

DEVELOPMENT AND VALIDATION OF CIRCULATION SOFTWARE PACKAGE FOR LIBRARIES IN FEDERAL UNIVERSITIES OF NORTH CENTRAL, NIGERIA**Dr. Nwachukwu V. N and Musa Baba Adamu**¹Department of Library and Information Science: University of Nigeria, Nsukka²University Library Services: Federal University of Technology, Minna

ABSTRACT: *The aim of this study was to investigate the development and validation of circulation software package for university libraries in Federal Universities of North Central Zone, Nigeria.. Specifically, five purposes and three research questions guided the study. Related literature was reviewed under conceptual framework, theoretical framework and related empirical studies. The study adopted descriptive survey at first after which it will adopt Research and Development (R&D). The study was carried out in North Central Zone, it has population of 155 comprising librarians and other library personnel who have worked in circulation department from seven federal university libraries in the zone. The study used purposive sampling technique to sample 108 librarians and other library personnel. From the above population one hundred and eight (108) questionnaires were distributed filled and returned; representing a return rate of 70%. The data collected were analysed using descriptive statistics of frequency tables and mean scores. And the decision rule for research questions one through three was based on whether the mean score value was lower than or equal to and above the criterion mean value of 2.50 for either rejection or acceptance. The findings of the study shows: that federal university libraries under study to high extent employ manual procedures in carrying out basic circulation functions such as registering users at the circulation Desk, charging out items to users at circulation Desk, Discharging and renewing items to users at the circulation desk. The study revealed that majority of the respondents strongly agreed and agreed that Fast report generation is not possible, Tracing a book on the library shelf is difficult, Information about issue/return of the books are not properly maintained, No central database can be created as information is not available in database, Difficulty in determining if a patron has overdue, the manual charging was characterized by long queues and unnecessary delays, manual card systems basically provide just one access point, the due date is on a card that has been lost, It is possible to have two (or more!) cards for each item, Waste the users time, The process is cumbersome and Inefficiency in service delivery. Finally, the finding also shows that majority of the respondents have little or no skill in Software design, Software installation/operations, Web design, Digitization and imaging technology, Online cataloguing(MARC) and OCR Devices classification (NLM). It also revealed that respondents have low skill in automated circulation system and System analysis and design. However, the table indicated that most of the respondents have a very high skill in MSOffice, Database searching technique and Transformation of data. Recommendations were made as follows; Libraries should encourage the production of local library application software by patronizing them and even be part of the software development, there is need for constant training and re-training of staff in the proper handling of Information and Communication Technology equipment and process so as not to run in to trouble, staff such as programmers, analysts, and operators should be employed to handle the computer system and train the librarians on basic trouble shooting, ICT facilities and other equipment should be made available for staff at the circulation desk, white the outdated ones should be replaced and each university library should have a stand-by generator and UPS to guard against power failure and its damage of the automation equipment. The project development of library*

circulation Software package that was developed based on the findings of initial descriptive survey carried out to manage the daily book transaction and manage the member, books record more efficiently to improve management of the book property in the library. This library circulation Software package is mainly use by librarian, library admin and users. Besides that, library circulation Software package also allows user to search for availability of books by Title, Author and ISBN via World Wide Web. The methodology adopted to develop this system is waterfall model. Thus, the work chapters included system planning, requirement analysis, system design, programming, system and testing, of the project. The software is available on-line via www.libcsp.com

KEYWORDS: Development, Circulation Software Package, Libraries, Federal Universities

INTRODUCTION

University libraries are essential contributors to knowledge generation and serve a wide spectrum of knowledge seekers. In fact, university libraries have been described as the "heart" of the university, because they provide a place for students and faculty to do their research and advance their knowledge. The fundamental role of any university library is to collect, process, store, disseminate and utilize information to provide services to the academic and research community. Librarians and library staff provide numerous services, ranging from acquisition, cataloguing, circulation serial and reference services to their users in order to address their diverse needs and interests. Both the faculty and students depend heavily on the library for information that is necessary in pursuing their individual and collective goals (Agyen-Gyasi et al., 2010).

University libraries have different categories of users' namely the academic staff (i.e. lecturers), undergraduate students, post graduate students, research fellows, administrative staff, alumni among others. Ifidon and Okoli (2002) note that universities have five (5) functions: Pursuit, promotion, and dissemination of knowledge; Provision of intellectual leadership; Manpower development; Promotion of social and economic modernization; Promotion of intra- and inter-continental and international understanding. From these functions, university libraries have derived their objectives to include, Provision of materials for undergraduate instruction, term papers, and Projects, as well as for supplementary reading through Circulation Department, provision of materials in support of faculty, external and collaborative research; provision of expensive standard works, especially in the professional disciplines, provision of materials for personal development, provision of specialized information on the region within which the University is situated and Cooperation with other university libraries with a view to developing a network of University library resources that is at the disposal of all scholars.

The Circulation Department in a library is the department assigned the responsibility for keeping that "orderly movement through a circuit" orderly, flowing, and complete. The Department's basic function is to, Facilitate and monitor the circulation of books from the regular collection; the department is usually responsible for circulating some books from other collections and for circulating non-book materials, the reserve book operation, in which books are circulated from a closed collection for limited time periods, is also often assigned to the circulation department in some university libraries and the circulation department is frequently given other duties because it is the main public contact point in the library and because it is

usually staffed during the hours that the library is open, many "housekeeping" chores are assigned to it. These vary from library to library, in addition to providing general library information to patrons, may include opening and closing the library, serving as the central library telephone switchboard, supervising photocopy services, providing room and carrel reservations, and general responsibility for emergency responses (Battaile,1992).

Thus, Circulation is defined by Webster's Ninth New Collegiate Dictionary as "orderly movement through a circuit." Circulation In a library is the orderly movement through a circuit, as it applies to the process of lending books to borrowers and then accurately reshelving them after they have been returned so that they will be retrievable by the next user. This basic cycle has attached to it many elaborations such as the record-keeping process and sub cycles such as those for overdue and holds. These sub cycles vary from library to library, but the basic cycle remains the same in every library that allows patrons to remove books".

In the quest to keep accurate records of library materials various types of circulation systems have been developed. Many of these systems have focused on four objectives: to be easy for patrons to use and library personnel to operate, to save borrower time, to speed up the routine of checking in and out; to reduce costs and to relieve librarians for more professional work. There are numerous types of circulation control in use in different types of Library depending largely on size and convenience. Prominent among these are the following: the Browne system, the Newark system, the Ledger system, automated systems, online processing and the book Card system. The Libraries under study uses the Newark system which provides that the borrower tenders his/her registration card, collects and completes the borrowers' cards and slips at the circulation desk by lending .

