ASSESSMENT OF LIBRARY APPLICATION SOFTWARE PACKAGES FOR LIBRARY OPERATIONS AND SERVICES IN FEDERAL UNIVERSITY LIBRARIES IN NORTH WESTERN STATES OF NIGERIA

BY

RACHAEL AYODELE
MSC/EDUC/2989/2009-2010

A THESIS SUBMITTED TO THE SCHOOL OF POSTGRADUATE STUDIES
AHMADU BELLO UNIVERSITY, ZARIA
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF MASTER OF INFORMATION SCIENCE

DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE
FACULTY OF EDUCATION
AHMADU BELLO UNIVERSITY, ZARIA

SEPTEMBER, 2015

DECLARATION

I declare that this thesis titled "Assessment of Library Application Software Packages for Library Operations and Services in Federal University Libraries in North Western States of Nigeria" has been written by me under the supervision of Professor Zakari Mohammed and Dr Ezra Shiloba Gbaje. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for any form of degree or Diploma at any University.

RACHAEL AYODELE ---------- ----------
Name of Student Signature Date

CERTIFICATION

This is to certify that this thesis titled "Assessment of Library Application Software Packages for Library Operations and Services in Federal University Libraries in North Western States of Nigeria" by Rachael Ayodele has met the requirements governing the award of the degree of Masters in Information Science of Ahmadu Bello University, Zaria and is hereby approved for its contributions to knowledge.

_____ _____

Prof. Zakari Mohammed Date
Chairman, Supervisory Committee

_____ _____

Dr Ezra Shiloba Gbaje Date
Member, Supervisory Committee

_____ _____

Abdullahi I. Musa PhD Date
Head of Department

_____ _____

Prof. Kabiru Bala Date

Dean, Postgraduate School

DEDICATION

This work is dedicated to the Almighty God, who is my protector, provider and my all in all. To the evergreen memory of my beloved mother Mrs Maria Ayodele who did not wait to eat the reward of her labour, may her soul rest in peace amen.

ACKNOWLEDGEMENTS

I wish to express my profound gratitude to God for sparing my life and making it possible to write this thesis.

I sincerely thank the Chairman, Supervisory Committee, Professor Zakari Mohammed for his tireless contributions and support towards the success of this work. I also wish to appreciate Dr Ezra Gbaje S, Member, and Supervisory Committee for his scholarly inputs, mentorship and corrections.

My appreciation goes to the entire staff of Library and Information science A.B.U Zaria: Dr Abdulllahi Musa my H.O.D and Acting University Librarian, Prof. Tijjani Abubakar Dean Faculty of Education, Dr. Baba S Aduku, Dr Abu Yusufu, Dr. Umar Babangida Dangani, Dr Umar Lawal, Mal. Habibu Mohammed, Mal. Abdulkadir Aliyu, Mal Hayyattu Musa, Dr Mrs H.M Daudu , Mrs Mohammed Fatima and all the Academic staff of the Department, for their Mentoring, corrections and inputs during defenses and course work.

I owe special thanks to my Dad Mr. Sunday Samuel Ayodele and my Siblings for their love, prayers, moral support and encouragement. Also my appreciation goes to my church members especially Arc. John Ayanwole, Pastor E. Alalade, Engr Moses Osigwe , Dn Dabo Ishaya and my church Pastor Rev Niyi Odewole for their prayers and encouragement.

I also owe thanks to all my course mates most especially Michael Esew, Godwin Amidu, Andrew Isibor, and Kudirat Abiola Adegoke for their support, encouragement and concern. Worth mentioning is the effort of Mr Joel Udeh, Mal Kabiru Ubale Funtua, Mustapha Haruna and Mohammed Kpakiko for their readily support in making the collection of data for analysis in their institutions smooth.

Special thanks to Dansadau Bala Mohammed of FIRS your encouragement and support is well appreciated.

Finally, I wish to register my appreciation to my colleague in Quality Assurance Unit Mal Suleiman Sambo for his moral support and encouragement throughout this program and all well wishers who supported me in one way or the other but whose names are not mentioned here. May God graciously bless you real good

ABSTRACT

The study Assessment of Library Application Software Packages for Library Operations and Services in Federal University Libraries in North Western States of Nigeria was conducted to assess automation of library operations and services in Nigerian University Libraries. This is because efforts are being put forward to improve on the library operations and services from being manually driven to electronically driven where information work is most done traditionally. Application of library management Software to library services could facilitate effective participation in the information sharing methods. Four objectives were achieved by formulating and answering four research questions for the study. The objectives were to find out the types of application software packages available for library operations and services in federal university libraries in North Western states of Nigeria, identify the criteria that influenced the choice of software, find out the ICT infrastructure and strategies put in place for the sustainability of the software packages and to ascertain the challenges affecting the full implementation and utilization of automation software packages in federal university libraries, Survey method was adopted for the study. The research instruments used to collect data for the study were questionnaire and interview. Purposive sampling technique was used to select 218 sample subjects from five federal universities where library automation has begun. That is 113 subjects from Ahmadu Bello University, Zaria, 36 from Bayero University, Kano, 34 from Usmanu Danfodiyo University, Sokoto, 15 from Federal University Dutsinma, Katsina State and 20 from Federal University, Dutse, Jigawa State. Data were presented in frequency tables and percentages. Analysis and discussions were made to each table. Findings of the study revealed that all university studied are making use of KOHA, Virtua and E-lib as well as DSpace and Greenstone to manage their digital information resources, that available module, functionality and open source features are some of the criteria used to choose the software packages. Again the finding revealed that all universities have put in place high-speed Internet connectivity, high capacity bandwidth, Institutional websites and are also conducting appropriate training at the introduction of the software, purchase after study and evaluation of software and are involving library staff in the acquisition and management of the software packages. The study concluded that these universities are confronted by inadequate funding; inadequate technical expertise and rapid software obsolescence were discovered as bane to successful implementation of automation software application packages. Based on these findings several recommendations were made such as the need to apply other Inter library loan software for Serial Management software, Reference Management Software; Digital Management software as far as information delivery is concerned, the need to consider major factors such as the Knowledge on how to identify software available in the Market, cost features, product quality, and compatibility with other programs, data migration or data transfers, record of vendor, operational efficiency, should put in place state-of-the-art ICT infrastructure such as functional library porter and high capacity server machine. In addition, university libraries should involve library staff in the process of procuring and managing library application software packages, interact with vendors and also involve library staff in decision making as part of strategies for the sustainability of library application software packages in the library and need to procure standard ICT facilities and power backups such as power inverter to complement standby generators and National Power Supply Companies in order to have up and running library automation system in federal university libraries.

TABLE OF CONTENTS

TITLE PAGE ---------- i

DECLARATION ---------- ii

CERTIFICATION ---------- iii

DEDICATION ---------- iv

ACKNOWLEDGEMENT ---------- v- vi

ABSTRACT ---------- vii

TABLE OF CONTENTS ----------viii–xi

CHAPTER ONE: INTRODUCTION

1.1 Background to the Study ---------- 1

1.2 Statement of the Problem ---------- 8

1.3 Research Questions ---------- 9

1.4 Objectives of the Study---------- 9

1.5 Significance of the Study ---------- 10

1.6 Scope of the Study ---------- 10

1.7 Assumptions of the Study ---------- 11

1.8 Operational Definition of Terms ---------- 11

REFERENCES ---------- 13

CHAPTER TWO: REVIEW OF RELATED LITERATURE

2.1 Introduction ---------- 15

2.2 Types of Library Application Software Packages Being Used in University Libraries -- 16

2.3 Criteria that Influenced the Choice of Library Application Software in University Libraries ---------- 29

2.4 ICT Infrastructure and Strategies Put in Place to Ensure Sustainability of Library Application Software in University Libraries ---------- 34

2.5 Challenges to the effective use of Library application software Packages in University Libraries ---------- 38

2.6 Summary of Literature review ---------- 41

REFERENCES ---------- 43

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction ---------- 48

3.2 Research Methodology ---------- 48

3.3 Population of the Study ---------- 49

3.4 Sample and Sampling Technique ---------- 49

3.5 Instrument for Data Collection ---------- 50

3.5.1 Validity of the Research Instrument ---------- 53

3.5.2 Reliability of the Research Instrument ---------- 53

3.6 Procedure for Data Collection ---------- 54

3.7 Data Analysis Technique ---------- 54

REFERENCES ---------- 55

CHAPTER FOUR: DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction ---------- 57

4.2 Response Rate ---------- 57

4.3 Data Analysis ---------- 58

4.3.1 Library Application Software Packages being used for library operations and services in the Federal University libraries in the North Western States of Nigeria ---------- 58

4.3.2 Criteria that Influenced the Choice of Library Application Software Packages that are Being Used in the Federal University Libraries in the North Western States of Nigeria - --- 61

4.3.3 ICT Infrastructure and Strategies Put in Place to Ensure Sustainability of Library Application Software in Federal University Libraries in North Western States of Nigeria -- 63

4.3.3 Criteria for Selection of Digital Asset Management Software for Digitisation Projects in Nigerian University Libraries ---------- 65

4.3.3.1 Challenges to the effective use of Library application software Packages in Federal University Libraries in North Western States of Nigeria ---------- 68

REFERENCES ---------- 71

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction ---------- 72

5.2 Summary of the Study ---------- 72

5.3 Summary of Findings ---------- 73

5.4 Conclusion ---------- 74

5.5 Recommendations ---------- 75

5.6 Recommendations for Further Studies ---------- 77

BIBLIOGRAPHY ---------- 78

APPENDIX A ---------- 86

APPENDIX B ---------- 87

APPENDIX C ---------- 93

APPENDIX D ---------- 94

LIST OF TABLES

Table 3.1 Distribution of the Population ---------- ---------- 49

Table 3.2 Showing Sample Size for the Study ---------- 49

Table 4.1 Response Rate ---------- 57

Table 4.2 Integrated Library Management Software Packages Being Used for Library Operations and Services in the Federal University Libraries in the North Western States of Nigeria ---------- 59

Table 4.3 Digital Management Software Packages Being Used for Library Operations and Services in the Federal University Libraries in the North Western States of Nigeria ---- 60

Table 4.4 Criteria that Influenced the Choice of Library Application Software Packages for Library Operations and Services in Federal University Libraries in the North Western States of Nigeria ---------- 62

Table 4.5 ICT Infrastructure Put in Place to Ensure Sustainability of Library Application Software Packages in Federal University Libraries in North Western States of Nigeria- 64

Table 4.6 Strategies Put in Place to Ensure Sustainability of Library Application Software Packages in Federal University Libraries in North Western States of Nigeria ---------- 66

Table 4.7 Challenges to the effective use of Library application software Packages in Federal University Libraries in North Western States of Nigeria ---------- 69

LIST OF ABBREVIATIONS

ABU	Ahmadu Bello University
AFL	Abdullahi Fodio Library
BUK	Bayero University Kano
BUL	Bayero University Library
CDS/ISIS	Computer Documentation System Integrated Set for Information systems
DLMS	Digital Library Management Software
FUDML	Federal University Dutsinma Library
FUJL	Federal University Jigawa Library
FUT	Federal University of Technology
GDP	Gross Domestic Product
ICT	Information and Communication Technology
ILL	Inter-Library Loan
ILS	Integrated Library Software
IITA	International Institute of Tropical Agriculture
KIL	Kashim Ibrahim Library
LASP	Library Application Software Package
MARC	Machine Readable Catalogue
NUC	National University Commission
OPAC	Online Public Access Catalogue
OSS	Open Source Software
PCS	Personal Computers
TINLIB	Triangulated irregular network Library
UDUS	Uthman Don – fodio University
UNESCO	Unesco Nations Educational Scientific and Cultural Organization

VTLS	Virginia Tech Library Software
WEBOPAC	Web Open Access Catalogue

CHAPTER ONE
INTRODUCTION

1.1 Background to the study

Library as an organization is involved in information creation, processing, organizing, storing, disseminating and utilization. It therefore becomes necessary for library to produce tools and systematic procedures for all activities so as to provide effective information management. The idea of computerization of library gave birth to the development of library application software packages.

Library Application Software no doubt offers information managers many opportunities to improve Library services to their client. It makes information resources easier to be located and retrieved. Also, it enables library staff to serve library patrons better by facilitating execution of multitude operational tasks such as cataloguing, acquisition, circulation, OPAC, management of e-resources and reference services among others with less stress. Borgman (1997) remarked that library application software first flourished in the 1960's being a period of expansion in higher education and increasing funds for library collections. As the rate of publication increased, libraries realized that they could not acquire and process materials fast enough with traditional manual systems and that automation could help to control costs on labour-intensive operations. He added that the goals for library application software for libraries include:

i. Efficiency of internal operations,

ii. Access to local library resources

iii. Access to resources outside the library

iv. To achieve the interoperability between information systems necessary to build a global information infrastructure.

In his contribution to library software, Gbaje (2007) stated that the use of library application software in university libraries has evolved from managing internal library operations to providing access to information and information resources in various formats and in many locations through a combination of Information and Communication Technologies (ICT). Following this development, there is a paradigm shift from local collections to global information access, thus making it possible for the removal of geographic constraints to library services.

1.1.1 Library operations and routines

Generally, a typical Library performs series of routines to ensure that the users are served better and all sections of the library function well. A library Operation is activities carried out to achieve the desired goals, mission and objectives of a library. Francis (2012) noted that the basic operations of a library are acquisition, online access catalogue, circulation, serials control, Information services, and reporting etc. Library and Information service centre managers carry out series of activities to make the library function and to control or manage the library.

Ibrahim (n.d) categorized the following Library activities into three library routines:

Managerial operations routine: involves planning, organizing and controlling the library activities, which can make library to attain its objectives. Libraries are structured according to divisions, units or sections such as acquisition, cataloguing, reference, serials, to provide quality services.

Public service routine: involves activities performed directly to the users of the library. They include readers' services, circulation desk, reference services at information units. These services are discharged to users. They may include routine enquiries on specific problems, finding information to questions, helping users to find information themselves, teaching users how to use

the library resources and do library research, registration of new users and maintenance and bookings from users.

Technical routines: are the activities being performed on the information resources acquired by library before they become ready for use .These activities are performed behind the scene. They include: selection and acquisition, receiving of materials ordered, processing of new items and organization and arrangement of library materials.

1.1.2 Library and Information Services in University Libraries

University libraries are established to provide information resources and services in order to support the purpose of the university. Information services are those activities a library engages in to satisfy the information needs of a client. Andrew (2010) saw information services as services provided by the library which draws attention to information possessed in the library in expectations of a demand.

University libraries in Nigeria provides Technical Services, Reference and Information Services, efficient reference and information services, to network operations such as cataloguing, authority control, inter-library loan and compilation of bibliographies. Some of such services are: Book Borrowing, Library services in the home, CD ROM searching, E-mail, Bibliographic services, Interlibrary loan, Selective Dissemination of Information and Current Awareness etc.

It is important to stress that with the dynamics and growth of knowledge and Information, university libraries are expected to provide both manual and automated/online information services in order to meet the ever-growing needs of their users. Aguolu (2011) suggested that for the university library to meet the research needs of its users in various disciplines, the library must promote these essential services which include: Bibliographic services, interlibrary loan services, user education services and creation of special collection. It is expected that members

of the university community would find these essential information services very worthwhile and relevant in promoting and enhancing teaching, research and community service within and outside the university community.

Based on this, Fabunmi (2004) cautioned university libraries to work harder to provide information services that are timely in its delivery and easy to understand and use. According to Gbaje (2007) university libraries should provide information services to users to meet up with the growing needs and for librarians to be relevant they have to move their services to the online environment. He describes online reference services, online information literacy instructions, online library services and library portal as information services for the digital age.

1.1.2 Library Application Software

Library Application software is a sequence of instructions that tells the computer what to do, how to manipulate data and how to relate to users. It normally addresses one aspect of computing need or the other. (i.e the readily available software) for micro computers is referred to as "application software". An essential requirement of application software is that it should have capabilities to:

a. Store and manipulate data
b. Provide the user with capability to create a database
c. Enable the user to input his or her information into the database created
d. Edit data thereby allowing for the immediate correction of entry errors or a correction at a later date.

Library Application software has been defined by different scholars based on their background, experience and orientation. Bierman (1980) affirmed that the use of computers and associated technologies to do exactly what has been done in the library with the justification of

reduced cost or increased performance. That is, it is the use of computers to perform library operations most especially services that are routine and repetitive. However, Dhanavandan and Tamizhchelvan (2012) defined library application software as the application of automatic and semi automatic data processing machines to perform functions such as acquisition, circulation, cataloguing, reference service and serial control. Thomas (2012) defined library application software as computer programs that are written individually to operate specific, tailor made procedures and systems such as library housekeeping, words processing, database management, text retrieval, expert systems.

