

Design and Implementation of a Web Based System for Orphanage Management

Daodu S. S¹, Agu S. C² and Amadin F³.

¹Computer Science Department, University of Benin, Benin City, Nigeria.

²Computer Science Department, Madonna University, Elele, Nigeria.

³Computer Science Department, University of Benin, Benin City, Nigeria.

Abstract

Majority of Orphanages and State Governments in Nigeria have been using paper logs and manual entries for tracking orphanage records. These methods make it difficult to efficiently manage orphan data and to inform decisions at different levels. This study is in two folds. We analyzed and examined the public perception of having a web based information system for orphanage management and also designed and implemented a web based system for management of orphanages. The system we developed keeps track of orphanages, the orphans, the helps received by the orphanages and members of the public who rendered these helps. The study also explored the role of orphanages and government towards orphan care in Edo State of Nigeria, identified the problems in the orphanages and suggested ICT measures that would improve the role of orphanages in orphan care.

Keywords: System, Web Based System, Orphanages, Orphanages Management, Design and Implementation

1.0 Introduction

A system is a group of components, consisting of subsystems procedures that work in a coordinated fashion to achieve some objectives [1]. Web development is a broad term for the work involved in developing a web site for the internet (world wide web) or an intranet (a private network) [2]. Community associations (CAs) are seen as a kind of self-help organization that has the development of the people at heart [3]. Following William's [3] definition, an orphanage can be seen as a community that has the welfare and development of the orphaned children at heart. The challenges of Orphanages as well as CAs have been to create awareness in citizens that will encourage them to take responsibility for their individual and collective destiny [4]. The main contribution for the development of communities and orphanages is not the participation of the beneficiaries, although this is important, but rather it is the creation of local institutions that can ensure the contribution of that development process [3,5].

The ultimate goal of a sense of belonging of orphans has been achieved in the western countries and America where orphans and poorly developed abandoned children are a complete responsibility of the Government [6]. In the third World Countries, it is a glaring fact that government alone cannot provide virtually all that is needed for an effective community development and orphan care [3]. Following this fact, orphanages tend to make their own contributions to this effect by sheltering and feeding the orphans although this is important but sheltering and feeding of the orphans are not the only things that are expected of orphanages.

The problem is that majority of Orphanages and some Nigerian State Government has been using paper logs and manual entries for tracking orphanage records. These methods make it difficult to efficiently manage orphan data and monitor orphanages by the government which has lead to inadequate care and abuses of the orphans such as sales of babies, child labour, poor education, hunger, denial of some social amenities', psychological and emotional stress. Hence, the development of orphanages and the orphans should no longer be focused on the growth of basic services (shelter and feeding), but rather on distribution channels via which self-service platforms are extended to the government agencies, donors, benefactors and other relevant stakeholder for effective monitoring and overall developmental process of the orphans.

Corresponding author: Daodu, S. S, E-mail: sege.daodu@gmail.com, Tel.: +2348130762937 & 08055271312(A.F.)

The aim of this study is to design and implement a web base information system for orphanage management. In order to achieve this, specific objectives were considered:(1)To analyse and identify the specific challenges faced by orphanages in their efforts in orphan care. (2) To analyse and examine the role of ICT in orphan care in Nigeria. (3) To design and develop a web based system that would maintain records of orphanages.(4) To suggest ICT measures of improving the role of orphanages in orphan care.

2.0 Research Questions

- (1) What specific activities do the orphanages undertake or consider towards orphan care?
- (2) What opinions do people generally have about orphanages?
- (3) What are the public perceptions of having Internet based orphanage information system to help in monitoring the activities of orphanages ?
- (4) What are some government interventions, acts and laws to some child-abuse scandals in the orphanages.
- (5) Are there government monitoring teams and how regular do they supervise the activities of these orphanages?
- (6) Has there being some remarkable improvement or benefits as a result of government interventions?
- (7) Has government tried bringing in other alternative orphan care to substitute traditional orphanages as a result of government interventions and investigations?
- (8) What are the suggestions on what should be done to orphanages engaged in sales of babies, child labour and other abuses?
- (9) What are the suggestions on what should be done to orphanages engaged in defrauding people and the government?