Software Application to Circulation Functions

The application of computer technology into the library system has revolutionized the operations and use of libraries. With this technology, material resources needed for teaching and research become easy to access, More than ever before, Nigerian university libraries have developed interest in the use of modern technology to enhance their productivity and improve their services. Faisal and surendan (2008). Itemized the Advantages of Library software as follow: It provides users with timely access to library materials; it eliminates routine tasks or performs them more efficiently; it reduces the amount of time spent on material acquisition, serials management, budget administration and record keeping; it supports new means of information retrieval by introducing patrons to global information; it allows patrons to use search strategies that exceed those that can be used With card catalogue; it allows patrons to search library's collection from locations outside the Library's walls; It motivates users, equips them with problem solving and information retrieval skills, and provides them with lifelong learning experiences.

Automation of the processes of accessing information and technical services is the cherished goal of the university libraries, especially in the circulation and cataloguing subsystems. Circulation system, according to Olufeagba (1977) in Babafemi et,al (2007). Involves the mechanization of activities such as "charging of books to users, renewing of books, processing, reservation, monitoring of utilization of books, operating short term loans of document processing, overdue notices and calculating fines, answering library queries, discharging returned materials and checking for possible hold request. It has been observed, however, that a lot of time is wasted in carrying out these functions manually. To solve these problems more hands are employed, but this does not help the situation as it only leads to increased budget for

salaries and allowances of staff. With library automation these problem will not arise as it helps to save both library staff and users' time. Encyclopedia of Library and Information Sciences define "Library Automation is the use of automatic and semiautomatic data processing machines to perform such traditional library activities as acquisitions, cataloguing, and circulation. These activities are not necessarily performed in traditional ways, the activities themselves are those traditionally associated with libraries; library automation may thus be distinguished from related fields such as information retrieval, automatic indexing and abstracting and automatic textual analysis" (Kent, 1997). Furthermore, Ossai. (2010). Automated library denote a library in which the collections of library materials are primarily on paper but in which the library procedures have been computerized. The author also noted that the records needed for library operations must necessarily be concerned with individual copies of each title. A circulation system must know precisely which copy of which volume of which edition of which title was borrowed by precisely which borrower and when it is due back. Again Library automation refers to mechanization of library housekeeping operations predominantly by computerization. The most commonly known housekeeping operations are acquisition control, serials control, cataloguing, and classification and circulation control. Library automation or Integrated Library System (ILS) is an enterprise resource planning systems for a library, used to tracks items owned; borrow out item, returned items etc. therefore, the need of library software or automation has several reasons. Need of computers is present in all areas depending upon its usage, ranging from acquisition control, serial control, and cataloguing and circulation control, used for library manager's evaluation of reports, statistics. For administration of the library computers are used in all levels of work. Computers help in the following areas: Capacity to handle any amount of data and information; Participating in network programmers and resource sharing; Flexibility in information search; Standardization of library procedures and Speedy processing of information and its retrieval.

The study is conducted in federal university libraries of North-Central Zone of Nigeria. These are composed of Kogi, Benue, Kwara, Nasarawa, Niger and Plateau states as well as the Federal Capital Territory (FCT) Abuja. The federal university libraries of the zone and their year of establishment includes University of Jos library Plateau State (1975); University of Ilorin library, Kwara state (1975); Federal University of Technology, Minna library, Niger state (1982); University of Agriculture Makurdi library, Benue state (1988); University of Abuja library, Abuja (1988); Federal University of Lokoja library, Kogi state (2011) and Federal University of Lafia library, Nasarawa state (2011) (National Universities Commission (NUC) News Bulletins, 2012).

Subsequently, some of this Federal University libraries at one time or the other have implement software package in their house- keeping operations especial On-line Public Access Catalog (OPAC) using Technology Information Navigator for Libraries (TINLIB), Integrated Technical Services (ITS) and Koha. Despite the foregoing factor the fact remain that none of the libraries have activated their circulation module and above all, know studies has been carried out on the development and validation of circulation package in the zone. Hence, the need to "develop and validate a circulation software package for libraries in Federal University of North Central Nigeria

Statement of the Problem

Information resources in the library are meant to satisfy the day to day need of its clients. No matter how rich a university library collection is, the resources therein cannot be properly harnessed if the process of accessing the resources is poorly structured. The circulation

department of the university library acts as an interface between the users and the collections in the library. It is obvious that the manual method of charging and discharging services to users in the Circulation Subsection is poorly structured and characterized by long queues and unnecessary delays, the filling of users' cards and keeping of statistics is not only cumbersome but also getting out of control as filing cards spills over to the next day on several occasions; that maintenance of manual card catalogue proved problematic, limited information access points because creating duplicate records to increase access points is time consuming and costly, Slow and difficult processes for determining the circulation status of a given item, the potential for misfiled records, no means of easily providing users with a list of all items they have currently charged, no means by which library users can be informed of pending due dates, Provision of only the most rudimentary statistics because of the time involved in manually compiling detailed information and difficulty in determining if a user has overdue or other lost items which should prevent them from being able to borrow more material due to poor circulation system. Hence, the need for software package.

It is in view of the foregoing that the researcher intend to develop and validate a user friendly circulation software package for libraries in federal universities in North Central Nigeria so as to fill the gap that exist in this area.

Purpose of the Study

The study is aimed at the development and validation of circulation software package for university libraries in federal universities in North Central Nigeria. Based on this, the specific objective are therefore to:

1. Identify circulation procedures employed in the university libraries.
2. Identify the problems militating against circulation subsystem in the University Libraries
3. Ascertain the level of ICT skills of the librarians in the Libraries.
4. Develop an automated system for the circulation functions for the libraries
5. Validate the automated circulation package for the libraries

Research Questions

The following Research Questions were formulated to guide the study:

1. What is the circulation procedures employed in the university libraries?
2. What are the problems militating against circulation subsystem in the University Libraries?
3. What is the level of ICT skills of the librarians in the Libraries?

LITERATURE REVIEW

University library: is the heart of the university. It is established to serve lecturers, administrative staff, students, researcher and the entire University community. According to

Ifijeh (2011). university library is a part of a university organization which aims at the advancement of the functions of its parent body. Kumar (2006) in Ifijeh (2011) asserts that a university is supposed to perform the following functions: Teaching, Research, Publications, Conservation of knowledge and ideas and Extension services.

Library Circulation

Library circulation or library lending comprises the activities around the lending of Library books and other materials to users of a lending Library. According to battaile (1992)" circulation in a library is the orderly movement through a circuit, as it applies to the process of lending books to borrowers and then accurately reshelving them after they have been returned so that they will be retrievable by the next user. This basic cycle has attached to it many elaborations such as the record-keeping process and sub cycles such as those for overdue and holds. These sub cycles vary from library to library, but the basic cycle remains the same in every library that allows patrons to remove books".