There are generally two categories of library application software: Proprietary and Open source. Proprietary Software refers to any computer software that has restrictions on any combination of the usage, modification, copying or distributing modified versions of the software. Proprietary software may also be called closed –source software. Open Source Software (OSS) is computer software with its source code made available and licensed with a license in which the copyright is holder provides the right to study, change and distribute the software to anyone and for any purpose. Open Source Software movement accelerated the development of compatible open source library software, partly to provide an alternative to the sometimes highly prohibitive cost of the Proprietary Software. Examples of Library application software are; Alice for Windows, GLASS, CDS/ISIS, Strategic Library Automation and Management (SLAM), Liberty, Tin-Lib, and X-Lib, Libsys, Virtua, E- Lib, Libra, Greenstone, Evergreen, Dspace, fedora, KOHA, Millennium mi, Alexandria among others.

It has been observed that automation efforts in Nigeria Libraries have been persistently frustrated by lack of man power, funds, computing facilities, poor maintenance culture destructive interruption of electric power and other infrastructural factors (Menou, 1983, Thomps

1984, Eres, 1985, Ehikamenor, 1990, Idowu and Mabawonku, 1999, Faniran and Oyemakinde, 2000).

Library Automation

Traditionally, Library automation is referred to the computerization of the entire library housekeeping operations like acquisition, cataloguing, circulation & serials control. But today it is also referred to handling large quantity of data and information more efficiently and quickly with the help of computers and other modern information technologies.

According to Bhardwaj and Sukla (2000) library automation is a generic term used to denote the various activities such as acquisition, cataloguing, serials, circulation with an improved quality of products and services of library and information centers. It enhances the speed, productivity, adequacy and efficiency of the library professional staff and save the manpower to avoid some routine, repetitive and clerical tasks such as filing, sorting, typing, and duplication checking.

Library Automation an Overview by Rashid (1996*)* revealed the significant developments in the area of library automation, size, library management system, and information retrieval system, OPAC, CD-ROMs and networking. He further added that librarians and vendors are working together to improve service and systems and develop new products in response to user needs.

He identifies the problems in the existing system and gives reasons for automation. The study pointed out the requirement of library automation and discusses the technical, social and economic aspects of library automation in detail. The literature on library automation has gone multifarious, whilst in the past it was mainly concentrated on traditional housekeeping functions and now it has expanded on the library management systems to incorporate OPAC, CD-ROMs,

networks, desktop publishing, office automation, etc. There is hypermedia, multimedia, virtual reality.

Similarly, Bhardwaj and Shukla (2000), in the article A Practical approach to library automation discusses the aims, objectives and need for the change of library tools and technique under the changing environment with the concepts of automation of library activities, areas and services such as acquisition, database management, classification and cataloguing circulation, serial control, information retrieval, communication networks, and documentation services.

In the same vein, Concept of library automation and multimedia is discussed by Singh (1998), in his article "Compatibility of library automation software package with multimedia". He stated that a library automation software package having compatibility with multimedia should be the choice of libraries and information centers thinking of 21st century information handling. According to him, library automation involves total computerization of library activities staring from acquisition, to management and circulation to reference service. Library technology involves the use of Xerox machines and barcode reader to electronic security gate. If the software supports some of these technologies then it has compatibility with multimedia.

On the other hand, Sinha and Satpathy (2004), in "Library Automation and Networking for Managing Library and Information Services" discuss the history of library automation in brief. It traces the establishment of networks and use of information technology. The article reviews what library automation is and why it is needed and the areas of library automation and networking. It concludes that the success of library automation and networking depends mainly upon the proper planning and appropriate decision taken by the authorities from time to time.

1.2 Statement of the Problem

Application of Library software packages is aimed at improving and transforming the operations and services of Nigerian University Libraries such as Online Public Access Catalogue (OPAC), Customer Services, Reference Services, Bibliographic Services, Current Awareness Services, Inter-library Loan Services, and Media Services among others. However, considering this enormous benefits that are experienced with the impact of library application software packages, Nigerian university libraries still experience some obstacles or hindrances to include technical expertise of librarians handling the projects, inadequate funding, obsolete commercial software, man power problem, epileptic power supply and the available software to them in the effective and efficient use of these software packages in the library. This research work is being conducted to expose some of the inhibiting factors that are hindering full implementation and utilization of library Application Software Packages in Nigerian university libraries. A situation which could be attributed to inappropriate choice of software as a result of lack of feasibility studies on the technology and skills required to successfully run the software (Ogunrombi and Oladokun, 1992).

Other challenges pointed out by Ogunrombi and Oladokun (1992) are; lack of versatility of some software packages chosen to cope with all library processes. They further stated that Nigerian university libraries have had to contend with myriads of problems in their automation projects notable among such problems are inadequate technical support from the software vendors or their technical representative in the country. Lack of proper feasibility studies on the compatibility of such software hence software are usually donated to academic libraries, absence of proper consultation between the donor and the library management. The aforementioned problems led to frequent automation projects failure, project abandonment or fresh start when new software is chosen causing unsteadiness of the use of software, poor implementation and

sometimes migrating from less sophisticated software to a more sophisticated one. It is on this threshold that this study is set to look at how the interplay of these different components affects full automation of operations and services in federal university libraries in North Western States of Nigeria.

1.3 Research Questions

The following research questions guided the study:

1. What type of Library Application Software Packages is installed and is being used for library operations and services in the Federal University libraries in the North Western States of Nigeria?
2. What criteria influenced the choice and acquisition of the library application software that are being used in the Federal University Libraries in the North Western States of Nigeria?
3. What are the ICT infrastructures and Strategies put in place to ensure the sustainability of the Library Application Software Packages acquired in the Federal University Libraries in the North Western States of Nigeria?
4. What are the challenges to the effective use of Library application software Packages that are being used in Federal University Libraries in North western States of Nigeria?

1.4 Objectives of the Study

The Objectives of the study include:

1. To determine the type of Library Application Software Packages have been installed and are being used for Library operations and services in Federal University Libraries in North Western States of Nigeria.
2. To determine the criteria that has influenced the choice and acquisition of the Library Application Software Packages being used in Federal University Libraries in North Western States of Nigeria.
3. To determine the ICT infrastructure and strategies put in place to ensure the sustainability of the Library Application Software Packages acquired in the Federal University libraries in the North Western states of Nigeria.
4. To determine the challenges to the effective use of Library application software that are being used in Federal University Libraries in North western States of Nigeria.

1.5 Significance of the Study.

The study will be of assistance to the libraries in the Federal Universities in North Western States of Nigeria on the appropriate choice and use of Library Application Software and the Strategies for full implementation of Library application software packages in Nigerian University Libraries. The study will also contribute to the depth of existing literature in the field of Library, Archival and Information Science.

Information managers in the University libraries would find this study very useful to improve their self image; identify their relevance in the society. Much more the students of the department of Library and Information Science will have access to the work for further study when the need arises.

1.6 Scope of the Study.

The study is on Assessment of Library Application Software Packages. It covers Federal University libraries in the North Western States of Nigeria. The libraries which have not started automation are excluded.

1.7 Assumptions of the Study

The study is based on the assumptions that:

1. University libraries in North Western Nigeria appreciate the need to automate their operations and services.
2. University libraries in North Western Nigeria appreciate the need for Library application software packages to collect, preserve and disseminate information resources electronically.

1.8 Operational Definition of Terms

The following terms are defined operationally.

Application Software Packages: The sequence of instructions that tell the computer what to do, how to manipulate data and how to relate to users. It normally addresses one aspect of computing need or the other. Most of the "off – the- shelf-software" (i.e the readily available software) for micro computers is referred to as "application software".

Information Services: Activities concerned with ensuring the availability, accessibility and use of information by users.

Information Service Delivery: The act of providing various information products and services to the right customer in the right place at the right time and in the appropriate channel and format that will satisfy the customers' need.

Library Application services/operations : One where a computer system is used to manage one or several of the libraries key functions such as acquisition, circulation, cataloguing, serial control and the online public access catalogue.

.

References

Aguolu, C.C. and Aguolu, I. E. (2011). *Libraries and Information Management in Nigeria.* Maiduguri ; Ed-Linform Services. P.361-405.

Andrew, M. (2010). Understanding Library Services in Academic Libraries *Library Review* 16 (3). P.13.

Bierman, P. (1980). Library Automation *ARJI* vol.9 in Technology for Information Management and Science (Ed.) Madu E.C Ibadan: Evi-coleman,p.3.

Borgman, C. L. (1997). From Acting Locally to Thinking Globally: A Brief History of Library Automation. *Library Quarterly,Vol.67(n3)*.1997.

Bozimo, D. O. (2006). ICT and the Ahmadu Bello University Libraries. *Nigerian Libraries*: Journal of the Nigerian libraries Association vol.1-20.

Dhanavandan, S. (2012). An Evaluative Study of Automation Software Application and

Database Management Systems in Academic Libraries. *Journal of Emerging trends In Computing and Information Sciences*, vol.3 No.5, 677-679.

Fadehan, O.A (2009). Advocacy for Benchmarking in the Nigerian Institute of Advanced Legal Studies Library, Lagos. A Valedictory Lecture to Mark the End of Sabbatical Year Spent at the Nigerian Institute of Advanced Legal Studies Library University of Lagos Campus, Akoka, Lagos. Nigeria) Tuesday, 30th June, 2009.

Fabunmi, B. A. (2004). "Planning the University Libraries for Effective Customer Services in Nigeria" *Technology for Information Management and Service*, ed. By Evarest C. Madu, Evi-Coleman Publications, Ibadan. P.153.

Gbaje, E. S. (2007). Implementing Integrated Library System: Ahmadu Bello University Zaria Experiences. *LIBRESLibrary and information Science Research Electronic journal.*Vol.17(2).

Igun, S .E. (2006). Human Capital for Nigerian Libraries in the 21st Century. Library Philosophy and Practice 8(2): 1-4. Retrieved on Nov.18, 2010 from http//www.webpages. uidaho.edu.mbolin/igun.html.

Ogunrombi, S. A. & Oladokun, S. O. (2005). TINLIB: Application to Library Automation in a Nigerian University of Technology. *Nigerian Libraries*: Journal of the Nigerian Library Association. Vol.25 &26 (1-4)1-8.

Oketunji, F.S. (2001) X-LIB: A library application software options for libraries and information Centres. *Nigerian Libraries*. Vol.35,No.2. pp.29-37.

Oni, F. A. (2004). Enchancing the Performance of Library Operations through Appropriate Information Technology: Technology for Information Science ed. by Madu E.C, Evi-coleman publication,Ibadan.p.41-52.

Oyinloye, A.M (2004) Software Packages for libraries: technology for information science ed. by E.C Madu,Evi-coleman publication,Ibadan.p41-52.

Ugah, A. D. (2007). "Evaluating the Use of University Libraries in Nigeria: A Case Study of Michael Okpara University of Agriculture, Umudike" *Library Philosophy and Practice.*

Vijayakumar, A (2012). Application of Information communication technology in college Libraries. *International multidisplinary research journal*, 2(2), 91-94

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter present review of literature related to the subject matter under study. It covered the following sub- headings.

2.2 Types of Library Application Software Packages Being Used in University Libraries

2.2.1 Integrated Library System/ Library Management System

2.2.2 Digital Library Management System

2.2.3 Interlibrary Loan /Document Delivery Software

2.2.4 Serial Management System

2.2.5 Reference Management System

2.3 Criteria that Influenced the Choice of Library Application Software Packages Packages in University Libraries
2.4 ICT Infrastructure and Strategies Put in Place to Sustain Library Application Software Packages in University Libraries
2.5 Challenges to the Effective Use of Library Application Software Packages in University Libraries
2.6 Summary of the Review

2.2 Types of Library Application Software Packages Being Used in University Libraries

University Libraries acquire and install different types of application software packages to manage their operations and services in order to introduce efficiency in their service delivery. These application software packages are discussed under the following sub-headings:

2.2.1 Library Integrated System / Library Management system

Integrated Library Systems (ILS) is the current wave in the field of library automation. An ILS combines several activities of the library into one integrated system, allowing the library staff to perform all their functions online. These activities include simple housekeeping activities like acquisition, cataloguing to user services, and inter-library loan activities. Integrated library systems (ILS) are multifunction, adaptable software applications that allow libraries to manage, catalog and circulate their materials to patrons. Muller (2011**)** noted that in choosing ILS software, libraries must base their decision not only on the performance and efficiency of the system, but also on its fundamental flexibility to readily adapt to the future demands and needs of their patrons. With the advent of the Internet, the World Wide Web and open source technologies, developers, contributors and open source software users have turned more and more to free and open source software (FOSS) library solutions. Since the emergence of such

technology ten years ago, developers have continuously increased the offerings of fast, freely-available ILS software.

In the last few years we have seen the development of a number of ILS products in the open source world. One important trend in these kind products is the use of web-based client/server architecture. Riewe (2008) is of the view that the main type of software in use in libraries today is the integrated library system (ILS), which is the modern equivalent of the card catalog. An ILS provides a search interface to the library catalog and automates library tasks such as the tracking of book loans and returns. Although ILS vendors have added many different features, every ILS has nearly the same core components of cataloging and circulation tracking. Because the ILS core is stable, it is suitable for collaborative development. Collaboratively developed computer programs are known as *free software* or *open source software* (OSS). Librarians and programmers have worked together to produce several open source ILSs. Users and developers are free to share and change open source programs, a practice similar to sharing recipes. Open source licenses ensure that OSS and its derivatives may be freely viewed, used, copied, modified, and redistributed (Open Source Initiative, 2006). Examples of well-known OSS include the Mozilla Web browser, Apache Web server, KOHA, Evergreen and Linux operating system. Open source ILSs are new compared with proprietary ILSs and share less than two percent of the ILS market (Breeding, 2007a; Pace, 2005).

Prasad (2007) cited advantages of OSS as low cost and freedom from vendor lock-in. Because few libraries use open source ILSs, little empirical data exists about their use. Whether open source ILSs cost less than proprietary ILSs. Reported disadvantages of OSS are less ease of use and more need for technical expertise. The materials costs of OSS are low, but the labor costs of OSS might be higher. On the other hand, freedom from vendor monopoly allows

competition among service contractors, which helps to keep labor prices down. Other reported strengths of OSS include customizability, portability, and security. Free and open source software is the most permissive types of software for users. By contrast, proprietary software is the most permissive for software owners. A fee can be charged for distribution or technical support of OSS, yet a free version of OSS is usually available by download or compact disc.

Integrated refers to the ability of the system to share data among its modules. For example, the information to order a book may be entered in the acquisitions module, which may be used by the cataloging module, and searched via the OPAC. This integration reduces redundant data and effort. A synonym for ILS is library management system (LMS). ILSs vary by factors including scalability, database type, operating system compatibility, support for machine-readable catalog (MARC) record formats, and interoperability with other library networks and articles databases (Buchanan, 2003). Libraries in developing countries such as Nigeria have depended on library automation software imported from developed countries like United States of America, United Kingdom and some European countries. Many library automation software packages have been available in the Nigeria market. Some of which includes liberty, TINLIB, GLASS, Alice for windows, innovative millennium and Virtua.

This library automation software is very expensive to purchase, maintain, implemented and deployed. This is continued to be a challenge for most libraries. This is supported by many studies some of which include Gbaje (2007); Adebore, (2010); Ayofe and Lawal (2010). The library community is largely made up of not for profit, publicly funded agencies which have a very small budget compare to the cost of these software. Gbaje 2012 reported that very few academic libraries are automated particularly university libraries and sited the instance at which Ahmadu Bello University is using Virtua for management of its Library management system.

An integrated library system (ILS) with its various modules is the core of library automation and these systems are slowly being implemented in libraries in Nigeria; most of them are in place in university or special libraries. In the late 1980s several University libraries were provided with PCs and TINLIB DOS-based software by the NUC but because of lack of training, infrastructure and human capital many attempts to implement these early systems failed. Several other attempts at introducing early integrated systems were tried but failed because of lack of expertise or support from the companies offering the systems. Early versions of some of the early library systems such as TINLIB, CDS/ISIS or WINISIS provided by UNESCO, Bibliofile by ITS for Windows and Alice from Softlink were not very sophisticated, not always based on MARC records, had few modules and were not web-accessible. The newer generations of library systems is all web-accessible and are based on MARC records and inter-operability. Examples of these systems are Millennium from III, Virtua from VTLS, Liberty/Alice from Softlink and Koha, an open-source system developed by Katipo in New Zealand. Retrospective conversion from the less sophisticated non-MARC systems to the next generation of MARC based catalogs has posed problems and libraries should be encouraged to begin with a system which offers standard international formats which can easily be upgraded and converted and which are compatible with other integrated library systems which are being used in Nigeria.

