



## Development and Validation of Circulation Software Package for Libraries in Federal Universities of North Central, Nigeria

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#### ABSTRACT

In this study the development and validation of circulation software package for university libraries in Federal Universities of North Central Zone, Nigeria is investigated. Specifically, five purposes and three research questions guided the study. The study adopted descriptive survey and was carried out in North Central zone which has population of 155 comprising librarians and other library personnel who have worked in circulation department from seven federal university libraries in the study area. The study used purposive sampling technique to sample librarians and other library personnel. From the above population one hundred and eight (108) questionnaires were filled and utilized; representing a return rate of 70%. Collected data were analyzed 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 the federal university libraries 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 also revealed numerous problems associated with the manual circulation procedure. 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, and classification. On the other hand, other respondents have low skill in automated circulation system and system analysis and design. However, the findings indicated that most of the respondents have a very high skill in Microsoft Office, database searching technique, and transformation of data. The researchers made appropriate recommendations which include encouraging the use of in-house library application software. Accordingly, in this study, an online application for circulation was developed.

**Keywords:** Libraries, Circulation software package, Software development, Validation.

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### I. Introduction

University libraries serve as a centre for knowledge creation and service a wide range of knowledge seekers. They can be described as the heart of the university, since they provide research environment for students and faculty member to do their research and advance their knowledge. The university library play a fundamental role of collecting, processing, storing, disseminating and utilizing information to provide services to the academic and scholarly community. Librarians renders several services, ranging from circulation, acquisition, cataloguing, serial and reference services to their client in order to satisfy their varying needs and interests. Both the students and researchers relied heavily on the library for

information while pursuing their individual and collective goals.

University libraries service different kinds of users' which include the academic staff, students and research fellows, among others. Ifidon in addition to Okoli (2002) assert that academic institutions of higher learning have five characteristics: prosecute, promote, in addition to share know-how; offer intellectual authority; manpower development; promote cultural in addition to financial modernization; promote regional and inter-continental comprehension. Hence, the characteristics of university libraries include, the provision of materials for students to assist in writing term papers, and projects, also to supplement reading through Circulation Department, assist in collaborative investigation; facilitate interlibrary loan, creating awareness on new area of knowledge and

link up with other libraries to share knowledge.

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, 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).

According to Babafemi, Saliu, and Otenekwu (2013) circulation service is more or less the public relation section of the library. That is, it is a part of the functions of the library system that allows the library to achieve its goals. Books and equipment, no matter how adequately provided, do not make a library, but how well the library image is promoted and used. 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 loaning out books to borrowers and then reshelving them accurately upon returned so that they will be accessible by the next user. This basic routine has attached to it many activities such as the record-keeping process and sub cycles such as those for overdue and holds. These sub routines differs from library to library, but the basic routines remains the same in every library that allows users to remove books”.

In a bid to keep accurate records of library materials different kinds of circulation systems have been design. Many of them have concentrated on four objectives: to provide a user friendly system for users to use and library personnel to manipulate, to save users time, to fasting up the activities of checking in and out; to minimize costs and to relieve librarians cumbersome professional work. Various kinds of library circulation control are utilized in varieties of library depending mainly on size and ease of use. Well-known among these are: the Browne method, the Newark method, automated method, on-line and book card method. The libraries in this study use the Newark method that enables the client to tender his/her card, and collects and files the borrowers' cards and slips before charging out the book.

The application of computer technology into the library system has revolutionized the operations and use of libraries. With the advent of this technology, resources needed for teaching and research has become easily accessible, more than ever before, Nigerian university libraries have developed interest in the use of modern technology to enhance their productivity and improve their services. The advantages of library software as

follows:

- It allows users quick access to library materials;
- It eliminates manual activities or performs them more efficiently;
- It limits the amount of time spent on material acquisition, serials controls, budget management and record tracking;
- It provides new means of information retrieval by exposing users to world information resources;
- It allows users to use search strategies that exceed those that can be used with card catalogue;
- It enables users to search library's collection from remote locations;
- It empowers users with information related problem solving skills, and provides lifelong learning experiences.

Computerization of the processes of accessing information and technical services is the cherished goal of the university libraries, especially in the circulation and cataloguing subsystems. According to Babafemi and Adedibu (2007) 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. 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 problems will not arise as it helps to save both library staff and users' time (Ossai-Ugbah, 2010).