In recognition of the importance services of the circulation section of the Library, Olamigoke (1999) further affirm that the assertion that traditionally, the circulation and reference desks are Library patrons' first points of call for information and enquiries. As the first port of call, the responsibility of projecting the image of the Library in good light rests squarely on the staff at the circulation desk. This requires excellent human relations service. Alokun, (2003) buttressed further the enormity of this responsibility when he expressed the opinion that a Library is supposed to be readers' oriented and users' friendly and that Library services are supposed to focus on users' needs that it is the responsibility of the Library to strive and satisfy those needs promptly. The emphasis on "needs" above refers to information relevant to Library patrons contained in the resources of the Library. Madukoma (2011) relate to the description of information by karki (2006) who described it as a powerful resource as equal to other natural resources. In many cases, it is more important than other resources. The choice of adequately delivering service as pointed out above commences from the circulation desk. It is often said that first impression lasts long; the circulation desk therefore, should be handled by competent staff that have good communication and human relation skills and a friendly disposition. The efficacy of service delivery at the circulation desk has been greatly enhanced by the presence of the current obtainable and available technologies. Circulation of library materials: Circulation module has a database of users' details necessary for circulation of materials, provides overdue list, charges, generates reminder notice on borrowed materials. Crosby (2000) stated that, years ago, paper cards and ink stamps were the primary way books were tracked, now, most librarians use automated circulation systems to simplify book management. Librarians also set policies about lending time and renewals and, in libraries that offer computer access, establish rules governing computer use. Materials are circulated electronically to users with the aid of hand held scanners and bar code labels. Request for materials, reservation and renewal are done online. Request/reservation slips are printed out to retrieve the material for the user. Request/reservation is cancelled if the user failed to turn up after some days.

Characteristics of circulation transactions system

There are numerous types of circulation control in use in different types of Library depending largely on size and convenience. Prominent among these are the following: the Browne, system, the Newark system, the Ledger system and the book Card system. The Library under study uses the Newark system which provides that the borrower tenders his/her

registration card, collects and completes the borrowers' cards and slips at the circulation desk. For a circulation system to be functional and effective, it must address the followings:

Charging and discharging of materials timely and with ease, Show the eligibility of a borrower to enjoy the facility, Facilitate overdue alert and notices of return, Work out overdue fine when overdue books are returned, Provide for the reservation of books in high demand and Keeping statistical records of discharged books and registered users.

University library computerization in Nigeria has been in the pipeline. According to Abolaji (2000) states that significant and widespread efforts at computerizing library services started in the 1990s. Major efforts at computerization were stalled by the supposed lack of funds and expertise. Ekpenyong (1997) notes that most notable research libraries in Nigeria are advanced in computerization. Unfortunately, no significant efforts were recorded in this regard. University libraries in Nigeria are now moving from their isolated past into automated systems and networked operations. As Khalid (2000) observes, "that networked and automated functions bring the experiences of the evolution of libraries in developed countries. University libraries in Nigeria are trying to catch up with their counterparts in the developed world. University library automation in Nigeria started automation process in the late 1980s, with various stages of automation of library services. The Federal Government of Nigeria through the National Universities Commission (NUC), which oversees and disburses funds to all the federal universities in Nigeria, introduced projects aimed at computerizing university services across the country.

The NUC initiated Management Information Systems (MIS) which gave birth to all Nigerian Universities Network (NUNET) project. With the aim of developing a viable local and wide area network in each institution and more recently followed by the National Virtual (Digital) Library Project. The mission was "to provide, in an equitable and cost effective manner, enhanced access to national and international library and information resources and for sharing locally available resources with libraries all over the world using digital technology." (UNESCO) in Nok. (2006). The objectives of the Virtual Library Project are as follows: to improve the quality of teaching and research in institutions of higher; Learning in Nigeria through the provision of current books, journals and other Library resources; to enhance access to academic libraries serving the education community in Nigeria to global library and information resources; to enhance scholarship, research, and lifelong learning through the establishment of permanent access to shared digital archival collections; to provide guidance for academic libraries on applying appropriate Technologies used in the production of digital library resources; and to advance the use and usability of a globally-distributed network of Library resources.

Obajemu et,al (2013). Conduct a study on Library software products in Nigeria: A survey of uses and assessment. The purpose of the study is to create awareness on the existing software in Nigeria so as to enhance quality selection. It provides librarians with pragmatic steps to take when making choices and highlights the operational problems associated with library software. The researchers surveyed 50 libraries in Nigeria: 22 federal, state and private universities; 11 polytechnic libraries; 3 colleges of education libraries, and 14 research institutional libraries. Data for this study were collected through structured questionnaire. Of the 120 questionnaire administered, 97 of them were returned filled. Results show that a greater number of the respondents are computer literate, and agree with the guiding steps a library should follow before acquiring software. Also, some of the respondents are quite aware of the various types of software being paraded in Nigerian markets. The study not only

discusses problems associated with software installations but also suggests ways out of them. Finally, the study makes recommendations on the way forward.

RESEARCH METHOD

The study adopted descriptive survey at first after which it will adopt Research and Development (R&D). The study was carried out in North Central Zone, it has population of 155 comprising librarians and other library personnel who have worked in circulation department from seven federal university libraries in the zone. The study used purposive sampling technique to sample 108 librarians and other library personnel. The instrument used for data collection is structured questionnaire. Data collected were analysed using mean, frequency and percentage count.

Data analysis and interpretation

This chapter deals with the presentation and analysis of data collected which are guided by the three research questions of the study. Specifically, the tables presented below represents the responses from one hundred and eighty (108) out of 155 Questionnaires distributed and returned representing seventy percent (70%) response rate.

Research Question One: What is the circulation procedures employed in the university libraries?

Table 1: The procedures for registering users at the circulation Desk University Libraries of North Central Zone, Nigeria?

S/NO	UNIVERSITIES	FUT NMIN NA N=24	UNI JOS N=15	UNI ABUJA N=12	UNI ILORIN N=18	UNI OF AGRIC MAKUR DI N=13	FED UNI LOKOJA N=16	FED UNI NASSA RAWA N=10	Cluster Mean	Decision
	Registration Procedure	Mean	Mean	Mean	Mean	Mean	Mean	Mean		
1	Present their admission letters school fees payment receipt and users passport	3.8	3.9	3.9	4.0	3.9	4.0	3.7	3.89	Accepted
2	Issue form to the users with registration number	3.8	3.9	3.8	3.9	3.9	4.0	3.3	3.81	Accepted
3	Validate it with the HOD's signature and stamp	3.6	3.9	3.6	3.4	4.0	3.9	3.5	3.69	Accepted
4	Return it to the circulation desk for processing	3.8	3.8	3.8	3.9	4.0	3.9	3.7	3.87	Accepted
5	Issue of library ID card to users	3.5	2.8	3.1	2.8	3.3	2.8	3.2	3.10	Accepted

Key: 4 = Very Highly Employed 3 = Highly Employed 2 = Moderately Employed,

1 = Not Employed.