One recent automation project that deserves special mention is the Carnegie/MacArthur funded implementation of integrated library systems for six of the larger government universities in Nigeria (ABU, BUK, OAU, UI, the University of Jos (UNIJOS), and the University of Port Harcourt (UNIPORT). These university libraries have all implemented VTLS's Virtua integrated Library system with the assistance of training from the Mortenson

Center at the University of Illinois. One project that many libraries feel is important is the digitizing of some of their local holdings. This practice is not yet widespread since it requires infrastructure that is not common in Nigeria, however, several libraries have managed to start these projects. An examination of the digitization initiative of the University of Nigeria, Nsukka, shows that the challenges included legal aspects, training, infrastructure, and stakeholders. In 2008, the University of Nigeria, Nsukka embarked on the process of digitizing all of its legacy and scholarly works such as theses, projects, and publications of scholars in journals, books, and inaugural lectures. The aim was to protect the original documents and improve remote access and visibility for scholars. The project has not been without problems but continues to lead the way in Nigeria with this kind of implementation. Another project of note is the Digitization of Theses and Dissertations in Nigerian Universities that was initiated by the Association of African Universities at the Ahmadu Bello University, University of Jos and OAU in Ile-Ife.

Electronic Databases offer thousands of digitized journals and e-books and libraries need to offer pathways to guide users to the best ones. African Journals Online (AJOL) is an important effort at freely offering digital copies of African journal articles. This online resource along with JSTOR offers a wealth of digitized peer-reviewed journal articles for researchers in Africa. The National Universities Commission (NUC) developed a Virtual Library in 2001 but many of the links to digital resources are invalid and it needs better maintenance in order to be an effective research tool. eIFL provides an invaluable service by allowing open access to electronic databases such as Bio-One, Agora and Hinari to libraries in low GDP countries like Nigeria. All of these resources are freely available with registration by any educational

institution in Nigeria so there is no excuse for every university to not offer these resources for their clientele.

Open source ILSs include Avanti MicroLCS, Emilda, Evergreen, Gnuteca, Koha, OpenBiblio, PhpMyLibrary, and PhpMyBibli (Corrado, 2004). However, most libraries use proprietary ILSs such as Innovative Interfaces Millennium and Sirsi Dynix Horizon (Breeding, 2007a; Pace, 2005).

However, Sharma (2007) also outlined the different type of ILS library software to include the following

CDS/ISIS, WINISIS, Software for Universities Library (SOUL), Alice for Windows (AFW) LibInfo, MIDAS Library Management System (MIDAS LMS), Library Management System (LMS), Library System (LIS), LibSys, Koha: The First Open Source Integrated Library System, PhpMyLibrary, OpenBiblio, GNU Library Management System (GLIBMS), Avanti: An Open Source Library Computing System, PhpMyBibli: A Free Solution for the Media Library, OpenBook, Learning Access ILS, NewGenLib, Evergreen, SENAYAN,ABCD**,** BiblioteQ, Virtua (Vtls), Tin Lib, X-Lib, Millenium mi, Alexandrian, SLAM, Library Suit among others.

2.2.2 Digital Library Management System

Digital Libraries have greatly evolved during the last few years. They are no longer only the digital counter part of physical libraries (or physical museums, video achieves, etc.) rather they are intricate networked systems capable of supporting communication and collaboration among different, worldwide distributed user communities. Digital library management system evolved with the inception of Digital Library**.** Prasad (2007) acknowledged that digital library management system provides the appropriate framework both for the production and administration of Digital Library System by incorporating functionality essentially fundamental

to Digital Libraries, and also provides provision for integration of additional software that provides more refined and advanced functionality.

Digital Library can thus be established by setting up and deploying a dual Digital Library Management System and then loading or harvesting content. Reed (2013) said this approach will largely simplifies and reduces the effort required to set up a Digital Library that promises a guaranteed better quality of service. These generic systems have started to appear from the second half of 1990's even though implementing the devised DLMS features only to some extent. The DLMS (Digital Library Management System) available are commercial as well as open source. Open source digital library management software's provide extensible features to administrators' and allows an organization to showcase their digital achieve to world audience. Tramboo (2012) listed and explained the following types of DLMS under Open source and proprietary Software

DSpace

The DSpace is a joint project of the MIT Libraries and HP labs. It is a digital asset management system that allows institutions, such as libraries to collect, archive, index, and disseminate the scholarly and intellectual efforts of a community. Written with a combination of technologies by MIT, it is primarily used to capture bibliographic information describing articles, papers, theses, and dissertations. DSpace is adaptable to different community needs. Interoperability between systems is built-in and it adheres to international standards for metadata format. Being an open source technology platform, DSpace can be customized to extend its capabilities.

Greenstone

Greenstone is a suite of software for building and distributing digital library collections. It provides a new way of organizing information and publishing it on the Internet or on CD-ROM.

Fedora

Flexible Extensible Digital Object and Repository Architecture (Fedora) is a toolkit to build a digital object repository management system. The system, designed to be a foundation upon which interoperable web-based digital libraries, institutional repositories and other information management systems can be built, demonstrates how distributed digital library architecture can be deployed using web-based technologies, including XML and Web services.

E-prints

The primary purpose of the E-Prints software is to help create open access to the peer-reviewed research output of all scholarly and scientific research institutions. The default configuration creates a research papers archive, but could be used for other purposes.

CDSWare

CERN Document Server Software (CDSware) allows one to run one's own electronic preprint server, online library catalogue or a document system on the web. It complies with the Open Archives Initiative metadata harvesting protocol (OAI-PMH) and uses MARC 21 as its underlying bibliographic standard.

2.2.3 Interlibrary loan /Electronic document delivery software

Inter Library Loan (ILL) is the most visible form of resource sharing among libraries. The ILL protocol (ISO 10160:1997) developed by the National Library of Canada has sought to automate this process. It has become an ISO standard in1997. Wide implementation of this

protocol would reduce the gestation period in the delivery of ILL request considerably. (Yadagiri,1999).

Hosburgh and Okamoto (2010) pointed out that Electronic document delivery has been an important component of interlibrary loan (ILL) operations since the advent of the fax machine. Through the development of software programs such as Ariel, Prospero, ILLiad's Odyssey, and RapidX, electronic document delivery has been further refined to meet the needs of both interlibrary loan staff as well as end users.

Ariel

Ariel, released in the fall of 1991, was developed by the Research Libraries Group (RLG), formerly a membership-based, not-for-profit organization comprised of research libraries, museums, archives, historical societies and national libraries. Ariel is restricted to the DOS environment, but a Windows version was developed in 1994. Since then, Ariel "has grown from a solution for a relatively small group of large research libraries into a de facto international standard for document exchange used by libraries and document suppliers of all sizes and specialties" (Lavigne & Eilts, 2000).

Prospero

Developed by the Prior Health Sciences Library at Ohio State University in Columbus, Prospero was released in 1999 as free, web-based, open source software that works both with Ariel or as a standalone program. Prospero conveniently converts tagged image file format (TIFF) files into a portable document format (PDF), preserving the layout of the original, scanned document.

Odyssey

Released in April 2003, with ILLiad version 6.2.0.1, Odyssey has developed into a significant electronic document delivery component for ILLiad users. Odyssey enables document

transmission between ILLiad sites and has been expanded, with Atlas's Standalone product, to include non-ILLiad sites as well. The ILLiad component consists of such features as inclusion of all request information, auto-updating of the request, and the Trusted Sender setting.

Relais Express

Based in Ottawa, Canada, Relais International is a company that has provided software solutions for interlibrary loan and document delivery since 1995. With customers in Canada, USA, and the UK, Relais has found its market share predominately among larger academic research libraries, national libraries, and archives. Library and Archives Canada, National Institutes of Health, and the British Library are among those institutions that rely on Relais.

Relais Express combines scanning and delivery functions within a single interface. Any TWAIN-compliant scanner may be used and a range of electronic delivery options may be employed: Ariel, Odyssey, fax, post to web in PDF format, and email attachment. Patron and library delivery information is stored in the system. Once a document is scanned, it is properly prepared for delivery according to the specified method, updated, and sent via automated processes (Relais, 2010).

2.2.4 Serial management software

There is a wide range of open source search engines or information retrieval tools available on the web from Source forge. These systems can be categorized into two main groups, viz., those that use inverted files and those that use database systems.

Prasad, (2007) outlined the following serial management system to be:

CUFTS is an online serials knowledge base of full-text journal collections, providing Libraries with a searchable serials database for their web site, MARC records for their catalogues, direct to article OpenURL link resolving, and electronic resource management

(ERM) tools. The software comes with many global resources i.e. Information about various aggregators and the journal they offer. Using the global resources, each individual library can choose the journals they are subscribing.

CUFTS Electronic Resource Management (ERM): CUFTS offers essential electronic resource management services, allowing a library to maintain the information about its electronic collections, including licensing terms, renewal dates, contacts, etc. CUFTSERM can send a librarian renewal notification, reminding him of approaching deadlines.ERM allows the following information to be added to facilitate serials management. Costs, Renewal dates, Licensing terms, Contacts and Reports among others.

Browse & Search Journal titles:

For the end-user CUFTS provides browse and search facility to know whether a particular journal is accessible. For the convenience of the end-users librarians can classify the journals under various subject categories making it intuitive to his client. This is achieved by using one of the tools of CUFTS i.e CJDB (CUFTS Journal Data Base) settings. In brief CUFTS provides the following facilities: E-Resource management, A – Z serials database, Full-text link resolving, Journal searching, Collection comparison reports and MARC records.

GODOT

Godot is software in researcher suit, which serves as a link resolver. GODOT stands for Generalized Online Documents, Ordering, and Texts. GODOT facilitates direct links to full text collections, using the CUFTS knowledge base. It can also display holdings in catalogue or other organizations catalogues in the consortium. GODOT can be integrated with Interlibrary Loan systems, including the open source Open ILL (Open Inter Library Loan) and Library management Systems to provide direct or mediated interlibrary loan requests by users.

GODOT and ILL

Much of GODOT's functionality and its configuration options are related to submitting Document Delivery requests based on the results of the Z39.50 broadcast search for holdings. A library's interlibrary loan agreements with other libraries can be configured as Direct, Mediated, Information Only or Not Allowed.

dbWIZ

dbWiz allows federated search (also known as meta search, broadcast search, parallel search) across multiple databases, web sites, catalogues, and other online resources from a single interface, and presents the results as an integrated list. In way, db WIZ provides a single stop search facility and saves the hassle of the end user going to every resource to search for desired information.

2.1.5 Reference management software

Reference Management Software "enables an author to build a library of references by entering the details of each reference in a structured format. Enrico (2012) argued that they usually support mechanisms for organizing sets of references by tagging or use of 'folders', and will generate references, citations or bibliographies in a range of referencing styles. Many of these packages are open-source software. EndNote ,EndNote Web, BibDesk, JabRef, ZoteroPapers, Mendeley, Bookends, Citavi, Qiqqa, RefWorks, CiteULike, Connotea, ProCite, BibSonomy, BibTeX, Reference Manager CiteULike, BibSonomy and Connotea are not RMS strictly speaking, but their role in the Social Bookmarking applied to the academic literature is remarkable (see for example Giglia, 2010; Hammond, Hannay, Lund, & Scott, 2005; Redden, 2010).

EndNote EndNote Web, ProCite, Reference Manager

EndNote seems the best known instrument in the field, as it is always cited in the literature about RMS. It is produced by Thomson Reuters, the big business data provider company also owner of important scientific bibliographic tools such as ISI Web of Knowledge. EndNote provides an extremely rich set of features and a huge list of citation styles which probably make it the most complete suite in the market (Zhang, 2012).

Zotero

Zotero is a project of the Roy Rosenzweig Center for History and New Media of the George Mason University, VA, and is funded by the Andrew W. Mellon. It was launched in 2006 as free open-source software. Even if it was not the first free-of-cost citation manager to appear on the scene, Zotero quickly gained popularity as the free open-source alternative to EndNote (Farkas, 2006).

Mendeley

Mendeley was founded in 2007. The company was started by three PhD students who were frustrated by what they saw as the lack of good tools for organising their references and sharing relevant papers with others in their research group. Mendeley is proprietary software available in the free mode: the basic version is free, and additional features can be purchased. The first beta version came out in 2008.

RefWorks

RefWorks was founded in 2001 and a business unit, the leading company in electronic publishing. It is web-based software which allows users to save and access citations on a central hosted database. The license can be acquired individually or institutionally: this latter solution allow all the members of the institution to minimize the costs and benefit of additional features such as sharing citations (Reichardt, 2010).

BibDesk and JabRef

BibDesk and JabRef are both open-source applications which mainly act as BibTeX front-end: they provide a graphic interface for managing BibTeX formatted references. BibDesk was created in 2002 for the Mac environment.

Reference Desk Manager (RDM)

The Reference Desk Manager (RDM) is a PHP based web application, specifically designed to meet the needs of Reference Services in libraries.

Morris Messenger

Morris Messenger is a web-based messenger system which can be used as an effective reference tool by the libraries.

Ask a Librarian (ASKAL)

Ask a Librarian (ASKAL) is a self-managing email-based reference service suite for libraries. The user services like reference, circulation, and document delivery are really crucial since it is the face of the library. Automating these functions not only helps reducing the burden on the librarians but also improves the image of the library among the users.

2.3 Criteria that Influenced the Choice and acquisition of Library Application Software in the University Libraries

The quantity of commercially available software is vast and grows every day. Even fifteen years ago (Resnick 2009), it was estimated that, in the field of educational software alone, there were more than ten thousand current titles. The success of automation depends on the selection of appropriate software and its full implementation. Furthermore, Resnick (2009) stated

that very few library software packages can meet all the requirements of a particular library. That, each package has its own unique features and limitations. Hence, it is necessary to evaluate the library automation software with varying facilities according to the requirement. To determine the best software package to be chosen, it is important to analyze and identify the needs of the library and match them with the features and functions of the application software.

In fact**,** every librarian and information officer should keep in mind the requirement of the library automation and fitness of software for their purpose. Then he should select such software which should fulfill such requirements and also compatible with the future technology and multimedia.

According to Randhawa (2013), Selection of library management software is not a simple task. Sometimes librarians go with either renowned software or maximum number of usage of the library. Selection of Library Software may require the following points/steps, which might help the librarians to select the right software for their housekeeping operations as well as information retrieval. Randhawa (2013) further stated that there are many Library Software, which are very popular and being used by number of libraries and Librarians may have to do the comprehensive study about them before taking decision in this regard.

While examining the software, the Librarian must have the following information about the software which might help them to select the right software for housekeeping operations as well as information retrieval: How it matches the library's requirements product quality, features and functions, staff training and support service, Operating system, hardware and software requirements functionality: What modules are available, value addition to existing functions, user interface: navigation, error alerts, intuitive, customization, design: flexibility, switching from one module to another, multifunction modules, does it enhance the productivity,

conforming to standards: MARC, Z39.50, ISO-2709, etc. Scalability: single user-multi user network. Can it be used in client server LAN architecture or fully web browsing architecture, user-controlled customization, reports that help to take decisions, security levels migration of data or data transfer.

In this regard, Rowley (1993) proposed a strategy for selection and evaluation of library automation software. The criteria included certain factors like cost, history, originator, supplier, services, functions, support, maintenance, technical consideration and capability, ease of use and interface integration.

In the same vein, Malwad (1995) discussed the selection criteria of the Application Software Packages that are available in the market for a wide range of applications including library house-keeping operations, and information storage and retrieval. Their capabilities differ, prices vary and their versions keep on changing. Selection of suitable software package is an important factor in library automation system. The selection is based on specific needs of the institution, its environment, budget, user's aims and objectives.

Gargouri, et al (2010) highlighted the criteria for evaluating library software packages to include its features and add-ons. They considered an evaluation as basically a judgment of worth. Gargouri, et al (2010) added that the ability to evaluate the return on our investment gives us the basis on which to choose between alternative. It is a matter of comparison of actual result with external standard, in the light of existing institutional realities which may be relevant to evaluating the future trajectory of the program or services and provide an objective basis for decision making.

Similarly, SPARC (2002), in his article "Evaluating library software and its fitness for purpose" provided a conceptual paper based on existing software evaluation models. The main

purpose is to adapt general principles used for evaluating software quality to more specific requirements, characteristic of information retrieval and educational applications in library environments. It also provides a model of software quality which embraces a number of top level factors. These are functionality, reliability, usability, efficiency, maintainability and portability.

In another review, Bhardwaj and Sukla (2000), in the article "A Practical approach *to* library automation*"* discusses that software selection is a very complicated issue, on the observation of experts. The discussion should be made by the selection committee and most suitable in regard of flexibility, capacity, expandability, security, economy, user's friendly, module based and updated with the latest technology is to be procured. They further discussed the leading names of the software packages with its features which are available in the market.

Likewise, Muir (2005), in his articles "An introduction to the open source software issue" traces the issue on Open Source Software (OSS). He described features and utilization of open source software and what is happening with OSS applications in universities and other libraries in the western world like USA, Canada, and New Zealand etc. According to this article, OSS allows programmers to alter the software and redistribute it, with the requirement that they make these changes available to other developers.

As a result of this Joes (1997), discussed in article "*LIBSYS*: A solution for library automation and networking" about the future developments of LIBSYS software and has given some points to be considered while selecting the software such as simplicity in use, user base, regional applicability, networking capabilities and local support. Similarly, Adeniran (1999) in his work "Library software in use in southern Africa: a comparative analysis of search engines, database fine-tuning and maintenance tools" studied all types of libraries in the following countries: Botswana, Lesotho, Mozambique, Namibia, South Africa, Swaziland and Zimbabwe.