The study is conducted in Federal University Libraries of North-Central Zone of Nigeria. These are composed of Kogi, Benue, Nasarawa, Kwara, Niger and Plateau States and the Federal Capital Territory, 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, 2016). Subsequently, some of these Federal University libraries in the study area at one time or the other have implemented software package for their house-keeping operations especially 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.

## **II. 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, lack of effective information access points which result in time consuming, limited processes for determining the circulation status of a given item, the tendency of misfiled records, it is difficult to provide a list of all items they have currently charged, users can be notify of pending due dates, the manual statistics makes it difficult to determine if a user has overdue or other lost items which should prevent them from being able to borrow more materials due to poor circulation system. Hence, there is a 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.

## **III. Aim of the Study**

The study is aimed at the investigating the library circulation procedure 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.

## **IV. Research Questions**

The study is guided by the following research questions:

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?

## **V. 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 challenging 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. Finally, it was stressful for the researcher to combine descriptive survey with research and development (R&D) as it requires a lot of time and resources to achieve result.

## **VI. Literature Review**

University libraries exist so as to serve lecturers, administrative staff, students, researchers and the entire University community. According to Fijeh (2011), university libraries are essential part of a university organization which strives to advance the functions of its parent institution. Kumar (2006) assert that a university is established to perform the functions of Teaching, Research, Publications, Conservation of knowledge and ideas and Extension services (Ifijeh, 2011). Library circulation refers to activities such as charging and discharging of library materials to users. According to Battaile (1992) circulation in a library is the orderly movement through a circuit, as it relates to the charging and discharging of books to borrowers for easy retrieval by the next user. The cycle involves record keeping processes and sub cycles such as those for overdue and holds. However, these vary from library to library.

In recognition of the important services rendered by the Library, it should be noted that circulation and reference services are really important. Alokun (2003) depicted library should provide a user friendly environment to its users that will satisfy their varying needs. In the same way Madukoma (2011) in Karki (2006) described service centres as a powerful resource equivalent to other natural resources. He noted that the choice of effective service delivery in the library depend solely on the circulation desk. 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 few years back, paper cards and ink stamps were the primary method by which books were tracked, today, most librarians use computerized circulation systems to simplify book management. Librarians also make policies about lending time and renewals and establish rules governing computer use if they provide computer access. 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.

Computerization of University library in Nigeria has been on board. As asserted by Abolaji (2000) the

significant work on computerizing stockpile services were only available in the actual 1990s. He stated that digitization of library services started in 90s. He stress further that that actual digitization process was stalled due to inadequate findings and technical competence. Khalid (2000) observes that networked and computerized functions bring the experiences of the evolution of libraries in developed countries. University libraries in Nigeria have been trying to catch up with their counterparts in the developed countries. University library automation in Nigeria started automation process in the late 1980s, with various stages of computerization of library services.

The National Universities Commission (NUC) introduces Management Information Systems (MIS) which gave birth to all Nigerian Universities Network (NUNET) project. With the sole aim of providing a reliable internet connectivity among universities with aim of providing enhanced access to libraries worldwide and for sharing available resources with libraries all over the world using digital technology. Basically, the objectives of the project are to improve on the quality of teaching and research in institutions of higher learning in Nigeria through the provision of library resources and to enhance access to university libraries serving the education community in Nigeria to global world (Nok, 2006).

Egunjid and Awoyemi (2012) opined that computerization will enhance library's services to the academic community. They further stress that library staff enjoy working in an automated environment and the patrons enjoy services rendered using an OPAC instead of a card catalogue. They also stated that library computerization will address the problem of manual processing of materials.. They also observed that using KOHA ILS which is an open source ILS will help to solve one of the major problems of library computerization in Nigeria which is funding. In a survey of the factors affecting actual system use, Akinbobola and Adeleke (2013) submitted that that user friendliness, supportive management, and computer self-efficacy actually, influenced library personnel's use of the KOHA software system.

Obajemu et al. (2013) investigated a study on library software products in Nigeria: The purpose of the study was to create awareness on the existing software in Nigeria so as to enhance quality selection. The finding provides librarians with pragmatic steps to take when making choices and highlights the operational problems associated with library software. The study not only discusses problems associated with software installations but also suggests ways out of them. Finally, the study makes recommendations.

