

JIMMA UNIVERSITY
COLLEGE OF NATURAL SCIENCES
DEPARTMENT OF INFORMATION SCIENCE

**INVESTIGATING THE STATUS OF OPEN SOURCE INTEGRATED
LIBRARY MANAGEMENT SYSTEM FOR EFFECTIVE LIBRARY
SERVICES IN JIMMA AND MEKELLE UNIVERSITIES, ETHIOPIA**

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**Investigating the Status of Open Source Integrated Library Management
System for Effective Library Services in Jimma and Mekelle Universities,
Ethiopia**

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Declaration

I, the undersigned, MSc Information and Knowledge Management student declare that, this thesis is my original work in partial fulfillment of the requirement for the degree of Master of Science in Information and Knowledge Management. Where other peoples work has been used, it has been carefully acknowledged and referenced in accordance with the requirements.

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Dedicated

To

My wife Birkti Mesfin and My beloved son Abel

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List of Abbreviations/acronyms

AACR	Anglo American Cataloguing Rules
ABCD	Automation of libraries and Centers of Documentation Automation des Bibliothèques et Centres de Documentacion
ARL	Association of Research Libraries
API	Application Programming Interface
CA	Current Awareness
CDS/ISIS	Computerized Documentation Service/Integrated Set for Information
CMS	Content Management System
CSRG	Computer Systems Research Group
FAO	Food and Agriculture Organization
FDT	Flied Definition Table
FL	Formatting Language
FOSS	Free and Open Source Software
FST	Flied Selection Table
HTML	Hypertext Markup Language
IAH	Interface for Access of Health Information
ICT	Information and Communication Technology
ILL	Inter library Loan
ILMS	Integrated Library Management System
ILO	International Labour Organization
ILS	Integrated Library System
INASP	International Network for the Availability of Scientific Publications

ISBD	International Standard Book Description
ISBN	International Standard Book Number
ISIS	Integrated Set for Information Services
IUC	Institutional University Cooperation
JISIS	Java Integrated Set for Information Services
JU	Jimma University
JUL	Jimma University Library
MARC	Machine Readable Catalogue
MFN	Master File Number
MU	Mekelle University
NBP	Network Based Platform
OCLC	Online Computer Library Center
ODI	Open Discovery Initiative
OPAC	Online Public Access Catalogue
OSS	Open Sources software
PFT	Print Format Table
PHP	Personal Home Page
SDI	Selective Dissemination of Information
SPSS	Statistical Package for the Social Science
SQL	Structural Query Language
UNESCO	United Nation Educational, Scientific and Cultural Organization
VAX	Virtual Address eXtension
VLIR	Vlaamse Interuniversitaire Raad - Universitaire Ontwikkelings Samenwerking (Flemish University Council - Cooperation)

WEBLIS Web based Library Integrated System

WHO World Health Organization

WWW World Wide Web

XML Extensive Mark- up Language

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Abstract

Open source integrated library system emerged as an alternative model of software development. It has revolutionized the development of integrated library management software and offers a number of attractions for libraries, especially for developing countries. The use of open source has grown rapidly and becomes a trend because of its low cost, flexibility, availability of source code and free redistribution. Open Source allows that library to participate directly in the development of its systems and services in a manner consistent with the value of librarianship. Due to the advantages of open source, small and medium size libraries are moving to open source library management systems. The main aim of this study was to investigate the implementation of open sources integrated library management system for effective library services. The methodology employed to conduct this study was survey research method and the respondents' drawn from Jimma and Mekelle universities, the study population for this study was (13,550) which comprised of academic staff, library staff and students. Convenience sampling method was used to select students and academic staff, purposive sampling method was used to select study areas and sample of library staff. Data for the study was collected through questionnaire, face-to-face interview and observation. The result of the study shows that 36% of respondents indicated that ABCD integrated library system has a complete feature to manage overall integrated library services. 67% of respondents indicated that their library system was partially automated and 26.5% respondents said that the automation was at initial stage. Only OPAC and cataloging parts of ABCD integrated library system are 100% (hundred percent) automated, circulation partial automated, acquisition and serial control not yet functionally automated. The research indecates that both universiety libraries were faced different factors influnce on full implementation of ABCD library system these are low participation of ICT center, lack of feasibility study, lack of management support, inadequate funding and lack of skilled digital librarian

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the study

Integrated Library Management System (ILMS) or popularly known as Integrated Library System (ILS) or Library Automation Software (LAS) is computerized information system developed specifically for the management of day to day library operations and services. It is called integrated because of its capability to integrate all the functions that are relevant in a Library setup (Ukachi, 2012)

Integrated Library System (ILS) is an automated library system that is capable of managing the operations of more than one basic library functions it is a system which can keep track of all library operations such as items, billing, tracking various items owned by library like books, journals, magazines and DVDs orders made by various faculty staff, students and also even patron management. By this system any library can operate all the library operations easily and centrally (Breeding & Yelton, 2011)

In addition to that ILS can connect various libraries including their various branches. ILSs were known as "library management system" or "automated library system". Before any automated library system, libraries usually used a card catalog to index its books and others. After some sometimes, computers were used to automate this card cataloging and then it became known as "automated system". But, as the internet is getting stronger libraries are demanding more and more automated facilities, new and powerful ILSs started development by various companies (Giannakopoulos, 2014)

Today's ILS software's can do various tasks at a time, for example Acquisitions, cataloging, tracking newspapers and magazines most of the jobs are web based. Any authenticated user can operate these software from anywhere of the world. That means, major ILS now offer web-based portals where library users can log in to view their account, renew their books, and be authenticated to use online databases. In any integrated library system, there are generally two

interfaces, one is for patrons and another is for administrators. In library system the operation of a user/member/patron and staff of the library is different. A user can search a book, view available book list, can issue book, renew books, can hold books, can print issue list, can edit his/her information (patron information) (Lipinski, 2012).

According to Ukachi (2012), recent developments in information handling processes have also obligated libraries to embrace automation as a means of enhancing their service delivery to their clients. According to Lubanski (2012), automation simply means "the use of machines or technologies to optimize productivity in the production of goods and delivery of services". (Aina, 2004) opined that automation involves the computerization of routine tasks hitherto being performed by human beings. Library automation therefore, is a process of applying or utilizing ICT facilities to perform those tasks that are traditionally performed manually in the libraries such as acquisition, cataloging, circulation, serials management, library automation requires the utilization of hardware and software.

ILS is an enterprise resource planning system for a library, used to track items owned, orders made, bills paid, and patrons who have borrowed materials from a library system. (Lourdes, 2010) Integrated Library Management System ILMS usually comprises a relational database, software to interact with that database, and two graphical user interfaces (one for patrons, one for staff). Most ILMS separate software functions into discrete programs called modules, each of them integrated with a unified interface, each patron and item has a unique ID in the database that allows the ILMS to track its activity. Larger libraries use an ILMS to order and acquire, receive and invoice, catalog, circulate, track and shelve materials. Smaller libraries, such as those in private homes or non-profit organizations (like churches or synagogues, for instance), often forgo the expense and maintenance required to run an ILMS, and instead use a library computer system. (Parvez, 2011)

In the present digital era of information dissemination and most of the library services are based on information technology as well as resources available in electronic formats. For many libraries, organizing information sources like books and other media can be a challenging task, especially as the library grows with more resources. Now just because the world has been

blessed with wonderful software solutions that make everything easier to do, doesn't mean that every library is using these solutions. However, the high price of such software prevents most of the libraries from using them. So as to deal with this issue, and for the benefit user communities of libraries, organizations and individuals have developed software, which are distributed free of cost. Known as free/open source software, these are extensively available on the internet and can be downloaded, installed, modified and distributed (Breeding, 2012).

There are a number of both proprietary and open sources ILS available nowadays, and it is not an easy task to compare them. All ILS shares a lot of common functionalities and they differentiate in their levels of maturity and finalization (Muller, 2011). There are also new features reflecting recent technological trends and changes in the users' behavior and expectations. Flexibility of the ILS software and the speed at which changes are adopted become the important factors in ILS development. Proprietary ILS is usually costly, protected by copyright and have restrictions and limitations on usage and distribution. In situations when libraries of all types and sizes are affected by serious financial restrictions (Hamby et al., 2011). open source solutions are becoming a more viable alternative than they were in the past (Wrosch, 2007) "Open" or "free" means that the library does not have to pay the license fees and upgrades, but some expenses such as the staff time, training, infrastructure, software support are similar to the proprietary ILS

Library professionals like to see open source ILMS through different perspectives. Some people are attracted to open source ILMS due to its philosophy. Another segment is technology know-how librarians who try open source ILMS because of openness in source code and support towards open standards. Small and medium size libraries feel automation of acronym housekeeping operations as a financial burden due to the high price of commercial or proprietary Library Management Systems. Libraries in developing countries show interest in open source ILS because of its economic feasibility; i.e. free availability. Open source library management systems give effective way to automate their library operations without much financial investment. (Morgan, 2009)

Mekelle and Jimma University Libraries were started open source integrated library management systems since 2005 at the time of WEBLIS and currently it is update into ABCD, the system

has play great role to integrate library services of Online Public Accesses Catalog , acquisition, circulation and content management are doing in one system. The purpose of this study is to investigate the status of open sources integrated library management system for effective access of services using the system.

1.2 Statement of the problem

Now a days the services delivery and over all activities of libraries are supported by ICT, which used commercial or open sources library software realized to enhance or shift from traditional to modern library management system. The library used to face challenges because of shortcomings of a manual library system and had financial limitation to implement a computer-based library system. The manual operations of the libraries had limitations to satisfying the needs of users and staff. For example, it did not allow searching for an item by combining keywords or subject headings. Even if a search is successful, locating the material was difficult, i.e., knowing whether the material is in circulation, on the shelf, out of circulation, etc. The Library staff faced difficulties to know the collection size, circulate books to users, and compile reports.

Traditional library system is difficult to update due to increase volumes of research activities and interdisciplinary specialization in different fields, there is the result of information explosion and due to this it becomes very difficult for the libraries and information centers to update the information. Hence library automation is necessary (Payne & Singh, 2013). Some libraries are concerned that Open Sources Software (OSS) ILSs lack major functionalities for acquisitions, cataloging, authority control, and offline circulation (McDermott, 2012). Another key concern is whether the OSS ILS vendors and support community, which provide training and documentation, are responsive and sustainable (Muller, 2011) Libraries are very concerned about open source support options because they often struggle with a lack of technical expertise for the new systems.

It is ILMS which can ensure improved and quick service. For example, the manual work of housekeeping such as acquisition, cataloguing, circulation, serial control can be done with greater speed and efficiency with no arrears or backlog kept pending (Raiz, 2010). He argues that various factors have contributed to bringing change from conventional to integrated library

operations. Broadly speaking, the main reasons behind this change are growth of document and new dimension of user's needs. Suku and Mini (2009) observed that the reasons necessitating integrated systems or automation of University libraries as explosion of knowledge resulting in numerous specializations and flow of almost non-stop information, inability of users to explore unlimited literature, wastage of enormous precious time in handling routine and repetitive library operations and cannot acquire and make available the entire published materials and to facilitate easy, fast, and reliable sharing of resources between libraries cutting across space and time.

Developing African University libraries used open sources integrated library systems; however the library system is not yet fully integrated only Online Public Access Catalog (OPAC) and data entry of the software is partially functional, due to this users are not getting complete, easy access of information sources and services properly. (Nigussie, 2010) library automation system is able to manage library services in modern and professional manner that allows information sources to be well organized and disseminated on time to all information seekers by bringing all library services into one system, but due to insufficient funds for libraries, lack of technical qualified library professionals, problems of properly adopt or customization of library software, lack of proper support of University managements and ICT center as well as system interrupt affect sustainability of library systems in their daily operations are difficulty for implementation of integrated library system.

In Ethiopian higher academic libraries the introduction of modern library services are a recent phenomenon, through my observation from their websites all public University libraries use free and open sources software. Mekelle and Jimma University libraries using an open sources library system which is "Automation of libraries and Centers of Documentation" *Automation des Bibliothèques et Centres de Documentacion (ABCD)*, however, not fully integrated as a result the library sections circulation, Acquisition, serial control and content management part of the ABCD were not properly provide services for their users. Hence, it is the intention of this study to investigate the status of open source ILMS of Jimma and Mekelle universities for effective Library services.

1.3. Research Questions

1. To what extent have Jimma and Mekelle University libraries integrated their functions using open source software?
2. How do users access information sources using existing open source integrated Library software
3. What are the status of staff capacity and standards in use by Jimma University (JU) and Mekelle University (MU) to integrate their library systems?
4. What are the challenges the libraries' facing implementation of open sources ILMS?

1.4 Objectives of the study

To investigate the implementation status of open sources integrated library management system and effectiveness of library services in Jimmma and Mekelle University. The specific objectives are:

1. To investigate which library services are functional integrated
2. To examine how users have access of information sources using integrated library systems
3. To find out hinders of implementation of integrated library management systems
4. To suggest means and ways for the improvement of effective implementation of library systems

1.5 Significance of the study

A successful ILMS meet the present and future demands of both users and staff, helping the library run consistently and smoothly without unnecessary complications. Additionally it is important for librarian's member that the field of library automation is constantly evolving, requiring periodic assessments of contemporary trends in order to ensure their current Integrated Library System is keeping up with the competition, This study aims at investigating the status of open source integrated library management system for effective Library Service which would be relevant to University librarian to see their current status of services delivery system, acquiring and organizing of information sources.

The finding is contribute to better understanding of University directors and managements to give emphasis on budget allocation, capacity building and upgrading of integrated library systems and services. The result of the study would be of immense benefit to the library staff because it creates awareness among them on the need for workshops and seminars to be organized so as to improve on their jobs. Shall be of immense significance to the technical section librarians because it is assist them in adopting policies and standards on using of open sources integrated library system and also improving upon effective service delivery to users.

The study would contribute to library and documentation center researches in Ethiopia serving as reference in looking to integrated library management system issues in academic institutions, public libraries and documentation centers. Thus, the beneficiaries of the outcome of this research are University managements, donors, researchers and library employees in general.

1.6. Scope and limitation of the Study

The scope of the study was to investigate the implementation status of open source integrated library management system for effective library services, focused to ABCD software. This software is currently used in Jimma and Mekelle University library. The study was conducted in April-May/2015. Due to time and budget constraints data were collected from academic staff, regular postgraduate and undergraduate graduate's class students of the two universities.

1.7 Operational Definitions of terms

Operational definitions of terms may help for readers have better understanding of terms and concepts discussed in this study thus some basic definitions of terms are as follows:

ABCD is the acronym for a software suite for the automation of libraries and documentation centers. In Spanish this is, in full: '**A**utomatisación de **B**ibliotecasy **C**entros de **D**ocumentación', which keeps the same acronym valid also for French (**A**utomation des **B**ibliothèques et **C**enters de **D**ocumentacion). The name itself already expresses the ambition of the software suite not only providing automation functions for the libraries but also other information providers such as documentation centers

Anglophone Africa: includes five countries in West Africa (The Gambia, Sierra Leone, Liberia, Ghana, and the most populous African country Nigeria).

Free and open-source software (FOSS) is computer software that can be classified as both free and open sources software. That is, anyone is freely licensed to use, copy, study, and change the software in any way, and the source code is openly shared so that people are encouraged to voluntarily improve the design of the software.

Integrated library Management system: When the library management systems perform effectively and link circulation activities with cataloging, serials management and acquisition at any given time, manage all the basic functions of a library using one system.

Management: has been defined in many ways, but the basic essence of management is using organizational resources to achieve objectives through planning, organizing, staffing, leading, and controlling.

Library management: is a sub-discipline of institutional management that focuses on specific issues faced by libraries and library management professionals. Library management encompasses normal management tasks as well as intellectual freedom, anti-censorship, and fundraising tasks. Issues faced in library management frequently overlap those faced in management of non-profit organizations.

Integrated Management System: integrates all of an organization's systems and processes in to one complete framework, enabling an organization to work as a single unit with unified objectives.

Interlibrary loan: One of the functions of a library that is a member of a consortium or network, where materials are loaned to member libraries.

Library automation: A generic term used to refer to the application of computers in libraries to automate operations.

Open Source - the software is most likely free and the source code is completely open. You can modify, fix, add to, take away, and change the code any way you wish.