This study identified 29 software packages from 22 per cent usable survey returns. The study examines the various search engines, facilities to modify or fine-tune preset database structure, import and export facilities, and other tools available on all off-the-shelf packages in the region. The operating environments and modes are also examined. Software designers in developed countries have created a variety of applications for library and documentation work. The cost of development and maintenance of software can be very high and the libraries have to pay a large amount of money to automate their procedures.

In view of this, Ramesh (1998) in the article "Technical problems in University libraries on Automation-An overview" described that in order to provide efficient library service to the enlightened readers of the present day world, it is essential that the technical services of a library should be well organized with proper demarcation by making use of recent applications for fast and quick service to the users/readers.

The services like acquisition, cataloguing, circulation etc., discussed the traditional methods of management of technical services employed prior to automation and also notices the tremendous changes in the infrastructure of library technical problems that has arisen in making them most effective and useful in university libraries in the light of information technology. "Constraints for evaluation of acquisition operations and supplier performance use LibSys" by Mandal and Jeevan (2006), have discussed the practical problems faced by collecting data from the LibSys package to evaluate the acquisition system and book suppliers in the Central Library of IIT, Kharakpur. The paper also attempted to highlight the importance of customer specific reporting options in library automation packages which gather qualitative aspects of a library system using the quantitative data assimilated from the different housekeeping operations. They

highlighted the importance of suitable provision in automation packages for evaluating the performance of different sections of library and its various stake holders.

However, Melissa (2010) in the article Criteria for Selection of OSS suggested that the following guidelines for evaluation of Open Source Software must follow a single principle: thoroughly investigate the software before implementing. Some questions that should be asked include: What are the programming language requirements? What is the operating environment?, How is maintenance handled? Does the software have the necessary functionality?

Sharing the same opinion with Melissa (2010), Sharma (2005) discussed that library application software selection process is extremely tasking on the average library professional. In particular technology, feature and functions, security and authentication issues, long-term cost, vendor viability, services and support, e.g. maintenance considerations, as well as training and documentation are to be considered for software selection with greater attention.

2.4 ICT Infrastructure and Strategies Put in Place to Sustain of the Library Application Software in University Libraries

Information and communication technology (ICT) consists of hardware, software, networks and media for collection, storage, processing transmission and presentation of information (World Bank, 2001). ICT is made up of two basic components; the information technology (IT) and the communication technology (which include the internet and telecommunication technology). Information technology refers to the creation, storage and processing of data through the use of computers and other microelectronics. Through convergence the link between information technology and communication technology is what is now commonly referred to as Information and communication technology (ICT).

Gbaje (2007) posited that librarians and information professionals are then challenged to create information system for the collection, organization, dissemination and preservation of information and new knowledge regardless of formats. This new age of information offers possibilities for the future with information delivered in different formats limited only by boundaries of our imagination. Also the potential of the electronic are breathe taking the prospect of change as wide spread and fundamental as the agricultural and industrial revolution of the earlier eras. In the last couple of years, students, lecturers and other target users of library in Nigerian tertiary institutions have increasingly demanded and preferred access to electronic sources delivery and networked information from their respective libraries (Covi and Cragin, 2004). Internet access is one of the greatest technological advancements being experienced in this 21st century. It revolves around advancements in Information and Communication Technology which has gone a long way to influence the mode of information gathering, storage, retrieval and dissemination in these times. Internet access is used for electronic mailing services, electronic on-line chats, group activities among others (Akintunde, 2006). It has resulted in increased access to timely, accurate, relevant and current information in most ICT compliant libraries all over the world.

Furthermore, the globalization of the entire world in recent times has placed additional demands on academic libraries to conform in order to avoid the risk of obsolescence and irrelevance in the scheme of things. Teaching and research in tertiary institutions now demand the use of high caliber ICT infrastructure and facilities to keep abreast of current information in all fields. Be that as it may, Akintunde, (2006) opined that many libraries in Nigeria still operate in the traditional service pattern where librarians are in charge in main service points of circulation, reference, serials, acquisition, cataloguing and documents without any emphasis on

academic disciplines. This is a sad affirmation of a similar complaint made years ago by Afullo (2000) that Nigeria was rated among the lowest in Africa in telecommunication infrastructure and so not much is expected of academic libraries in Nigeria, though the situation seems to have improved overtime to some extent.

One of the major problems militating against globalization of information services in academic libraries in Nigeria is the dearth of ICT infrastructure and facilities. This problem has been lamented severally by authors such as Chizenga (2000), Oketunji (2001), Okiy (2003), Gbaje (2007), and Akanni (2008). To date, many of the problems militating against adequate provision of ICT facilities and services in academic libraries as enumerated by Alasa and Kelechukwu (2008) are still very much with us. These problems include:

- Poor and inadequate telecommunication facilities;
- Poor level of ICT literacy even within the academic community;
- Poor computer facilities;
- Poor level of awareness of internet facilities in the academic community;
- Minimum involvement of academic institutions in network building and diffusion in Africa;
- Ignorance of decision or policy makers of the power of information network on the economic and industrial development of a nation.

Moreover, on the dearth of ICT facilities, Oketunji (2001) further identified two major challenges such as:

- A largely exploitative local computer market and unsatisfactory after sales maintenance and support;

- Inadequate pool of relevant technical staff with the problem or difficulty in their recruitment and retention.

Library application software has come a long way considering its sustenance. Library application software is needed for library operation on training librarians for the digital age in Nigerian University Libraries. Chiware (2007) enumerated that trainees must learn about open source software and the concept of creative commons which include expertise in downloading, installation, management and updating software. Also, knowledge of web server's management, web publishing, web access and information retrieval, database management, networking, storage technologies and network processor are equally important

In the light of this, Sykes (1991) supported that, library automation will succeed best where participation of employees in decision making and taking their views into consideration will result in design of an appropriate implementations strategies that will sustain library application software package in Universities. Theja (2007) listed the following strategies establishing a shared motivating vision, appropriate training and coaching for people involved, appropriate staffing, encouraging the participation of staff at all levels, creating open communication and collaboration culture.

Harish (2007) automation strategy of IT's has been to use the in-house software developed by libraries. This is preferred due to the availability of expertise and also for the problem pertaining to software and hardware maintenance efficiently and effectively. However he said that there is urgent need to formulate well thought integrated automation strategy to bring speedy, fruitful and visible impact of library automation processes and activities on the user community and the staff of concerned Libraries. The following major factors may be taken into consideration while formulating strategy for library automation. Conducting feasibility study,

data preparation activities, standardization of forms and records, writing library systems and procedures, site preparation, data element, mandatory and optional, data entry work, environment creation, manpower requirement, proposed services, training programme, manual and documentation, compatibility maintenance of hardware and software, specialized presentations, backup system and procedures, bar coding implementation, financial resources availability and generation, interaction with staff, level of understanding of problems, awareness and commitment about current trends, professional interaction with fellow colleagues.

Contrary to the opinion of Harish (2007), Imo (2011) outlined seven strategies that could be employed to enhance or sustain software use in Libraries to include: purchase after study and evaluation of software, collaborating with ICT bodies and experts to identify quality software, in –house development of software, provision of training at the introduction of the software, provision of adequate maintenance support for the installed software, regular seminar / workshops on software maintenance, use and involving library staff and management in software acquisition and user groups.

2.5 Challenges to effective utilisation of Library application software Packages in the University Libraries

There are many constraints to any kind of development in university libraries world over. It is not an easy environment in which to move ahead to computerize its operations and services. It is in this light that Gbadamosi (2012) said that the implementation of library automation has faced varied problems and challenges which may differ from institution to institution depending on the disposition of the institution to ICT application, funding and technical expertise of the librarian anchoring the project. In the same vein, Ming, (2000) highlighted some of the pressing challenges and problems to be hardware breakdown, software problems, unreliable power

supply, inadequate funding, staff training deficiency and planned obsolescence of commercial software.

Owing to the above assertion by Ming, (2000), Ayankola (2012) also narrated the various attempts by Nigerian universities in automating the libraries from the 1970's and how at one point or the other the automation project failed. She attributed the failures to manpower problem, funding, poor maintenance of equipments, epileptic power supply system and of course the software packages available then. She reiterates that the challenges and frustration engendered in the previous attempts will this time around strengthen the libraries to strive for success. The ultimate is for the software to live up to expectation.

In the current system of scholarly communication, developing countries may be considered to have low research impact due to limited visibility of research output from such countries. Despite the promising potentials of Library Application Software Packages to improve information services delivery in developing countries, the new form of scholarly communication is little exploited in such countries when compared to developed countries (Durrant, 2004).

The development of institutional repositories requires fast and reliable internet connection as well as deployment of adequate information and communication technology infrastructure. The major point of internet access to students and staff at Nigerian universities is through internet cafés (Christian, 2011). A study of Internet usage in Obafemi Awolowo University by Jagboro (2003) showed that 45.2 percent of the respondents access the Internet through Internet cafés. The situation is not too different at the University of Lagos as reported by Christian (2011) that there are about seven of such commercial internet café at the University each with an average of about 20 computers. The cafés are operated by private entrepreneurs on facilities or buildings leased from the University. The average cost for using the internet facility

at the café is about $1 for an hour. Although this may appear cheap, the connectivity is so slow that it may take about 15minutes to access a yahoo mail account. There is also a university local area network (LAN) that provides internet connections to the academic staff but the university's LAN is so often plagued with technical issues that even the academic staffs often do patronize the cafés for internet access.

Electricity supply is a major problem in developing countries like Nigeria. This problem has made the development of projects like an institutional repository in Nigeria much difficult and expensive. Fabunmi (2006) has observed that poor electricity supply is a major impediment to the operation and growth of information and communication technology in Nigerian universities. Another institution that has had to deal with this problem in its effort to develop an institutional digital repository is the International Institute of Tropical Agriculture (IITA). The Institution which is at the final stage of developing an open access institutional repository also had to locate its server in the United Kingdom due mainly to the incessant problem of power supply in Nigeria. While 27.4% of the respondents at the University of Lagos 'strongly agree' that inadequate information and communication technology infrastructure is a problem to the development of institutional repository at the university, 46.8% 'agree' to that proposition. Various other researches has also confirmed that many institutions in developing countries face an unreliable electricity supply, poor Internet connections, as well as a lack adequate computer equipment, appropriate software, and even technological expertise (Arunachalam, 2003).

Lack of funding is another major problem experienced by developing country institutions in their effort to establish digital repositories. As has been stated above, the state of ICT infrastructure in academic and research institutions in developing countries like Nigeria is so low to sustain the development of institutional repositories. Hence a viable digital repository project

will first require serious upgrading of the current state of ICT facilities in many academic and research institutions in Nigeria (Durrant, 2004).

Similarly, Imo (2011) also recounts his experiences right back from the 1970's of how Kenneth Dike Library, University of Ibadan started automation fully only to be affected by harsh economic situation for some time until early 1990 when the library was encouraged by the automation success of IITA. In the Kashim Ibrahim Library (KIL) Ahmadu Bello University, Zaria the idea started in 1972 with the automation of its serials record by the computer center of the university. These efforts he said did not yield much dividend for the libraries because there were no tangible results to show and this was due to the fact that these attempts at library automation were directed from outside the library. Serious automation effort started in the 1990,s and many university libraries cashed in on the opportunity presented by the World Bank project organize and executed by NUC, TINLIB was adopted only for the project to be abandoned at its early stage. This may be due to lack of adequate maintenance support and technical guide. It is now clear that the lack of good software is a bottleneck to the full exploitation of the performance capabilities of modern hardware. Execution rates of instructions have demonstrably improved to such an extent that software is now the key concern.

2.6 Summary of the Review

The foregoing literature reviewed showed that Library Application Software in library operations and services in University Libraries is making tremendous headway. The use of Library Application Software in Libraries has led to dramatic reorganization and change in work pattern and demands for new skills, jobs, retraining and reclassification position. Library Application Software Packages allows for the integration of various library activities and

services to facilitate co-operation in order to avoid duplication of efforts, eliminate repetitive works and saves time, money and increases efficiency.

There are different types of library application software available in the market and each of them with different functionality. The proprietary (commercial) and open source application software package ranging from Integrated library system (Koha, Virtua, Libsys, Tin lib, and others) digital management systems(Green stone, Dspace, Fedora and so on), interlibrary loan system(Prospero, Ariel, Odyssey), serial(cuft, Godots) and reference management systems. The following criteria influences the choice and acquisition of library application software packages: the use of experience, cost adaptability, originator, suppliers, storage capacity, support, reliability, time of deployment, memory capacity, operational efficiency, model version, battery power etc. It is obvious that Library application software packages have improved and enhanced Library and Information Service delivery amidst of various challenges such as inadequate feasibility studies prior to acquisition, inadequate funding, inadequate ICT infrastructure and poor implementation strategies among others exist in the University Libraries. The operation of the library and information services will be effective and efficient if the right software is selected in University Libraries. It is therefore, expected that the adoption of the appropriate application software will be maintained and sustained in order to enhance teaching, learning and research in university libraries.

References

Adeniran, O. R. (1999). *Library Software in Use in Southern Africa:A Comparative Analysis of Search Engines, Database Fine-tuning and Maintenance Tools*. The Electronic Library, vol.17 (1).

Adegbore, A. M (2010) Automation of two Nigerian University Libraries. *Library philosophy And practice.Ejournal* vol.10, No.19.p. 3.

Afullo, T. J. (2000). Global Information and Africa: The Telecommunication Infrastructure for Cyberspace. Library Management, 21(4) 205-213.

Akintunde, S. A. (2006). State of ICTs in Tertiary Institutions in Nigeria: Window on the Universities. In Compendium of Papers Presented at the 44th Annual National Conference and AGM of Nigerian Library Association, Abuja. 18-23 June 2006. 123-137.

Alasa, M, and Kelechukwu, I. (2008). Internet and Academic Library Services Development in Nigerian. Nigerian Libraries 33(1) 17-28. April 02, 2013 from www.arl.org/sparc/IR/IR_Guide.html#management.

Amin S. (2003). Open source software for libraries: A trend report. *A guided research and training centre Indian statistical institute* 8th mile, Bangalore.

Arunachalam, S. (2003). Reaching the unreached: what role can ICTs play in rural development? Paper Presented at the Asian Regional Conference of UN ICT Task Force – Media Lab Asia, New Delhi, 25 April.

Ayankola I.A (2012). The challenges and frustration of software adoption in Nigeria libraries: A Survey of some selected libraries. *Library philosophy and practice. E journal*.

Breeding, M. (2013). April 2). Automation marketplace 2013: The rush to innovate. *Library Journal: The Digital Shift*. Retrieved August 14, 2014, from

http://www.thedigitalshift.com/2014/04/ils/automation-marketplace-2014-therush-

Breeding, M. (2007b). *Lib-web-cats: Current automation system = Koha.* Retrieved March 11, 2014, from http://www.librarvtechnology.org/lwcprocessquery. pl?ILS=Koha

Bhardwaj, R. K. and Shukla, R. K. (2000). *A Practical Approach to Library Automation.* Library Progress (International), vol.20 (1) p.1-9

Chauhan B. P. (2000). Library Automation. Step –by step. Thapar institute of engineering and Technology. Patiala.

Christian, M. (2008). Issues and Challenges to the Development of Open Access Institutional Repositories in Academic and Research Institutions in Nigeria. A Paper Prepared for the International Development ResearchCentre (IDRC). Retrieved on 10/03/2013 from http://idl.- bnc.idrc.ca/dspace/handle/123456789/36986/1/127792.pdf.

Connell, R., and Janke, K. (2006). Turnaround time between ILLiad's odyssey and ariel delivery methods. *Journal of Interlibrary Loan, Document Delivery & Electronic Reserve, 16*(3), 41-56. doi:10.1300/J474v16n03_07.

Covi, M. L. and Cragin, H. M. (2004). Reconfiguring Control in Library Collection Development: A Conceptual Framework for Assessing the Shift Toward Electronic Collections. Journal of American Society and Technology, 55(4), 312-325.

Durrant, S. (2004). Overview of Initiatives in the Developing World. Retrieved on 11/03/2013 from http://drwin.nap.edu./books/03090091454/html/122.html

Fabunmi, B. A., Fabunmi, M. and Paris, W. (2006). Digitisation of library resources: Challenges and Implications for Policy and Planning. International Journal of African & African American Studies, 5(2), 23-36.

Francese, E. (2012). Reference Management Software as Digital Libraries: A Survey At the University Torino. Internationational master in digital library learning.OsloAkershus

Francese, E. (2012). The Usage of Reference Management Software (Rms) in an Academic Environment: A Survey at Tallinn University. *Advances on Information Processing and Management*, *1*, 293-296

Francis, A. T. (1997, March). Regional Information Networks: necessary thrust area for INFLI BNET to establish integrated information system in India. Paper presented at 4th National convention for Automation of Libraries in Education and Research of INFLIBNET on I.T. Application in academic libraries, Patiala.