## **VII. Research Method**

The study adopted descriptive survey at first after which it will adopt R&D. Gall and Borg (2007) explained R&D as an industry-based development approach involving the use of research findings to design and develop new programs and material which assist in knowledge and skills. To some researches, this design is called functions of industry design. R&D provides valuable means of achieving educational improvement

and that it equally ensures that educational products in use are of proven quality. Therefore, R&D is suitable for this study because it is designed for the development and validation of circulation software package for libraries. 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 155 librarians and other library personnel. The instrument used for data collection is structured questionnaire. Data collected were analyzed using mean, frequency and percentage count.

### **a. Data Analysis and Interpretation**

This section 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 1:** What is the circulation procedures employed in the university libraries? Table 1 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 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 manually.

Table 3 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 revealed that majority of the respondents indicated that all the items listed above are the various problems associated with manual circulation procedures with the mean scores above 2.50 set as criterion level for accepting an item.

Therefore, the researcher concludes 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 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 Microsoft Office, 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.

TABLE I  
THE PROCEDURES FOR REGISTERING USERS AT THE CIRCULATION DESK IN UNIVERSITY LIBRARIES OF NORTH CENTRAL ZONE, NIGERIA

S/NO	UNIVERSITIES	FUT MINN A N =24	UNI JOS N =15	UNI ABUJ A N =12	UNI ILORI N N = 18	UNI AGRIC MAKUR DI N =13	FED UNI LOKOJ A N =16	FED UNI NASSA RAWA N =10		
	Registration Procedure	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Cluster Mean	Decision
1	<i>Present their admission letters school fees payment receipt and users passport</i>	3.8	3.9	3.9	4.0	3.9	4.0	3.7	3.89	Accepted
2	<i>Issue form to the users with registration under number</i>	3.8	3.9	3.8	3.9	3.9	4.0	3.3	3.81	Accepted
3	<i>Return it to the circulation desk for processing</i>	3.8	3.8	3.8	3.9	4.0	3.9	3.7	3.87	Accepted
4	<i>Issue of library ID card to users</i>	3.5	2.8	3.1	2.8	3.3	2.8	3.2	3.10	Accepted

ABUJA = University of Abuja, UNI ILORIN = University of Ilorin, UNI AGRIC MAKURDI = University of Agriculture Makurdi, FED UNI LOKOJA= Federal University Lokoja, FED UNI NASSARAWA = Federal University Nassarawa N= Number of Response

TABLE II  
THE PROCEDURES FOR CHARGING OUT ITEMS TO USERS AT CIRCULATION DESK IN UNIVERSITY LIBRARIES OF NORTH CENTRAL ZONE, NIGERIA

S/NO.	UNIVERSITIES	FUT NMIN NA N =24	UNI JOS N =15	UNI ABUJ A N =12	UNI ILORI N N = 18	UNI OF AGRIC MAKU RDI N =13	FED UNI LOKOJ A N =16	FED UNI NASSARAW A N =10	Cluster Mean	Decision
	Registration Procedure	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Cluster Mean	Decision
1	<i>The borrower presents his or her identification card</i>	2.7	3.2	2.4	3.2	2.4	2.9	3.3	2.86	Accepted
2	<i>retrieves the material(s) from the shelf of the Library</i>	3.6	3.8	3.8	3.3	3.6	3.8	3.3	3.59	Accepted
3	<i>He/she brings it to the circulation desk along with the Library identity card</i>	2.9	3.3	2.9	3.0	3.4	2.8	3.4	3.07	Accepted
4	<i>certifies the fitness of the material for lending</i>	3.4	4.0	4.0	3.7	3.7	3.8	3.9	3.73	Accepted
5	<i>Issues borrowers' slip(s) and the book (pink) card(s)</i>	3.6	3.9	3.3	3.8	3.9	3.7	3.4	3.68	Accepted
6	<i>Patron completes the slip(s) and the book card(s)</i>	3.5	4.0	4.0	3.5	3.5	3.8	3.5	3.68	Accepted
7	<i>Staff stamps the material with the date due stamp then releases the material to the users.</i>	3.8	4.0	3.9	3.8	3.9	4.0	3.6	3.87	Accepted