Proprietary - the software costs money and the source code is restricted. You cannot modify, fix, add to, take away, or change the code in any form.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Concepts of Integrated Library Management System

In the 1990s, a cycle of transition started in library automation development and implementation reflecting the evolution of the information industry at the time. The majority of research and academic libraries moved towards automating access to their collections, alas not in a homogeneous manner. The evolution of web 2.0, however, the convenience of the relevancy-ranked search results promulgated by Google, and the convergence of media industries is urging Libraries and ILMS Vendors to redesign the ILMS. Library websites offer access to unconnected silos: electronic journals, the catalogue, databases, subject guides, ambiguous discovery services, all accessed separately. Moreover, eBooks have entered the library stream; while the dominance of print collections is gradually receding their importance cannot be underestimated however, especially for research/academic libraries. Library workflows have also been changed to accommodate for these changes. (Giannakopoulos, 2014)

Library is a fast growing organism. The ancient methods of maintaining it are no longer dynamic and efficient. For expeditious retrieval and dissemination of information and better service for the clientele, application of modern techniques has become absolutely indispensable. A properly computerized library will help its users with quick and prompt services. Library integrated system or automation refers to mechanization of library housekeeping operations predominantly by computerization. The most commonly known housekeeping operations are acquisition control, serials control, cataloguing, and classification and circulation control. Library automation or Integrated Library System (ILS) is an enterprise resource planning systems for a library, used to tracks items owned, order made, bills paid.(Reddy, 2013)

The justification for investing in higher education libraries lies in the extent to which a linkage can be demonstrated between such an investment and improvement in quality, efficiency and achievement in university education. At the university, the library has been seen as an instrument

of teaching alongside lecture and discussion methods and the librarian serves as a teacher, guiding the student in the ways of investigation and research. This is achieved by first acquiring information materials to support every course in the curriculum and every research project of the faculty, and secondly organizing them in a manner that permits easy access to their contents and finally, ensuring that such access is facilitated by giving users the necessary skills to retrieve the required information. (Kamba, 2011)

The relevance of the application of Information and Communication Technology (ICT) in library activities such as acquisition, cataloguing, circulation and serials management, is no longer debatable as libraries globally have realized the need to move from their isolated past into integrated systems and networked operations (Ukachi, 2012). Recent developments in information handling processes have also obligated libraries to embrace automation as a means of enhancing their service delivery to their clients

In 2002, an overview of the first FOSS ILSs found that they were not yet as functional as commercial systems, but might work for certain small libraries: In their current state, the open source automation systems offer only promise and potential and are not yet a viable option for a run-of-the-mill library. Even for small libraries that might be satisfied with the capabilities of the open source systems, the technical implementation and difficulty in securing ongoing support remain a challenge. In early 2010, library technology researcher Marshall Breeding noted, “library automation based on open source software has become a major trend” (Breeding, 2010). Breeding is also the author of an annual Automation Marketplace survey of over 2,100 libraries about the ILSs in use and satisfaction with them. The 2011 survey, conducted in 2010, found “just over 10% of survey respondents currently operate open source ILS products, with generally moderate to high satisfaction scores”

2.1.1 Brief history of Mekelle and Jimma Universities

Located in the Horn of Africa, Ethiopia is a country of over 91 million people. Forty eight percent of the population is under the age of fifteen years, following the establishment of the new government in 1994 Ethiopians witnessed a dramatic increase in school enrollment. (Alemayehu.

2012) the Higher education sub-sector of the Ethiopian Education System is deemed to be of the utmost strategic significance for the future economic and social development of the country. (Negash, 2006). Until the final decade of the 20th century, higher education in Ethiopia was not given due attention, its curriculum was not always relevant to the country's problems nor was its capacity in line with the country's needs for trained individuals. However, actions have been implemented to change that situation. The Ethiopian Government is working to re-align its higher education system so that it can contribute more directly to its national strategy for economic growth and poverty reduction (World Bank, 2008).

In 1991 the focus being given to education by the Government of the Federal Democratic Republic of Ethiopia (FDRE) is extremely encouraging. It is part of the global resurgence of interest in education. The FDRE seems to have realized that education is the gateway to future economic prosperity in Ethiopia and the chosen instrument for combating unemployment. It is very well accentuated in many of the recent educational documents of the country that education is the sole driving force behind scientific and technological advance and an essential prerequisite for cultural vitality spearheading all forms of social progress and equality. (Mulu, 2012) Ethiopian higher education is relatively young; currently there are 33 Universities and a College under the direct auspices of the Ministry of Education. (Teshome, 2010)

2.1.2 Background of Mekelle University

Mekelle University is found at the town of Mekelle in Tigray region of Northern Ethiopia, at a distance of 783 Kilometers from the Ethiopian capital city (Addis Ababa). Mekelle University came about as a result of the merger of the former Mekelle Business College and Mekelle University College established in May 2000 by the Government of Ethiopia (Council of Ministers, Regulations No. 61/1999 of Article 3) as an autonomous higher education institution. The two colleges have their own historical developments after beginning from scratch, and have also experienced exhausting ascends and descend, with voluminous relocations from place to place.

Mekelle Business College was first established as a school of Economics in 1987 by the Ethiopian People's Revolutionary Democratic Front (EPRDF) in one of the then liberated areas

of Tigray- Dejena (in Western Tigray). The main objective of the school was to train middle-level experts who could assume the financial and administrative responsibilities of the public in the then liberated areas during the armed struggle. Regardless of the challenges it faced, the college started a diploma program in October 1991. At the beginning the intake capacity of the college was 150 students. It began with 16 academic staff and about 20 administrative staff members. At the end of the first year, the college received a full accreditation by the Ministry of Education. Since then, the college has been continuously expanding its programs and building its capacity. (Mekelle University, 2015)

Mekelle University College was incepted in 1993 as the Arid Zone Agricultural College which had been recited in Mekelle after a series of relocations. During the former regime, the College was originally intended to be located near Selekleka, in northwestern Tigray. But, due to many reasons, it was first established at Asmara University as a faculty, but was then moved to Agarfa, in southern Ethiopia, when the Dergue displaced Asmara University in 1990 due to the then political instability. In 1991, after some years, Asmara University returned to Asmara and the Arid Zone Agricultural Faculty moved temporarily to Alemaya University. In 1993, the Arid Zone Agricultural College was again relocated, this time to Mekelle. As the College of Dry land Agriculture and Natural Resources Management, and permanently settled at the Endayesus Campus, which had been a military barrack since the time of Emperor Menelik. With all the challenges it faced, the Arid Zone Agricultural College started with three degree programs in 1993 with 42 students. After two years, the Faculty of Science and Technology was established at the same campus and, together, these two faculties were then upgraded to Mekelle University College. Having a common Board of Governors played a significant role for the establishment of Mekelle University and then to achieve rapid growth after its official inauguration in May 2000. At present, the University has eight colleges and ten institutes. It hosts over 33,000 students in the regular, continuing education programme and summer, evening, distance education and in-service programs in both undergraduate and graduate programmes.

Mekelle University is thus now a government-funded higher institution with an international reputation for teaching and research and with collaborative understanding with national and

international sister institutions. Since its establishment, it has proved to be one of the fastest growing Universities in Ethiopia. (Mekelle University, 2015)

Mekelle University Libraries

When the Arid Zone Agricultural College started with three degree programs in 1993 and with 42 students, there was no any purpose built library except a classroom converted into a library. After a few weeks of its establishment, the renovation was completed and the Tigray Development Association donated a bulk of books to the library. Bulk acquisition was also undertaken through purchase. After two years, the Faculty of Science and Technology was established at the same campus and together these two faculties were then upgraded to Mekelle University College. There were facilities dispersed in Faculties and Departments. There were; however, minimal library and documentation facilities and services. First, there was no any purpose built library except renovated buildings. Second, there were no information sources and services that could adequately satisfy user's needs.

The merger of the two colleges into Mekelle University and its official inauguration in May 2000 has greatly improved the facilities and services. As a result, there are now purpose built libraries. At present, the University has seven purpose built libraries in different campuses and more than 300000 collections of books, journals and research papers as well as e-books and e-journals are organized and accessible by users. (Ben van Baren & Alemayehu, 2013)

Since 2004 G.C the library has been a member of Vlaamse Interuniversitaire Raad Universitaire Ontwikkelings-samenwerking/ Mekelle University Institutional University Cooperation VLIR /MU - IUC project with the objectives of upgrading library services. The library project achieved its objectives via implementing the ABCD and Greenstone open sources software, in collaboration with Belgian expertise organized capacity building training in Ethiopia and abroad and purchased of library materials for the past ten years. Currently, the library provides e-resources services for the users.

2.1.3. Background of Jimma University

Jimma University (JU) is located in Oromia region in Jimma zone. JU is established in December 1999 by the amalgamation of Jimma College of Agriculture (founded in 1952), and Jimma Institute of Health Sciences (established in 1983). The two campuses are located in Jimma city 352 km southwest of Addis Ababa with an area of 167 hectares. JU aspires to be the leading public premier in the country, renown in Africa and recognized in the world. The University has a mission of training higher caliber professionals at undergraduate and post-graduate levels through its cherished and innovative community based education while retaining its academic excellence in integrating training, research and service. JU is organized in to the following Colleges: College of Agriculture and Veterinary Medicine, College of Business & Economics, College of Natural Sciences, College of Public Health and Medical Sciences, College of Social sciences and Law, and Jimma Institute of Technology with more than 100 undergraduate programs, 30 master's degree programs and 3 PhD programs (JU, 2015).

Jimma University Libraries System (JULS) was established in 1999 to promote the instruction, research and public service goals of the university through provision and organizing of information resources in different formats. The resources and information services required for supporting learning, teaching and research activities of the university is enhanced through managing the resources effectively and economically; establishing an environment conducive to study which caters for multiple learning styles Liaising with users and establishing their needs in cooperation with other university services; carrying out smooth and attractive work conditions in the library systems and information professionalism with the objective of improving library's uses and services; maintaining effective links with all other public and private universities and colleges' staff to exchange and share experiences, resources and assist each other; as well as to respond to changes in education, approaches and policy of academic library systems in general.

Jimma university library engaged VLIR/JU-IUC project since 2006 G.C, the project currently run three activities (i.e., Automation by using ABCD (opens source software). Digitization using Greenstone software (also free and open source), E-library services expansion, up to 500 PCs for a 24 hours service, more than 250000 monographs were entered in to the system, library staffs are participated in capacity building in Ethiopia and abroad through the project found. (Jimma University, 2015)

2.2. Historical background of integrated library Management system

2.2.1. Pre-computerization

Prior to computerization, library tasks were performed manually and independently from one another. Selectors ordered materials with ordering slips, cataloguers manually catalogued items and indexed them with the card catalog system (in which all bibliographic data was kept on a single index card), fines were collected by local bailiffs, and users signed books out manually, indicating their name on cue cards which were then kept at the circulation desk. Early mechanization came in 1936, when the University of Texas began using a punch card system (Wallace, 1994) to manage library circulation. While the punch card system allowed for more efficient tracking of loans, library services were far from being integrated, and no other library task was affected by this change.

2.2.2 1960s the influence of computer technologies

The next big innovation came with the advent of MARC standards in the 1960s which coincided with the growth of computer technologies – library automation was born (Kochtanek,2002) from this point onwards, libraries began introducing with computers ,and starting in the late 1960s and continuing into the 1970s bibliographic services utilizing new online technology and the shared MARC vocabulary entered the market (Wallace,1994) these included Online Computer Library Center (OCLC) 1967, Research Libraries Group (which has since merged with OCLC),and Washington Library Network (which became Western Library Network and is also now part of OCLC).

2.2.3 1970s -1980s the early integrated library management system

The 1970s can be characterized by improvements in computer storage as well as in telecommunications. (Wallace, 1994) As a result of these advances, ‘turnkey systems on microcomputers, known more commonly as integrated library management systems (ILMS) finally appeared. These systems included necessary hardware and software which allowed the connection of major circulation tasks, including circulation control and overdue notices. As the technology developed, other library tasks could be accomplished through ILMS as well,

including acquisition, cataloguing, reservation of titles, and monitoring of serials. (Kochtanek, 2002)

2.2.4 1990s-2000s the growth of the Internet

With the evolution of the Internet throughout the 1990s and into the 2000s, ILMSS began allowing users to more actively engage with their libraries through Online Public Access Catalogue (OPAC) and online web-based portals. Users could log into their library accounts to reserve or renew books, as well as authenticate themselves for access to library-subscribed online databases. Inevitably, during this time, the ILMSS market grew exponentially. By 2002, the ILMSS industry averaged sales of approximately US\$500 million annually, compared to just US\$50 million in 1982. (Kochtanek, 2002)

2.2.5 2010s -Present the rise of cloud based solutions

The use of cloud based library management systems has increased drastically (Olson, 2010) the rise of "cloud" technology started. Some common management systems include Libramatic, Aura Software and Librarika Many modern cloud based solutions allow automated cataloging by scanning a book's ISBN. (Hamby, 2011) This technology was pioneered by Libramatic, although it is currently in use by systems such as Library World. Librarika is smart Integrated Library System (ILS) that is deployed on the Cloud. OPAC is built on each Librarika libraries with easy to manage functionalities, Librarika has a method called "Smart Add" that lets Librarians to add book automatically by just inputting the ISBNs, in addition, Librarika offers free library creation with built-in OPAC for up to 10,000 book titles with the ability to get more free titles for non-profit and charities, which serves well for many school, college and other small libraries.

2.3 New generation ILMSS

The rapidly expanding technological landscape, the current traits of peoples' online information behavior and their expectations, along with the emerging trends of linked-data and open access are the basic factors in the design of the new, web-scale ILMSS (Giannakopoulos, 2014) Vendors in the ILMSS market have developed or are now developing such systems; experience derived from implementing any of those new systems has not yet grown into a consolidated body of

literature. The new ILMS is a Library Services Platform, i.e. library-specific software designed to automate the managing of diverse collections, as well as internal library operations, fulfillment of requests and delivery of services. It also combines open APIs to explore platform services, catering for extensibility and interoperability (Giannakopoulos, 2014) What Vendors have traditionally done, is selling an ILMS a series of modules which libraries can buy one at a time. It follows that the more modules a library buys, the greater will be the capacity of the ILMS. And this, of course, has financial implications. What's more, e-book management is currently not a part of the available Library services platform; eBook management subsystems do exist and are available as separate modules to be purchased and docked to the new ILMS (Giannakopoulos, 2014)

All new systems require a discovery layer, which integrates 'seamlessly' with the new ILMS. Based on index-based searching, it incorporates a unified search interface that promises to make 'discoverable' as many as possible of the resources a library offers, plus other, pre-defined sources. Pre-selected subscription databases, search or met search engines and open access sources, all at one go, and then exploit the data available in manifold ways. The Open Discovery Initiative (ODI) has been established to investigate into standards and best practices for discovery services, since they are newcomers to the field. (Giannakopoulos, 2014)

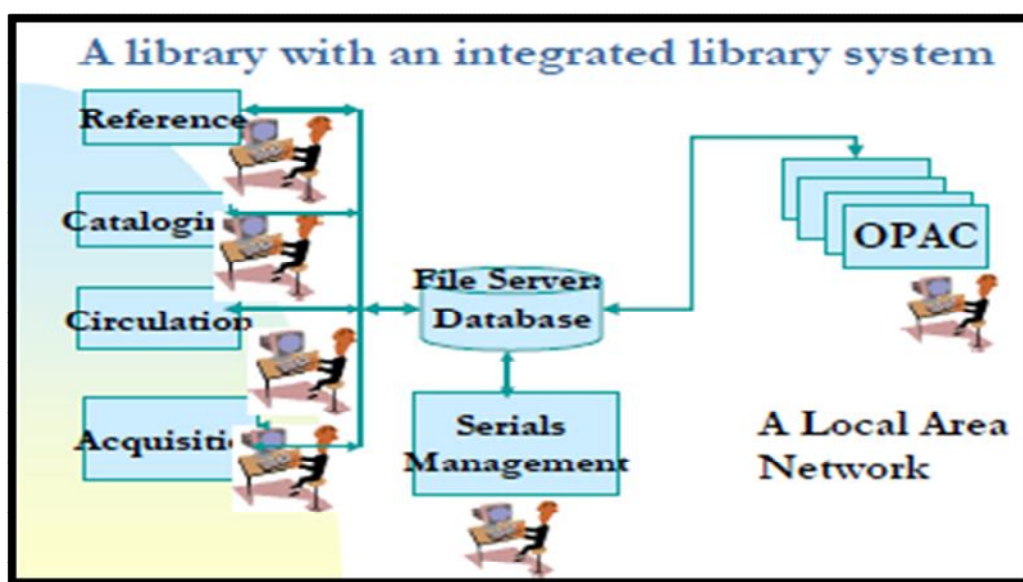


Figure 2.1: A library with an integrated library Management system (Source: UNESCO, 2010)

The Integrated Library System, or ILS, provides computer automation for all aspects of the operation of a library. These products are generally organized into modules that address specific functional areas”. Standard modules include cataloging for creating bibliographic records that represent works in the library’s collection, circulation that automates tasks related to loaning items to patrons, serials control for managing periodicals and serials, acquisitions to handle the procurement process for new items added to the collection, and the online public access catalog to allow library users to search or browse through the library’s collection. Each of these modules offers a very detailed suite of features to accommodate the complex and nuanced routines involved in the library work. (Uzomba and Oyebola, 2014)

2.4. Utilization of ICTs in academic libraries

Academic libraries are those libraries located in institutions of higher learning mainly universities and colleges and are primarily intended to serve the students and the faculty. The main objective of such libraries is to assist its users in the process of transforming information to knowledge (Adele, 2010). As fountains of knowledge, academic libraries provide services to support learning and research. In one of his many papers, Swanson (1980) stated that libraries are not designed-at least not in the sense that one might design a computer or a factory, rather; they have evolved in response to certain problem situations and have been shaped by countless, relatively independent, individual decisions. (Hellen, 2007) indicated that academic libraries are currently operating in a new technological environment and that they need to adapt to it. (Otiye, 2004) adds that one of the major challenges that libraries and the library profession will face in the new millennium is how to cope with electronic and paperless literature however, academic libraries in Kenya need to integrate technological solutions into mainstream information products and services.