3.0 Research Methodology and Data Analysis

4.0 The Research Design

A research design is a plan or blue print, which specifies how data relating to a given problem should be collected and analyzed; it provides the procedural outline for the conduct of any given investigation [3]. This study being quantitative and qualitative employs the cross sectional survey research design. This method of research technique covers a broad area of questionnaires, interviews and observation, which implies using a selected sample from a fraction of the total population to analyze a large population.

5.0 Area of the Study

This study was carried out in Benin City, the capital of Edo State in the South South Region of the Federal Republic of Nigeria. The study population was made up of the people selected by simple random sampling that include; staff of Edo State Ministry of Women Affair and Social Development, Ministry of Information, Ministry of Youths and Sports, Central Hospital, Owners of three private orphanages, Edo State Orphanage and Students of Social Works, University of Benin, all in Edo state.

6.0 Discussion and Results

The data from the field presented useful insights on how the role of ICT could improve the management of orphanages in Nigeria. The questionnaire is made up of 25 questions. They were distributed to 150 respondents and 100 were returned. It was divided into three main sections. Section A, dealt with the specific activities of orphanages towards orphan care. Section B dealt with People opinion about orphanages, while section C was focused on the public perceptions of having Internet based orphanage information system. The interview guide was used for the qualitative data to collect information from key informants.

The following are some of the major results as recorded from the study: The study revealed that the public had some negative perception of the role of orphanages and government towards orphan care. It was established from the study that the public are of the view that there should be a web based system for management of orphanages by keeping records (including death reports) of orphans, thus provide updated statistics of the approved orphanages and orphans. Moreover, the relevant stakeholders should routinely work with the information system in order to monitor the number of admitted orphans into the homes, how children are being given out for adoption, the number of adopted orphans, follow-up monitoring on adopting parents assigned to the orphans .

7.0 Design and Implementation of the Web Based System

Following the quantitative and qualitative analysis from respondents written opinions in section 2.0, the study designed and implemented a Web Base System. The remaining part of the research focuses on the analysis, design and implementation of the Web Based System for Orphanage Management using the case study of the four orphanages visited during the research.

8.0 Analysis of the Web Based System

The system analysis phase of the System Development Life Cycle (SDLC) involves modeling how the current system works from a logical (not physical) point of view, identifying its weaknesses and the opportunities to improve, creating a logical model of the new system[7]. During this phase a variety of modeling techniques can be employed. The three modeling techniques used in the system analysis of this research are the Entity-Relationship Diagram (ERD), Data Flow Diagram (DFD) and the Unified Modeling Language (UML).

Entity-Relationship Data Model identifies the broad outlines of the corporate data model [8]. The outline is in terms of entities, that is, things about which data must be recorded and the relationships between them. The Entities of this Web Based System for Orphanage Management are Members (Benefactors, Sponsors and Charity), Orphanages, Orphans (i.e. Children) and Helps. We have such relationships between entities as Member can give One or Many Helps.

Data Flow Diagram modeling involves graphical representation of the processes or actions that capture, manipulate, store, and distribute data between system and its environment and among components within a system [9]. Figure 1 shows the DFD of the Web Based System for Orphanage Management.