Gargouri, et al. (2010). Open Access, Whether Self-Selected or Mandated, Increases Citation Impact, Especially for Higher Quality Research. Retrieved on 16/07/2013 from http://openaccess.eprints.org/index.php?/archives/168-The-Self-Archiving-Impact-Advantage-Quality-Advantage-or-Quality-Bias.html.

Gbadamosi, B.O. (2012). Emerging challenges to effective library automation and E- library: The case of Emmanuel Alayande College of Education, Oyo, Nigeria. *Library philosophy And practice. E-journal*. vol 9 No.29

Gbaje E.S (2007) changes and implementing virtual library for higher institutions in Nigeria *Paper presented at the 45th Annual National conference and AGM of Nigerian Library Association*. Abuja, Nigeria

Gbaje E.S (2013) Open source software a panacea for library automation in Nigeria. *JIRM.*Vol.3 N0.2, P.2

Hosbourgh, N. & Okamoto, K. (2010) Electronic Document Delivery: A survey of the landscape Horizon. *Journal of interlibrary loan, Doc delivery and electronic*. Vol. 20,issue 4 Retrieved on 22/10/13 from http//www.informaworld.com/smpp/content-db=all? Content10.1080/072303x.2010.502096 on 22

Harish C(199) Information Tech based library and Information services: a case study of IIT Madras, National seminar on challenges before the university libraries in india in the 21st century, ILA.vadodava. p.277 -284

Imo, T (2011) The challenges of software use in Nigerian University libraries: review of Experience from 1990 -2009. *Library philosophy and practice. E-journal*. vol.9, no.1 p.9-12.

Jagboro K.O. (2003).A Study of Internet Usage in Nigerian Universities: A Case Study of ObafemiAwolowo University, Ile Ife Nigeria First Monday, 8(2) Retrieved 02/01/2013 fromhttp://firstmonday.org/issues/issue8_2/jagboro/index.htm.

Joes, A. (1997). *LIBSYS; A Solution for Library Automation and Networking*: Luck now .Librarian vol.29 (12), pp.40-42

Mahapatra, M., & Ramesh, D.B. (2004). *Information Technology Application in Libraries: A textbook for beginners.* Orissa: Reprint Ltd. 248.

.Malwad, N. M. (1995). *Selection criteria for Library Automation Software*. DESIDOC Bulletin of Information Technology, vol. 15, (2), pp.17-26

Manjunath, G. K. (2008) Library automation. Why and how? Retrieved 18 august 2015 from http//www.igidr.ac.in/lib/paper.html

Martha, S. (2014). The development of Information communication technology in Nigerian Libraries. *ELIS*.reprints.

Ming, S. (2000). Access to Digital Information: Some Breakthrough and Obstacles, Journal of Librarianship and Information Science, 32(1).

Mishra, R. K. **(** 2000). Resource Sharing; The Third Dimension of Library Automation, *ALIBER*-Chennai.

Morgan, S. (2001). Change in University Libraries: Don't Forget People Library Management. Vol. 22 Pp.1-2

Muller, T. (2011). How to Choose a Free and Open Source Integrated Library System. *International Digital Library Perspectives*. Canada. Vol 27, no1, pp.57 – 78.

Oketunji, I. (2001). Agenda for Putting Information Technology to Work in Nigeria Libraries in the New Millennium.In Compendium of Papers Presented at Annual National Conference and AGM Owerri, June 2000.17-12.

Open Source Initiative. (2005). *History of the OSI.* Retrieved July 15, 2014, fromhttp://opensource.org/history

Pace, A. K. (2005, September). Helping You Buy: Integrated Library Systems.*Computers in Libraries,* 25(8), 25-32. Available from http://connection.ebscohost.com/content/article/1039964484.html

Prasad A.R.D (2007) Researcher an Open Source Software Suit for Consortia. 5th International Caliber. *INFLIBNET* Ahmedabad.

Randhawa S. (2013). Open Source Library Management Software Centre for Research in Rural Industrial Development. *E library Research Journal. Vol.1,issue 7,pp.1-7.*

Reed, J. (2013). Jira and Read Scale: Two Tools Libraries Can Use to Enhance Reporting of Reference Transactions. Masters thesis. North Carolina.pp.1-5.

Reiswig, J. (2010). Mendeley. *Journal of the Medical Library Association: JMLA ,98*(2), 193-194. doi:10.3163/1536-5050.98.2.021the Hyperlinked Library. *Serials Review*, *33*(4), 253–256.

Ritson, N. & Marden, A. (2007). Organizational Management. Viva Books, New Delhi. P.299-327

Riewe L.M. (2008) Survey of Open Source Integrated Library Software. *Masters Theses. Sanjose Scholarly work.* U.S.A Retrieved on 03/11/2013 from http:// scholarworks.sjsu.edu/etd- theses.

Sharma, S. D. (2007). Library Automation Software Packages Used in Academic Libraries: A Comparative Study of Dissertation Submitted in Partial Fulfillment for Associates in Information Science. *NISCIR* New Delhi.

Shepherd, M. C. (2000). Library Automation and Management Change." *Proceedings of the IATUL Conferences*. Paper 22.purdue university. Ontario.

SPARC (2002). SPARC Institutional Repository Check-list and Resource Guide.Retrieved on April 02, 2013 from www.arl.org/sparc/IR/IR_Guide.html#management.

Sykes, P. (2010). Automation and Non Professional Staff: The Neglected Majority. *Library Management*. Vol.12, p.3

Stranack, K. (2006). CUFTS: An Open Source Alternative for Serials Management. Serials Librarian 51 (2), 29-40.

Tedd, L. A. (2009). An Introduction to Computer Based Library Systems. London: Heyden International, 3.48 Ibid.,Tedd, L.A., 3.115

Theja, K. A. (2007). Library Automation: Strategies for Library Human Resource Management. Journal of University Librarians. Vol.11,p. 100 -109

Thompson, V. (2012). Training Staff for Newly Installed Automated Circulated Systems. Library Management. Vol 11, p.5

Williams, T. & Channaveeraiah, L. (2008). From Automation to Transformation: Impact of ICT in LIS: Major Shifts and Practices. International CALIBER. P 159 -176

World Bank (2002). Information and Communication Technology: A World Bank Group Strategy. USA: World Bank Group.

Yadagiri, A. (1999). Application of I.T. in Library Services in the Central Library, REC Warangal: A Case Study. IASLIC Bulletin, 44, 111-115

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research method adopted for carrying out the research. It captured the population of the study, the sampled population and sampling procedure, the research instrument used for the study and the procedures for data collection and analysis.

3.2 Research Methodology Adopted for the study

The research method adopted for this study was survey method. A survey methodology is a procedure whereby information is gathered from population that responds to questions. Bernacle (2001) stated that survey research involves a problem definition, data collection, careful analysis and reporting of findings. McMillan and Wergin (2002) described survey research method as a descriptive research methodology that interprets what exists, the conditions and relationships of that which exists. This implies that survey research concerned itself with present event but also considers past events and influences in relation to current conditions. Survey research method is mainly concerned with the discovery of the relative incidence distribution and interrelations of variables using either large and small population or items (Renckly, 2004). Tronchim (2002)

opined that survey research is a research method in which a group of people or items are considered to be representative of the entire group.

The choice of this research method was informed by the nature of the research problem being investigated. In line with the factors mentioned, a survey research method was found to be the appropriate type of inquiry in the assessment of library application software packages for library operations and services in federal university libraries in North Western States of Nigeria.

3.3 Population of the Study

The total population consists of 266 Professional Librarians in the libraries investigated.

Librarians in the Federal University Libraries studied constituted the population of the study. Nweden (1992), Afolabi (1999), Kolo(2003) and Eniayeju (2008) defined population as the totality of individuals, groups, subjects, objects and institutions that have one or more common characteristic that are of interest to the researcher.

Table 3.1: Distribution of the Population

S/No.	Institutions	No. of Staff
1,	Kashim Ibrahim Library, Ahmadu Bello University, Zaria	113
2.	Abdullahi Fodiyo Library, Usmanu Danfodiyo University, Sokoto	34
3.	Bayero University Library, Kano	36
4.	Police Academy Library, Wudil	12
5.	Federal University Dutse Library, Jigawa	11
6.	Nigerian Defence Academy Library, Kaduna	20
7.	Federal University Birnin Kebbi Library, Birnin Kebbi	4
8.	Kebbi State University Library, Aliero	16
9.	Federal University Dutsinma Library, Katsina	15
10.	Federal University Gusau Library, Zamfara	5
	Total	**266**

Source: University Registry records 2014

3.4 Sample and sampling techniques

A sample is a subset of a population selected to participate in the study, it is a fraction of the whole, selected to participate in the research work (Hungler, 1999). The Federal University libraries in the north western state of Nigeria which have started automation process of their

operations and services were selected as the sample institution for the study. The sampling method adopted for this study was purposive sampling technique because of the belief that there is no reason for anyone that is part of the population to be different from the others with respect to the characteristics under investigation (Afolabi,1999). Purposive sampling is the process of selecting a sample on a basis of one's knowledge of the population, its elements and the nature of the research aims (Earl, 1990 as cited by Polit & Hungler, 2009).

In line with the opinion of Earl (1990) as cited by Polit & Hungler (2009), the researcher therefore selected Kashim Ibrahim Library, Ahmadu Bello Unversity, Zaria; Bayero University Library, Kano; Abdullahi Fodiyo Library, Usmanu Danfodiyo University, Sokoto; Federal University Dutsinma Library, Katsina State and Federal University Dutse Library, Jigawa State. Table 3.2 below showed the sample size for the study.

Table 3.2: Sample Size for the Study

S/No.	Institutions	No. of Staff	Percentage (%)
1.	Ahmadu Bello University, Zaria	113	51.9
2.	Bayero University, Kano	36	16.5
3.	Usmanu Danfodiyo University, Sokoto	34	15.6
4.	Federal University, Dutsinma	15	6.9
5.	Federal University Dutse, Jigawa	20	9.1
	Total	**218**	**100**

3.5 Instruments for Data Collection

The instruments that were used to collect data for this study are questionnaire, interview and direct observation. The researcher made use of digital recorder to record the interview process for five minutes each with the heads of units/sections. The semi-structured/unstructured interview involved the researcher personally interviewing the heads of units (ICT, Cataloguing/Classification, Readers services, Reference and Serials) on the existing library application software packages, criteria used in the selection of application software being used, ICT infrastructure and strategies put in place and the challenges being faced in their library

operations and services as well as the level of automation in their libraries. This will enable the researcher to explain or elaborate on any item in the questionnaire that might not be well understood by the respondents.

Questionnaire

The need to collect current and up-to-date information on the problem under study prompted the use of questionnaire. A questionnaire is simply a 'tool' for collecting and recording information about a particular issue of interest. It is mainly made up of a list of questions, but should also include clear instructions and space for answers or administrative details. Questionnaires should always have a definite purpose that is related to the objectives of the research, and it needs to be clear from the outset how the findings will be used. Respondents also need to be made aware of the purpose of the research wherever possible, and should be told how and when they will receive feedback on the findings (Oppenheim, 1992). The questionnaire enables respondents to express their opinion freely. With questionnaire data collected on the views and perception of the respondents towards assessment of library application software packages for library operations and services in federal university libraries in North Western States of Nigeria. And according to Goldhor (1992) it is more cost effective because it provides respondents opportunity to prepare and revise their answers.

The questionnaire was structured to involve both open ended and close ended questions. The open ended questionnaires are the types that did not provide any options for the respondents hence respondents are allowed to express their views. The close ended type or fixed response questionnaire restricted response opinions on certain questions about the problem under study. The items in the questionnaire were divided into four sections according to the following categories:

Section A: What types of Library Application Software Packages that are being used for library operations and services in the Federal University libraries in the North Western States of Nigeria?

Section B: What criteria influenced the choice of library application software that is being used in the Federal University Libraries in the North Western States of Nigeria?

Section C: What are the ICT infrastructures and Strategies put in place to ensure the sustainability of the Library Application Software Packages acquired in the Federal University Libraries in the North Western States of Nigeria?

Section C: What are the challenges to the effective use of Library application software Packages that are being used in Federal University Libraries in North western States of Nigeria?

Interview

A semi-structured interview was used to collect information. Bryman (2007) opined that when conducting a survey study research with multiple case studies, there will be a need for some structure in order to ensure cross-case comparability. The semi-structured interview was use to find out the extent to which the automated library system operations and services are effective and efficient in providing the desired services; the type of Library Application software packages have been installed and are being used; the criteria that influenced the choice and acquisition of the library application software being used; The unstructured interview emanated from follow-up questions in response to some of the questions that required detail explanations as well as observations during visit. In some cases, data is collected through telephone contact,

similarly personal contact with concerned authorities mainly librarians or information officers and Software builders.

Observation

Observation involves the use of the eyes rather than the ear and the voice. Direct observation of facilities available for library application software, such as computer hardware and software available and conditions of facilities was conducted to provide additional information that may be needed for the research.

3.5.1 Validity of Research Instruments

Validity is defined as a measure of truth or falsity of the data obtained through using the research instrument. It is classified as internal and external validity of the measuring instrument (Ekeh, 2003). Joppe (2000) provides the explanation of validity in research to be when the research truly measures, that which it was intended to measure or how truthful the research results are. In other words, does the research instrument allow you to hit "the bull's eye" of your research object?

In order to make sure that the final copy of the questionnaire is valid for the study, the researcher employed the services of some experts in integrated library management system and the two supervisors who examined the face and content values of the instrument and they made necessary corrections of the instrument.

3.5.2 Reliability Test of the Research Instrument

The reliability test was conducted using Guttmann's split-half method of measuring reliability of the items in the questionnaire. A pre test was carried out whereby Ten (10) copies

of the questionnaire were numbered and five (5) each were administered to the library staff. This was to enable the researcher determine the reliability coefficient. All odd numbers constituted one half while the rest numbers that were even formed the second half. The responses in the two sets were correlated to give the reliability coefficient of 0.72 which was found reliable and could produce good result.

3.6 Procedure for Data Collection

The researcher visited each of the selected institutions to administer the questionnaire, conduct follow-up interview with heads of units/sections directly concerned with the problem understudy and carried out on the spot observation of physical facilities and software packages installed and being used. Also, three trained research assistants complement the efforts of the researcher in the administration of the structured questionnaire. Four weeks was used to carry out the interview and personal observations of the library application software while two weeks was used to collect the questionnaire.

3.7 Data Analysis Technique

Descriptive statistical tool was used to analyze the data collected. The results were presented in frequency tables. The researcher in addition used statistical tools by means of percentage and frequency, in analyzing data from the research questions.

References

Afolabi, M (1999), Research methodology in fundamental of Research in Librarianship edited by U.A Alkaleri. Kaduna, J.V.C Press P.32.

Baker, T.L. (1994), *Doing Social Research* (2nd Edn.), New York: McGraw-Hill Inc.

Bernacle, R. (2001). Phenomenology and education research. A paper presented at AARE Conference, Fremantle, December.

Belmont, CA: Wadsworth. Maxwell, J. A. (1996). *Qualitative research design: An interactive approach.* Thousand Oaks, CA: Sage Publications.

Best, J. W & Khan, J.N (1989), Research in Education. United States of America. Prentice Hall Publishers.

Bryman, A. and Bell, E. (2007:315). Business Research Methods. Oxford University Press.

Creswell, W.J (2003). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 2nd Ed. Thousand Oaks, CA: Sage Publications.

Denzin, N. K., & Lincoln, Y. S. (1994). Introduction: Entering the field of qualitative research. In N. K. Denzin& Y. S. Guba (Eds.), *Handbook of qualitative research* Thousand Oaks, CA: Sage Publications.

Ekeh, I.F (2003), Research methodology and Statistics in Education. Nigeria: Madol Press Ltd

Eniayeju, P.A, et al (2008) Guideline on Writing a Research Project Report. Onaivi printing and publishing co Ltd. P.24.

Fontana, A. & Frey, J. (2003). The Interview: From structured questions to negotiated text Chapter 2, in Denzin, N.K., & Lincoln Y.S (Eds) (2003). *Collecting and Interpreting Qualitative Materials. 2nd Edition*, Thousand Oaks, CA: Sage.

Gay, L.R. (1981). Educational Research: Competencies for Analysis and Applications. – 2nd ed. Columbus: Charles E. Merrill Publishing Company and A. Bell and Howell Company.

Goldhor H.L.(1992) Applied multivariate statistics for the social sciences: Hillsdale: NJ: Eribaum.

Joppe, E. C. (2000). Introduction to Research Methodology. 3rd ed. Onitsha. African First Publishers Ltd.

Kolo, E.D (2003), Basic Research concepts for behavioral Researchers. Zaria:Stevano Press p.48

Lofland, J., &Lofland, L. H. (1995). *Analyzing social settings: A guide to qualitative observation and analysis*.

McMillan J.H. and Wergin J.F (2002). Understanding and evaluating educational research. New Jersey: Merrill Prentice Hall.

Nweden, B.O (1992),Summary notes on Research principles, methods and reportWriting. Vom: N.V.R.I,Press p.5

Olayiwola, A.O(2007), Procedures in Educational Research. Kaduna: KE p.83.