Odero-Musakali and Mutula (2007) stated that the future of universities greatly hinges on their ability to embrace and leverage the potentials of these emerging technologies at all levels of their business activities and strategies. Academic libraries have no choice but utilize ICT in their functions as (Omoniwa,2001) hypothesized that in the twenty-first century, globalization of information and the adoption of information technology will be the hallmark of great libraries. If

libraries are to function effectively in the present age, the manual processes or methods will have to give way to information and communication technologies (ICT) and a computer driven environment.

ICTs have had a far reaching impact on library and information institutions and services worldwide (Abdelrahman, 2009). A study by (Haneefa, 2007) indicated that libraries and Information centers have been employing ICT and electronic information resources and services to satisfy the diverse information needs of their users. Intense efforts have been made by various libraries in employing ICTs in their various operations with information retrieval systems are being designed to suit the needs of end users as well as to simplify the process. The ICTs as used in academic libraries attempts to deliver numerous applications such as wide-area network applications, local area networks, online information services (the Internet), online databases, library databases, CD-ROMs, online access catalogues, retrieval networks, digital online archives, mainframe computers, microcomputer labs, and other digital content services (Ghuloum and Ahmed, 2011). The phrase “our library is the heart of the university” has become hollow as it does not carry much weight as it did in the past. Moropa (2010) argued that although academic libraries have and are still being referred to as the heart of the university it does not appear so; the reality is that they have been dislodged from that position. If libraries are to function well in the present age the manual process will have to give way to the Information and Communication Technologies (ICTs) and a computer driven environment (Adele and Olorunsola, 2010), those libraries that cannot adjust to these new information technologies will not survive .

Technological advancement has compelled libraries to adopt interactive online media for their survival (Maxymuk, 2007). Kavulya (2004) argued that although the ICT is being incorporated in the management of university libraries in Kenya, there is need for adoption of strategic planning in all areas of library management in order for them to remain viable sources of information. University libraries in Kenya have to make use of modern ICTs so as to facilitate better access to local and global information.

2.5 Open Source Software (OSS)

Open source, by definition, means that the source code is available. Open source software (OSS) is software with its source code available that may be used, copied and distributed with or without modifications, and that may be offered either with or without a fee. If the end-user makes any alterations to the software, he can either choose to keep those changes private or return them to the community so that they can potentially be added to future releases" (Kenwood, 2001).

For Lee (2001) "open-source software (OSS) is software for which the source code is freely available for anyone to see and manipulate. There are various licensing models to which the OSS label has been applied, but the basic idea is that the software's "license may not restrict any party from selling or giving away the software as a component of an aggregate software distribution containing programs" and the working software must either be distributed along with its source code or have a "well- publicized means of downloading the source code, without charge, via the Internet." .This is contrasted with proprietary software, which is distributed as compiled object code or machine code, leaving the source code solely under the control of the individual software vendor"

Sliman (2002) attributed that open standards begin when a collaboration of interested Party's results in a consensus on specifications for implementing common requirements. They permit open access for anyone desiring to utilize the results in a way that enables conformity across implementations. The author further states that Open Standards is the concept of people working together openly to collaboratively develop solutions for addressing common requirements and goals. (Corrado, 2005) brings out a definition of open standard as "a standard that is independent of any single institution or manufacturer, and to which users may propose amendments." While open standards have garnered increased attention in libraries recently, the use of open standards in librarianship is not new. (Coyle, 2002) states that an open standard should not prohibit conforming implementations in open source software; Three key characteristics of open standards identified by this author are that anyone can use the standards to develop software,

Anyone can acquire the standards for free or without a significant cost and the standard has been developed in a way in which anyone can participate.

Lochhaas and Moore (2010) stated that Open source software is software that provides access to the source code, meaning that users are free to see how the product is made. Additionally, users have the right to modify the product (change the code) to their liking, experiment with different versions, and give away or resell the new product with the guarantee that they must also provide their source code. Modifying the product and redistribution are the two main components of open source software. Morgan (2002) stated that open source software code can be read and modified and can be distributed without always having to pay for it. “Free” software is the term used by Free Software Foundation (FSF) that was founded by Richard Stallman, for indicating software that can be freely used and its code freely read, distributed and modified. (Morgan, 2002)

Chudnov (1999), in his writing encouraged the library professionals to draw their attention towards open source software by elaborating the benefits of open source software and equalizing the philosophy of librarianship and OSS. He suggested that using open source software the libraries can cut the costs involved in development and management of proprietary software in library as well as the libraries could modify the codes as per the requirement of the library. He said “We are an educational institution, and we are here for people to learn about computers. That should include learning how the software on this computer works. Libraries should actively discourage the concealment of generally useful knowledge, and that includes proprietary software.

2.5.1 Adoption of open source software in libraries

There were some free tools in existence of libraries. Most of them were developed by OCLC and Worldcat, which were distributed free to its member libraries, but were out of reach to non-member libraries (Clarke, 2000). A free cataloging utility named (Computerized Documentation Service / Integrated Set of Information Systems) CDS/ISIS and later renamed as WINISIS (Windows Integrated Set of Information Systems) was developed by UNESCO in 1985 and distributed to libraries worldwide for free through their website. The free software movement or

open source movement was already in the limelight in 1980s nonetheless, libraries were still away from the concept of free software. During this decade UNIX was already installed on computers while Linux was about to be born. During late 1980s concept of free software was taking momentum and commercial vendors were looking towards free software as an opportunity to accomplish their commercial goals.

This resulted in establishment of Cygnus Solutions, the world's first open source software company by Michael Tiemann, with the help of David Henkel-Wallace and John Gilmore. Tiemann found business opportunities in open source as he states: "Open Source would unify the efforts of programmers around the world, and companies that provided commercial services (customizations, enhancements, bug fixes, support) based on that software could capitalize on the economies of scale and broad appeal of this new kind of software." (Tiemann, 2009) late 1980s and early 1990s the whole world had been looking at FOSS as an approach to save their money to be invested on commercial software or FOSS as a business strategy itself. However libraries did not turn towards it before late 1990s; instead, there were some proprietary software which were using open source software as a component of their ILS.

Frumkin (2002) suggested that the FOS movement gave librarians an opportunity to become more active in determining the future development of the software they use, rather than letting vendors keep control. As (Brandt ,2001) notes, librarians have long been active not only in taking advantage of technological innovations but also in experimenting with new approaches (using Peter Scott's HyTelnet as one example), and the FOS approach should increase the opportunities for such activity. (Rafiq,2009) says that most of the libraries in developing as well as developed countries do not afford to purchase costly commercial software and FOSS have more attraction for them. There are many state of the art library software projects available in FOSS category for all kind of routine procedures. An initiative in this regard was the establishment of Open Source Software for Libraries (OSS4Lib Project <http://www.oss4lib.org>) at Yale Medical Library in early 1999. The mission of oss4lib is to build better and free systems for use in libraries. Toward this end, it maintains a listing of free software and systems designed for libraries (the physical, books on shelves kind), and it tracks news about project updates or

related issues of interest. (Chudnov, 2005). Libraries are reengaging with software development projects and a dozen of library projects are being developed by library community.

Breeding (2009) states that Open source software is currently one of the options preferred by libraries, because of the facilities it offers for copying, modification and distribution, the absence of license restrictions and the possibility of interoperation with other applications. Open source software has created new opportunities for libraries when most libraries face budget cuts and they cannot afford to maintain the proprietary integrated library system in use. Open source software compared to proprietary software is inexpensive, if it is not free. Many libraries have adopted for open source solutions. (Pranee, 2012)

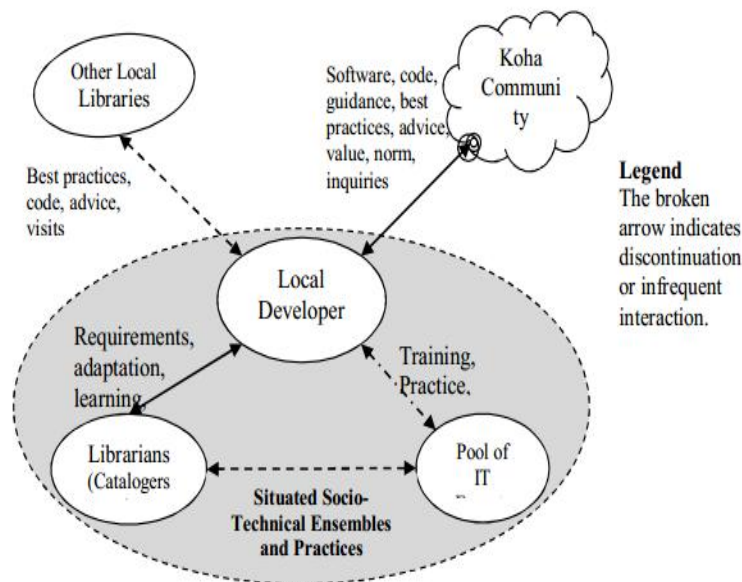


Figure 2:2 Co-located and Trans-Situated Socio-Technical Ensembles, Learning and Sharing in the Implementation of Koha in AAUL (Nigussie, 2010)

Tennant (2009) a user services and information systems librarian, continued the advocacy of OSS for libraries. He encouraged librarians to install OSS on a trial basis. Tennant asserted that open source is better than proprietary software because libraries may alter it to meet their needs, and such alterations may benefit other libraries as well. However, he noted that small libraries were unlikely to have technically sophisticated personnel who could install and maintain OSS,

and large libraries exceeded the scalability limits of open source ILSs at the time. Uzomba (2014) stated in his study Open source software, on the other hand, is quite the opposite. The open source mentality revolves around sharing and collaboration, and these two important elements describe open source software perfectly. First and foremost, open source software is free for anyone to have; more importantly, not only is the software free, but it is also free for anyone to copy, hack, modify, etc. This increases the possibilities of a software program's potential because of this free-thinking model. Many large groups of programmers have customized basic open source programs into whatever they deemed necessary, and have in turn given these modifications back to the open source community for free where others can continue to build on their work.

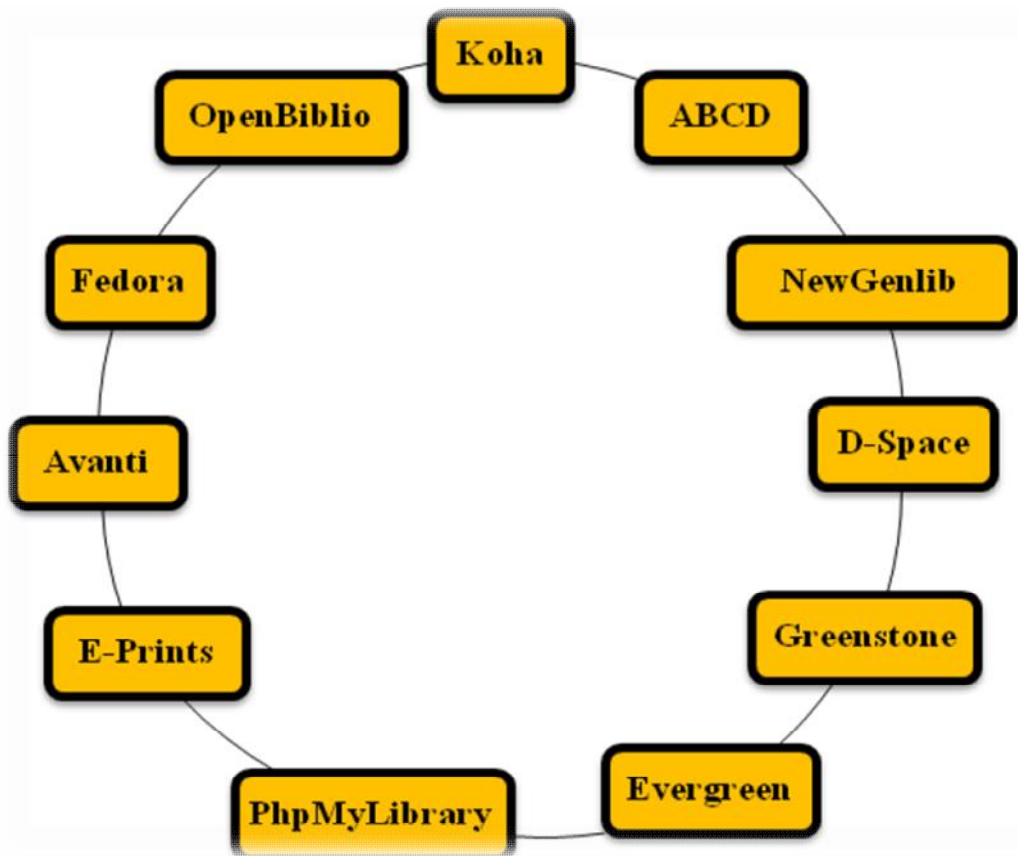


Figure: 2.3 Some open source software's (Reddy and Kumar, 2013)

2.5.2 Comparison of open source Integrated library software

KOHA Open Source Software (KOHA OSS) is one of the most utilized open source software for integrated library system. As open source software which is freely available and free to be adopted, it is being used widely by the public, school, and special libraries around the world. KOHA OSS is collaboratively developed and maintained by a community of professional librarians and information system professionals all over the world who possess not only extensive understanding of library operations and management but also possess wide experience in library automation and computerized library system. This is a fact that is not commonly known by the library fraternity in Malaysia.

Koha Modules

Koha has all essential modules that a complete ILS should have. Koha has acquisition, circulation, cataloguing, OPAC, and serials module. The brief details of the same are as mentioned below in this Section.

Acquisition: Acquisition module of Koha works in two modes. Simple mode and advanced mode. The simple mode provides an interface for adding new holdings to the catalogue. Advanced mode provides options and interface for tracking of acquisition process such as requests, orders, claiming, invoicing, budget control and other processing of the library.

Cataloguing: The cataloguing module of Koha follows worldwide recognized MARC/MARC21 format for creating bibliographic records. Additionally, it can also convert these records to ISBD format. Z39.50 protocol is implemented to retrieve the cataloguing records of other libraries.

Circulation: Circulation module of Koha provides an easy interface for issuing or returning of books. Moreover patron management is also available in this module. This module calculates fine on overdue materials automatically. There is provision to operate with the institutional email server to provide email notifications to the user regarding checking out and in.

Serials: Serial module of Koha provides interface for registering periodical subscription, to renew them and to track the arrival of them. It also forwards the information of library holdings

to the OPAC and keeps the patrons abreast about the serial issues available in the library.

OPAC: Online Public Access Catalogue of Koha is very interesting. It provides simple Google type search option with an advanced Boolean logic based search.

Evergreen

Evergreen is yet another prominent open source software which was first released in 2006 and is now adopted by more than 1000 libraries including public libraries, academic libraries, and special libraries all over the world (Evergreen, 2013). It was initiated as a project at Georgia Public Library to take care of more than 200 public libraries of Georgia State.

Evergreen Modules

Acquisition: Acquisition module in Evergreen has all features and options required for a library. Evergreen provides platform to users to file their request for an item as the library admin can approve or reject a request, create orders for requested book, allot budget for a financial year, receive invoices from vendors and forward it to the technical section for further processing.

Cataloguing: Cataloguing in Evergreen supports MARC format for entering bibliographic details of an item. Admin can modify or create templates using MARC tags. In order to import the cataloguing records from other libraries Z39.50 features is available in this module.

Circulation: Through circulation interface admin can issue books to users and can get them checked in back to the library. To specify the period of circulation, admin has to specify the circulation period for various category of users. In addition to check in and out, the circulation module provides option to renew the status of an item which is already a checked out item; option to mark the item as lost or set their status in maintenance in case the book is not available in stacks due to binding or other technical reasons.

OPAC: Evergreen OPAC provides a state-of-the-art web interface (Yang & Hofmann, 2010). It provides a simple and Boolean logic based search option to the users. Evergreen provides an excellent navigation from one search result to another with a specific subject or author.

Serials: Serial module is one which was added much later than the other modules in Evergreen. It first appeared in Evergreen in 2009 while full-fledged serial module was added in 2011.

NewGenLib

NewGenLib is another prominent open source software for libraries. It is born and developed in India by Verus Solution with the help of Kesavan Institute of Information and Knowledge Management, Hyderabad.

NewGenLib Modules

NGL has all modules which are generally found in all ILS and there are some modules which are peculiar to it. The details of the modules of NGL are as follows:

Acquisition: acquisition module in NGL provides comprehensive functionality for acquisition. Request made through OPAC are shown here. Additionally the librarian can also add or remove items through this module.

Cataloguing: NGL like Koha and Evergreen follows MARC format for bibliographic entry. However, it has eased the work of library professionals by creating a number of MARC based templates for various category of items such as single volume book, multi volume book, book chapter, non-print material, serials, journal article.