Table 1 above shows that all the registration procedure employed items were highly rated by the respondents as 'very highly employed' with mean scores of 3.5 and above in all the university libraries under study as indicated above. While one or two items were rated as 'highly employed' with mean scores between 2.5 and 3.49 respectively by respondents from most of the university libraries under study except for federal university of technology where all the items were rated as 'very highly employed'. In general with the entire items cluster mean above 2.5, the researcher therefore concludes that the university libraries under study are operating on manual circulation procedures for registering users.

Table 2: The procedures for charging out items to users at circulation Desk in University Libraries of North Central Zone, Nigeria

S/N O.	UNIVERSITIES	FUT NMINN A N =24	UNI JOS N =15	UNI ABUJA N =12	UNI ILORIN N = 18	UNI OF AGRIC MAKUR DI N =13	FED UNI LOKO JA N =16	FED UNI NASSARA WA N =10	Cluster Mean	Decis ion
	Registration Procedure	Mean	Mean	Mean	Mean	Mean	Mean	Mean		
1	The borrower presents his or her identification card	2.7	3.2	2.4	3.2	2.4	2.9	3.3	2.86	Acce pted
2	The user identifies and retrieves the material(s) from the shelf of the Library	3.6	3.8	3.8	3.3	3.6	3.8	3.3	3.59	Acce pted
3	He/she brings it to the circulation desk along with the Library identity card	2.9	3.3	2.9	3.0	3.4	2.8	3.4	3.07	Acce pted
4	The staff on duty certifies the fitness of the material for lending	3.4	4.0	4.0	3.7	3.7	3.8	3.9	3.73	Acce pted
5	Issues borrowers' slip(s) and the book (pink) card(s)	3.6	3.9	3.3	3.8	3.9	3.7	3.4	3.68	Acce pted
6	Patron completes the slip(s) and the book card(s)	3.5	4.0	4.0	3.5	3.5	3.8	3.5	3.68	Acce pted
7	Staff stamps the material(s) - slip(s) and the book card(s) with the date due stamp then releases the material to the users.	3.8	4.0	3.9	3.8	3.9	4.0	3.6	3.87	Acce pted

Key: 4 = Very Highly Employed 3 = Highly Employed 2 = Moderately Employed,

1 = Not Employed.

Table 2: shows the response on the circulation procedures employed for charging out items in federal university libraries under study, all the means score are accept because they are above 2.50 set as criterion level for accepting an item. This revealed that most of the university libraries in the study area are charging out material to patron manually.

Table 3: The procedures for Discharging and renewing items at the circulation desk

S/N O.	UNIVERSITIES	FUT NMINN A N =24	UNI JOS N =15	UNI ABUJ A N =12	UNI ILORIN N = 18	UNI OF AGRIC MAKUR DI N =13	FED UNI LOKOJ A N =16	FED UNI NAS SAR AWA N =10	Cluster Mean	Decision
	Procedure for discharging out items	Mean	Mean	Mean	Mean	Mean	Mean	Mean		
1	Borrower must tender his/her Library Identity card	2.6	2.5	2.6	3.2	2.8	3.1	4.0	2.9	Accepted
2	Staff on duty examines the book to ensure that it is returned in good condition	3.8	3.9	3.8	3.9	3.2	3.3	3.2	3.6	Accepted
3	Retrieves the borrower's slip(s) and book card(s)	3.7	3.9	3.6	3.6	3.7	3.9	3.5	3.7	Accepted
4	Ascertains the date due and crosses it out in the presence of the borrower.	3.5	3.8	3.8	3.9	4.0	3.9	3.7	3.8	Accepted
5	If overdue, fine is calculated for the defaulter	3.2	2.8	3.1	2.8	3.3	2.9	3.2	3.0	Accepted
6	If it is for renewal, it will first be discharged and then charged out, if there is no awaiting request on that item.	3.0	3.3	2.4	3.2	2.4	2.9	3.3	2.9	Accepted
7	If returned, the book card is inserted in the book pocket and the book is passed to the stack for onward transmission to the shelve	3.6	3.8	3.4	3.3	3.6	3.8	3.2	3.5	Accepted

**Key: 4 = Very Highly Employed 3 = Highly Employed 2 = Moderately Employed,
1 = Not Employed.**

Table 2: shows the response on the circulation procedures employed for charging out items in federal university libraries under study, all the means score are accepted because they are above 2.50 set as criterion level for accepting an item. This also indicates that most of the respondents

from the university libraries under study adopt manual procedures for discharging items to their clients at the circulation desk.

Research Question 2: What are the problems militating against circulation subsystem in the University Libraries?

This question sought to determine the problems militating against circulation subsystem in the University Libraries of North-Central Zone, Nigeria.

Table 4: problems militating against circulation subsystem in the University Libraries?

S/N O.	UNIVERSITIE S	FUT NMIN NA N =24	UNI JOS N =15	UNI ABUJ A N =12	UNI ILORIN N = 18	UNI OF AGRI C MAKU RDI N =13	FED UNI LOKOJ A N =16	FED UNI NASS ARA WA N =10	Mean	Cluste r Mean	Decision
	Problems militating against circulation procedures	Mean	Mea n	Mean	Mean	Mean	Mean	Mean			
1	Fast report generation is not possible.	3.9	3.7	3.9	3.8	4.0	3.9	3.7	3.9		Accepted
2	Tracing a book on the library shelf is difficult.	3.8	3.9	3.9	3.6	3.9	4.0	3.5	3.7		Accepted
3	Information about issue/return of the books are not properly maintained	3.6	2.3	2.9	2.8	2.8	2.8	3.4	3.9		Accepted
4	No central database can be created as information is not available in database.	3.7	3.8	3.9	3.9	3.9	3.7	3.9	3.8		Accepted
5	Difficulty in determining if a patron has overdue	3.8	3.6	4.0	4.0	4.0	3.8	3.4	4.0		Accepted
6	the manual charging was characterized by long queues and unnecessary delays	3.2	2.8	3.8	3.9	3.8	3.9	3.7	3.9		Accepted