Oppenheim A. N. (2002) Understanding reliability and validity in qualitative research. The Qualitative Report, 8(4), 597 606. Retrieved from http://www.nova.edu/ssss/QR/QR84/golafshani.pdf

Polit D.F and Hungler B.P (2009). Basic Research Methods for Librarians (2nd ed.). Greenwich, Conn:
Ablex Publishing Corp.

Renkly, T. (2004). Research methodology on-line. Retrieved from http://tsum.edu/-trenckly/mainpage.html on 9th December, 2012.

Stake, R. (1995). The art of case research. Thousand Oaks, CA: Sage Publications.

Tesch, R. (1990). *Qualitative research: Analysis types and software tools.* Bristol, PA: Falmer Press.

Tronchim, W. M. K. (2002). Research method knowledge base. Retrieved from http://www.socialresearchmethods.net/ on the 10th July, 2013 from

Uzuagulu, A.E(1998), Practical Guide to Writing Research project, reports in tertiary institutions. Retrieved from http://www.nova.edu/ssss/QR/QR84/golafshani.pdf on 05/08/14.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter presents the data collected for the study. It also presents the analysis and discussion of findings.

4.2 Response Rate

A total of 218 (100%) copies of the questionnaire were administered to the respondents. Out of this, 155 (71%) were duly completed and returned. The high response rate could be as a result of the researcher's personal contact with the respondents. The distribution of the respondents by their university libraries is shown in Table 4.1

Table 4.1: Response Rate

Universities	No. of Prof.&Para -Prof. Staff	copies of Questionnaire Distributed	copies of Questionnaire Returned	Percentage (%)
KIL, ABU Zaria	113	113	73	33.5
B.U.L, Kano	36	36	29	13.3
AFL, Sokoto	34	34	26	11.9
FUDML	15	15	11	5.0
FUDL	20	20	16	7.3
TOTAL	**218**	**218**	**155**	**71%**

KEY
KIL ABU = Kashim Ibrahim Library, Ahmadu Bello University, Zaria
BUL = Bayero University Library, Kano
AFL = Abdullahi Fodiyo Library, Usmanu Danfodiyo University, Sokoto
FUDML = Federal University Dutsinma Library, Katsina State
FUDL = Federal University Dutse Library, Jigawa State

Table 4.1 showed the response rate of the respondents. The results showed that Kashim Ibrahim Library of Ahmadu Bello University, Zaria had the highest response rate of 73(33.5%), followed by Bayero University Library, Kano with 29(13.3%) and Abdullahi Fodiyo Library of Usmanu Danfodiyo University, Sokoto with 26(11.9%). The researcher was patient with the respondents to fill the questionnaire before they were collected and there was high sense of

cooperation demonstrated by the staff of these institutions. The university libraries with the least respondents were Federal University Dutsinma Library, Katsina State with 11 (5.0%) respondents and Federal University Dutse Library, Jigawa with 16 (7.3%) respondents. The least responses recorded were because the universities were newly established and the automation process in their libraries is at infant stage.

4.3 Data Analysis

The data collected for this study were presented in order of the research questions.

4.3.1 Library Application Software Packages in use for library operations and services in the Federal University libraries in the North Western States of Nigeria

The first research question of this study was to find out the type of Library Application Software Packages that are being used for library operations and services in the Federal University Libraries under study. Table 4.2 showed the information received from respondents.

Table 4.2 Integrated Library Management Software Packages Being Used for Library Operations and Services in the Federal University Libraries in the North Western States of Nigeria

Types of LASP	Type of Integrated Library Management Software Packages											
	Federal University Libraries											
	KIL, ABU		BUKL		AFL, UDU		FUDML		FUDL		TOTAL	
	F	%	F	%	F	%	F	%	F	%	F	%
Virtua	73	33.5	29	13.3	-	-	-	-	-	-	102	46.8
KOHA	-	-	-	-	26	11.9	-	-	16	7.3	42	19.3
E-Lib	-	-	-	-	-	-	11	5.0	-	-	11	5.0

KEY
KIL ABU = Kashim Ibrahim Library, Ahmadu Bello University, Zaria
BUL = Bayero University Library, Kano
AFL = Abdullahi Fodiyo Library, Usmanu Danfodiyo University, Sokoto
FUDML = Federal University Dutsinma Library, Katsina State
FUDL = Federal University Dutse Library, Jigawa State

In table 4.2, the data collected from the respondents indicated that the Kashim Ibrahim Library in Ahmadu Bello University, Zaria and Bayero University, Kano Library are the only two Federal Universities in the North Western States of Nigeria that adopted Virtua (VTLS) Integrated Library Management Software Package for automating in the operations and services with 73(33.5%) and 29(13.3%) scores respectively. The reason for this highest number of respondents received is due to the fact that Virtua was donated to the libraries with 5years free subscription for a start and virtua also consist of all library core modules and can easily be integrated to other software packages for collaboration and resource sharing.

The Abdullahi Fodiyo Library in Usmanu Danfodiyo Univesity, Sokoto and the Federal University Dutse Library adopted KOHA Integrated Library Management Software Packages for their library operations and services with 26(11.9%) and 16(7.3%) scores respectively. The KOHA is open source software with the ability to index documents for easy search, retrieval and archiving bibliographic databases for online access. Its design architecture accommodates communication standard and cataloguing tools such as MARC I & II and *Z39.50*. The Federal University Dutsinma Library adopted the E-Lib Integrated Library Management Software Package with 11(5.0) response scores. It was adopted because of its interoperability, viability,

ease of use and easy integration with other repository software such as Dspace or Eprints. Muller (2011**)** noted that in choosing ILS software, libraries must base their decision not only on the performance and efficiency of the system, but also on its fundamental flexibility to readily adapt to the future demands and needs of their patrons.

Table 4.3 Digital Management Software Packages in Use for Library Operations and Services in the Federal University Libraries in the North Western States of Nigeria

LASP	Digital Asset Management Software Packages											
	Federal University Libraries											
	KIL, ABU		BUKL		AFL, UDU		FUDML		FUDL		TOTAL	
	F	%	F	%	F	%	F	%	F	%	F	%
DSpace	73	33.5	29	13.3	26	11.9	-	-	16	7.3	144	66.0
Greenstone	-	-	-	-	26	11.9	-	-	-	-	26	11.9

KEY
KIL ABU = Kashim Ibrahim Library, Ahmadu Bello University, Zaria
BUL = Bayero University Library, Kano
AFL = Abdullahi Fodiyo Library, Usmanu Danfodiyo University, Sokoto
FUDML = Federal University Dutsinma Library, Katsina State
FUDL = Federal University Dutse Library, Jigawa State

Table 4.3 showed the analysis of the data collected from the respondents. It revealed that Kashim Ibrahim Library, Bayero University, Kano Library, Abdullahi Fodiyo Library and Federal University Dutse Library are currently using DSpace Digital Management software package with 73(33.5%), 29(13.3%), 26(11.9%) and 16(7.3%) respectively. University Libraries which adopted DSpace Digital Asset Management Software Package indicated that the DSpace is an open source software that is interoperable it has the ability to manage large collections of digital asset and to integrate external tools with the repository to extend the functionality of the repository via provided software interfaces (APIs), or by modifying the code-base. However, on the other side the respondents from Abdullahi Fodiyo Library indicated that Greenstone Digital Asset Management Software is being run side-by-side with DSpace to provide back-end system for archiving digital surrogates. This is because the DSpace has the ability to deploy multiple instances for off-site and disaster recovery; ability to function with the institution's off-site backup facility; ability for components to reside at different physical locations; ability for

development, testing and production environment. These observations agreed with that of Reed (2013) when he remunerated that this approach will largely simplifies and reduces the effort required to set up a Digital Library that promises a guaranteed better quality of service.

4.3.2 Criteria that Influenced the Choice of Library Application Software Packages in the Federal University Libraries in the North Western States of Nigeria

The second objective of this study was to identify the criteria used to select Library Application Software Packages being used for library operations and services in the Federal University Libraries under study. The result of the investigation is shown in Table 4.4 .

Table 4.4 Criteria that Influenced the Choice of Library Application Software Packages for Library Operations and Services in Federal University Libraries in the North Western States of Nigeria

Criteria	Federal University Libraries											
	KIL, ABU		BUKL		AFL, UDU		FUDML		FUDL		TOTAL	
	F	%	F	%	F	%	F	%	F	%	F	%
Available modules	73	33.5	29	13.3	26	11.9	11	5.0	16	7.3	155	71
Open source feature	73	33.5	29	13.3	26	11.9	11	5.0	16	7.3	155	71
Functionality	73	33.5	29	13.3	26	11.9	11	5.0	16	7.3	155	71
Ease of use	73	33.5	29	13.3	26	11.9	11	5.0	16	7.3	155	71
Reliability	73	33.5	29	13.3	26	11.9	11	5.0	16	7.3	155	71
Efficiency	68	31.1	25	11.4	20	9.1	8	3.6	14	6.4	135	61.6
Conformity to standard	52	23.8	21	9.6	17	7.7	8	3.6	12	5.5	110	50.2
Maintainability	52	23.8	21	9.6	17	7.7	8	3.6	12	5.5	110	50.2
Portability	45	20.6	14	6.4	14	6.4	6	2.7	8	3.6	87	39.9
Productivity enhancement	45	20.6	11	5.0	11	5.0	6	2.7	7	3.2	80	36.6
Operating system requirement	33	15.1	11	5.0	11	5.0	4	1.8	4	1.8	63	28.7
Compatibility with the future technology	33	15.1	11	5.0	11	5.0	4	1.8	4	1.8	63	28.7
Web browsing architecture	27	12.3	6	2.7	5	2.2	5	2.2	7	3.2	50	22.9

KEY
KIL ABU = Kashim Ibrahim Library, Ahmadu Bello University, Zaria
BUL = Bayero University Library, Kano
AFL = Abdullahi Fodiyo Library, Usmanu Danfodiyo University, Sokoto
FUDML = Federal University Dutsinma Library, Katsina State
FUDL = Federal University Dutse Library, Jigawa State

Table 4.4 showed that criteria such as available module, open source feature, functionality, ease of use and reliability have the highest response scores of (36:90%). The researcher found out that apart from being open source software, it also allows user to modify some features to meet their needs. Other criteria with high number of responses included: efficiency with 135(61.6%), conformity to standards had 110(50.2%) and maintainability also scored 110(50.2%). The implication of this could be attributed to the fact that successful performance of Library Application Software depends largely upon the degree of satisfaction by its usability and ability to integrate easily with external tools to extend the functionality.

For example, available modules, open source feature, functionality, ease of use, reliability have 33.5% response scores and efficiency, conformity to standard, maintainability, portability and productivity enhancement have between 31.1% and 20.6% with operating system requirement, compatibility with the future technology and web browsing architecture having 15.1% and 13.3%. Whereas, though cumulatively, it could be said that all the libraries studied are mindful of the choice of Library application software based on given criterion, apparently, only ABU tend to have defined criteria for the choice/adoption of Library application software as 10 of the 13 criterion provided for them to respond to have 20% and above scores. The rest of the four libraries have less than 20% response scores generally for the entire criterion. This suggested that other libraries under study do not rely on any criteria for the choice of library application software they use.

Other criteria included portability with 87(39.9%), productivity enhancement had 80(36.6%), operating system requirement 63(28.7%), compatibility with the future technology had 63(28.7%) and web browsing architecture had the least with 50(22.9%). This is contrary to that of Randhawa (2013) who stated that there are many Library Application Software packages,

which are very popular and being used by number of libraries and Librarians may have to do the comprehensive study about them before taking decision in this regard.

4.3.3 ICT Infrastructure and Strategies Put in Place to Sustain the Library Application Software in Federal University Libraries in North Western States of Nigeria

The objective of this study is also aimed at identifying the ICT infrastructure and the strategies put in place to ensure sustain Library Application Software Packages in the Federal University Libraries under study. The responses are contained in Table 4.5

Table 4.5 ICT Infrastructure Put in Place to Ensure Sustain the Library Application Software Packages in Federal University Libraries in North Western States of Nigeria

ICT Infrastructure	Federal University Libraries											
	KIL, ABU		BUKL		AFL, UDU		FUDML		FUDL		TOTAL	
	F	%	F	%	F	%	F	%	F	%	F	%
High-speed Internet connectivity	73	33.5	29	13.3	26	11.9	11	5.0	16	7.3	155	71
Dedicated Bandwidth	73	33.5	29	13.3	26	11.9	11	5.0	16	7.3	155	71
High-speed client computers	73	33.5	29	13.3	26	11.9	11	5.0	16	7.3	155	71
Functional Institutional Website	73	33.5	29	13.3	26	11.9	-	-	-	-	128	58.7
Functional Library Portal	73	33.5	29	13.3	26	11.9	-	-	-	-	128	58.7
High-Capacity server machine	73	33.5	29	13.3	26	11.9	-	-	-	-	128	58.7
Power Inverters	52	23.8	21	9.6	-	-	-	-	-	-	73	33.4

KEY
KIL ABU = Kashim Ibrahim Library, Ahmadu Bello University, Zaria
BUL = Bayero University Library, Kano
AFL = Abdullahi Fodiyo Library, Usmanu Danfodiyo University, Sokoto
FUDML = Federal University Dutsinma Library, Katsina State
FUDL = Federal University Dutse Library, Jigawa State

Table 4.5 showed that federal university libraries under study have in place high-speed Internet connectivity, dedicated bandwidth and high-speed client computers accounted for 155(71%) number of responses.

Though it could be said that the libraries under study have put in place some ICT infrastructure to sustain the Library Application software, on individual basis, ABU Library is the only one that have some ICT infrastructure to sustain the application software with response scores of 20% and above. For example high- speed internet connectivity, dedicated bandwidth, high speed client computers, functional institutional website, functional portal have 33.5% response scores and high capacity server machine and power inverters has 23.8%. However, the other four libraries have less than 20% response scores. This suggested that the libraries rarely gave imperative to availability of ICT infrastructure to sustain the application software they use. This is contrary to the position of Alasa and Kelechukwu (2008) who opined that many of the problems militating against adequate provision of ICT facilities and services in academic libraries include; poor and inadequate telecommunication facilities as well as poor level of ICT literacy even within the academic community. The findings revealed that even though these facilities exists, these libraries are still facing some technical hitches such as network downtime, low bandwidth compared to the increasing number of the users, inadequate staff skills which hinders full implementation of library automation.

In Table 4.5, it was revealed that not all federal university libraries have functional institutional website, functional library portal and high capacity server machine which recorded 128(58.7%). Libraries where these facilities are absent is because they are newly established Universities and are just coming up. Power inverter had the least with 73(33.4%). The findings revealed that many university libraries under study have standby power generating plant. Despite

the availability of generating plant they still need power inverter to complement the high cost of running the generator. This finding is in line with that of Afullo (2000) that Nigeria was rated among the lowest in Africa in power supply and telecommunication infrastructure and so not much is expected of academic libraries in Nigeria, though the situation seems to have improved overtime to some extent.

Table 4.6 Strategies for Sustainable Library Application Software Packages in Federal University Libraries in North Western States of Nigeria

Strategies	Federal University Libraries											
	KIL, ABU		BUKL		AFL, UDU		FUDML		FUDL		TOTAL	
	F	%	F	%	F	%	F	%	F	%	F	%
Appropriate training at the introduction of the software	73	33.5	29	13.3	26	11.9	11	5.0	16	7.3	155	71
Purchase after study and evaluation of software	73	33.5	29	13.3	26	11.9	11	5.0	16	7.3	155	71
Provision of adequate maintenance support for the installed software	73	33.5	29	13.3	26	11.9	11	5.0	16	7.3	155	71
Involvement of library staff in the acquisition and management of software	73	33.5	29	13.3	26	11.9	-	-	-	-	128	58.7
Interaction with vendors	73	33.5	29	13.3	26	11.9	-	-	-	-	128	58.7
Collaborating with ICT bodies and experts	73	33.5	29	13.3	26	11.9	-	-	-	-	128	58.7
Involvement of library staff in decision making	44	20.1	17	7.7	18	8.2	-	-	-	-	79	36.2
Regular seminar and workshops on software maintenance	52	23.8	21	9.6	-	-	-	-	-	-	73	33.4

KEY
KIL ABU = Kashim Ibrahim Library, Ahmadu Bello University, Zaria
BUL = Bayero University Library, Kano
AFL = Abdullahi Fodiyo Library, Usmanu Danfodiyo University, Sokoto
FUDML = Federal University Dutsinma Library, Katsina State
FUDL = Federal University Dutse Library, Jigawa State

From table 4.6 for example, appropriate training at the introduction of the software, purchase after study and evaluation of software, provision of adequate maintenance support for the installed software, involvement of library staff in the acquisition and management of software, interaction with vendors and collaborating with ICT bodies and experts have 33.5% response scores, while involvement of library staff in decision making and regular seminar and workshops on software maintenance have between 23.8% and 20.1% response scores. It has been observed that from cumulative perspectives, the libraries studied have strategies for sustaining their application software they use. However, from individual perspectives, it is clear that only ABU Library has strategies to sustain its application software as it has 20% and above response score for all the suggested strategies as against the other four libraries. This suggests that the other four libraries are seriously mindful of the need to put in place same strategies to sustain their library application.