Circulation: circulation of NGL is very simple and communicative. The circulation module works on the basis of the parameters set by the admin such as user privileges and overdue charges etc. Issue and return, and renewal function are very rapid in NGL and it also accepts the barcode standards and RFID integration. Moreover, this module also deals with the items lost or damaged, items sent out for binding, inter library loan, Book Bank, and weeding out of the books.

OPAC: Online Public Access Catalogue of NGL is developed with several features of Web 2.0. NGL OPAC provides several search options besides simple and Boolean logic based search. Patron may select the category of items, such from books, serials, book chapters and serial articles.

Table 2.1: Functions of ABCD and Koha library software

Feature	ABCD	Koha
GENERAL CHARACTERISTICS		
Version evaluated	1.1 beta 1	3.4.4
Date of manufacture	2008	1999
Number of implementations worldwide (according to http://www.librarytechnology.org/)	16	1169
Number of developers	approximately 20 developers from BIEME and VLIR	more than 150 individual developers; 16 contributing companies and institutions
Community support	YES (project web pages, wiki, trac and mailing list)	YES (community web pages, wiki, blogs, mailing lists etc.)
Open source/license	GNU Lesser General Public License (LGPL)	GNU Public license (GPL) v.2
Programming language	PHP (only EmpWeb module is programmed in Java)	PERL
Type of database	Textual (only EmpWeb module in MySQL)	MySQL
Multi-branch mode	YES	YES
Multi users and remote load	YES	YES
Installation on personal computer	YES	YES
Multi language support	YES	YES
ONLINE CATALOG (other than the "next-generation catalog" functionalities)		
Simple and advanced online catalog search	YES	YES
Managing record by the end-users (saving, exporting etc.)	YES	YES
Search limits	YES	YES
Results narrowing	YES	YES
Saving search history	YES	YES
Saving search results	NO	YES
Browsing subject authorities	NO	YES
Information about availability of items	YES	YES
Information about location of items in the library	YES	YES
News and private messages to patrons and staff	NO	YES
Possibility of changing online catalog view	YES	YES
ACQUISITION		
Budgets	YES	YES
Vendor database	YES	YES

Baskets of orders	YES	YES
Currency conversion	NO	YES
Users suggestions/recommendations for acquisition	YES	YES
CATALOGING		
Supported metadata standards	Independent of formats	MARC 21 and UNIMARC
Managing of various types of material (books, serials, etc.)	YES	YES
Managing analog and digital content	YES	YES
Cataloging via Z39.50 (copies)	YES	YES
Authority control	YES	YES
Creating authority records on the fly	NO	YES
Creating a normative list of keywords	YES	YES
Duplicate detection	NO	YES
Merging duplicate bibliographic records	NO	YES
Import / export of data	YES	YES
Prompts and help messages integrated in admin interface	YES	YES
Date and time of the latest transaction	YES	YES
SERIALS		
Serials frequency planning	NO	YES
Routing lists	NO	YES
Bidding	NO	NO
Import/export of patron database	YES	YES
Setting up different patron categories	YES	YES
Defining different circulation rules for different collections/patron categories	YES	YES
Defining fines rules	YES	YES
Bar code support	YES	YES
RFID technology	NO	YES
Self-checkout	YES	YES
Inventory control	YES	YES
E-mail/SMS overdue and other notices	NO	YES
Patrons profile pictures	YES	YES
Holds / Recall	YES	YES
Reservations	YES	YES
Short term loans	NO	NO
Interlibrary loan	NO	NO

Source: Macan, B., Fernández, G. V. and Stojanovski, J. (2013)

Table 2.2: Functional modules and general feature of free open source software

Sl No.	Functional Modules	Koha	Newgenlib	e-Granthalaya
1	Circulation	✓	✓	✓
2	Acquisitions	✓	✓	✓
3	Serials	✓	✓	✓
4	Cataloguing	✓	✓	✓
5	Reports	✓	✓	✓
6	Budget	✓	✓	✓
7	Micro Documents	X	X	✓
8	CAS/SDI	X	✓	✓
9	Accession Register	✓	✓	✓
10	Digital Library	✓	✓	x
11	News Paper Clippings	X	X	✓

Note: Availability (✓) and non-availability (X) of element/item

General feature

Sl. No.	General Features	Koha	Newgenlib	e-Granthalaya
1	Authority file and controlled vocabulary	✓	✓	✓
2	Client server architect	✓	✓	✓
3	Source code	✓	✓	X
4	Binaries installation	✓	✓	✓
5	Report generation	✓	✓	✓
6	Z39.50 client for federated searching	X	✓	X
7	Z39.50 copy cataloguing	✓	✓	✓
8	Article indexing	X	✓	✓
9	Zebra search engine	✓	X	X
10	Scalable, manageable, high speed and efficient	✓	✓	✓
11	Union cataloguing	✓	✓	✓
12	RFID integration	X	✓	X
13	Linux compatible	✓	✓	X
14	Windows compatible	✓	✓	✓
15	Give technical support after installation	✓	✓	✓

Source: C S venkatarama Reddy (2013) comparative study of FOILS

2.5.3 ABCD open sources software

ABCD, in English, is “Automation of Libraries and Centers of Documentation”. The name itself already expressed the ambition of the software suite to provide not only automation functions for traditional libraries but also other information providers such as documentation centers. It is developed by BIREME (WHO, Brazil) in collaboration with the Flemish Interuniversity Council, Belgium, and using UNESCO’s ISIS database technology.

The primary aim of ABCD is to provide an integrated library management tool, covering all major functions in a library, such as Acquisitions, bibliographic database management, user management, transactions, serial control, online end-user searching on local and external bibliographic databases, and library portal. It allows bibliographic records imported from other libraries, for example, the Library of Congress, Oxford University, Yale University, Boston University, University of Toronto, University of Chile, and Australian National University, through the Z39.50 protocol, which helps libraries to maintain international standards in bibliographical information such as MARC, CEPAL and AGRIS. ABCD also allows for local customization of Z39.50 servers to suit one’s needs. (de Smet, 2009)

According to de Smet (2009) ABCD is thus designed as a tool for librarians rather than for ICT technicians. ABCD does require the use of the Formatting Language of ISIS, which allows library staff to manipulate all data in their databases in a high granular way in order to keep a full control of it without extensive programming. ABCD is a menu-driven software and provides help instruction at every step.

ABCD is called a 'suite' of software’s for library and documentation centers automation because it exists of some relatively independent modules, which can fully co-operate but also can exist without each other. In fact some existing advanced software’s, mostly having already shown their potential in demanding environments in BIREME applications (within the Virtual Health Library context), were adopted and adapted into ABCD that is why the original names such as iAH, SeCS (both developed by BIREME) and EmpWeb (Empréstimosen Web) developed originally by KALIO Ltda. of Uruguay and amply tested in Chili) are maintained. (de Smet & Dhamdhere, 2010)

a) As a generic, flexible bibliographic tool as the name itself suggests, ABCD however aims not only at providing a solution for libraries, but for documentation centers as well. These typically have slightly different needs and requiring more flexibility in the bibliographic structures. For this reason ABCD not only has tried to include full-text features but was principally conceived to offer a very open solution, allowing any fields structure to be created and maintained within the same software. As a library system, however, ABCD comes pre-configured for some major bibliographic standards, i.e. MARC21, CEPAL and AGRIS. But we repeat: the same mechanisms interface and forms can be used to create and maintain any structure, whether bibliographic or not. So, to put the aims a bit more precise: ABCD aims at providing a very generalized tool for managing libraries and documentation centers.

b) ABCD as a librarian-oriented tool

Another specific aim of ABCD is to offer a tool for librarians, rather than ICT technicians. This is achieved by taking library and information science principles (rather than computer or programming principles) as the starting point, even in the design of the databases themselves. Typically a bibliographic record is one real entity in an ISIS database, not a complicated series of elements queried or joined together from many tables (as in relational systems), however preserving criteria like efficiency (in space usage, speed of operation). Each entity subsequently can be thoroughly module by the librarians themselves with the use of the ISIS Formatting Language (FL), which allows dealing with all elements of an entity (e.g. a substring from a subfield of an occurrence of one specific field at micro-detail level) without real programming - even if the FL allows some degree of programming logics like loops and nested conditions - for the creation of any output format. This output can be anything like a sort key, an indexing key, a screen format or - as is the case in e.g. ABCD - ISIS data embedded in web-pages or any other grammar such as XML. Lots of teaching experiences with ISIS show that librarians are perfectly capable of understanding and using all this, reaching advanced results without any real programming.

c) **ABCD as a tool for developing countries** ABCD aims at providing librarians and information workers in developing countries a very powerful tool, which however takes into account some specific realities, such as :

Low availability of ICT skills: as with previous ISIS-based solutions, librarians are in principle enabled to solve their problems by avoiding unnecessary software architectures while still allowing flexibility

Low availability of bandwidth and connectivity: by using modern web-techniques such as AJAX and JavaScript, data-traffic in between client and server is kept minimal, allowing the local computer (at the 'client-side') to process the data as much as possible without always referring

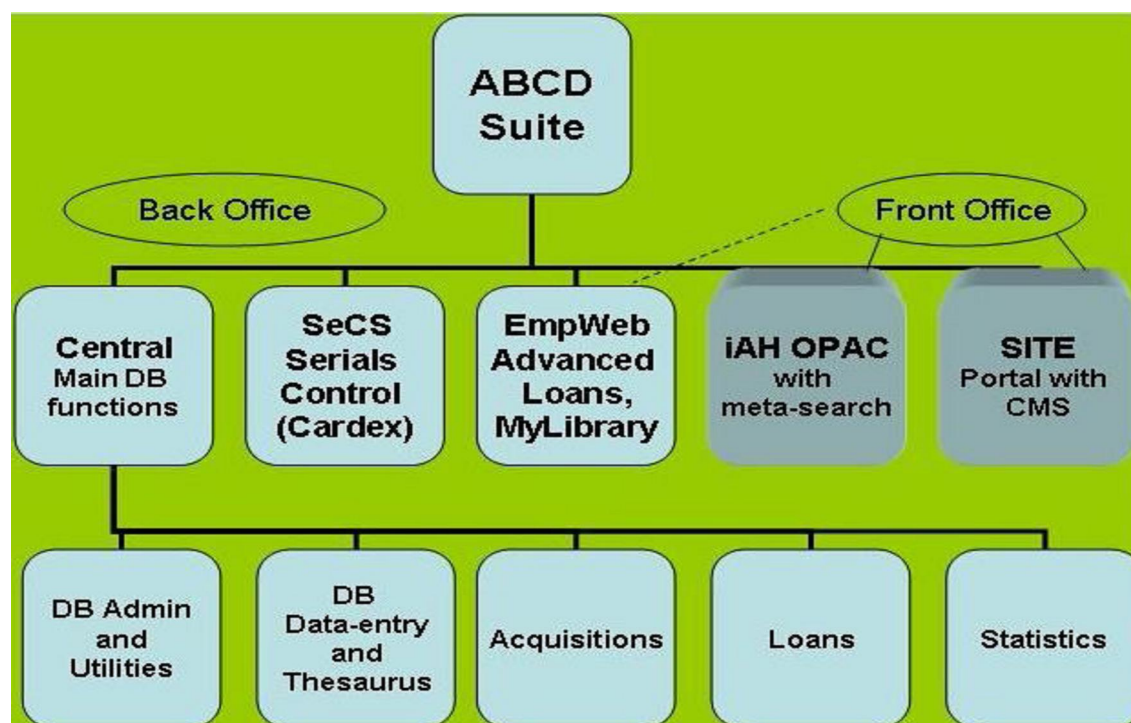


Figure: 2.4 ABCD Suite

Source: de Smet, 2009

2.5.3.1 ABCD modules

The following are available modules in the ABCD software. (de Smet, 2010) each module has a separate login and password. All modules are menu-driven and easy to operate.

1. ABCD Central

It comprises following sub-modules:

Users' administration module allows specifying user profiles and assigning users to them to define access to any subset of (functions of) different modules and their databases.

Administration module helps to create new databases from scratch or from the pre-existing database models.

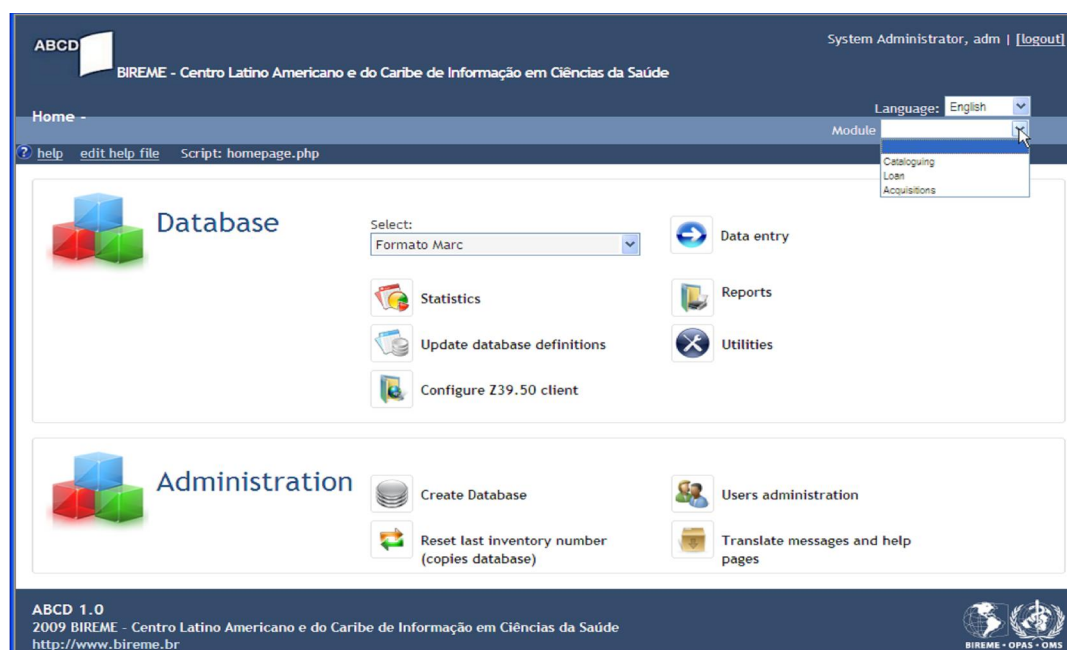


Figure: 2. 5 ABCD central module

Source: de Smet, 2010

Data entry/cataloguing module helps to enter data with authority control pick lists, separate handling of subfields (and MARC indicators) or by importing the record from other library catalogs through the Z39.50 facility. The indexing definition can be specified in detail as is the case with the presentation formats. The library staff can generate and print different statistical reports. One can search records through index listings. One can import or export the database or records.

2. Acquisition module has four major functions:

Suggestions: starting process of obtaining documents comprising New | Approval / Rejection | Bidding | Decision | Overview

Purchase orders: the actual process of acquiring documents by creating orders, generating orders from approved suggestions, checking pending orders, and lastly, receiving documents

Databases: management of the four acquisitions-related databases (i.e., suggestions, providers, orders, and copies)

3. ABCD Advanced Loan Module (EmpWeb)

ABCD Advanced Loan Module (EmpWeb) caters to the advanced loan management system. Fully based on ISIS-databases, EmpWeb offers for more complex and higher-volume organizations the possibility to store transactions in SQL and retrieve user-data from external SQL (e.g., MySQL, Oracle) data-sets. Using the JAVA scripting language “Groovy”, one can specify more advanced policy rules (e.g., adding the season as a third dimension on top of user/object categories to define the loan policy). Users can check their own library-loan status from the OPAC and an online reserve possibility. Connections can be defined per IP-number and with time-tables defined per library within the loans-system if so desired. (De Smet, 2010).

4. ABCD OPAC

ABCD Online Public Access Catalogue (OPAC) allows library users to retrieve information from all defined catalogs, databases, and websites with simple, intermediate or advanced interfaces. Results can be displayed in any ISIS-format, including hyperlinks to the original documents for digital library functions, select, print, sent-to-email, bookmark in the major social networks, and export to XML.

5. ABCD Site

A CMS (content management system) is provided for the creation of the ABCD Site. It enables library staff to create, manage, and publish the portal. The site organizes information in a structure that integrates and interconnects reference databases, specialist directories, events of institutions, full texts collection, and catalogues of bibliographical resources available on the local network or internet. It provides OPAC or search tool for all those resources.

This research is investigating the status of Open source library software ABCD in Mekelle and Jimma Universities. The study aims to find out the effectiveness of library services using open sources integrated library management system and how do users have access of information sources and services

CHAPTER THREE

3. METHODOLOGY

3.1 Research Method

The research method used in this study was descriptive survey method. It is a valuable tool for assessing opinion and trends. Descriptive survey method seeks to find out certain facts concerning an existing phenomenon. It measures variables by asking people questions (data collection) and interpreting the data. On this ground, (Ifidon, 2007) asserted that survey method gathers data from members of a population in order to determine the current status of that population with respect to one or more variable. Since it focuses on people and their belief, opinion, perception and makes it easier for situation to be described exactly as they exist and as considered appropriate for this study. Therefore, descriptive survey method was used to examine the significant value of ABCD open sources integrated library system in Jimma and Mekelle University libraries.