KEY: Strongly Agree = 4, Agree= 3, Disagree = 2, Strongly Disagree = 1

7	manual card systems basically provide just one access point	4.0	3.9	3.9	4.0	4.0	4.0	3.7	3.7	Accepted
8	the due date is on a card that has been lost	3.8	3.9	3.8	3.9	3.8	4.0	3.3	3.8	Accepted
9	It is possible to have two (or more!) cards for each item	3.6	3.9	3.6	3.4	4.0	3.9	3.5	3.7	Accepted
10	Waste the users time	3.8	3.8	3.8	3.9	4.0	3.9	3.7	3.9	Accepted
11	The process is cumbersome	3.5	2.8	3.1	2.8	3.3	2.9	3.2	3.1	Accepted
12	Inefficiency in service delivery	2.7	3.2	2.4	3.2	2.4	2.9	3.3	2.9	Accepted

Table 4: revealed that, majority strongly agreed that Fast report generation is not possible, Tracing a book on the library shelf is difficult, Information about issue/return of the books are not properly maintained, No central database can be created as information is not available in database, Difficulty in determining if a patron has overdue, the manual charging was characterized by long queues and unnecessary delays, manual card systems basically provide just one access point, the due date is on a card that has been lost, It is possible to have two (or more!) cards for each item, Waste the users time, the process is cumbersome and Inefficiency in service delivery. All the means score are accept because they are above 2.50 set as criterion level for accepting an item. Therefore, the researcher conclude that all the items listed above are the problems militating against circulation subsystem in the University Libraries of North central, Nigeria.

Research Question 3: What is the level of ICT skills of the librarians in the Libraries of North Central Nigeria?

This question sought to determine the level of ICT skills of the librarians in the Libraries of North Central Nigeria.

Table 5: level of ICT skills of the librarians in the Libraries of North-Central Zone, Nigeria.

level of ICT Skills proficiency		4		3		2		1		Remark
S/N	Items	FQ	%	FQ	%	FQ	%	FQ	%	
1	Software design	11	10%	26	24%	15	14%	56	52%	no skill
2	Software installation / operations	1	1%	10	9%	6	6%	91	84%	very low skill
3	Web design	1	1%	9	8%	14	13%	84	78%	very low skill
4	Digitization and imaging technology	4	4%	7	6%	9	8%	88	81%	very low skill
5	Online cataloguing(MARC)	1	1%	3	3%	5	5%	99	92%	very low skill
6	Online classification (NLM)	12	11%	36	33%	9	8%	51	47%	very low skill
7	Automated circulation system	6	6%	5	5%	97	90%			very low skill
8	System analysis and design	5	5%	7	6%	96	89%			very low skill
9	Networking	3	3%	3	3%	4	4%	98	91%	dissatisfied very low skill
10	MSOffice	56	52%	14	13%	16	15%	22	20%	Very High skill
11	Database searching technique	93	86%	12	11%	2	2%	1	1%	Very High skill
12	Transformation of data	96	89%	6	6%	4	4%	2	2%	Very High skill
13	OCR Devices	1	1%	8	7%	29	27%	70	65%	very dissatisfied

4=Very High; 3=Moderate; 2=Low; 1= Not at all

Table 5: revealed that, majority 56(52%), 91(84%), 84(78%), 88(81%) 99(92%), 51(47%) and 98(91%) respectively have no skill in Software design, Software installation / operations, Web design, Digitization and imaging technology, Online cataloguing(MARC) and Online and OCR Devices classification (NLM). While 97(90%) and 96(89%) of the respondents have low skill in Automated circulation system and System analysis and design. However, 56(52%), 93(86%) and 96(89%) have a very high skill in MSOffice, Database searching technique and Transformation of data. Hence the researcher conclude that the respondents skill in basic computer application is relatively high but have little or no skill required for effective ICT service delivery in the library as such professional Librarian and non Librarian need training in the following areas. Software design, Software installation / operations, Web design, Digitization and imaging technology, Online cataloguing(MARC) and Online and OCR Devices classification (NLM), Automated circulation system and System analysis and design to enable them maximize the prospect that are bound in ICT.

SUMMARY

This research work was on the development and validation of circulation software package for university libraries in Federal Universities of North Central Zone, Nigeria. Five purposes and three research questions were posed to guide the study. Related literature was reviewed under conceptual framework, theoretical framework and related empirical studies. The study adopted descriptive survey design after which it adopted Research and Development design (R&D) based on the finding of the descriptive study. The study was carried out in North Central Zone, 108 respondents were used as population for the study through a purposive sampling technique. A well-structured questionnaire was used in data collection. Frequency, percentages and Mean were used to answer the three research questions that are for descriptive survey while the remaining two research questions were answered through development of program. The result of the study shows that federal university libraries under study to high extent employ manual procedures in carrying out basic circulation function the above sub-heading is in accordance with the research questions that guided the study.

Data were gathered on the circulation procedures employed in the university libraries and analyzed. The findings of the analysis are contained in table 1, 2 and 3 shows that federal university libraries under study to high extent employ manual procedures in carrying out basic circulation functions such as registering users at the circulation desk, charging out items to users at circulation desk, discharging and renewing items to users at the circulation desk. The above findings is in agreement with the findings of the study conducted by Nwachukwu *et al* (2014). The study investigated utilization of library oriented software packages among university libraries in North Central Zone of Nigeria. His Findings revealed that none of the software packages is in use as a result there is no extent of utilization. In his description of the position of the academic Library in the present information age, Omekwu (2010) stated that academic Libraries are critically situated in the environment of global change and transformation. This statement underscores the roles of academic Libraries and Libraries in general at a time and age of globalization. In the same vein Adegboro (2010) stated that the serious need for automation in university libraries, in his view Both the library professionals and patrons have agreed to the enormous importance of computerization of library routines and this research has buttress other researches that have been made relating to the title of the research. 70% of the research population attested to the assumption that as opposed to traditional system, automation makes information retrieval very easier and faster, thus, it is incumbent that Nigerian university libraries be automated. In the same view, the findings from table 1, 2 and 3 also agreed with the findings from Babafemi (2007) that observed that the use of computer technology in the circulation subsystem of the library of the Federal University of Agriculture, Abeokuta and all other libraries in general is inevitable for effective and efficient performance of the subsystem and that of the library system in general. From the above findings in relation to support from other literatures it is evident that circulation procedures employed in the university libraries; will yield better service delivery when automated.