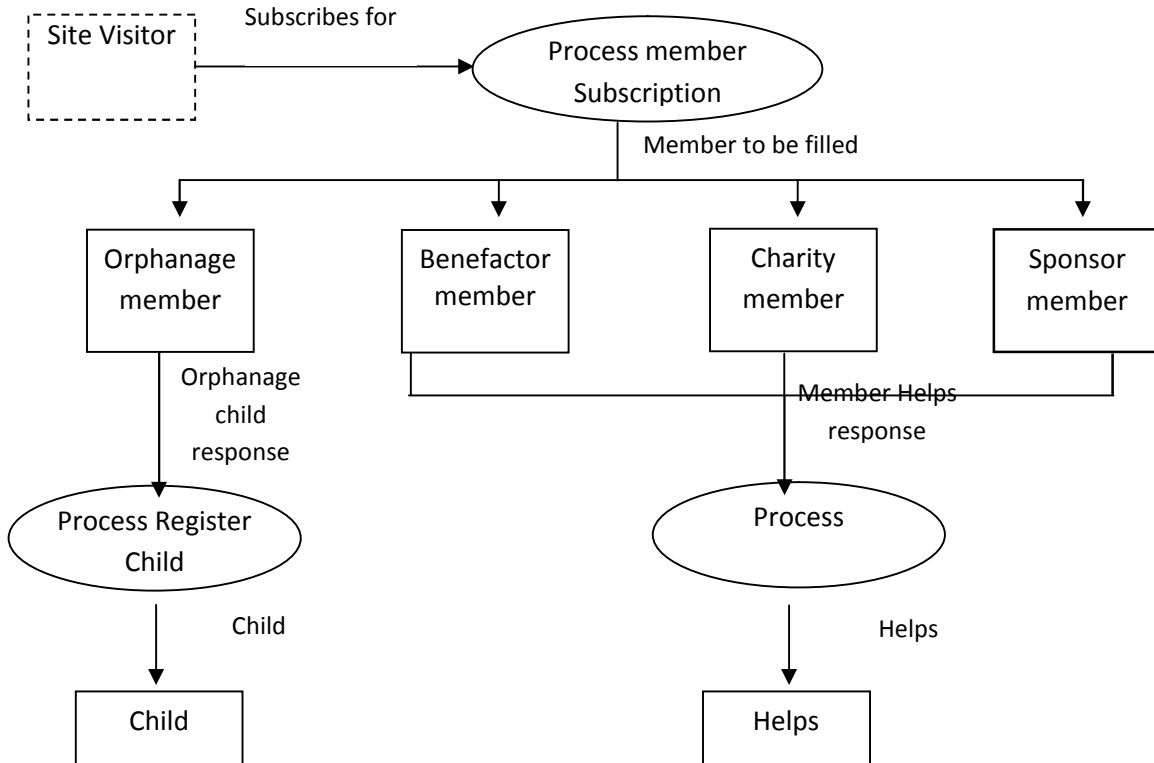


Figure 1: Data Flow Diagram of the Web Based System

Unified Modeling Language (UML) is an object oriented technique that offers different groups of diagrams to model a system [10]. The various UML diagrams used in the analysis of this Web Based System are Use-case diagram, Class diagram and Sequence diagram. A Use-case is a related sequence of system’s activities for completing a single business task. An actor represents anything that needs to interact with the system to exchange information. An actor can be a user, a role or time which could be from an external system. An actor initiates systems activity (i.e., a Use-case). Table 1 shows the Use-cases of the Web Based System.

Table 1 Listing of Actors and Use-cases of the Web Based System for Orphanage Management

Actor	Use-case	Use-case Description
Site Visitor	SUBMITS NEW SUBSCRIPTION	Site visitor joins the system by subscribing.
Member (Benefactor, Charity and Sponsor)	GIVES HELPS	A member gives helps to the orphanage. (Helps can be Food or other gift items, Training a child in a formal education or other vocational studies. Sponsoring a project, Giving cash donation and so on)
Member (Benefactor, Charity, Sponsor)	ADOPTS CHILD	A member adopts a child or children from an orphanage.
Orphanage Member	RECEIVES HELP	Orphanage member receives help from a benefactor, charity or sponsor member
Orphanage Member	REGISTERS CHILD	Orphanage enrolls a child as a member of the orphanage.
Time	GENERATE DAILY HELP REPORT	The System generates daily Help report analysis.
Time	GENERATE DAILY MEMBER REPORT	The System generates daily Member report analysis.
Time	GENERATE DAILY ORPHANAGE REPORT	The System generates daily Orphanage report analysis.
Time	GENERATE DAILY CHILD REPORT	The System generates daily Child report analysis.
Time	GENERATE DAILY STATISTICAL REPORT	The System generates daily Statistical report analysis.

Requirement Use-case is used to document only general information about each system’s event (i.e., Use-case) in order to define and validate requirements, which include the Typical Courses and its Alternate Courses. Each Use-case will be continually refined to include more and more details. Table 2 shows Give Helps Requirement Use-case.

Table 2 Give Helps Requirement Use-case of the Web Based System

Use-case Name:	Give Helps	
Actor(s):	Member (Benefactor, Charity or Sponsor)	
Description:	This Use Case describes the process of a member giving helps to an orphanage. On completion, the member will receive an acknowledgment message.	
References:	NOIS – 1.0	
Typical Course of Events	Actor Action Step 1: This Use Case is initiated when a member gives Helps to an orphanage Step 5: This Use Case concludes when the member sees the acknowledgment message.	System Response Step2: The orphanage receives the Helps and enters the record into the System. Step3: Generates daily Helps report on the System.
Alternate Course	Step 2: None for now.	
Pre-Condition	Helps of only the members will be acknowledged.	
Post-Condition	None for now	
Assumption	None for now.	

