

Design of an Automated Library Management System for State Universities in Nigeria

Akazue Maureen and Ojeme Blessing

Department of Mathematics and Computer Science, Delta State University, Abraka, Nigeria

Abstract: Library automation has to do with the act of computerizing user's registration and library materials, borrowing and returning, locating of material and calculating overdue fines in the library system. The status of automated library management systems in Nigerian state universities were assessed through site visits and interview surveys of the views of academic/non-academic staff, students and researchers in the universities. This study designed an automated library system that will help university libraries to keep accurate track of the transaction done via storing information about library users, accurately locating library materials effectively with ease and tracking of all borrowing and returning of books. Also where fine is applicable, the system can calculate overdue of library defaulters and provide useful information that can help the management of the library in decision making. The findings were used to design an automated library management system for Delta State University in Nigeria.

Key words: Library materials, borrowing, returning, management systems, accurate track, decision making

INTRODUCTION

Library system automation is done so as to ensure that the registration, borrowing and returning of books is done effectively as well as overcoming the problem of inaccurate overdue charges and to generate report at the end of each day, week, month and semester.

The manual method of library management system for most state university like Delta State University involved many problems such as registration of users and difficulty in keeping proper records of books as well as time and energy wasted in searching for a particular material (Johnson and Ckipson, 2006; Nok, 2006; Oseyi, 2006; Ley and Bence, 1978; Jefferson, 2001; Mohammed, 1991).

This study designed an automated system that will help university libraries to keep accurate track of the transaction done via storing information about library users, accurately locating library materials effectively with ease and tracking of all borrowing and returning of books. Also where fine is applicable, the system can calculate overdue of library defaulters and provide useful information that can help the management of the library in decision making.

Literature review: The status of automated library management systems in Nigerian state universities were assessed through the use of fact finding techniques such as site visits and interview surveys of the views of

academic/non-academic staff, students and researchers in the universities. Programming language software (Visual-Studios.net) was used as a programming tool for writing the code and for designing the interface.

According to Sani and Tiamiyu (2005), automated services were far from adequate and out of the 29 different automated services that one would expect in a modern university only about 40% were available and utilized. When this survey was carried out (2009 to early 2010), the accessed status of Delta State University was similar to the condition stated by Sani and Tiamiyu (2005) and Fabunmi (2009) that the university libraries had lagged behind the pace of automation in other units of the universities, mainly because the average Nigerian university library has not yet embraced the idea of the virtual reality of a library in the digital age. The institution as well as the students cannot achieve any form of educational expertise without a good library which will presently and in future contribute to the fulfillment of the objectives of the library (Moulin and Sullian, 1999; Debreceny and Ellis, 2000; Tang, 2001; Abdulkadir, 1994; Khalid, 2000; Ifidon and Okoli, 2002).

MATERIALS AND METHODS

The Delta State University library is divided into six divisions, two campus libraries and two medical libraries. The library has different units such as Serial unit (it stocks

serials or periodical publication such as newspaper, magazine, bulletins and journals), Technical unit (take care of binding and repairs of books and responsible for stamping, numbering book card for any new material as well as perform the processing of books before they are been dispatched to different section of the library), Readers service division, Special collection division, System division, Audio/Visual unit and Reference division.

A system analysis of existing library system in Delta State University library showed that the manual system being used in the library has a lot of setbacks, difficulties and time-wastage. The problem of the old system was adequately identified and handled properly in designing the new system. Process design that shows the process taking place in the system was represented using structured flowcharts. In the input designs, the major data entries considered are: Book registration, Serial registration, Library user registration, Borrow book, Returned borrowed book, Pay fines, Database user registration and Search.

These processes were designed based on the database design of this project and the structures of the user interface (sixteen forms) are discussed.

Book registration form: It accept an input from the user of the system pertaining to a new book to be registered into the library. The form processes the inputs and stores them in the database (Fig. 1).

Serial input registration: This form accepts input of newspaper, newsletters and information material that come up periodically.

Library user registration: This form display details of the library user and the input is stored in the database. This enables the library administrator to know number of registered users (Fig. 2).

Search form: It is used to search for information and it makes it easier for anyone to access a particular piece of information quickly and efficiently.

Create system user form: It is used to create username and password of those to use the software. The form is coded in such a way that anyone that uses the software can be identified using the categories of users (Fig. 3).

Fig. 1: Book registration

Fig. 2: Library user registration form

Fig. 3: System user forms

Fig. 4: Login form

Fig. 5: Checking out

System login form: It is used to gain access to the software after it has been created in the create user form (Fig. 4).

Borrowed book form: It contains the checking out and checking in form as well as the short term borrowing (Fig. 5).

Book check in form: It monitors when book are returned by those who borrowed them (Fig. 6).

Pay fine form: It registers dues owed by library defaulters. The fine is stored in a database which can only be viewed by the administrative user (Fig. 7).

Patron activity monitor: This form monitors the activities of a library user such as borrowing, paying of fine and other activities of interest to the library administration (Fig. 8).