3.2 Description of the Study Site

There are 33 universities established in different parts of Ethiopia. Out of the 33 universities 12 were established recently and are in the process of developing library services and skilled professionals. Twenty one of them are somewhat experienced on developing and using open sources library software; out of which, Mekelle and Jimma University libraries are advanced on the use of open source library software and they are using similar library systems (i.e. ABCD integrated library system, in addition to this, the libraries are supported by Belgium government Institutional University Cooperation (IUC) library project. The project contributes on the implementation of modern library services, capacity building and experience sharing for library professionals and ICT infrastructure in libraries for the past ten years. Therefore, in this study Mekelle and Jimma universities are arbitrarily selected based on the above mentioned reasons. By geographical location, Mekelle University is located at the Northern part of Ethiopia in Tigray regional state at Mekelle city which is far about 783 KM from Addis Ababa and Jimma

University is located in south west of Ethiopia in Oromiya regional state in Jimma zone at Jimma town, which is far about 355KM from Addis Ababa.

3.3 Study Population

The study targeted populations 13,550 was obtained from registrar office and human resource director office of JU and MU. The study population includes Academic staff, Postgraduate (PG) Undergraduate graduating class students and Library staff of the two universities (i.e. Mekelle University (MU) and Jimma University (JU)). Table 3.1 below shows the population distribution

Table 3.1: Total Population

No	University	Academic staffs	Postgraduate	Undergraduate (graduating class)	Total
1	JU	1369	1320	3641	6330
2	MU	1655	1748	3817	7220
	Total	3024	3068	7258	13550

Source: (JU, 2015) and (MU, 2015)

3.4 Sample size and Sampling technique

There are a number of methods used to determine sampling size of study. The researcher used purposive and convenience sampling technique. Convenience sampling to select the sample size of 374 respondents from academic staff, postgraduate and undergraduate (graduating class students’) and purposive sampling technique was used to select 30 library staffs. Those are branch library heads, Technical processing staff and library directors of Jimma and Mekelle University libraries. The total sample size for the study was 404 participants.

3.5 Sample size determination

The total populations identified for this study from selected universities were 13,550. From this total number of populations 3,068 were postgraduate students, 3,024 academic staffs and 7,458 undergraduate graduating class students, with a total sample size of 404 participants Thus, the sample size was determined using the sample size determination formula by Kothari, 2004:

The sample size is calculated using a single population proportional formula.

$$n = \frac{z \left(\frac{\alpha}{2} \right)^2 * P(1 - p)}{d^2}$$

(Kothari, 2004)

Where

- ✚ n= the desirable calculated sample size
- ✚ $Z(\alpha/2)=1.96$ (95% confidence level for two sides)
- ✚ p= proportion of population and barriers (50%)
- ✚ d= degree of accuracy desired setting at (5%)

Therefore the value of n was calculated as follows

$$n = \frac{(1.96)^2 * 0.5(1-0.5)}{(0.05)^2} = 384$$

Use this formula

$$n = \frac{nf * N_{sub}}{N_{total}}$$

Considering the population correction factor into account the sample size should be:

$$n = \frac{384}{1 + \frac{384}{13550}} = 374$$

Sample size allocation (proportional allocation for (JU and MU)

$$n_1 = \frac{n * N_1}{N}, \quad n_1 = \frac{374 \times 6330}{13550} = 175 \text{ for JU}$$

$$n_2 = \frac{n * N_2}{N}, \quad n_2 = \frac{374 \times 7220}{13550} = 199 \text{ for MU}$$

For Academic staffs

$$n_1 = \frac{n * N_1}{N}, \quad n_1 = \frac{374 \times 3024}{13550} = 83$$

For postgraduate students

$$n_2 = \frac{n * N_2}{N} \qquad n_2 = \frac{374 \times 3068}{13550} = 85$$

For undergraduate (graduating class students)

$$n_3 = \frac{n * N_3}{N} \qquad n_3 = \frac{374 \times 7258}{13550} = 200$$

Table 3.2: Proportional sample size allocation of JU and MU

	Jimma University	Mekelle University
Academic staffs	$n_1 = \frac{374 \times 1369}{13550} = 38$	$n_1 = \frac{374 \times 1655}{13550} = 45$
Postgraduate	$n_2 = \frac{374 \times 1320}{13550} = 37$	$n_2 = \frac{374 \times 1748}{13550} = 49$
Undergraduate (graduating class)	$n_3 = \frac{374 \times 3641}{13550} = 100$	$n_3 = \frac{374 \times 3817}{13550} = 105$
Total	175	199

3.6 Data collection methods and instrumentations

The purpose of data collection is to obtain information to keep on record, to make decisions about important issues, to pass information on to others. Primarily data was collected to provide information regarding the specific topic. The methods used to collect data for this study were questionnaire, interview and observations check lists. From different categories of each data collection methods fixed alternative questionnaire method was used to collect data from the students, academic staffs, branch head librarians and technical staffs in the library. Whereas semi-structured face-to-face interview method was used to collect data from the library directors and also detailed observation was done for the availability and implementation status of integrated library systems at each study site.

The questionnaires included several types of questions: nominal, dichotomous and likert type

items see appendices A and B. Among different types of interviews, the semi-structured face-to-face interview method was used to collect data that could not be directly observed in the semi-standardized interview has some structure to it, but the wording of the questions was flexible, respondents have a greater ability to express their opinions in their own words when using this type of interview see appendix C

3.6.1 Instrumentation

The self-administered questionnaire in appendix A and B, interview as well as observation in appendix C and D were the main research instruments used for the study.

3.6.1.1 Questionnaire

Questionnaire helps to collect a good deal of data from a large number of respondents within a short period of time. Thus, questionnaire was selected because of the freedom of respondents and helps to catch their viewpoints regarding ABCD open source integrated library system. So structured questionnaire was adapted after review literature of Sharma (2007) studied in Library Automation software packages used in academic libraries of Nepal and (Umoren, 2012) Acquisition and Utilization of library oriented software packages in academic libraries in Akwa Ibom and Cross River States. Questionnaires were modified to local situations from previous tools that were applied in different studies related to open sources integrated library management system. The questions and statements of the questionnaire were grouped and arranged according to the particular objective. A four sections was used to collect data from staff and postgraduate and undergraduate students' in selected University (JU and MU) containing the following sections: (a) Socio demographical information (profile) of respondents (b) Implementation status of ABCD library software (c) use and access of library services using open sources library systems (d) challenges on the customization of open sources integrated library systems.

3.6.1.2 Interview

An interview involves asking questions in a face-to-face manner with a respondent (Kothari, 2004). Interview was conducted with Jimma and Mekelle university library directors and librarian those who are working in technical processing sections from May 13-14, 2015 and June 8-9, 2015 respectively were done to gain in-depth data about the implementation status of ABCD open source integrated library system.

3.6.1.3 Observation

Observation is more than just looking at the involvement of the system, but involves close viewing of actions, the recording of these actions, the analysis and interpretation of what has been seen (Kothari, 2004). The researcher thus did detailed observation during the interview period with directors of Jimma and Mekelle from May 13 -14, 2015 and June 8-9, 2015 respectively by prepared observation checklist.

3.7 Data Collection Procedure

The data for this research was collected using questionnaire, interview and observation (see appendices a, b, c and d respectively). The questionnaires were created using suitable questions modified from related research and individual questions formulated by the researcher. To collect data from the respondents the researcher got official letter from the Department of Information Science, Jimma University requesting for assistance from institutions (departments) of all study site. Then the researcher submitted the letter to library directors of the study site to get permission to conduct the survey. After the recruitment of three data collectors and trained them; the researcher and data collectors went to main campus of JU and MU for data collection. The researcher did the observation in both universities library systems and interviews with library directors and technical processing staff.

3.8 Reliability and Validity

The reliability and validity tests were done by using data collection instrument as elaborated in sections 3.6 above. It involved 40 respondents from students and academic staffs of Agriculture campus and College of Business and Economics campus from Jimma and Mekelle universities respectively. The aim of the validity was to test the adequacy of research instruments and to assess the data analysis techniques so as to uncover potential problems if any for the main study. Reliability and validity tests were used as the key determinants for usefulness of the research instruments.

The review of the questionnaire mainly involved rephrasing and deletion of some of the statements, re-arranging the order of the questions for proper flow of ideas as well as deletion of

some of the questions that were not part of the research model in order to reduce the length of the questionnaire. Grammar and spelling were corrected as well.

3.9 Data Analysis, Presentation and Interpretation

After the required amount of data were collected from the field, it was reviewed for any inconsistencies, organized and then analyzed. Data analysis, SPSS version 20 was used, data was analyzed using both inferential and descriptive statistics. Thematic analysis was done for qualitative data. This involved categorizing related data into themes or topics by peruse through the collected data and identifying information that was related to the research questions and the objectives. After categorizing the data, codes were developed based on the collected data then coded materials were placed under the identified themes. After that interpretation of the data was done and a summary report developed, which identified the major themes and associations between them. However, percentages, charts, tables, t - test and One-Way-ANOVA comparisons were used to present the results of findings, which were discussed in chapter four of this study.

3.10 Ethical consideration

Ethical consideration were maintained and respondents consents were sort at time of data collection (see addressed letters to respondents at beginning of questionnaire-appendix A and B); through explaining and seeking their consent on the importance of study findings, which should benefit and cause no harm to them. Respondents were told that their privacy and confidentiality were maintained at all times, all findings portrayed in a confidential manner and no personal or identifiable information were to be recorded or printed in the study. No names were also to be recorded during the interviewing process. Although, the researcher was aware that ethical issues may arise at any point during any study regardless of the rigorous planning. However, the researcher noted and acted on the importance that possible ethical issues should be identified, prevented, and reviewed as best as possible prior to, during and after the study.

CHAPTER FOUR

4. RESULTS AND DISCUSSIONS

4.1 Results

4.1.1. Response rate

This Chapter presents the results obtained from the survey (i.e. questionnaire, interviews and observation.) In this study a total of 404 respondents' were participated these are academic staff, students and library staffs were identified. 374 (100%) questionnaires were distributed to students and academic staff out of that 328 (87%) were filled out and returned properly and found appropriate for the analysis of this particular study. The study targeted 30 library staffs and questionnaires were distributed to branch library heads and technical processing staff. Interviewees were done with library directors. In total 404 respondents were participated from Jimma and Mekelle University.

The responses for the likert scale data that was collected for this study was analyzed by using mean and median. According to Kenate.D and Gojeh et al., (2013) taking a decision on the respondents ranking of the variables, the mean of responses were guided by the scale 1.0-1.49 very low, 1.5-2.49 low, 2.5-3.49 medium, 3.5-4.49 high and 4.5-4.99 very high.

4.1.1.2 Demographic Analysis of respondents

This section of the analysis is concerned with background of the respondents to understand the respondents who participated in filling the questionnaire for this research. Profile of respondents is presented in table 4.1 below.

Table 4.1 Demographic Characteristics of the Study Participants

University Respondents	Gender		Total	
	Male	Female		
Jimma University	116 35.4%	38 11.6%	154 47%	
Mekelle University	125 38%	49 15%	174 53%	
Total	241 73.4%	87 26.6%	328 100%	
Respondents Status				
	Academic Staff	Postgraduate Students	Undergraduate GC Students	Total
Jimma University	32 9.8%	33 10%	89 27%	154 47%
Mekelle University	39 11.9%	44 13.5%	91 27.8%	174 53%
Total	71 21.6%	77 23.5%	180 54.8%	328 100%

According to the demographic data in Table 4.1 above 47% (154) of the respondents were from Jimma University and 53% (174) from Mekelle University, from these 73.4 % (241) are males and 26.6% (87) are females, this indicated that most respondents were males and 21.6% (71) were academic staff, 23.5% (77) of postgraduate students and 54.8% (180) were undergraduate graduate class.

As a result more than half of the respondents were from undergraduate students. This demographic data interpretation revealed a very good representation of the study population, which indicated that most participants in the JU and MU have experience of using the open source integrated library system.

Table 4.2 Profile of Library staff respondents

Respondent's position/role in the library	Universities		Frequency	Percentage		
	Jimma	Mekelle				
Library Director	1	1	2	6.5 %		
Head of Acquisition	1	1	2	6.5%		
Head of Library Section	7	5	12	40%		
Head of Cataloging & Classification	1	1	2	6.5%		
Head of Digital Library	1	1	2	6.5%		
System Development Coordinator	1	1	2	6.5%		
Others	3	5	8	26.5%		
Sub total	15	15	30	100%		
Gender			Level of Education			
	Male	Female	Diploma	Bsc/BA	Msc/ MA above	Total
JU	8 26.6%	7 23.4%	3 10%	9 30%	3 10%	15 100%
MU	10 33.4%	5 16.6	3 10%	11 36.6%	1 3.4%	15 100%
	18 60%	12 40%	6 20%	20 66.6%	4 13.4%	30 100%

Table 4.2 shows that 40% (12) respondents were head library sections and 26.5% (8) are from other positions the rest respondents have the same result. Out of 30 respondents 60% (18) were male and 40% (12) female as well as 66.6% (20) degree holders, 20% (6) diploma holders and 13.4% (4) master and above holders. This implies that most of library staffs are first degree graduate or holder. This indicated that the libraries may have some potential to manage open sources integrated library system.

4.1.1.3 Library staff year of employment

To determine employment status of library staff a question was asked regarding their work experience in their universities libraries. Most number of respondents found that more years of employment. The responses were summarized in figure 4.1

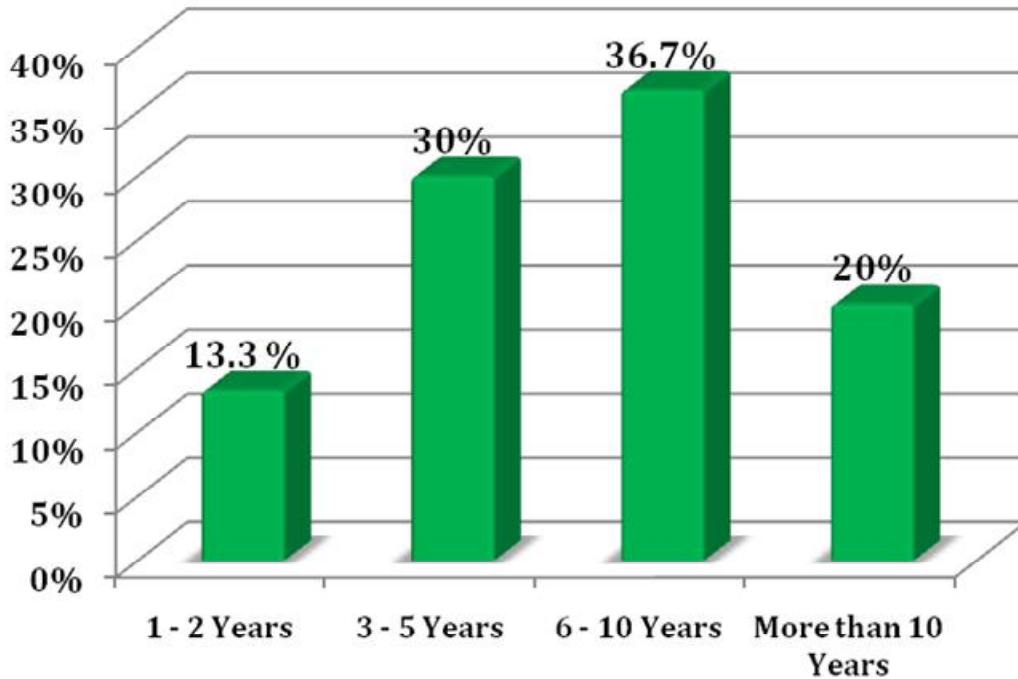


Figure 4.1 Years of employment

The above figure 4.1 shows that 36.7% (11) respondents said that their years of employment were six to ten years, 30% (9) replied that they had three and five years working period and 20% (6) respondents indicated that they had more than ten years working experience, only very few number of respondents 13.3% (4) had one to two years in their libraries. From this we can say that majority of library staff those who are working in technical processing and head branch libraries have more years of working experience. It indicated that the library staffs had good experience on their library activities. Thus, they can be able to easily practice and accept the transformation of the library services using open sources integrated library management system and information technology in their libraries.

4.1.1.4 Computer Literacy Skills of students and staff

The purpose of this part was to determine the level of users' computer skills to have access to essential information and effective use of information and communication technologies. Majority of respondents' from both universities' computer literacy skill level is good. Figure 4.2 summarized responses from students and staffs.