A Class is a set of objects that share the same attributes and behavior. A class is represented using a rectangle. The rectangle is divided into three portions. The top portion contains the name of the class. The middle portion contains the name of the common attributes of interest. The lower portion contains the common behaviour (or methods). Figure 2 presents a Class Diagram of the Web Based System. It shows that the system has four classes – Orphanage, Member, Child and Helps. The connecting lines represent associations between the classes. The verb phrase describes the association. For example, Orphanage registers Child. All associations are implicitly bidirectional, meaning they can be interpreted in both directions. The class diagram also shows the complexity or degree of each association. For example one instance of an orphanage class must exist for one or many instances of the Child class. Each of the classes contains sets of attributes and methods.

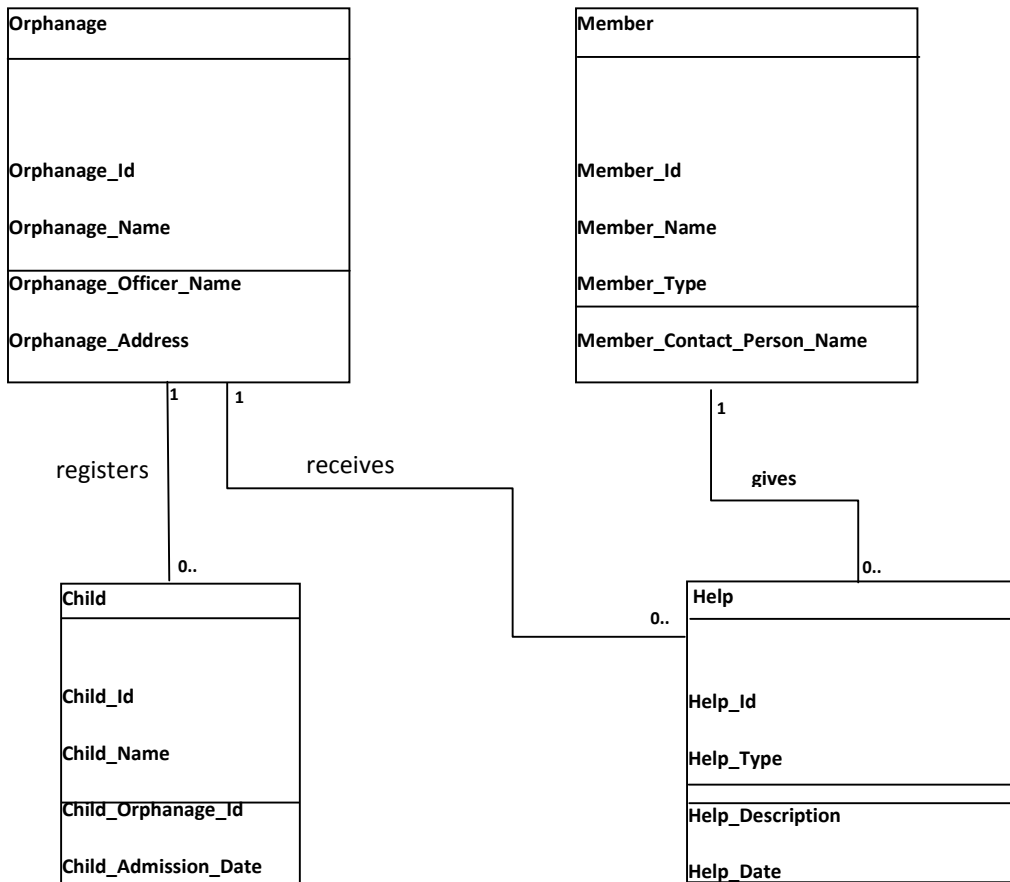


Figure 2: Class Diagram of the Web Based System

Sequence diagram indicates how Events cause transitions from object to object as a function of time [11]. In essence, the sequence diagram is a shorthand version of the Use-case. Figure 3 shows a sequence diagram for the Help Processing of the Web Based System. The event, Start Help Process, is derived from the external environment and channels behavior to a **Help Processing** object. The Help processing object passes Request Member ID event to **System** object which enters the Member ID by a User. The Help Processing object validates Member ID in a database and returns result (found or not found) to the **System**. A valid Member results in Is Member event which creates **Member Help** record in the database. An invalid Member results in Display error message event.

