered a student of any school, he/she must register.

Registration Form
This form is used by students to register, after that visit the website to check their status if they have admitted or not, the student clicks below the home page, on the same place, the link to check if he/she status to determine if he/she is admitted or not using the pin code he entered in his form. All the field are mandatory, which means the student must fill them all.

Admission Status: This link assist student to check if the board through a system analyst have admitted them, admitted, is below the home page menu.

Contact Interface
Contact Interface provide information such as address of the board, and a space for complaint from students, teachers, staff and other persons with clear description of who is writing to the board

Administrator Environment

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This is restricted environment; it is used by the administrator to change system content it's accessed by clicking on administrator link on the system menu. Access to this environment requires an admin username and password. Once the correct admin password is entered the person will have access to view/ modify/delete and all control of the system.

Admin Password Interface

This is an interface that separate the front-end from the back-end, from here the admin can login to his platform and make some manipulate to the frontend.

Administrators Home Interface

This is the administrator's home interface; it's accessed when a correct admin password is entered in the interface above. Once on this interface the administrator can view clients' data and attend to each according to the request, also responsible to add changes to system content.

Admitted Student Interface

The interface is accessed by clicking on the admitted student link to view student that have send their request, from there the admin can activate the person which mean he has been enrolled or deactivate in other words not admitted.

Conclusion

The department of administration was established to look strictly into the school activities in the process of admission to eradicate the misfortune of natural disaster or mishandling of record of student in the particular post-primary school/secondary school.

In conduction therefore, if the Post-Primary School Management Board (PPSMB) deems it necessary to ensure the promotion of computerized Educational Administrative Information System in the post-primary school especially in the monitoring of the school programmes and recording of information about a student. There should be no double mind that the school administrators in the secondary schools would have problem concerning school record and this should be done effectively and efficiently.

Recommendation

Designing a database driven website for an educational administration in the aspect of school activities entails more of data collection than traditional programming. Nevertheless, the outcomes and benefits of a well-planned website cannot be over emphasized. Although many factors contribute to an effective website, yet there are so many that one could not but think of them all. The internet with all its functionality has indeed changed the way people live and interact politically, socially, economically and otherwise. Thus, BPPMB should utilize this technological development in coordinating school activities. Also, the new system would assist the school administrators in discharging their roles in the educational environments. Similarly, the system will relieve staffs of much of their tedious and time-consuming work and there would be efficiency in each day's school actuaries and report generations would be very fast and speedy for operations especially post- primary schools.

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