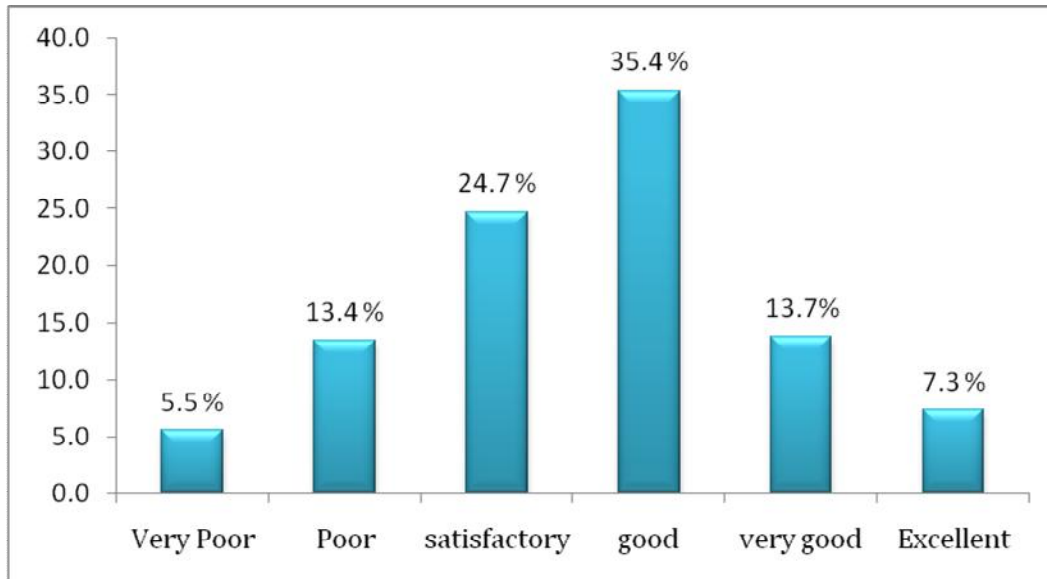


Figure 4.2 users level of computer literacy

Figure 4.2 shows that level of respondents' computer literacy. The majority of the respondents' computer literacy skill is good (35.4%) followed by satisfactory (24.7%), very good (13.7%) and excellent (7.3%) computer skill. A little over 13.4 % and about 5.5% of the respondents noted that their computer literacy level was poor and very poor respectively. The Figure illustrates that computer literacy skill of users were good. This implies that computer literacy skills of users were very capable enough to use or would not face problems in accessing ABCD integrated library resources and services

4.1.1.5 Users experience in the use of automated/integrated library system

Participants were asked to determine whether they had an experience on use of integrated library services in their university. The response was summarized in figure 4.3

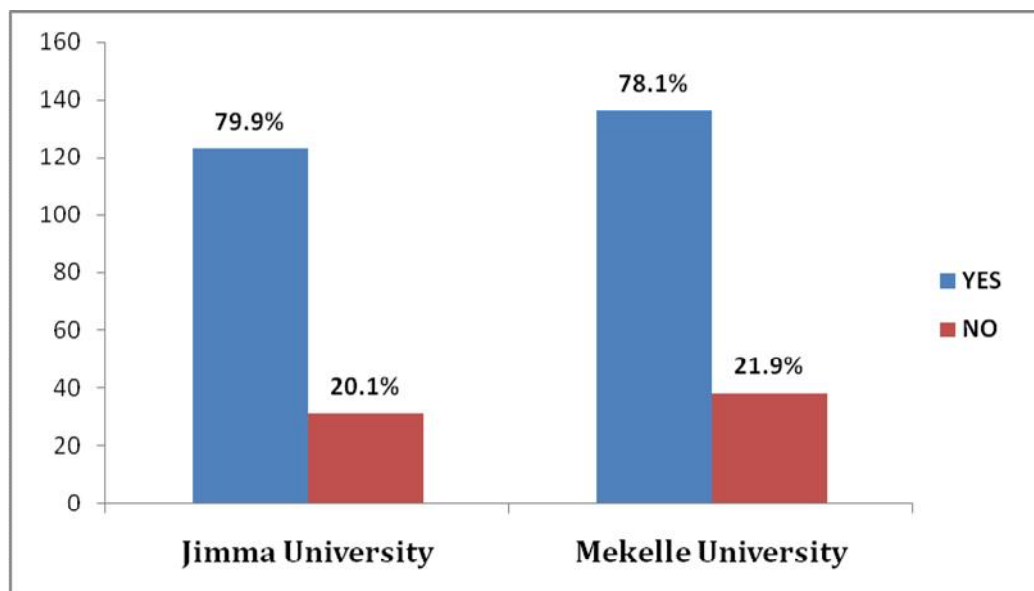


Figure 4.3 respondents use of University library automated system

Figure 4.3 shows that respondents of 78.1% (136) from MU and 79.9% (123) from JU said that they had experience on use of automated and e-resource services. Respondents of 21.9% (38) from MU and 20.1% (31) from JU indicated that they have no experience in the use of integrated /automated in their university. This implies that library users had experience on the use of automated service; thus users have capable to use open sources ABCD integrated library system.

4.1.1.6 Device used to access automated library services

A question was asked to both students and staffs on which devices were used in order to determine what library services provided that can run on the different media type. Most of the respondents indicated using PCs and laptops. But there were also users that indicated the use of smart phones and mobile phones.

Table 4.3 device use to access library services

Device used	Yes	No
PC / desktop	231 70.5%	97 29.5%
Lap top	192 58.5%	136 41.5%
Mobile Phone	54 16.5%	261 82.5%
Smart phone	38 12%	282 88%

Accordingly, table 4.3 above shows that 70.5% (231) of the respondents use PCs, 58.5 % (192) use laptop and 17.1% (54) use mobile phone and the rest of the 11.1% (38) respondents use smart phones. This implies that other devices rather than PCs and Laptops provided by the JU and MU for use by their users could be used to access library services.

4.1.1.7 Internet facility

Integrated library management system needs internet connectivity, using it, will afford users to access and retrieve information sources and services. The respondents in this study rated the universities internet connectivity. Most respondents replied that the internet connectivity in their universities library was fair and good. The responses of respondents were summarized in table 4.4 below

Table 4.4 respondent’s opinion on internet facilities

University Respondents	Rate (frequency ,percentage, mean and SD)							
	Very poor	Poor	Fair	Good	Very good	Excellent	X	SD
Jimma University	6 1.5%	13 4.5%	43 13.5%	66 20%	17 5.5%	9 2.5%	3.66	1.09
Mekelle University	11 3.5%	26 8%	64 19.5%	51 15.5%	16 4.5%	6 1.5%	3.30	1.35
Total	17 5%	39 12.5%	107 33%	117 35.5%	33 10%	15 4%		

As presented in table 4.4 internet facilities in the university libraries 20% (66) JU and 15.5% (51) of MU respondents indicated that internet connectivity is good, 19.5% (64) MU and 13.3% (43) of JU said that fair, 5.5% (17) of JU and 4.5% (16) of MU respondents said that the internet facility is very good. Few numbers of respondents as compared to other responses on the table shows 2.2% (9) and 1.5% (6) university respondents replied that internet facilities were excellent. On the other hand 1.5% (6) and 4.5% (13) respondents of JU and 3.5% (11) and 8% (26) respondents of MU claimed that the internet facilities were very poor and poor respectively this implies that the internet facilities of JU and MU need improvement.

Table 4.5 T test on Internet facilities at p = 0.05 significant level

T-Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Level of internet connectivity	Equal variances assumed	.395	.530	2.893	326	.004	.358	.124	.114	.601
	Equal variances not assumed			2.899	323.416	.004	.358	.123	.115	.601

The above T test table 4.5 indicated that significant difference was found between Jimma and Mekelle university libraries in terms of internet services facilities since the Sig value is .530 which is greater than 0.05 as a result we can use equal variance assumed row data and look under Sig.(2- tailed) the value .004 shows that less than 0.05 . We can say that there is significant difference between the university internet facilities provision. $T(326) = 2.8, P = .004$, JU mean 3.66 (SD = 1.09) and MU mean 3.30 (SD = 1.13). This implies that Jimma university library have a bit better internet facilities than Mekelle university.

4.1.1.8 Learn the use of automated library services

Respondents were asked questions to rate themselves regarding means of training to use automated library services. Table 4.6 present the results on how the respondents learnt to access the integrated library resources and services.

Table 4.6 Learn the use of automated services [N= 328]

Learn to handle automated service	Rate (frequency and percentage)			Total
	Academic staff	Postgraduate	Undergraduate	
orientation from university Library	5 7%	16 20.7%	55 30.5%	76 23%
Self instruction	33 46.5%	30 39%	50 27.5%	113 34%
Guidance from friends/colleagues	30 42%	28 36.3%	66 36.5%	124 37.8%
External courses	3 4.5%	3 4%	9 5%	15 4.5%
Total	71	77	180	328

As depicted in table 4.6 the result of this study revealed that guidance from friends/ colleagues and self instruction was the main means of learn usage of automated library services 37.8 % (124) and 34% (113) responded respectively. Only 23% (76) respondents said that orientation from university Library and 4.5 % (15) were from external courses. This implies that majority of library users learnt each other and shared their experiences the use and access of library resources and services.

4.1.1.9 How often users use integrated library system

It is important to know how frequently the users use ABCD integrated library system in their universities in order to know the interest of library users on the system, questions were asked to staff and students how often users were visit. The study indicated that small numbers of respondents visited and uses ABCD system daily; large numbers of respondents use the library system once in a week. The responses were summarized in figure 4.4

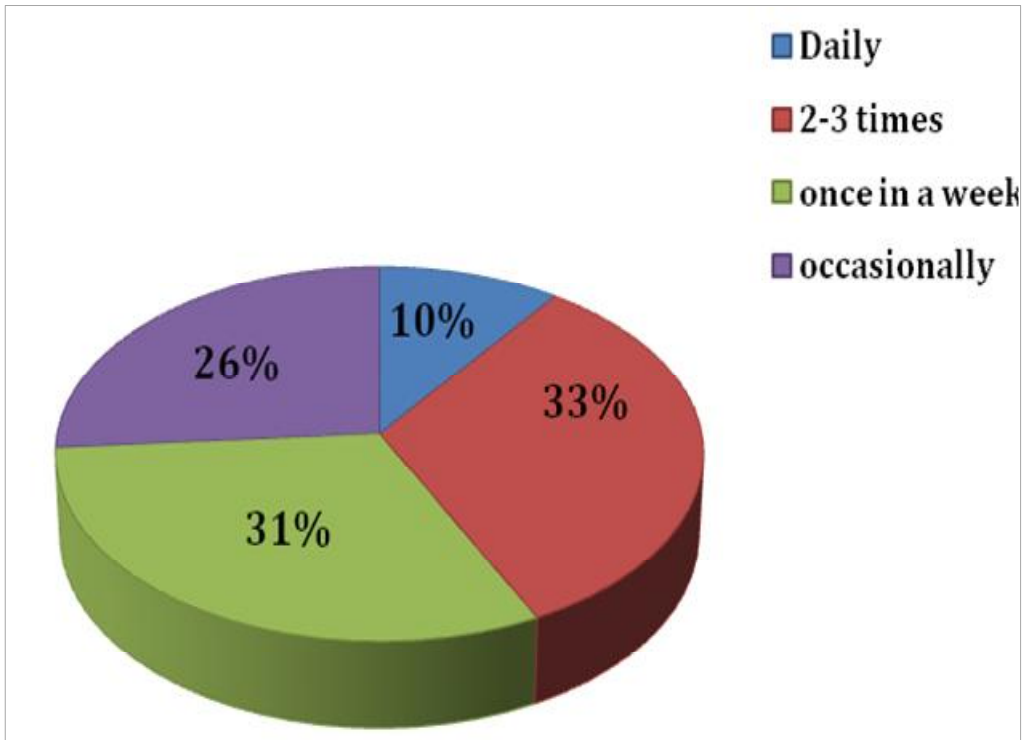


Figure 4.4: Frequency use of library system

The above figure depicted that 33% (107) respondents use ABCD system 2-3 times in a week, the second top numbers of respondents were 31% (102) use once in a week, 26% (86) respondents said that they use occasionally and 10% (33) of respondents indicated daily. This implies that integrated library systems of the universities were averagely accessed by users.

4.1.1.10 Respondents opinion on ABCD integrated library system

To determine how respondents feeling on usage of ABCD integrated library system in their universities; respondents were asked questions to what extent they agree or disagree with the functions of the services provided in the system. Few number of respondents said that the system functions were used without difficulty. The responses were summarized table 4.7

Table 4.7: Respondents opinion on ABCD library System [N= 328]

ABCD indictors	Rate scale (frequency and percentage)					Descriptive statistics & decision		
	SDA	DA	N	A	SA	X	SD	DN
Friendly user interface	64 20%	55 17%	72 22.5%	99 30.5%	32 10%	2.94	1.29	N
Integrated links	68 21%	115 35.5%	74 23%	52 16%	27 3.5%	2.45	1.10	DA
Reliable of OPAC	15 4.5%	40 12.5%	66 20.5%	136 42%	66 20.5%	3.61	1.08	A
Stable of ABCD OPAC	77 24%	116 36%	62 19%	49 15%	18 5.5%	2.43	1.22	DA
Spelling error check	157 48%	97 29.5%	57 17.5%	16 5%	0	1.79	.900	DA
Basic search	21 6.5%	38 11.5%	50 15%	136 41.5%	81 24.5%	3.67	1.15	A
Easy to access remotely	74 23%	55 17%	76 23.5%	85 26%	32 10%	2.83	1.31	N

Key: 5= strongly Agree (SD), 4= Agree (A), 3= Neutral (N), 2=Disagree (DA), 1=strongly Disagree (SA), X= mean, SD= standard deviation, DN = Decision

To find out the respondent's observation of ABCD integrated library system in their respective libraries, they were asked to give opinion about integrated library services functions. The result presented in table 4.7 above shows that the most response were disagreed and strongly disagreed for the questions related with integrated and linkage, stability and spelling error check with (mean = 2.45, mean = 2.43 and mean 1.79) respectively. The second high score rate were neutral questions associated with user interface and easy to access remotely with (mean value of 2.94 and 2.83). Respondents were agreed only with reliability and basic search with mean value of 3.61 and 3.67. This indicated that respondents were disagreed with most functions of the ABCD integrated library system.

4.1.1.11 Means to use integrated library service

In order to determine respondent's usage of ABCD integrated library system question were asked to staff and students. Majority of respondents indicated that campus network was a way to access library services. Responses were summarized in figure 4.5

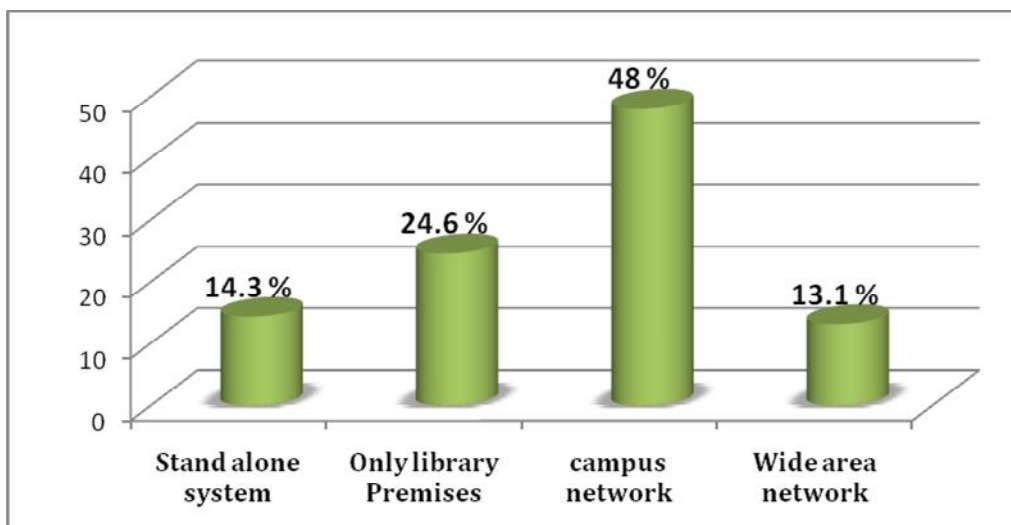


Figure 4.5 means to access integrated library services

The figure shows that 48% (154) respondents used campus network to access ABCD integrated library system, 24.6% (79) respondents indicated that they use library premises, 14.3% (46) and 13.1% (42) respondents used stand alone system and wide area network respectively. It is found that majority of library users got their access through campus area network. This implies that if the libraries create access using wide area network, users would want to access ABCD library system outside the campus. That is wherever internet connection is available; this would bring effective and efficient integrated library services.

4.1.1.12 Respondents Opinion on ABCD users manual

Respondents were asked question about ABCD users manual this is very important to determine how users obtain guide on the use of ABCD integrated library services to access collection in their library system. Responses were summarized in figure 4.6 below.