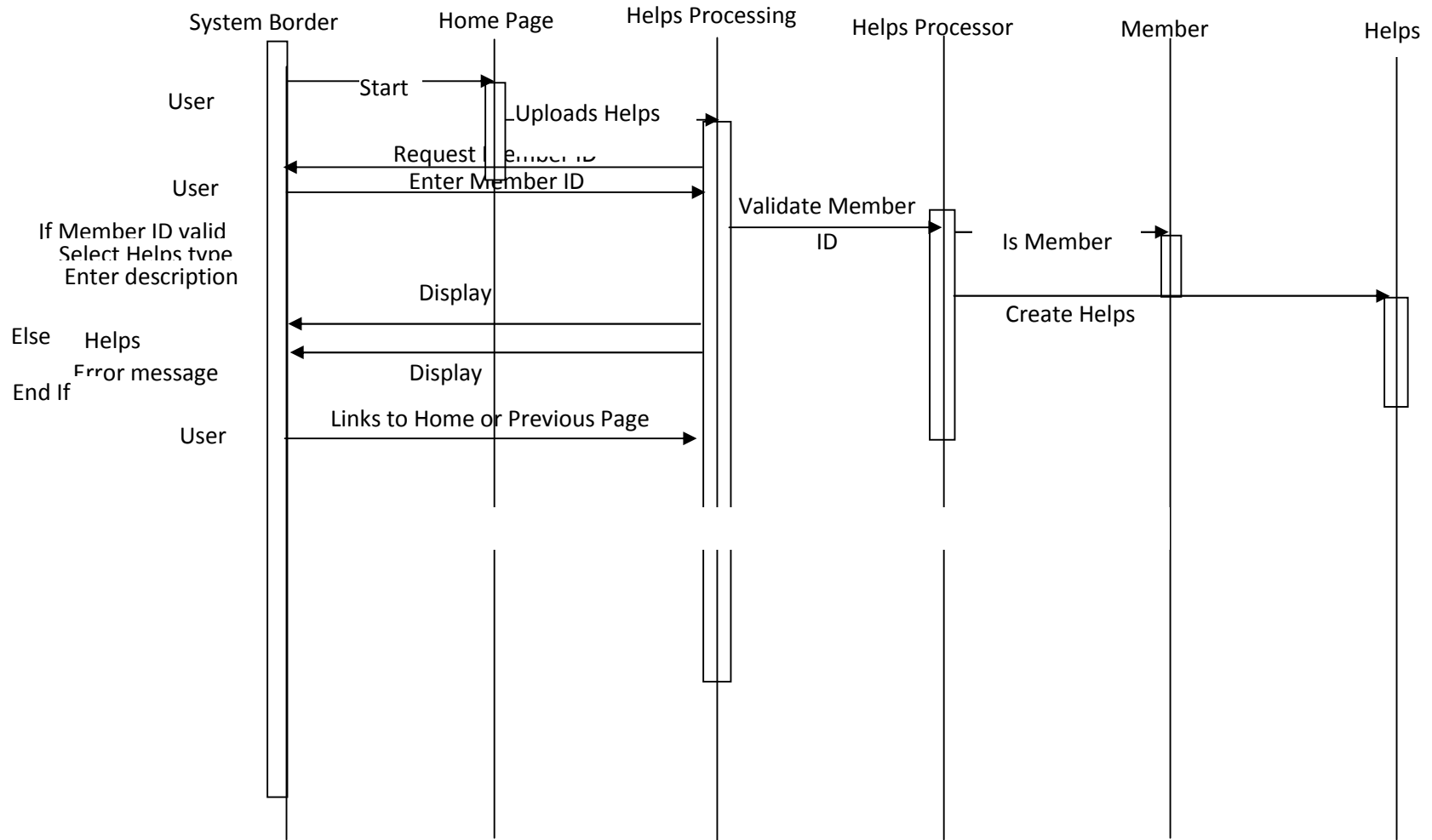


Figure 3: Sequence Diagram for Helps Processing of the Web Based System

9.0 Design and Implementation of the Web Based System

System design requires screen and report forms, terminal dialog, database or file design [12]. Database schema is the transformation of the data requirement (of the system analysis) into a set of data structures to be implemented using a chosen DBMS. These data structures constitute the computer database (tables, forms and reports) that will be made available to the information system. The choice of the Database Management System, (DBMS) must be considered as it has great impact on the performance of the new system. The DBMS used in the design and implementation of the web based system is My SQL. The Table designs of the Web Based System for the Orphanage Management are as follows: The Orphanage Table is used for maintaining records of orphanages. The Child Table is used for maintaining records of orphans in the orphanages. The Member Table is used for maintaining records of members of the public who render Helps to orphanages. The Helps table is used for maintaining records of Helps rendered to orphanages. Table 3 shows the structure of Child table of the Web Based System.

Table 3: Structure of Child Table

Field	Type	Attributes	Null	Default	Extra
child_id	int(10)	UNSIGNED	No	None	AUTO_INCREMENT
child_name	varchar(255)		No	None	
child_admission_date	Date		No	None	
child_birth_date	Date		No	None	
child_sex	varchar(1)		No	None	
child_adopted	varchar(1)		Yes	NULL	
child_orphanage_id	int(10)	UNSIGNED	No	None	

The Input Forms we designed for the Web Based System are: Membership Registration Form, Orphanage Registration Form, Child Registration Form and Help Entry Form. Figure 4 shows the Input design form for registration of new Orphanages to the Web Based System.

The Output Reports we designed for the Web Based System are: Membership Output list, Orphanages Output list, Child Output list and Helps Output list. Figure 5 shows the columns headings of Output design for listing of orphanages in the Web Based System.

System Implementation involves some close coordination to make the system not just workable but successful [13]. Implementation of a successful information system requires a set of activities: programming, testing, documenting, installing, converting and training.