Fig. 6: Book checking in form

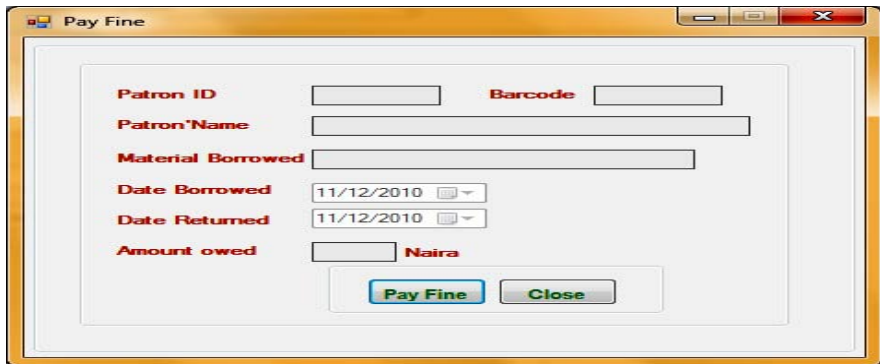


Fig. 7: Pay fine form

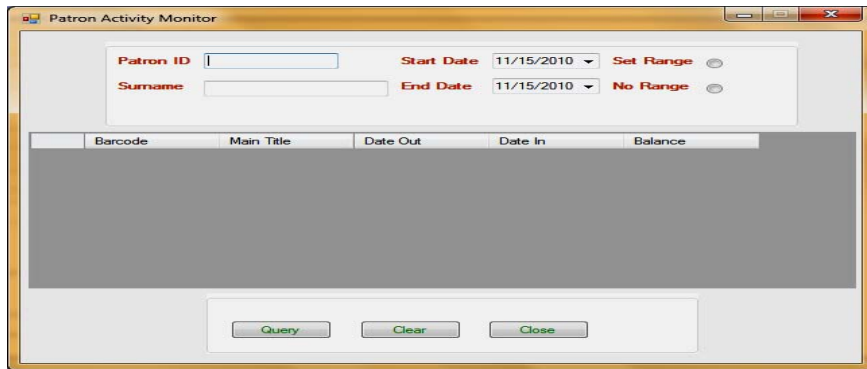


Fig. 8: Patron activity monitor

Book history form: This form or interface displays the descriptions of a particular library material to enable readers know the kind of book (Fig. 9).

The database: It is designed using the Structured Query Language (SQL) server Enterprise manager. It is composed of tables, stored procedures and relationships. The tables involved are catalogue table, Circulation table, The serial table, User account table and Library user table.

Relationship was created to link one table to another in order for users to be able to access the tables

simultaneously and view them as one table. The relationship used is the catalogue_circulation, the borrowed_fine register, the lib_use_reg_useraccount and the user_usergroup relationship. The database table design is made up of four columns namely: column name which holds the name of the field whose value is gotten from input forms using stored procedures, datatype (describes the type of data in the field and the kind of values stored), length (holds the maximum number of characters one can enter in the field) and allow nulls (sets the field to either accept an empty entry or not). The table

The screenshot shows a software window titled "Book History". Inside the window, there is a search area with a "Select" dropdown menu, a "Barcode/Accession Number" text input field, and a "Main Title" text input field. Below this search area is a section titled "Current Status" which contains four rows of information, each with a label and a "Display" button: "Date entered into System: Display", "Total Loan Times: Display", "Date of Last Loan: Display", and "Last Loan person: Display". At the bottom right of the window, there are two buttons: "Clear" and "Close".

Fig. 9: Book history form

properties of checking out/checking in table design, Book registration table design, Library user registration table design, Pay fines table, User login table design, Special collection and Short term borrowing table design were designed in SQL.

System implementation: There are various tasks that are being performed in the system development phase. These involve program development; testing and debugging of the program, the acquisition and installation of the hardware, the training of the library staff in order to be able to operate the system.

The hardware requirements for the implementation of the proposed system are SVGA Monitor, Mouse device, Keyboard, Microsoft compactable graphic card, 40 GB or higher of hard disk drive is recommended, Pentium 3 is recommended and minimum of 500 mHz or higher in speed and 1GB (Gigabyte) or higher of RAM. The software requirement include Microsoft SQL server enterprise, Microsoft Visual Studios, 2008. Windows XP operating system or higher.

The program is a 2-tier program. Visual Studio (front end) is used to design the interface used to interact with the database which stores the data in the SQL server (back end). All procedures were generated in the SQL server called up or executed directly using Visual studio codes.

Program testing: The way in which the program responds to test data was analyzed. This involves two major program testing: Alpha testing and Beta testing. The software installation process and usage is user friendly.

Currently, Delta State University library has evolved an ICT development plan and so, the university library system is being developed into virtual learning centre facilitated by automation. When this is completed, the software will be installed to aid library management as well

as enable the library system to effectively serve as the hub of teaching and learning. After which it can also be given to other Nigeria state universities to implement.

CONCLUSION

This librarysoft can keep track of transaction in the library, speed up the processes of searching for materials, valid users, book information and generate reports that help the library staff know the status of the library departments and advice the management of the library on how to manage and develop the library based on the report generated by the system.

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