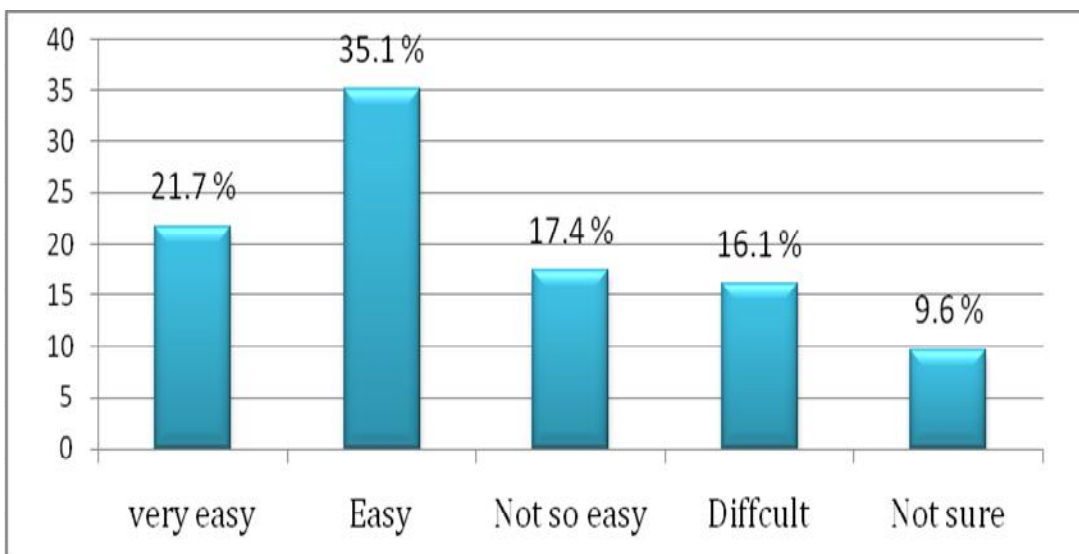


Figure 4.6 ABCD users manual

As presented the above figure, 35.1% (113) respondents replied that the user's manual is easy and 21.7% (70) were very easy. Nearly 17.4% (56) of respondents indicated that the ABCD manual were not so easy and 16.1% (52) respondents said that difficult and 9.6% (31) respondents were not sure. The study result implies that most numbers of respondents easily understood ABCD manual system of their libraries and it shows that ABCD manual help users to access library resources and services without difficulty.

4.1.1. 13 Respondents opinion on OPAC search

Online public access catalogue (OPAC) is very helpful for users to know what types of collection the library have and where these collection are found and status of the library resources provide information very fast and easily, in order to determine the search facility of OPAC both universities library systems respondents were asked question how they accessed the library collection and way of searching to retrieve information resources. Responses were summarized in table 4.8

Table 4.8: Online Public Access Catalogue search facilities

Search facility	Rate (frequency ,percentage, mean and SD)							
	Below average	Average	Good	Very good	Excellent	X	SD	DN
Title search	31 9.5%	39 12%	47 14.5%	111 34.5%	95 29.5%	3.62	1.28	HA
Author search	42 13%	101 32%	78 24.5%	77 24%	19 6%	2.78	1.13	M
Search by combine key word	111 35%	140 44.5%	56 17.5%	8 2.5%	0	1.88	.786	L
Search by subject	93 28.5%	102 31.5%	40 12.5%	76 23.5%	12 3%	2.49	1.23	M
Search by Boolean Operators	35 10.5%	43 13%	47 14.5%	114 35%	83 25.5%	3.58	1.72	HA

As shown in table 4.8, respondents used title and Boolean operators search mechanism; with high mean score of 3.62 and 3.58. The second high score were average for author and subject search; with mean value of 2.78 and 2.49 respectively. Respondents give low score for search by combine keyword with mean value of 1.88. It is found that majority of respondents used title, Boolean and author as search facilities. This implies that OPAC search facilities of ABCD integrated library system in helped users to know the collection of their libraries.

Table: 4. 9 ANOVA table OPAC and retrieval of documents

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Author search facility	Between Groups	8.057	3	2.686	2.740	.043
	Within Groups	306.782	313	.980		
	Total	314.839	316			
Title search facility	Between Groups	9.840	3	3.280	2.412	.067
	Within Groups	433.733	319	1.360		
	Total	443.573	322			
search by subject	Between Groups	7.013	3	2.338	2.058	.106
	Within Groups	362.263	319	1.136		
	Total	369.276	322			
search by combined keyword	Between Groups	9.344	3	3.115	2.955	.033
	Within Groups	327.799	311	1.054		
	Total	337.143	314			
search by Boolean operator	Between Groups	8.332	3	2.777	2.485	.061
	Within Groups	356.497	319	1.118		
	Total	364.830	322			
* The mean difference is significant at the 0.05 level						

In table 4.9 above a one-way ANOVA was conducted to examine whether there were statistically significant differences between retrieve of documents and search facilities using ABCD integrated library system. The results revealed that there is statistically significant difference of author search with $p=0.043$ and combined key word search facilities with $p=0.033$ that were less than the P - value 0.05 level of significant.

4.1.1.15 Respondents opinion on circulation services

The circulation activities of any library are vital; in order to determine the circulation module of ABCD integrated library system facilities. A question was asked to students and academic staff of both JU and MU feeling on circulation services delivery. Responses of respondents were summarized in table 4.10

Table 4.10: Integrated library system circulation service facilities

Statement	Rate (frequency ,percentage, mean and SD)							
	SDA	DA	N	A	SA	X	SD	DN
fast and ease borrowing of library resources	91 28%	111 34.5%	68 21%	52 16%	0	2.25	1.03	DA
Online renewal of books	113 35%	98 42%	70 25%	37 10.5%	5 1.5%	2.14	1.07	DA
Ease to return library resource	91 28%	122 37.5%	77 23.5%	25 7.5%	7 2%	2.34	1.10	DA
fast Overdue fine fee	50 15.5%	94 29%	117 36%	60 18.5%	0	2.58	.965	N
Ease to reserve reference books	81 25%	104 32.5%	78 24.5%	51 16%	7 2%	1.51	1.07	DA
fast e-mail feedback	106 32.5%	124 38%	78 24%	11 3.5%	6 1.5%	1.98	.962	DA

Scale: 5=strongly Agree (SA), 4=Agree (A), 3=Neutral (N), 2=Disagree (DA), 1 =strongly Disagree (SD), DN= decision

As depicted on the above table 4.10, the circulation services' facilities of both university libraries respondents indicated disagree and strongly disagreed with all circulation Services facilities that include: borrowing of library resources, online renewal of books, and return of books, reserve reference books and e-mail feed back with mean value of 2.25, 2.14, 2.34, 1.51 and 1.98 respectively. Respondents' opinions were neutral on fast overdue fine fee with mean value 2.58. The finding shows that the circulation services were not effective and efficient to provide quality services for library users. This implies that the ABCD circulation module was not properly managed and it needs some improvement on error handling and technical aspects of the circulation module of their libraries.

Table 4.11 ANOVA table for circulation services facilities

Table 4.11 presents the results of the comparison of respondent opinion on integrated circulation

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
fast and easy borrowing of library resources	Between Groups	.001	1	.001	.001	.980
	Within Groups	346.624	320	1.083		
	Total	346.624	321			
Online renewal of books	Between Groups	.028	1	.028	.024	.877
	Within Groups	369.421	321	1.151		
	Total	369.449	322			
Ease to return library resources/ books	Between Groups	4.692	1	4.692	.486	.486
	Within Groups	3097.846	321	9.651		
	Total	3102.539	322			
fast Overdue fine fee	Between Groups	.061	1	.061	.065	.799
	Within Groups	298.002	319	.934		
	Total	298.062	320			
Ease to reserve reference books	Between Groups	2.984	1	2.984	.028	.604
	Within Groups	378.156	319	1.185		
	Total	381.140	320			
fast e-mail feedback	Between Groups	1.542	1	1.542	.031	.562
	Within Groups	298.347	323	.924		
	Total	299.889	324			
* The mean difference is significant at the 0.05 level						

services facilities between the universities. The levels of mean score on ABCD integrated library system of circulation services between the universities from the respondents are not significantly different, the significant value of most variables were greater than p-value = 0.05. This indicated that the circulation services facilities in Jimma and Mekelle university libraries have the same status and similar for variables “fast and easy browsing of library resources with mean value =

2.25, Online renewal of books mean value of 2.13 and 2.15, Ease to return library resources 2.4 and 2.37 and fast e-mail feedback mean value 2.01 respectively. This indicated that there is no significant different among the university libraries circulation services provision using ABCD integrated library system.

4.1.1.14 Respondent's opinion on status of retrieve of document

In order to determine the status of information retrieval from both universities; library respondents were asked to express their feeling on retrieval of documents; even if large number of respondents were supposed to be fairly successful but nearly similarly number of respondents argued that information retrieval from their libraries system were not very successful. Responses were summarized in figure 4.7 below.

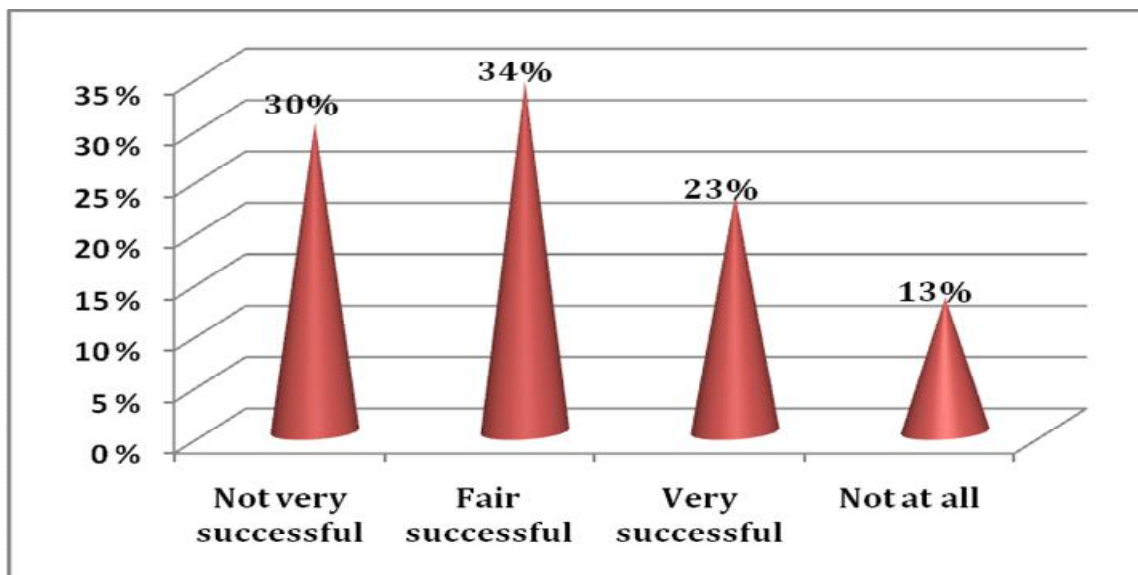


Figure 4.7 Retrieval of documents

The above figure 4.7 depicted that 34% (112) respondents said that document retrieval from integrated library system were fairly successful, 30% (99) and 23 % (75) respondents indicated that information retrieval function of the library system were not very successful or very successful respectively. While 13 % (42) respondents claimed not at all successful. The findings show that majority of respondents' retrieved documents from their libraries system. This implies that ABCD open source integrated library system was able to afford users an average retrieval of documents in their libraries.

Table: 4. 12 ANOVA table for retrieve of documents and respondents status

ANOVA					
Retrieve of documents					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	11.737	2	5.869	5.859	.003
Within Groups	317.510	317	1.002		
Total	329.247	319			

Table 4.13: Multiple comparison of respondents on retrieval of documents

Multiple Comparisons						
Dependent Variable: Retrieve Of Documents						
Tukey HSD						
(I) Respondents Status	(J) Respondents Status	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Academic staff	Postgraduate	.267	.167	.247	-.13	.66
	Undergraduate	-.201	.142	.335	-.54	.13
Postgraduate	Academic staff	-.267	.167	.247	-.66	.13
	Undergraduate	-.468*	.138	.002	-.79	-.14
Undergraduate	Academic staff	.201	.142	.335	-.13	.54
	Postgraduate	.468*	.138	.002	.14	.79

*. The mean difference is significant at the 0.05 level.

Table 4.12 and table 4.13 presents the results of ANOVA test retrieval of documents, while table 4.13 on multiple comparison of the retrieval of documents using ABCD integrated library system among respondents. the result shows the respondents are significantly different at the 5% level ($p\text{-value} = 0.05$) that is $.003 < 0.05$. The Turkey HSD multiple comparison tests confirm that, the mean score listed of academic staff, postgraduate and Undergraduate 2.1, 1.97 and 2.38 respectively. The significant value of academic staff with postgraduate is .247, academic staff with undergraduate .335 and postgraduate with undergraduate significant value of .002 based

on the result we can conclude that there is statistical significant difference between users to retrieve documents from the library system.

4.1.1.16 Respondents opinion on libraries services facilities

In order to find out automated services facility of Jimma and Mekelle universities library and users' view on services provided, different questions were asked to academic staff and students. Summary of their response and decisions made is presented in table 4.14

Table 4.14 Respondent's opinion on libraries service facilities

Rate (frequency ,percentage, mean and SD)								
Services and facilities	SDA	DA	N	A	SA	X	SD	DN
Library has sufficient subscribed journals	174 54%	106 32.5%	33 10%	10 3.5%	0	1.63	.791	DA
Library has enough e-information resource	78 23.5%	73 22%	71 21.5%	78 23.5%	28 8.5%	2.71	1.29	N
The available institutional repository system	53 16%	21 6.5%	49 15%	116 35.5%	89 27%	3.51	1.37	A
e-resources are accessed from any location	46 14%	61 18.5%	67 20.5%	102 31%	45 13.5%	3.12	1.27	N
The availability of internet service lab	37 11%	29 8.5%	56 17%	106 32.5%	96 29%	3.6	1.30	A
Linkage with various sources of information	59 18%	53 16%	50 15%	91 27.5%	74 22.5%	3.21	1.42	N
Ease of communication with library staffs	35 10.5%	28 8.5%	68 21%	129 39%	68 21%	3.51	1.21	A
Fast and easily download of e-resources	40 12%	42 13%	77 23.5%	117 35.5%	45 13%	3.26	1.22	N
Library ABCD site is easy to navigate	51 16%	20 6%	46 14.5%	114 35.5%	87 27%	3.52	1.37	A

Scale: 5=Strongly Agree (SA), 4=Agree (A), 3=Neutral (N), 2=Disagree (DA), 1 =Strongly Disagree (SD)

The respondents were asked to provide their opinion about automated library services facilities. As shown in the above table 4.14 response agreed and strongly agreed on the question related with availability of internet service lab, available institutional repository, communication with library staffs and ABCD site navigation with mean = 3.6, mean = 3.51, mean = 3.51 and mean = 3.52 respectively. Respondents also had the second high score neutral question that was related with ease download of e-resources, linkage with various sources; e-resources are accessed from any location and enough e-information resource with mean value of 3.52, 3.21, 3.21 and 2.71 respectively. Respondents claimed disagreed with sufficient subscription of journals with mean value of 1.63. It is indicated that user's accessed resources effectively with some services of their library as well as users did not appropriate service in some areas. This implies that the ABCD open source integrated library management system was only functional in some service sections of the library. Thus the current ABCD open source library software needs properly managed and involvement of ICT skilled expertise and digital librarian in order to fully customized and effectively integrate each section of the libraries.

4.1.1.17 Respondents opinion on orientation on the use of library resources and services

Orientation and awareness are some of the major tasks for libraries to have before providing services for its users. It creates better understanding about library collections and type of services they provide. To determine whether orientation is essential or not a question was asked respondents. Accordingly, most respondents indicated that library orientation is very essential. Responses were summarized in figure 4.8 below

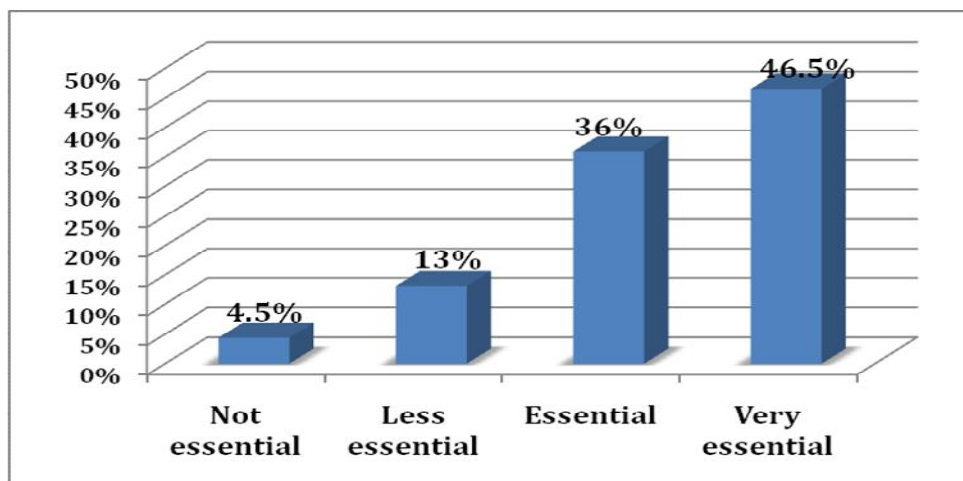


Figure 4.8 Respondents opinion on oration

As shown the above figure 4.8 showed 47% (149) respondents indicated that orientation is very essential, 36% (115) respondents indicated essential. While 13% (42) and 4% (14) of respondents indicated that library orientation was less essential and not essential respectively. This implies that oration on the use of library services is essential by users

4.1.2 Librarians' Responses

One of the objectives of this section was to assess the implementation status of open sources integrated library management system of that is ABCD in Jimma and Mekelle University libraries along with problems on the implementation of open sources library software.