The figure shows a registration form titled "Orphanage Registration Form". It contains the following elements:

- Name:** A text input field.
- Upload image:** A "Choose File" button next to the text "No file Chosen", and two empty text input fields below it.
- Name of officer in charge:** Two empty text input fields.
- Submit:** A button at the bottom center.

Figure 4: Orphanage Registration Form Design

Click on any image to see its full size

Image	Name	Address	Phone Number	Email Address
-------	------	---------	--------------	---------------

Figure 5: Orphanage Output List Design

10.0 Development and Deployment of the Web Based System

The Web Based System was developed using HTML to respond to the system’s interface. Hypertext pre-Processor (PHP) and Apache web server were used for the application layer, MySQL database was used for the data layer. The Cascading Style Sheet (CSS) was used to bring uniformity in the formatting of the system’s interface. The HTML was used because of its ability to integrate scripts from different scripting languages [14]. The choice of PHP, Apache, and MySQL is because they are open source and codes for creating tables, searching for entries in tables is easily executed in any platform and the codes are efficient - taking less time in processing and occupying less memory space in returning information found in database. Also, Apache server has MySQL server which is the database management system selected [15].

In developing the application, first we installed Apache Web Server/2.2.17 which came with MySQL Server 5.5.8, Dreamweaver editor for coding HTML, CSS and PHP in the local computer. Second we deploy the system on the local host via Transmission Control Protocol/ Internet Protocol (TCP/IP). Simply type localhost/norissite/index.html on the address bar of any web browser to execute the Orphanage Information system (i.e., the Web Based System).

Figure 6 depicts a live deployment of the Web Based System using Google Chrome web browser on Intel Pentium (R) Dual Core T2390 processor 1.87Ghz speed and memory capacity of 2.00GB with Windows 7 Ultimate 32-bits operating system. It shows the screen shots representing the Home Page of the Nigerian Orphanage Information System