Data were collected and analyzed on the problems militating against circulation subsystem in the University Libraries of North-Central Nigeria. The findings contained in table 4 revealed that there are numerous problems militating against manual circulation procedure such problems include that Fast report generation is not possible, Tracing a book on the library shelf is difficult, Information about issue/return of the books are not properly maintained, No central database can be created as information is not available in database, Difficulty in determining if a patron has overdue, the manual charging was characterized by long queues and unnecessary

delays, manual card systems basically provide just one access point, the due date is on a card that has been lost, It is possible to have two (or more!) cards for each item, Waste the users time, The process is cumbersome and Inefficiency in service delivery. This finding is supported by the assertion of Nkhoma (2003). Computerization of the processes of accessing information and technical services is the cherished goal of the library, especially in the circulation and cataloguing subsystems. With the finding of the study showing that: the manual charging was characterized by long queues and unnecessary delays, the filling of users' cards and keeping of statistics was not only cumbersome but also getting out of control as filing cards spills over to the next day on several occasions; that maintenance of manual card catalogue proved problematic, and that the control and maintenance of serials was cumbersome as a result of many records created. It is evident that this finding is heavily supported by the work of Olufeagba (1977) who says that circulation system involves the mechanization of activities such as "charging of books to users, renewing of books, processing, reservation, monitoring of utilization of books, operating short term loans of document processing, overdue notices and calculating fines, answering library queries, discharging returned materials and checking for possible hold request.

The finding shows that a lot of time is wasted in carrying out these functions manually. To solve these problems more hands are employed: but this does not help the situation as it only leads to increased budget for salaries and allowances of staff. With library automation the problem does not arise as it helps to save both library staff and users' time,

Data was gathered on the purpose(s) for the level of ICT skills of the librarians in the Libraries and analyzed. The findings of such analysis as contained in table 5 revealed that respondents have title or no skill in six of the items as: Software design, Software installation/operations, Web design, Digitization and imaging technology, Online cataloguing(MARC) and OCR Devices classification (NLM). It also revealed that respondents have low skill in automated circulation system and System analysis and design. However, the table indicated that most of the respondents have a very high skill in MSOffice, Database searching technique and Transformation of data.

These findings were supported by the findings of Obaje (2014) who opined that the computer literacy skills acquired mostly by library personnel where the use of Microsoft Office, followed by ability to use PowerPoint and ability to configure and troubleshoot computers and printers. Generally, the level of computer literacy skills of library personnel in University libraries of North-Central Zone, Nigeria is Low.

RECOMMENDATIONS

1. Libraries should encourage the production of local library application software by patronizing them and even be part of the software development
2. There is need for constant training and re-training of staff in the proper handling of Information and Communication Technology equipment and process so as not to run in to trouble.
3. Staff such as programmers, analysts, and operators should be employed to handle the computer system and train the librarians on basic trouble shooting.

4. ICT facilities and other equipment should be made available for staff at the circulation desk, while the outdated ones should be replaced.
5. Each university library should have a stand-by generator and UPS to guard against power failure and its damage of the automation equipment.

Limitation of the Study

This study encountered a number of limitations among which are: the choice of using purposive sampling techniques to select only those who have experience or have worked in circulation section from the overall population of the library personnel of the seven federal university libraries in North Central Zone, Nigeria was stressful as the researcher could not ascertain beforehand how many of the respondents have work or have experience of Circulation sub-section as sure the instrument was sent based on the entire Population. However, during the project development process, I have learnt a lot of new knowledge and programming code from this project. Besides that, there are also some problems that appears as biggest challenge during the development process. It was stress full for the researcher to combine Descriptive survey with R&D as it requires a lot of time and resources to achieve result.

CONCLUSION

The manual circulation subsystem adopted by the libraries studied has revealed a lot of challenges facing the sub system, library automation is capital intensive. Hence, it worth any amount spent on it. University administration should endeavour to provide enough fund for library automation. If this is done, the library can generate fund for the university through internet searches to users, online inter-library loans services at reasonable charges.

The purpose of this study was based on the development and validation of circulation software package for university libraries in federal universities of North Central Nigeria. The study has five purpose(s) and three research questions that guided it. However, in this study, literature were reviewed conceptually based on the research questions and empirically based on the relationship existing between the studies and the present study.

The software package is flexible and easy to use; all that require is for users to have internet browsing skills and access to internet facilities.

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APPENDIX

Development and Validation of Library Circulation Software Package

The developing process of the library circulation Software package will be carried out in this chapter as well as the system objectives and scope. Library Circulation Software Package is an online application and it is suitable to use by small, medium and large size library. It is used by librarian and library admin to manage the library using an online computerized system. The system is developed and designed to help librarian record every book transaction so that the problem such as file missing or record missing will be eliminated. The software is available online for access via this link: <http://www.libscp.com>

Book and member maintenance module also included in library circulation Software package. Librarians can register or edit the member or book in the system. With this computerized maintenance, libraries will not lose the book record or member record which always happen manual system. Users can check whether a particular book is available, borrowed out, at the comfort of their home via internet. Beside that activity log

Report is also provided by system so that admin can check what process has been carried out such as register new book, edit member information as well as login, logout information. All these modules are able to help librarian to manage the library more convenience and efficiently compare to those library without computerized system.

Project Aims and Objectives

The general purpose is the development and validation of circulation software package for university libraries in federal universities in North Central Nigeria.

The model specific aims and objectives intend to be achieved after successful completion of the Project is as follows

- To reduce the paper-work in library
- To record every book transaction in online system so that problem such as record file missing will be eliminated
- To design a user friendly graphical user interface which suit the u Book and member maintenance module also included in library circulation Software package. Librarians can register or edit the member or book in the system. With this computerized maintenance, libraries will not lose the book record or member record which always happen manual system. Users can check whether a particular book is available, borrowed out, at the comfort of their home via internet. Beside that activity log

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Project Aims and Objectives

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The model specific aims and objectives intend to be achieved after successful completion of the Project is as follows

- To reduce the paper-work in library
- To record every book transaction in online system so that problem such as record file missing will be eliminated
- To design a user friendly graphical user interface which suit the users

- To produce technical report that documents the phases, tasks and deliverables in the project
- To produce technical report that documents the phases, tasks and deliverables in the project

Project Scope

In this sub chapter, project scope discuss what modules were contains inside the library circulation Software package. For library circulation Software package, it is divided into online web site and library system. For my part, I was responsible for database while the online web site was carried out by my friend Olushola Gabriel

Outline of approach / Methodology used

The software used to develop Library Management System is Microsoft Visual Studio 2010 and wamp as the server On the other hand; the methodology I used to develop this system is waterfall model.

Waterfall model is one of a system development life cycle (SDLC) model. Users proceed to next phase if and only if current phase is complete. Users are not allowed go back to previous phases if there are any mistake that is why it was named waterfall model, just like the water is always fall down from the waterfall and not flow upward.

In Royce's original waterfall model, the waterfall model originally consists of 6 phases which are:

Requirement Specification, Design, Construction, Testing and Debugging, Installation and Maintenance.

System Design

This chapter will discuss about System Design phase which is one of the SDLC phase. The GUI design, database design will be carried out in this chapter.

External Interface Requirements

3.1.1 User Interfaces

Library circulation Software package is used by librarian and admin so it just simply designed and not colorful. The interface is user friendly and easy to use. This can be proving when user can know what the button's function is when he/she looks at the button. It is because the button's text is clear and easy to understand. For example when want to delete a record, I use 'Delete' as button's text and not 'Destroy' or 'Eliminate'.