TABLE III  
THE PROCEDURES FOR DISCHARGING AND RENEWING ITEMS AT THE CIRCULATION DESK

S/NO.	UNIVERSITIES	FUT NMIN NA N =24	UNI JOS N =15	UNI ABUJA N =12	UNI ILORIN N = 18	UNIOF AGRIC MAKURD I N =13	FEDUNI LOKOJA N =16	FEDUNI NASSAR AWA N =10	Cluster Mean	Decision
	Procedure for discharging out items	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Cluster Mean	Decision
1	<i>Borrower must tender his/her Library Identity card</i>	2.6	2.5	2.6	3.2	2.8	3.1	4.0	2.9	Accepted
2	<i>Staff on duty examines the book</i>	3.8	3.9	3.8	3.9	3.2	3.3	3.2	3.6	Accepted
3	<i>Retrieves the borrower's slip and book card</i>	3.7	3.9	3.6	3.6	3.7	3.9	3.5	3.7	Accepted
4	<i>Confirm the date due and crosses it out in the presence of the borrower.</i>	3.5	3.8	3.8	3.9	4.0	3.9	3.7	3.8	Accepted
5	<i>If overdue, fine is calculated for the defaulter</i>	3.2	2.8	3.1	2.8	3.3	2.9	3.2	3.0	Accepted
6	<i>If it is for renewal, it will first be discharged and then charged out, if there is no awaiting request on that item.</i>	3.0	3.3	2.4	3.2	2.4	2.9	3.3	2.9	Accepted
7	<i>If returned, the book card is inserted in to the book pocket and the book is passed to the stack for onward transmission to the shelve</i>	3.6	3.8	3.4	3.3	3.6	3.8	3.2	3.5	Accepted

TABLE IV  
PROBLEMS MILITATING AGAINST CIRCULATION SUBSYSTEM IN THE UNIVERSITY LIBRARIES

S/NO	UNIVERSITIES	FUT NMIN NA N =24	UNI JOS N =15	UNI ABUJ A N =12	UNI ILORI N N = 18	UNI OF AGRIC MAKU RDI N =13	FED UNI LOKOJ A N =16	FED UNI NASSARAWA N =10	Cluster Mean	Decision
	<i>Problems militating against circulation procedures</i>	Mean	Mean	Mean	Mean	Mean	Mean	Mean		
1	<i>Slow report generation</i>	3.9	3.7	3.9	3.8	4.0	3.9	3.7	3.9	Accepted
2	<i>Tracing a book on the library shelf is difficult.</i>	3.8	3.9	3.9	3.6	3.9	4.0	3.5	3.7	Accepted
3	<i>Information about issue/return of the books are not properly maintained</i>	3.6	2.3	2.9	2.8	2.8	2.8	3.4	3.9	Accepted
4	<i>No central database can be created as information is not available in database.</i>	3.7	3.8	3.9	3.9	3.9	3.7	3.9	3.8	Accepted
5	<i>Difficulty in determining if a patron has overdue</i>	3.8	3.6	4.0	4.0	4.0	3.8	3.4	4.0	Accepted
6	<i>The manual charging was characterized by long queues and unnecessary delays</i>	3.2	2.8	3.8	3.9	3.8	3.9	3.7	3.9	Accepted
7	<i>Manual card systems basically provide just one access point</i>	4.0	3.9	3.9	4.0	4.0	4.0	3.7	3.7	Accepted
8	<i>The due date is on a card that has been lost</i>	3.8	3.9	3.8	3.9	3.8	4.0	3.3	3.8	Accepted
9	<i>It is possible to have two (or more!) cards for each item</i>	3.6	3.9	3.6	3.4	4.0	3.9	3.5	3.7	Accepted
10	<i>Waste the users time</i>	3.8	3.8	3.8	3.9	4.0	3.9	3.7	3.9	Accepted
11	<i>The process is cumbersome</i>	3.5	2.8	3.1	2.8	3.3	2.9	3.2	3.1	Accepted
12	<i>Inefficiency in service delivery</i>	2.7	3.2	2.4	3.2	2.4	2.9	3.3	2.9	Accepted