However, the researcher gathered that the staff in federal university libraries required more awareness on library application software strategies and its area of coverage. Hence, some essential strategic elements were scored low and some were not scored at all which revealed that the staff has inadequate knowledge about those essential sustainability strategies. For example involvement of employees in decision making had 79(36.2%), regular seminar and workshops on software maintenance had 73(53.4%) and skilled staffing has case. This contradicts Harish (2007) who advised that library automation strategies should also cover skilled manpower because the public–owned Federal University Libraries considerable number of manpower that can appropriately manage application software packages adopted for library operations and services.

4.3.4 Challenges to effective utilisation of Library application software Packages in the Federal University Libraries in North Western States of Nigeria

Another objective of this study was to identify the challenges to effective utilisation of the library application software packages in the federal university libraries in North Western States of Nigeria under state. The result of the findings are contained in Table 4.7

Table 4.7 Challenges to effective utilisation of Library application software Packages in the Federal University Libraries in North Western States of Nigeria

Challenges	Federal University Libraries											
	KIL, ABU		BUKL		AFL, UDU		FUDML		FUDL		TOTAL	
	F	%	F	%	F	%	F	%	F	%	F	%
Inadequate funding	73	33.5	29	13.3	26	11.9	11	5.0	16	7.3	155	71
Inadequate technical expertise by the librarians anchoring the software	73	33.5	29	13.3	26	11.9	11	5.0	16	7.3	155	71
Rapid software obsolescence	73	33.5	29	13.3	26	11.9	11	5.0	16	7.3	155	71
Poor library automation policy	68	31.1	24	11.0	22	10.0	-	-	-	-	114	52.2
Poor staff training	60	27.5	22	10.1	22	10.1	-	-	-	-	104	47.7
Inadequate ICT infrastructure in the library	56	25.6	18	8.2	19	8.7	-	-	-	-	93	42.6
Erratic power supply	41	18.8	17	7.7	14	6.4	9	4.1	11	5.0	92	42.2

KEY
KIL ABU = Kashim Ibrahim Library, Ahmadu Bello University, Zaria
BUL = Bayero University Library, Kano
AFL = Abdullahi Fodiyo Library, Usmanu Danfodiyo University, Sokoto
FUDML = Federal University Dutsinma Library, Katsina State
FUDL = Federal University Dutse Library, Jigawa State

Table 4.7 showed that federal university libraries in North Western States of Nigeria are being faced with a lot of challenges. Respondents have indicated inadequate funding, inadequate technical expertise by the librarians anchoring the software and rapid software obsolescence with (155,(71%) as the major challenges facing federal university libraries under study. Other challenges pointed out by the respondents include; poor library automation policy (114,(52.2%), poor staff training (114,(52.2%), inadequate ICT infrastructure in the library (93,(42.6%) and erratic power supply which had (92,(42.2%). The implication of this is that hardly will there be successful library automation without smooth interplay of these factors identified above. This finding agreed with the assertion of Durrant (2004) who stated that despite the promising potentials of Library Application Software Packages to improve information services delivery in developing countries, the new form of scholarly communication is little exploited in such countries when compared to developed countries due to numerous challenges like inadequate fund, inadequate technical expertise, unstable power supply among others.

The finding also revealed that erratic power supply was scored low by few numbers of respondents which indicated that virtually all federal university libraries understudy enjoy relatively good hours of power supply with power backup plants. This contradicts the assertion of Fabunmi (2006) who observed that poor electricity supply is a major impediment to the operation and growth of information and communication technology in Nigerian university libraries.

Generally the Libraries studied face the same challenges in the utilization of their application software. However it has been observed that only KIL Library ABU Zaria out of the five libraries studied articulated its challenges with six of the identified challenges having 25% and above response scores. On the other hand the other four libraries studied had less than 15%

response scores for all the identified challenges to effective utilization of their respective application software. Since several studies on library and information services in Nigeria point to such challenges answer to effective provision of such services to their customers, it could be said that the other libraries could not articulate their challenges and are not serious about it hence the low response scores attained.

References

Afullo, T. J. (2000). Global Information and Africa: The Telecommunication Infrastructure for Cyberspace. Library Management, 21(4) 205-213.

Alasa, M, and Kelechukwu, I. (2008). Internet and Academic Library Services Development in Nigerian. Nigerian Libraries 33(1) 17-28. April 02, 2013 from www.arl.org/sparc/IR/IR_Guide.html#management.

Durrant, S. (2004). Overview of Initiatives in the Developing World. Retrieved on 11/03/2013 from http://drwin.nap.edu./books/03090091454/html/122.html

Fabunmi, B. A., Fabunmi, M. and Paris, W. (2006). Digitisation of library resources: Challenges and Implications for Policy and Planning. International Journal of African & African American Studies, 5(2), 23-36.

Harish, C.(199) Information Tech based library and Information services: a case study of IIT Madras, National seminar on challenges before the university libraries in india in the 21st century, ILA.vadodava. p.277 -284

Muller, T. (2011). How to Choose a Free and Open Source Integrated Library System. *International Digital Library Perspectives*. Canada. Vol 27, no1, pp.57 – 78.

Randhawa, S. (2013). Open Source Library Management Software Centre for Research in Rural Industrial Development. *E library Research Journal. Vol.1,issue 7,pp.1-7.*

Reed, J. (2013). Jira and Read Scale: Two Tools Libraries Can Use to Enhance Reporting of Reference Transactions. Masters thesis. North Carolina.pp.1-5.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter presents the summaries of the study and the major findings, conclusion and recommendations.

5.2 Summary of the study

The purpose of the study was to assess the library application software packages adopted for the library operations and services in the federal university libraries in the North Western States of Nigeria. The basic assumption of this study were that university libraries in North Western Nigeria appreciate the need to automate their operations and services in order to collect, preserve and disseminate information resources electronically. The researcher therefore, attempted to find out the types of library application software packages used for library operations and services; the criteria that influenced the choice of the software application packages that will enhance productivity and provide efficient services delivery in the library; Provision of appropriate ICT facilities; adoption of the right strategies to sustain the application software packages; and the challenges that affect effective use of the application software packages in the automation of the federal university libraries in North Western States of Nigeria.

In order to achieve the objectives of the study, four research questions were raised. The research questions sought to identify the type of application software packages adopted by the university libraries under study, the criteria that influenced the choice of the software packages; ICT infrastructure and strategies put in place to sustain the adopted of the software packages and the challenges that affect the implementation of the software packages adopted for use in federal university libraries in North Western States of Nigeria.

The researcher made use of survey research method for the study. The choice of this research method was informed by the nature of the research problem being investigated. Also survey research method is concerned with the discovery of the relative incidence distribution and interrelations of variables using either large and small population or items. The population of the study involved all federal university libraries in North Western States of Nigeria. Purposive sampling technique was used to randomly select five federal university libraries in the zone this is because purposive sampling is the process of selecting a sample on a basis on one's knowledge of the population, its element and the nature of the research aims. The university libraries include; Kashim Ibrahim Library, Ahmadu Bello University, Zaria, Bayero University Library, Kano, Abdullahi Fodiyo Library, Usmanu Danfodiyo University, Sokoto, Federal University Dutsinma Library, Katsina State and Federal University Dutse Library, Jigawa State. The total number of Professional Librarians in the five universities was 218. The research instruments used to collect data for the study were questionnaire and interview. Descriptive analysis using frequency table and simple percentages were used to analyse the data collected. The results of the findings were presented in tables, figures and showing their relative frequencies to their corresponding percentages.

5.3 Summary of findings

The summary of the major findings of the study are as follows:

1. The types of Library application Software Packages that are being used by the federal university libraries studied for library operations and services are KOHA, Virtua, DSpace, Greenstone and E-Lib.

2. The criteria that influenced the choice of the application software packages in the federal university libraries studied were: available modules; open source feature; functionality; ease of use; and software reliability.
3. The ICT infrastructure and strategies put in place for software sustainability were: high-speed Internet connectivity; dedicated bandwidth; high-speed client computers; appropriate training at the introduction of the software; purchase after study; evaluation of software; and provision of adequate maintenance support for the for the installed software.
4. All the federal university libraries in the North Western States of Nigeria are facing the following challenges; inadequate funding; inadequate technical expertise by the Librarians anchoring the software; and rapid software obsolescence among others.

5.4 Conclusion

Based on the major summary of the findings of this study, it can be concluded that that the Federal university libraries in the North Western State do not have good ICT infrastructure and sustainable strategies. There is need for libraries to adopt and incorporate all types of Library Application software package such as Digital management system, inter library loan, Serial management, Reference management into their systems.

The major challenge faced by the Federal universities in the North western state of Nigeria is inadequate funding and rapid software obsolesce .

5.5 Recommendation

Based on the findings of this study, the following recommendations were made:

1. Federal University libraries in the North western state of Nigeria should apply other types of Library Application Software such as Inter library loan software for Serial Management software, Reference Management Software; Digital Management software as far as information delivery is concerned. This is

necessary in order to ensure that library professionals are exposed to diverse Library application software that will give them added advantage and specialized work experience in various library and information centers in Nigeria and beyond.

2. Federal University libraries in the North western state of Nigeria should consider major factors such as the Knowledge on how to identify software available in the Market, cost features, product quality, and compatibility with other programs, data migration or data transfers, record of vendor, operational efficiency. This would help significantly in reducing the rush to acquire an application that will be used for a short time only to be abandoned for another one.

3. In view of the need to prolong the lifespan of Library Application Software in the Federal University Libraries studied, Information Managers should put in place the state-of-the-art ICT infrastructure such as functional library portal and high capacity server machine. In addition, university libraries should involve library staff in the process of procuring and managing library application software packages interact with vendors and also involve library staff in decision making as part of strategies for the sustainability of library application software packages in the library.

4. Concerted and deliberate effort should be made by Federal University libraries in the North western state of Nigeria to have a well articulated library automation policy that will guide library automation project and implementation. There is need to procure standard ICT facilities and power backups such as power inverter to complement standby generators and National Power Supply Companies in order to have up and running library automation system in federal university libraries.

5.6 Suggestion for further studies

1. Use of Library Application software in University Libraries in Nigeria.

2. Integrating Geographic Information Systems into Library Services in State University Libraries

3 Digital libraries and Application of library software in Ahmadu Bello University Zaria

4 Utilization of free and open source software in University Libraries in Nigeria.

Bibliography

Ahenkorah-Marfo, M and Borteye, E. M. (2010). Networking the Library Catalogue: Lessons from the Kwame Nkrumah University of Science and Technology Library, Kumasi, Ghana *Ghana Library Journal*, 20(1):1-21

Aguolu, C.C. and Aguolu, I. E. (2011). *Libraries and Information Management in Nigeria.* Maiduguri ; Ed-Linform Services. P.361-405.

Andrew, M. (2010). Understanding Library Services in Academic Libraries. *Library Review* 16 (3). P.13.

Adeniran, O. R. (1999). *Library Software in Use in Southern Africa: A Comparative Analysis of Search Engines, Database Fine-tuning and Maintenance Tools*. The Electronic Library, vol.17 (1).

Adegbore, A. M (2010) Automation of two Nigerian University Libraries. *Library philosophy and practice. Ejournal* vol.10, No.19.p. 3.

Afullo, T. J. (2000). Global Information and Africa: The Telecommunication Infrastructure for Cyberspace. *Library Management*, 21(4) 205-213.

Afolabi, M (1999). Research methodology in fundamental of Research in Librarianship edited by U.A Alkaleri. Kaduna, J.V.C Press P.32.

Akintunde, S. A. (2006). State of ICTs in Tertiary Institutions in Nigeria: Window on the Universities. In Compendium of Papers Presented at the 44th Annual National Conference and AGM of Nigerian Library Association, Abuja. 18-23 June 2006. 123-137.

Alasa, M, and Kelechukwu, I. (2008). Internet and Academic Library Services Development in Nigerian. Nigerian Libraries 33(1) 17-28. April 02, 2013 from www.arl.org/sparc/IR/IR_Guide.html#management.

Amin S. (2003). Open source software for libraries: A trend report. *A guided research and*

training centre Indian statistical institute 8th mile, Bangalore.

Arunachalam, S. (2003). Reaching the unreached: what role can ICTs play in rural development? Paper Presented at the Asian Regional Conference of UN ICT Task Force – Media Lab Asia, New Delhi, 25 April.

Ayankola I.A (2012). The challenges and frustration of software adoption in Nigeria libraries: A Survey of some selected libraries. *Library philosophy and practice. E journal.*

Bhanja, M. and Barik, N. 2009. Library Automation: Problems and Prospect, in 10th National Convention of MANLIBNET organized by KIIT University from 22nd – 24th, Jan

Bierman, P. (1980). Library Automation *ARJI* vol.9 in Technology for Information Management and Science (Ed.) Madu E.C Ibadan: Evi-coleman, p.3.

Borgman, C. L. (1997). From Acting Locally to Thinking Globally: A Brief History of Library Automation. *Library Quarterly, Vol.67(n3)*.1997.

Bozimo, D. O. (2006). ICT and the Ahmadu Bello University Libraries. *Nigerian Libraries*: Journal of the Nigerian libraries Association vol.1-20.

Breeding, M. (2013). Automation marketplace 2013: The rush to innovate. *Library Journal: The Digital Shift*. Retrieved August 14, 2014, from http://www.thedigitalshift.com/2014/04/ils/automation-marketplace-2014-therush-

Breeding, M. (2007b). *Lib-web-cats: Current automation system = Koha.* Retrieved March 11, 2014, from http://www.librarvtechnology.org/lwcprocessquery. P1.ILS=Koha

Bhardwaj, R. K. and Shukla, R. K. (2000). *A Practical Approach to Library Automation.* Library Progress (International), vol.20 (1) p.1-9

Baker, T.L. (1994). *Doing Social Research* (2nd Edn.), New York: McGraw-Hill Inc.

Bernacle, R. (2001). Phenomenology and education research. A paper presented at AARE Conference, Fremantle, December.

Belmont, CA: Wadsworth. Maxwell, J. A. (1996). *Qualitative research design: An interactive approach.* Thousand Oaks, CA: Sage Publications.

Best, J. W & Khan, J.N (1989), Research in Education. United States of America. Prentice Hall Publishers.

Bryman A. and Bell E. (2007). Business Research Methods. Oxford University Press.

Creswell W.J (2003). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. 2nd Ed. Thousand Oaks, CA: Sage Publications.

Chauhan B. P. (2000). Library Automation. Step –by step. Thapar institute of engineering and Technology. Patiala.

Christian, M. (2008). Issues and Challenges to the Development of Open Access Institutional Repositories in Academic and Research Institutions in Nigeria. A Paper Prepared for the International Development ResearchCentre (IDRC). Retrieved on 10/03/2013 from http://idl.- bnc.idrc.ca/dspace/handle/123456789/36986/1/127792.pdf.

Connell, R., and Janke, K. (2006). Turnaround time between ILLiad's odyssey and ariel delivery methods. *Journal of Interlibrary Loan, Document Delivery & Electronic Reserve*, *16*(3), 41-56. doi:10.1300/J474v16n03_07.

Covi, M. L. and Cragin, H. M. (2004). Reconfiguring Control in Library Collection Development: A Conceptual Framework for Assessing the Shift Toward Electronic Collections. Journal of American Society and Technology, 55(4), 312-325.

Dhanavandan, S. (2012). An Evaluative Study of Automation Software Application and Database Management Systems in Academic Libraries. *Journal of Emerging trends In Computing and Information Sciences*, vol.3 No.5, 677-679.

Delsey, A. H. (1990). Retrospective Conversion: a National Viewpoint. *IFLA Journal*, 16(1):55-57.

Durrant, S. (2004). Overview of Initiatives in the Developing World. Retrieved on 11/03/2013 from http://drwin.nap.edu./books/03090091454/html/122.html

Denzin, N. K., & Lincoln, Y. S. (1994). Introduction: Entering the Field of Qualitative Research. In N. K. Denzin& Y. S. Guba (Eds.), *Handbook of qualitative research* Thousand Oaks, CA: Sage Publications.

Ekeh, I.F (2003), Research methodology and Statistics in Education. Nigeria: Madol Press Ltd.

Eniayeju, P.A, et al (2008) Guideline on Writing a Research Project Report. Onaivi Printing and Publishing co Ltd. P.24.

Egunjobi, R.A. and Awoyemi, R. A. (2012). "Library automation with Koha", *Library Hi TechNews*, 29(3):12 – 15.

Fadehan, O.A (2009). Advocacy for Benchmarking in the Nigerian Institute of Advanced Legal Studies Library, Lagos. A Valedictory Lecture to Mark the End of Sabbatical Year Spent at the Nigerian Institute of Advanced Legal Studies Library University of Lagos Campus, Akoka, Lagos. Nigeria) Tuesday, 30th June, 2009.