Library Circulation Software Package (application used by librarian)

Normal level user

Login Page



Figure 1.1 Login Form

This is the login page for librarian and admin. The form is designed for use by librarian and admin which can be considered as backend. The login interface is simply design with ID and password textbox.

Main

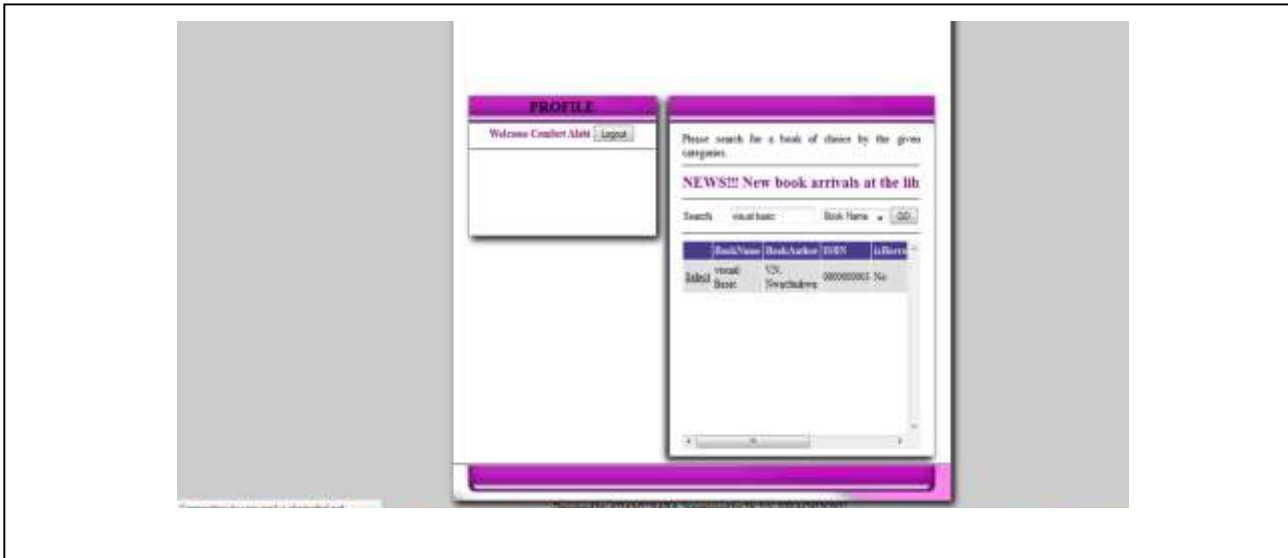


Figure 2.1 Library System Main Form

Figure 2.1 is the main page for library system. Here the form where book and user transaction module is carried out.

Library Detail Form

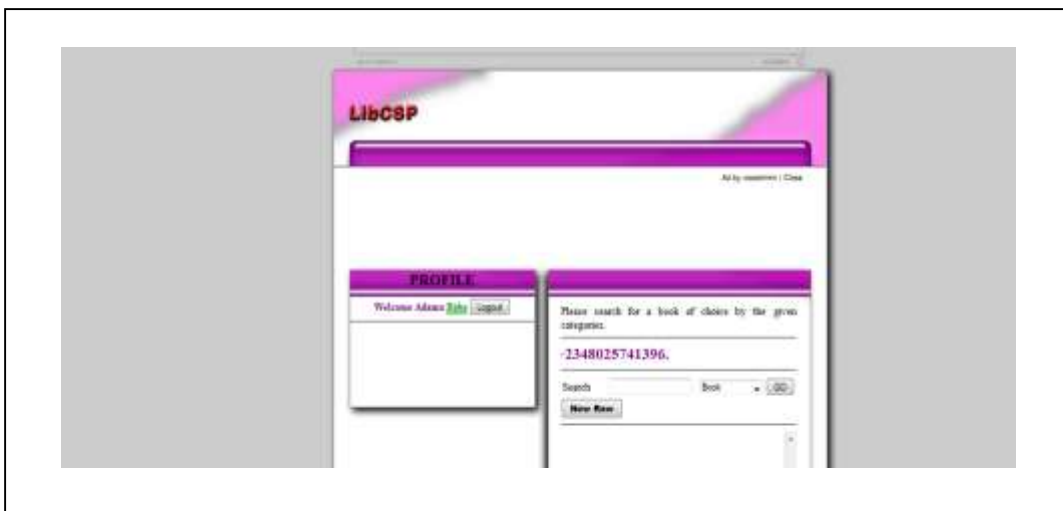
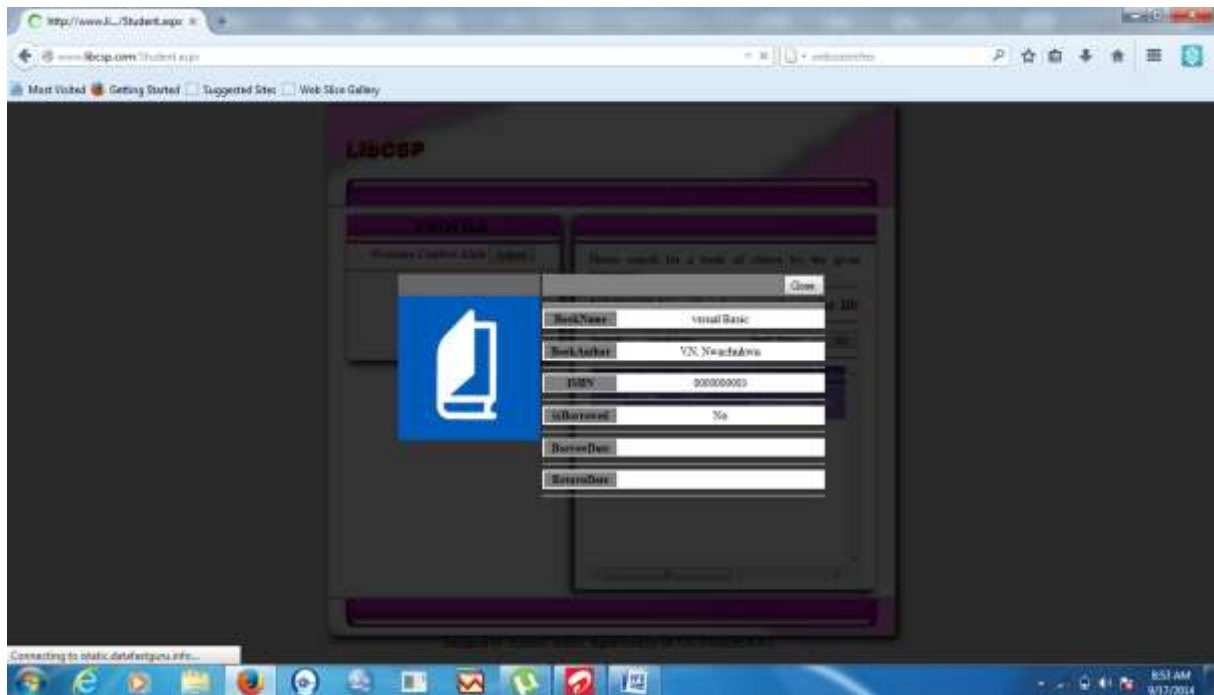


Figure 2.2 Library Detail Form

This form will be shown when admin user login for first time. The library detail must be entered to avoid some functional error. The form is small and full with the field needed. Most. A user searching for book visual basic authored by V.N. Nwachukwu or library management author by C.O. Omekwu will display below.