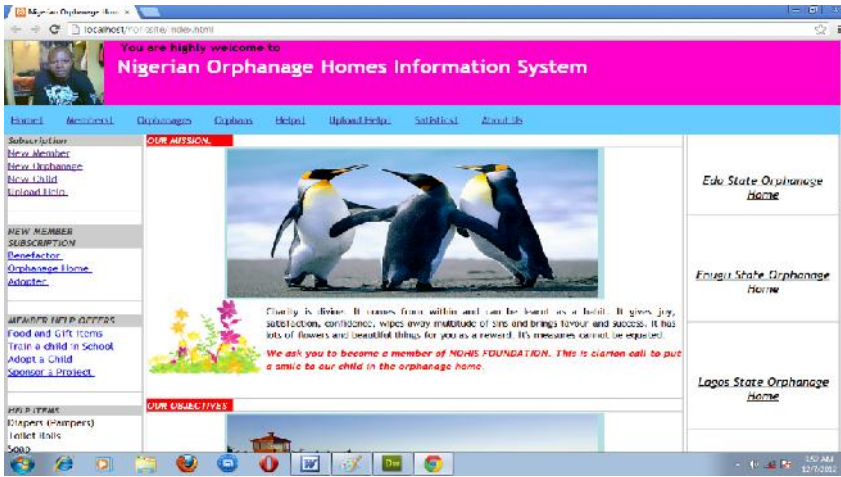


Figure 6: Home Page of the Web Based System

New Member link from the Home page opens The Member Registration Form through which a site visitor will filling in the form and submit for subscription processing. Figure 7 shows the Member Registration Interface.

Members link from the Home page opens The Members Column Report that list the member of the public that render helps to the orphanages. Figure 8 shows the Member Output List.



11.0 Conclusion

This Web Based System for Orphanage Management in its current version enables majority of the Nigerian State Government and Orphanages to initiate and evaluate the adoption of ICT solution to aid in better management of orphan data and timely dissemination of aggregate trends. We hope to present a pilot phase to Edo State Ministry of Women Affair and Social Development and four orphanage homes we visited. Throughout this pilot phase, emphasis is on working on feedback as it affects the pilot orphanages. By the end of the period of testing with realistic volume of relevant data, we hope to obtain a stable version of the system. This period is to be followed by a six-month test phase with quantitative measurements of benefits, usability and sustainability of the Web Based System as an effective tool for orphanage management. If favorable results are obtained at the end of this phase, the system can be gradually scaled up to other orphanages within the participating state and country at large.

12.0 Reference

- [1] Richard, W. and Jeffrey M. (1986). Using Computers in an Information Age, Delmar Publishers Inc. U.S.A.
- [2] Wikipedia (2014a). Web Development. Available online at http://en.wikipedia.org/wiki/web_development. Retrieved on 06/03/2014
- [3] Williams, N. (2010). The Role of Community Association in community development in Cameroon, a study of Mezan Division, Department of Sociology and Anthropology, University of Nigeria, Nsukka.
- [4] Mbuagbo, O. and Fru C. (2003). "Civil society and democratization. The Cameroonian experience". Journal of social development, 18 (2); 133-149
- [5] Sanchez, P. (2004). *Beyond bilingual education: New immigrants and public school policies in California*. California, U.S.A:Urban Institute Press.
- [6] Wikipedia (2014b). Orphanages Available online at http://en.wikipedia.org/wiki/Orphanage#United_States. Retrieved on 23/01/2014
- [7] Haag, S., Cummings M. and Rea A. (2004). Computing Concepts, 2/e, McGrawHill Technology Education, New York.
- [8] Lan, F. (1992). System Analysis and Design with Case Tools, Wm. C. Brown Publishers, USA
- [9] Valaciah, J., George J and Hoffer J., (2004). Essential of Systems Analysis and Design 2/e, Pearson Prentice Hall, New Jersey
- [10] Whitten, J., Bentley L., and Dittman C. , (2000). System Analysis and Design Methods, 5/e, Irwin/McGraw-Hill Higher Education. New York
- [11] Roger, S. (2005). Software Engineering, A Practitioner's Approach, 6/e, McGrawHill, new York
- [12] Hershey, L., Kizzier L., Levy D. and Wohl A. (1992). Planning and Implementing End-User Information Systems, South-Western publishing Co. Cincinnati, Ohio
- [13] Sarah, E. and Sawyer S., (2000). Computers, communications, Information, McGraw-Hill Higher Education, USA

- [14] W3SCHOOLS (2012). HTML Tutorial. Available online at <http://www.w3schools.com/html/default.html>. Retrieved on 15/01/2012
- [15] Boronczyk, T., Naramore E., Gemer J., Scouarnec Y., StolzJ. and Glass M. (2009). Beginning PHP6, Apache, MySQL, Web Development, Wiley Publishing, Inc. Indiana.