Fabunmi, B. A. (2004). Planning the University Libraries for Effective Customer Services in Nigeria *Technology for Information Management and Service*, ed. By Evarest C. Madu, Evi-Coleman Publications, Ibadan. P.153.

Fabunmi, B. A., Fabunmi, M. and Paris, W. (2006). Digitisation of library resources: Challenges and Implications for Policy and Planning. International Journal of African & African American Studies, 5(2), 23-36.

Francese, E. (2012). Reference Management Software as Digital Libraries: A Survey at the University Torino. Internationational master in digital library learning.OsloAkershus

Francese, E. (2012). The Usage of Reference Management Software (Rms) in an Academic Environment: A Survey at Tallinn University. *Advances on Information Processing and Management, 1*, 293-296

Francis, A. T. (1997). Regional Information Networks: necessary thrust area for INFLIBNET to establish integrated information system in India. Paper presented at 4th National convention for Automation of Libraries in Education and Research of INFLIBNET on I.T. Application in academic libraries, Patiala.

Fontana, A. & Frey, J. (2003). The Interview: From structured questions to negotiated text Chapter 2, in Denzin, N.K., & Lincoln Y.S (Eds) (2003). *Collecting and Interpreting Qualitative Materials. 2nd Edition*, Thousand Oaks, CA: Sage.

Gay, L.R. (1981). Educational Research: Competencies for Analysis and Applications. – 2nd ed. Columbus: Charles E. Merrill Publishing Company and A. Bell and Howell Company.

Gargouri,Y, Hajjem. C, Lavriviere et al. (2010). Open Access, Whether Self-Selected or Mandated, Increases Citation Impact, Especially for Higher Quality Research. Retrieved on 16/07/2013 from http://openaccess.eprints.org/index.php?/archives/168-The-Self-Archiving-Impact-Advantage-Quality-Advantage-or-Quality-Bias.html.

Gbadamosi, B.O. (2012). Emerging challenges to effective library automation and E-library: The case of Emmanuel Alayande College of Education, Oyo, Nigeria. *Library philosophy And practice. E-journal*. vol 9 No.29

Gbaje, E.S (2007) changes and implementing virtual library for higher institutions in Nigeria *Paper presented at the 45th Annual National conference and AGM of Nigerian Library Association*. Abuja, Nigeria

Gbaje, E.S (2013) Open source software a panacea for library automation in Nigeria. *JIRM*.Vol.3 N0.2, P.2

Goldhor,H.F (1992) Applied multivariate statistics for the social sciences: Hillsdale: NJ: Eribaum.

Gbaje, E. S. (2007). Implementing Integrated Library System: Ahmadu Bello University Zaria Experiences. *LIBRESLibrary and information Science Research Electronic journal.*Vol.17(2).

Hosbourgh, N. & Okamoto, K. (2010) Electronic Document Delivery: A survey of the landscape Horizon. *Journal of interlibrary loan, Doc delivery and electronic*. Vol. 20,issue 4
Retrieved on 22/10/13 from http//www.informaworld.com/smpp/content-db=all? Content10.1080/072303x.2010.502096 on 22

Harish, C (1999) Information Tech based library and Information services: a case study of IIT Madras, National seminar on challenges before the university libraries in india in the 21st century, ILA.vadodava. p.277 -284

Imo, T (2011) The challenges of software use in Nigerian University libraries: review of Experience from 1990 -2009. *Library philosophy and practice. E-journal*. vol.9, no.1 p.9-12.

Igun, S .E. (2006). Human Capital for Nigerian Libraries in the 21st Century. Library Philosophy and Practice 8(2): 1-4. Retrieved on Nov.18, 2010 from http//www.webpages.uidaho.edu.mbolin/igun.html.

Jagboro, K.O. (2003).A Study of Internet Usage in Nigerian Universities: A Case Study of Obafemi Awolowo University, Ile Ife Nigeria First Monday, 8(2) Retrieved 02/01/2013 fromhttp://firstmonday.org/issues/issue8_2/jagboro/index.htm.

Joes, A. (1997). *LIBSYS; A Solution for Library Automation and Networking*: Luck now .Librarian vol.29 (12), pp.40-42

Joppe, E. C. (2000). Introduction to Research Methodology. 3rd ed. Onitsha. African First Publishers Ltd.

Kolo, E.D (2003), Basic Research concepts for behavioral Researchers. Zaria:Stevano Press p.48.

Lofland, J., &Lofland, L. H. (1995). *Analyzing social settings: A guide to qualitative observation and analysis*.

Moorthy, A Lakshmana.(2004). Library Automation in India. In Horizon of Information Technology: New Age, New Wage Trend and Impact of Library Science."A Festschcrift" vol. no. 1 on the occasion of 55th birth anniversary of Dr.R.P.Kumar. Pane: Inamdar Bandhu Prakashan. 209.

Mahapatra, M., & Ramesh, D.B. (2004). *Information Technology Application in Libraries: A textbook for beginners.* Orissa: Reprint Ltd. 248.

.Malwad, N. M. (1995). *Selection criteria for Library Automation Software*. DESIDOC Bulletin of Information Technology, vol. 15, (2), pp.17-26

Manjunath, G. K. (2008) Library automation. Why and how? Retrieved 18 august 2015 from http//www.igidr.ac.in/lib/paper.html

Martha, S. (2014). The development of Information communication technology in Nigerian Libraries. *ELIS*.reprints.

Ming, S. (2000). Access to Digital Information: Some Breakthrough and Obstacles, Journal of Librarianship and Information Science, 32(1).

Mishra, R. K. **(** 2000). Resource Sharing; The Third Dimension of Library Automation, *ALIBER*- Chennai.

Morgan, S. (2001). Change in University Libraries: Don't Forget People Library Management. Vol. 22 Pp.1-2

Muller, T. (2011). How to Choose a Free and Open Source Integrated Library System. *International Digital Library Perspectives*. Canada. Vol 27, no1, pp.57 – 78.

McMillan J.H and Wergin J.F (2002). Understanding and evaluating educational research.

New Jersey: Merrill Prentice Hall.

Nweden, B.O (1992),Summary notes on Research principles, methods and reportWriting. Vom: N.V.R.I,Press p.5.

Olayiwola, A.O(2007), Procedures in Educational Research. Kaduna: KE p.83.

Oppenheim, A. N. (2002) Understanding reliability and validity in qualitative research. The Qualitative Report, 8(4), 597 606. Retrieved from http://www.nova.edu/ssss/QR/QR84/golafshani.pdf

Oketunji, I. (2001). Agenda for Putting Information Technology to Work in Nigeria Libraries in the New Millennium.In Compendium of Papers Presented at Annual National Conference and AGM Owerri, June 2000.17-12.

Open Source Initiative. (2005). *History of the OSI.* Retrieved July 15, 2014, fromhttp://opensource.org/history

Ogunrombi, S. A. & Oladokun, S. O. (2005). TINLIB: Application to Library Automation in a Nigerian University of Technology. *Nigerian Libraries*: Journal of the Nigerian Library Association. Vol.25 &26 (1-4)1-8.

Oketunji, F.S. (2001) X-LIB: A library application software options for libraries and information Centres. *Nigerian Libraries*. Vol.35,No.2. pp.29-37.

Oni, F. A. (2004). Enchancing the Performance of Library Operations through Appropriate Information Technology: Technology for Information Science ed. by Madu E.C, Evi-coleman publication, Ibadan. p.41-52.

Oyinloye, A.M (2004) Software Packages for libraries: technology for information science ed. by E.C Madu, Evi-coleman publication,Ibadan.p41-52.

Parvez, A (2011). Development in library services with the advent of ICT based products &services: a continuous process" *International Journal of Digital Library Services,* 1(2):1-9

Pace, A. K. (2005). Helping You Buy: Integrated Library Systems. *Computers in Libraries,* 25(8), 25-32. Available from http://connection.ebscohost.com/content/article/1039964484.html

Prasad A.R.D (2007) Researcher an Open Source Software Suit for Consortia. 5th International Caliber. *INFLIBNET* Ahmedabad.

Polit and Hungler (2009). Basic Research Methods for Librarians (2nd ed.). Greenwich, Conn: Ablex Publishing Corp.

Randhawa S. (2013). Open Source Library Management Software Centre for Research in Rural Industrial Development. *E library Research Journal. Vol.1,issue 7,pp.1-7.*

Reed, J. (2013). Jira and Read Scale: Two Tools Libraries Can Use to Enhance Reporting of Reference Transactions. Masters thesis. North Carolina.pp.1-5.

Reiswig, J. (2010). Mendeley. *Journal of the Medical Library Association: JMLA ,98*(2), 193-194. doi:10.3163/1536-5050.98.2.021the Hyperlinked Library. *Serials Review, 33*(4), 253–256.

Ritson, N. & Marden, A. (2007). Organizational Management. Viva Books, New Delhi. P.299-327

Riewe L.M. (2008) Survey of Open Source Integrated Library Software. *Masters Theses. Sanjose Scholarly work.* U.S.A Retrieved on 03/11/2013 from http:// scholarworks.sjsu.edu/etd- theses.

Renkly, T. (2004). Research methodology on-line. Retrieved from http://tsum.edu/-trenckly/mainpage.html on 9th December, 2012.

Sharma, S. D. (2007). Library Automation Software Packages Used in Academic Libraries: A Comparative Study of Dissertation Submitted in Partial Fulfillment for Associates in Information Science. *NISCIR* New Delhi.

Shepherd, M. C. (2000). Library Automation and Management Change." *Proceedings of the IATUL Conferences*. Paper 22.purdue university. Ontario.

SPARC (2002). SPARC Institutional Repository Check-list and Resource Guide.Retrieved on April 02, 2013 from www.arl.org/sparc/IR/IR_Guide.html#management.

Sykes, P. (2010). Automation and Non Professional Staff: The Neglected Majority. *Library Management*. Vol.12, p.3

Stranack, K. (2006). CUFTS: An Open Source Alternative for Serials Management. Serials Librarian 51 (2), 29-40.

Stake, R. (1995). The art of case research. Thousand Oaks, CA: Sage Publications.

Tedd, L. A. (2009). An Introduction to Computer Based Library Systems. London: Heyden International, 3.48 Ibid.,Tedd, L.A., 3.115

Theja, K. A. (2007). Library Automation: Strategies for Library Human Resource Management. Journal of University Librarians. Vol.11,p. 100 -109

Thompson, V. (2012). Training Staff for Newly Installed Automated Circulated Systems. Library Management. Vol 11, p.5

Tesch, R. (1990). *Qualitative research: Analysis types and software tools.* Bristol, PA: Falmer Press.

Tronchim, W. M. K. (2002). Research method knowledge base. Retrieved from http://www.socialresearchmethods.net/ on the 10th July, 2013 from

Uzuagulu, A.E(1998), Practical Guide to Writing Research project, reports in tertiary institutions. Retrieved from http://www.nova.edu/ssss/QR/QR84/golafshani.pdf on 05/08/14.

Ugah, A. D. (2007). Evaluating the Use of University Libraries in Nigeria: A Case Study of Michael Okpara University of Agriculture, Umudike" *Library Philosophy and Practice.*

Vijayakumar, A (2012). Application of Information communication technology in college Libraries. *International multidisplinary research journal*, 2(2), 91-94

Williams, T. & Channaveeraiah, L. (2008). From Automation to Transformation: Impact of ICT in LIS: Major Shifts and Practices. International CALIBER. P 159 -176

World Bank. (2002). Information and Communication Technology: A World Bank Group Strategy. USA: World Bank Group.

Yadagiri, A. (1999). Application of I.T. in Library Services in the Central Library, REC Warangal: A Case Study. IASLIC Bulletin, 44, 111-115

APPENDIX

Department of Library and Information Science

Faculty of Education

Ahmadu Bello University, Zaria.

Dear Respondent,

I am a Masters Students in the above named Department carrying out a Research entitled "Assessment of Library Application Software Package for Library Operations and Services in Federal Universities Libraries in North Western states of Nigeria.

I therefore, wish to request you to kindly assist to provide answers to the questions contained in the attached questionnaire. All responses will be treated confidentially and purely for academic purpose only.

Thank you for your cooperation.

Yours faithfully,

Rachael Ayodele O.
The Researcher

QUESTIONNAIRE ON ASSESSMENT OF LIBRARY APPLICATION SOFTWARE PACKAGES FOR LIBRARY OPERATIONS AND SERVICES IN FEDERAL UNIVERSITY LIBRARIES IN NORTH WESTERN STATES OF NIGERIA

Instruction: Kindly tick the appropriate box corresponding to the response of your choice. You may tick as many as applicable.

1. Name of Your Library ----------

Kashim Ibrahim Library, Zaria ( )

Abdullallahi Fodio Library, University, Sokoto ( )

Bayero University Library, Kano ( )

Federal University Dutse Library, Jigawa ( )

Federal University, Dutsinma Library Katsina ( )

SECTION A: TYPE(S) Of Library Application Software used for Library Operations and Services in Federal University Libraries in North Western States of Nigeria.

2. Which of the following Integrated Library Management Software Package(s) have you installed in your Library? Please tick more than one response where necessary.

G-lass ( )

Tin – Lib ( )

X – Lib ( )

Liberty ( )

Virtua ( )

E- Lib ( )

Alice for windows (AFW) ( )

KOHA ( )

Strategic Lib Automation& Mgt ( )

CDS/ISIS ( )

Lib info ( )

Libsy ( )

Millennium ( )

SOUL ( )

Evergreen ( )

3. Which of the following Digital Management Software Package(s) have you installed in your Library? Please tick more than one response where necessary.

Dspace ( )

Green stone ( )

Fedora ( )

E-prints ( )

4. Which of the following Inter Library Loan/Electronic Document Delivery Software Package(s) have you installed in your Library? Please tick more than one response where necessary.

Ariel ( )

Prospero ( )

Odyssey ( )

Relais Express ( )

5. Which of the following Serial Management Software Package(s) have you installed in your Library? Please tick more than one response where necessary.

Cufts ( )

Cuft (ERMes) ( )

Godots ( )

Godot and ILL ( )

Dbwiz ( )

6. Which of the following Reference Management Software Package(s) have you installed in your Library? Please tick more than one response where necessary.

EndNote ( )

BibDesk ( )

JabRef ( )

Zotero,Papers ( )

Mendeley ( )

Bookends ( )

RefWorks ( )

Reference Manager ( )

SECTION B: CRITERIA THAT INFLUENCE CHOICE OF THE LIBRARY APPLICATION SOFTWARE IN USED IN THE LIBRARIES

7. Which of the following criteria do you consider when choosing Library Application Software Packages for your library? Please tick more than one response where necessary.

Cost Features and Functions ( )
Available Modules ( )
Open Source Features ( )
Functionality ( )
Ease of Use ( )
Reliability ( )
Efficiency ( )
Conformity to Standard ( )
Maintainability ( )
Portability ( )
Productivity Enhancement ( )
Operating System Requirement ( )
Compatibility with the Future Technology ( )
Web Browsing Architecture ( )
Data migration or transfers ( )
User interface ( )
User- controlled customization ( )
Hardware and software requirements ( )

SECTION C: ICT INFRASTRUCTURE AND STRATEGIES PUT IN PLACE FOR SUSTAINING THE USE OF LIBRARY APPLICATION SOFTWARE PACKAGES ACQUIRED.

8. Which of the following ICT Infrastructure have you put in place for sustaining the use of Library Application Software acquired in your library? (Tick as many as possible)

High-Speed Internet Connectivity ( )
Dedicated Bandwidth ( )
High-Speed Client Computers ( )

Functional Institutional Website ( )

Functional Library Portal ( )

High Capacity Server Machine ( )

Power Inverter ( )

9. Which of the following Strategies have you put in place for sustaining the use of Library Application Software acquired in your library? (Tick as many as possible)

Purchase after study and evaluation software in question ( )

Appropriate Training at the Introduction of the Software ( )

Collaborating with ICT bodies and experts to identify quality software ( )

In- house development of software ( )

Interaction with Vendors ( )

Involvement of Library Staff in Decision Making ( )

Provision of training at the introduction of the software ( )

Provision of adequate maintenance support for the installed software ( )

Regular seminar / workshops on software maintenance and use ( )

Involving library staff in the acquisition and management of software ( )

User groups ( )

Creating open communication and collaboration ( )

Others: …….

SECTION D: CHALLENGES THAT AFFECT THE USE OF SOFTWARE PACKAGES ADOPTED IN FEDERAL UNIVERSITY LIBRARIES.

10. Which of the following factors affects the full implementation and utilization of the library application software package(s) in your library? Please tick as many as possible.

Inadequate funding ( )

Rapid software obsolescence ( )

Erratic power supply ( )

High cost of maintaining software ( )

Inadequate Technical Expertise by the Librarians anchoring the software ( )

Poor staff training ( )

Constant breakdown of hardware ( )

Inadequate house experts ( )

Inadequate ICT infrastructure in the Library ( )

Virus attack ( )

Others ----------