Book is available



Book is borrowed

Programming

This chapter discuss about the programming coding of the Library Circulation Software Package Different logic thinking and coding is required at development of the system. A lot of research has been done to enhance the efficiency when writing coding. Following would discuss the sample programming coding of VB.NET. See Appendix for detail.

System Testing

This chapter will show the test plan which programmer used to test the system. System Testing is an important phase in SDLC to ensure the system is bug free. If the system hasn't been test properly, user will meet a lot problem when using the system.

Conclusion

In this final chapter, the final evaluation and conclusion was performed on the testing and analyzing process that done in previous chapter including strengths, weakness and future enhancement of Library Circulation Software Package. In addition, personal reflection also include in final part of this chapter.

Web site validation

Online library Source code

```
!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
```

```
<html xmlns="http://www.w3.org/1999/xhtml">
```

```
<head><title>
```

```
</title><link href="StyleSheet.css" rel="stylesheet" type="text/css" /></head>
```

```
<body>
```

```
    <form name="form1" method="post" action="Default.aspx" id="form1">
```

```
<div>
```

```
<input type="hidden" name="__VIEWSTATE" id="__VIEWSTATE"
value="/wEPDwUIMTA1MDA3MzlkZLNq2C/MTjSYUNa0X6qnyKKAikIn" />
```

```
</div>
```

```
<div>
```

```

        <input type="hidden" name="__EVENTVALIDATION"
id="__EVENTVALIDATION"
value="/wEWBgLG3su+DgLMnJeIBgLWnKr2CgL8sbFyAvqN9PYLApDI2YUBdSbhbDG
ovOkTLNOFgtdMGGRergo=" />

```

```

</div>

```

```

<div>

```

```

    <table width="100%">

```

```

        <tr>

```

```

            <td></td>

```

```

            <td style="width:800px;">

```

```

                <div class="mainDiv">

```

```

                    <div style="width:800px;height:140px; background-
image:url('images/Library_Banner.jpg');">

```

```

                </div>

```

```

            <hr class="removeMargPad" />

```

```

        <div style="width:100%;min-height:300px; overflow:hidden;">

```

```

            <div style="float:left; width:100%;height:10px;"></div>

```

```

            <div style="float:left; width:25px;height:10px;"></div>

```

```

            <div class="loginDiv">

```

```

<div style="width:300px;height:200px;">

```

```

    <div id="ctlLogin1_panelLogin" style="height:200px;width:100%;">

```

```

        <div style="width:100%;height:40px;text-align:center;">

```

```

            <strong style="font-size:x-large;">LOGIN</strong>

```

```

        </div>

```

```

    <div style="width:300px;height:160px;">

```



```

        <span id="ctlLogin1_Label3" style="display:inline-block;font-
size:Large;width:100px;">User Type</span>

        <select name="ctlLogin1$DropDownList1" id="ctlLogin1_DropDownList1"
style="width:150px;">

            <option value="Student">Student</option>

            <option value="Librarian">Librarian</option>

        </select>

    </td>

    <td>

        &nbsp;</td>

</tr>

<tr>

    <td>

        &nbsp;</td>

    <td style="text-align: center">

        <hr />

        <input type="submit" name="ctlLogin1$Button1" value="Login"
id="ctlLogin1_Button1" style="width:100px;" />

    </td>

    <td>

        &nbsp;</td>

</tr>

<tr>

    <td>

        &nbsp;</td>

    <td style="text-align: center">

        <strong style="font-weight: bold; color: Purple">To Register, please visit the
library</strong>

```

```

        </td>

        <td>

            &nbsp;   </td>

        </tr>

    </table>

</div>

</div>

<script async src="//pagead2.googlesyndication.com/pagead/js/adsbygoogle.js"></script>
<!-- Side_Box1 -->
<ins class="adsbygoogle"
    style="display:inline-block;width:300px;height:250px"
    data-ad-client="ca-pub-7127556653267341"
    data-ad-slot="5836229835"></ins>
<script>
    (adsbygoogle = window.adsbygoogle || []).push({});
</script>
</div>

</div>

<div style="float:left; width:20px;height:10px;"></div>

<div class="infoDiv">

    <div style="width:100%;height:40px;text-align:center;">

        <strong style="font-size:x-large;"></strong>

    </div>

```

```
<div style="width:100%;text-align:justify; margin:10px 20px">

  <div style="width:90%"><strong style="font-size:medium; font-
weight:normal">Welcome to LibCSP Online. Here you can view all available books

    in the Library. You can know which is available for borrowing, which
has been taken and the return date.

    If you have borrowed any book from the library, please return in time,
others need

        them too. If return dates

            have been exceeded by you, you would be fined a penalty fee. So
please return books in time to

                avoid penalty fees. <hr />

                    Librarians can also login to manage book records and day to day
library transactions.<hr />

                        If you are new and wish to use this online library, please visit the
Library in person and get registered.</strong>

                            <hr />

                                <marquee behavior="scroll" direction="left" scrollamount="4"
style="color:Purple;font-weight:bold; font-size:x-large">NEWS!!! New book arrivals at the
library. | Books damaged in borrower's custody must be replaced or paid for by the borrow. |
For technical assistance, please call +2348036758480, +2348025741396.</marquee>

                                    <hr /></div>

                                        </div>

                                            </div>

                                                <div style="clear:both; width:100%;height:10px;"></div>

                                                    </div>

                                                        <hr class="removeMargPad" />

                                                            <div style="width:800px;height:50px; background-
image:url('images/Library_Footer.jpg');">

                                                                </div>

                                                                    </div>

                                                                        <div style="text-align:center">Designed by MUSA BABA. Supervised by Dr.
V.N. NWACHUKWU.</div>
```

```
</td>
<td></td>
</tr>
</table>
</div>
</form>
</body>
</html>
```