TABLE V  
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	FREQ UENC Y	%	FREQ UENC Y	%	FRE QUE NCY	%	FRE QUE NCY	%	
1	<i>Software Design</i>	11	10%	26	24%	15	14%	56	52%	No Skill
2	<i>Software Installation / Operations</i>	1	1%	10	9%	6	6%	91	84%	Very Low Skill
3	<i>Web Design</i>	1	1%	9	8%	14	13%	84	78%	Very Low Skill
4	<i>Digitization and Imaging Technology</i>	4	4%	7	6%	9	8%	88	81%	Very Low Skill
5	<i>Online Cataloguing(MARC)</i>	1	1%	3	3%	5	5%	99	92%	Very Low Skill
6	<i>Online Classification</i>	12	11%	36	33%	9	8%	51	47%	Very Low Skill
7	<i>Automated Circulation System</i>	6	6%	5	5%	97	90%			Very Low Skill
8	<i>System Analysis and Design</i>	5	5%	7	6%	96	89%			Very Low Skill Dissatisfied
9	<i>Networking</i>	3	3%	3	3%	4	4%	98	91%	Very Low Skill
10	<i>Microsoft Office</i>	56	52%	14	13%	16	15%	22	20%	Very High Skill
11	<i>Database Searching Technique</i>	93	86%	12	11%	2	2%	1	1%	Very High Skill
12	<i>Transformation of Data</i>	96	89%	6	6%	4	4%	2	2%	Very High Skill
13	<i>OCR Devices</i>	1	1%	8	7%	29	27%	70	65%	Very Dissatisfied

### VIII. Evaluation of the Findings

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 R&D design 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 are 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 our information and communication technology (ICT) age, Omekwu (2010) explained that academics Libraries are generally critically tucked within the globe, associated with worldwide connectivity. This particular affirmation underscores the importance associated with academics Libraries services. In the same vein Adegboro (2010) advocated 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 Tables 1, 2 and 3 also agreed with the findings from Babafemi and Adedibu (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;

- Slow report generation;
- Data about charging/discharging of books are not well managed;
- There is no centralized database for managing information available among others;
- Tracing a book on the library shelf is difficult;
- Information about issue/return of the books are not properly maintained;
- Manual charging characterized by long queues and unnecessary delays;
- Manual card systems basically provide one access point and it is possible to have two or more cards for each item;
- The process wastes the users' time.

To sum up, 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 Microsoft Office, 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 Microsoft 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.

## **IX. Development and Validation of Library Circulation Software Package**

The overall purpose is to improve and also validate charging and discharging systems at the circulation desk of university libraries in North Central Zone, Nigeria. The model purpose is to achieve efficient result such that the lapses associated with the manual procedure will be completely eliminated. A lot of research has been done to enhance the efficiency while coding. The application was evaluated, tested, to identify its strength, weakness and future use of the Library Circulation Software Package. The automated Software program is hosted online which is suitable to use by libraries irrespective of size. It is a user friendly application for librarians to manage the circulation systems of the library. The system is designed to help librarian history each and every publication exchange to avoid dilemma such as record lost will be eliminated. The program can be access online via this website link: <http://www.libscp.com>

The interface is user friendly and easy to use. It allows users to know what button's function he/she looks at the button. Book and new member component Librarians can easily register and edit the new member or book inside the program. Library circulation software package is user-friendly and has a simple and colourful design. Figures 1 and 2 show the login page for librarian and admin. The form is designed for use by librarian and admin which can be considered as backend. Therefore, the design of the login interface is simple. Figure 3 shows the form which 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 fields needed. Figures 4 and 5 show how a book is borrowed.

Fig. 1. Login form.

Fig. 2. Entering username and password.

Fig. 3. User profile form.

Fig. 4. Book is available.

Fig. 5. Book is borrowed.

## X. Recommendations

Based on the findings in this study, following recommendations can be made.

1. Libraries should encourage the production of local library application software and even be part of the software development.
2. There is a need for constant training and re-training of staff in the proper handling of ICT 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 troubleshooting.
4. ICT facilities and other equipment should be made available for staff at the circulation desk, white 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.

## XI. Conclusion

The manual circulation subsystem adopted by the libraries in Federal Universities of North Central, Nigeria has revealed a lot of challenges facing the subsystems and library automation systems are generally costly. Hence, university administration should endeavour to provide enough funding for library automation systems. Library automation systems provide many benefits. For instance, if there is a library automation system in use, online inter-library loans services can be provided at reasonable charges.

The purpose of this study was based on the development and validation of circulation software package. The study has five purposes and three research questions that guided it. However, in this study, literature

was reviewed conceptually based on the research questions and empirically on the relationship existing between the previous studies and the present study. Based on the findings in this study, a software package was developed. The software package is flexible and easy to use.

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