4.1.2.1 Opinion on integrated library system selection

In order to find out open source integrated library system selection criteria of both university libraries, a question was asked to library staff. Out of twelve listed option only six were considered as criteria. Responses are summarized in table 4.15 below.

Table 4.15 Open source library selection criteria

Criteria consider selection of library software	Frequency and percentage		Total
	JU	MU	
Cost of system	4 13.3%	4 13.3%	8 26.7%
Ease of use	2 6.7%	4 13.3%	6 20%
Flexibility and versatility of the software	4 13.3%	3 10%	7 23.3%
Interface and integration	1 3.33%	1 3.3%	2 6.7%
Rating of the software given by a recognized institution/body	2 6.7%	0	2 6.7%
Technical considerations and compatibility with the operating system available in the library	2 6.7%	3 10%	5 16.7%

The above table 4.15 shows that 26.7% (8) respondents indicated cost of the system, 23.3% (7) flexibility and versatility, 20% (6) ease of use and also 16.7% (5) respondents stated technical consideration of the software were considered as selection criteria. On the other hand 6.7% (2) respondents respectively stated that interface and integration as well as rating of the software given by a recognized institution taken as criteria to select library software for their libraries. It is indicated that cost of the software was the highest criteria and the second highest rank was flexibility of the software. This implies that the libraries used most common principle for open sources selection criteria

4.1.2.2 Respondents opinion on ABCD completeness features

The respondents were asked to indicate their view on ABCD integrated library system as a complete feature to manage overall integrated library services. Majority of respondents indicated that ABCD system has all features they need. Responses were summarized in figure 4.9 below.

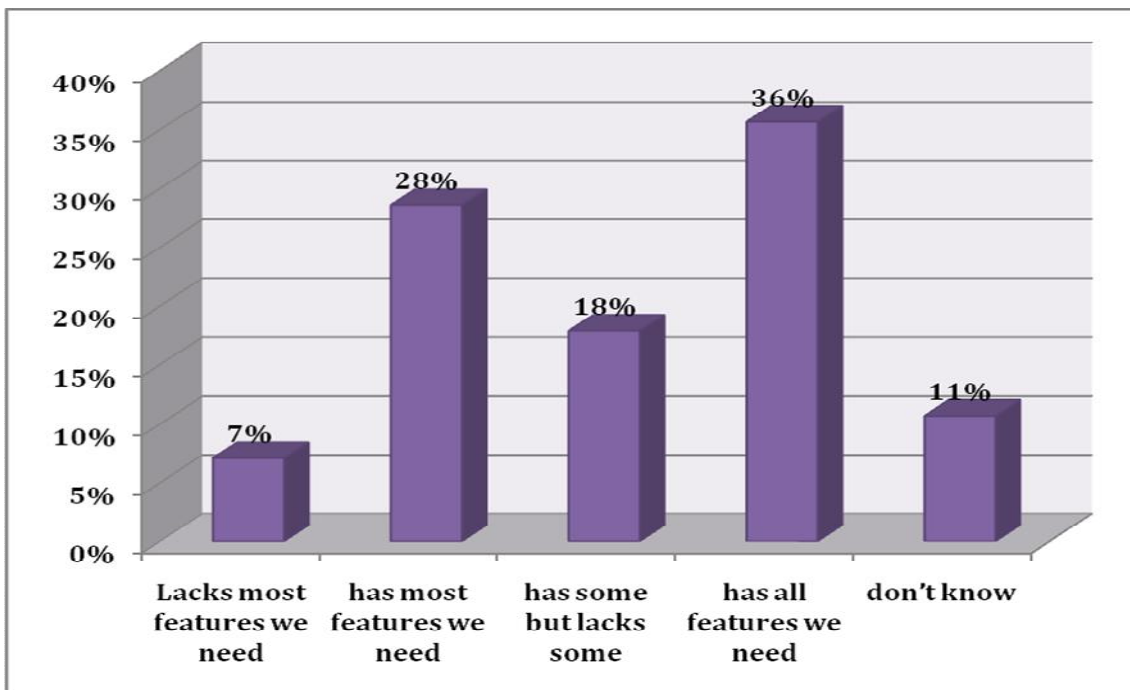


Figure 4.9 ABCD completeness feature

The result obtained as presented in the above figure 4.9 depicted that 36% of respondents' rate that ABCD library system has all features they need and 28% of respondents indicated that it has

most features they need. On the other hand 18% showed it has some but lacks some, 11% of respondents said that they lack most features they need, and 7% of respondents claimed that they do not know. From this study result we can say that ABCD open sources integrated library system has complete feature to manage acquisition, circulation, cataloging and serial control of library operations.

4.1.2.3 Respondents opinion on awareness of ABCD library software

In order to observe the awareness or knowledge level of ABCD library system a question was asked to Jimma and Mekelle universities library staffs, large number of respondents indicated that they are familiar with ABCD integrated library system. The responses were summarized in the figure 4.10 below.

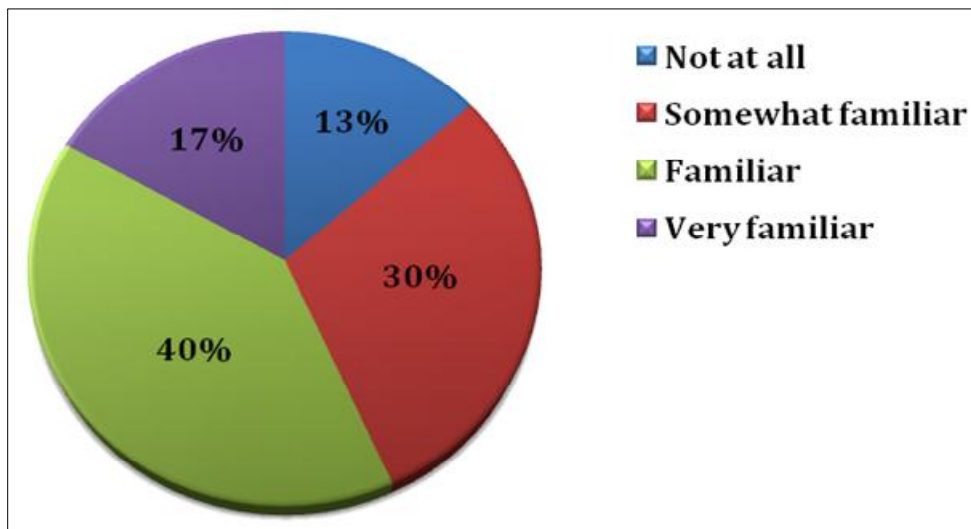


Figure: 4.10 Awareness of ABCD integrated library system

As shows in figure 4.10 above 40% of respondents indicated that they are familiar, 30 % of respondents were somewhat familiar and 17% of respondents very familiar. Only 13% of respondents claimed not at all familiar. It was found that majority of respondents have knowledge or awareness about their library integrated system. This implies that the library staffs are have the knowhow on ABCD integrated library management system and may possibly be

able to fully implement and integrate all library sections of the library services system effectively

4.1.2.4. Training of library staff

To determine whether the library staffs have training on integrated library system, questions were asked to library staffs of both universities. 83.3% staffs replied ‘Yes’ they attended training. 16.7% respondents indicated ‘No’. The responses are summarized in figure 4.11 below.

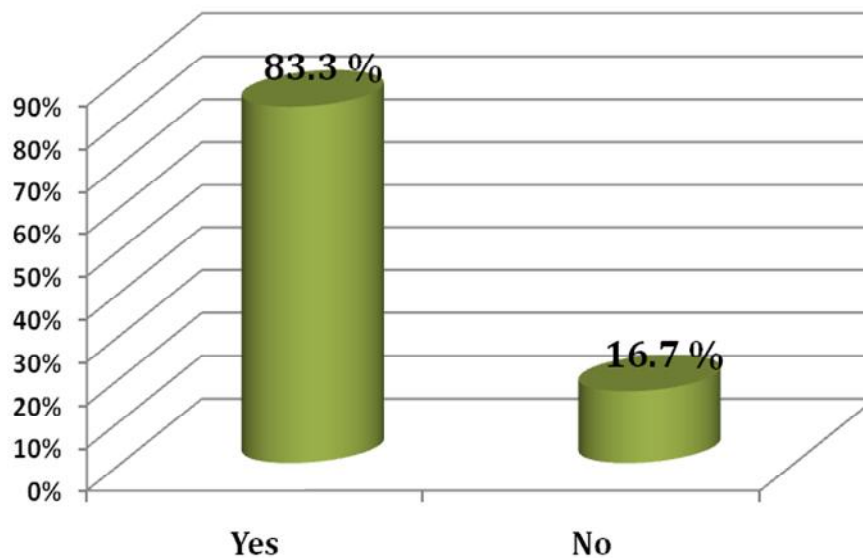


Figure 4.11 library staff training

Table 4.16 library staff training time

University Respondents	Rate scale frequency and percentage					Total
	1- Time	2 - Times	3- Times	4- Times	5 and above times	
Jimma University	2 7.5%	4 14.5%	4 14.5%	1 3.5%	2 7.5%	13 48.5%
Mekelle University	2 7.5%	5 18.5%	3 11.5%	3 11.5%	1 3.5%	14 51.5%
Sub total	4 14.5%	9 33.5%	7 26%	4 14.5%	3 11.5%	27 100%

The result presented in table 4.16 figure 4.11 shows that 83% of respondents said that they were attend training and 16.7% of respondents say no they were not obtain any training. Form this we can say that large numbers of respondents were participated in training or workshop related with integrated library system. Responded to the questionnaire item on how many times participants attended the training or workshops; 18.5% and 14.5 % of MU and JU respondents to have participated two times, 11.5% and 3.5 % MU and JU three times respectively. This implies that most of both universities library staff were attended training few times.

4.1.2.5 Library automation status

Participants were asked to indicate whether their universities library had already implemented the ABCD integrated library automation system. All respondents said “yes”. The result on status was that most respondents indicated that their library system has partial automated. Responses were summarized in figure 4.12 below.

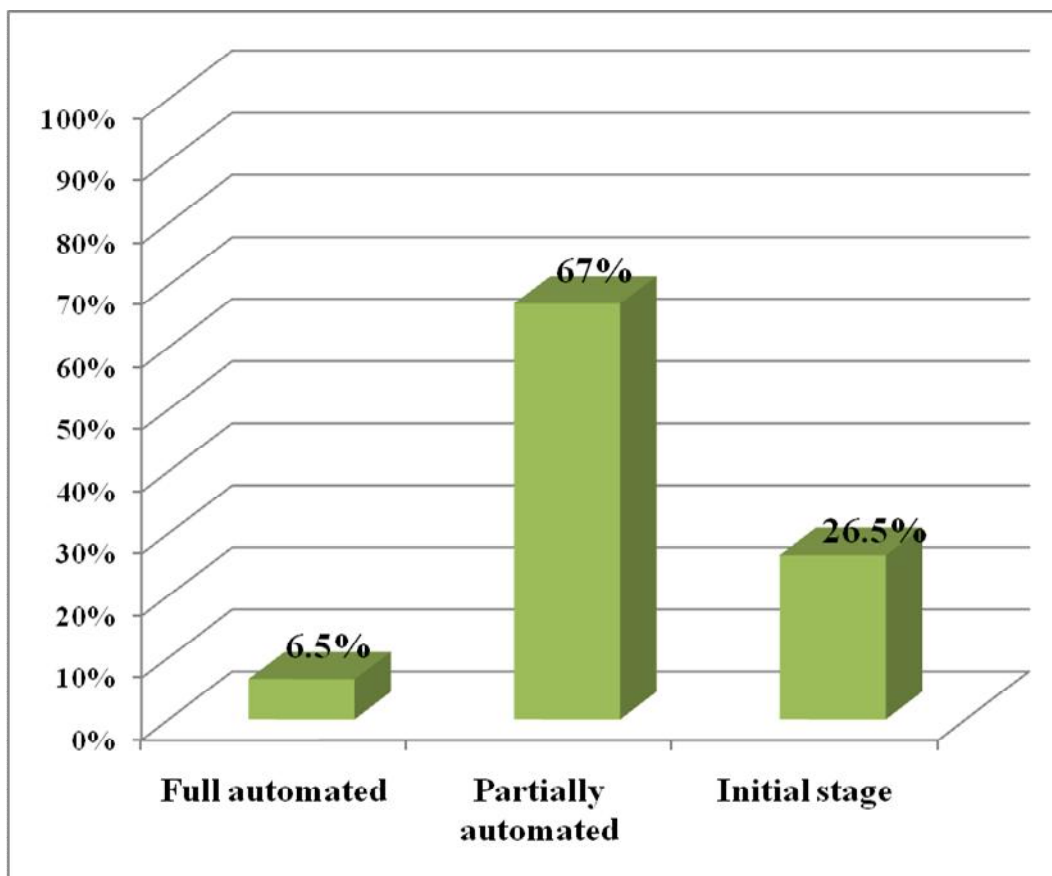


Figure 4.12 library auotomation status

The above figure 4.12 reflecteds that 67% (20) respondents indicated that their library system was partially automated with the ABCD open software, 26.5% (8) respondents said that the automation was at initial stage. while 6.5% (2) respndents cliamed that their library system was fully automated. This shows that the library system of both universities was not completely automated. This implies that the ABCD implemation status in Jimma and Mekelle university libraries need improvement for full funcanality and to provide effctive and quality services to their patrons .

Table 4. 17 T – test table on automation status

T- Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	T	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Integrated automation status	Equal variances assumed	.331	.570	-1.344	28	.190	-.267	.198	-.673	.140
	Equal variances not assumed			-1.344	26.989	.190	-.267	.198	-.674	.140

Level of significant at 0.05

The above T- test table 4.17 revealed that there was no significant difference found between JU and MU university libraries in terms of ABCD automation status at $p = 0.05$ level of significance; since the t-test showed the p -value at 0.570 at 2-tailed, which was greater than 0.05. This implies that the library system of both universities were partially automated

4.1.2.6 Factors affecting full implementation of integrated library system

In order to determine factors that affect full implementation of ABCD open source integrated library management system; respondents were asked in the questionnaire to express their opinion. The responses were summarized in table 4.18 below.

Table 4.18 factors affecting fully implementation of ABCD library system

NO	Factors affecting full implementation of open source integrated library system	Descriptive statistics		
		X	SD	DN
1	Inadequate funding	3.2	.925	A
2	Insufficient of ICT facilities	2.8	.953	N
3	Low participation of ICT center	3.4	1.22	A
4	Inadequate skilled digital librarian	2.93	1.27	N
5	Lack of feasibility study on the current open source software	3.33	.994	A
6	Lack of top management support to the library system	3.3	1.08	A
7	Unreliable Power supply	2.87	1.00	N

The respondents were asked different questions to check out the factor which affect full implementation of ABCD integrated library system. Descriptive statistics presented in Table 4.18 show that respondents agreed for low participation of ICT center, lack of feasibility study, lack of management support and inadequate funding with mean=3.4, mean= 3.33, mean = 3.3 and 3.2 respectively. But were neutral on inadequate skilled digital librarian, insufficient ICT facilities and irregular power supply with mean = 2.93, mean = 2.8 and mean = 2.87 respectively.

This implies that the current integrated library system used in both university libraries had different factors affecting the full implementation of the ABCD integrated library system that can cause ineffective service delivery of library sections.

4.1.2.7 Respondent’s opinion on experience use of open sources library system

To determine universities library experience on using open source integrated library system the questionnaire asked library staffs opinion. Majority of respondents in the libraries have more than five years experience on use of ABCD library system. Responses were summarized in table 4.19 below.

Table 4.19 experience on use of ABCD open source library system

University respondents	Scale rate of frequency & percentage		
	1 – 2 years	3-4 years	5 years and above
Jimma University	1 3.5%	3 10%	11 36.5%
Mekelle University	2 6.5	4 13.5%	9 30%
Total	3 10%	7 23.5%	20 66.5%

Table 4.19 depicts that, 66.5% of respondents indicated that their libraries have more than five years of experience on usage of ABCD integrated library management system, 23.5% of respondents said that between three and four years, only 10 % respondents claimed their libraries have very few years on use of ABCD integrated library system. From the result university libraries have more than five years in the use of ABCD system. This implies that both university libraries have exposure on use of Open sources integrated library management system. Therefore, the libraries could be expected to have fully integrated their library functions in order to provide effective and efficient services to their users

4.1.2.8 Opinion of respondents on ABCD circulation module

The questionnaire asked library staffs to express their feeling on ABCD library circulation module. Some respondents indicated that the circulation module of integrated library system was hard and some respondents also reflected that the library circulation module was easy. Responses of respondents were summarized in figure 4.13 below.

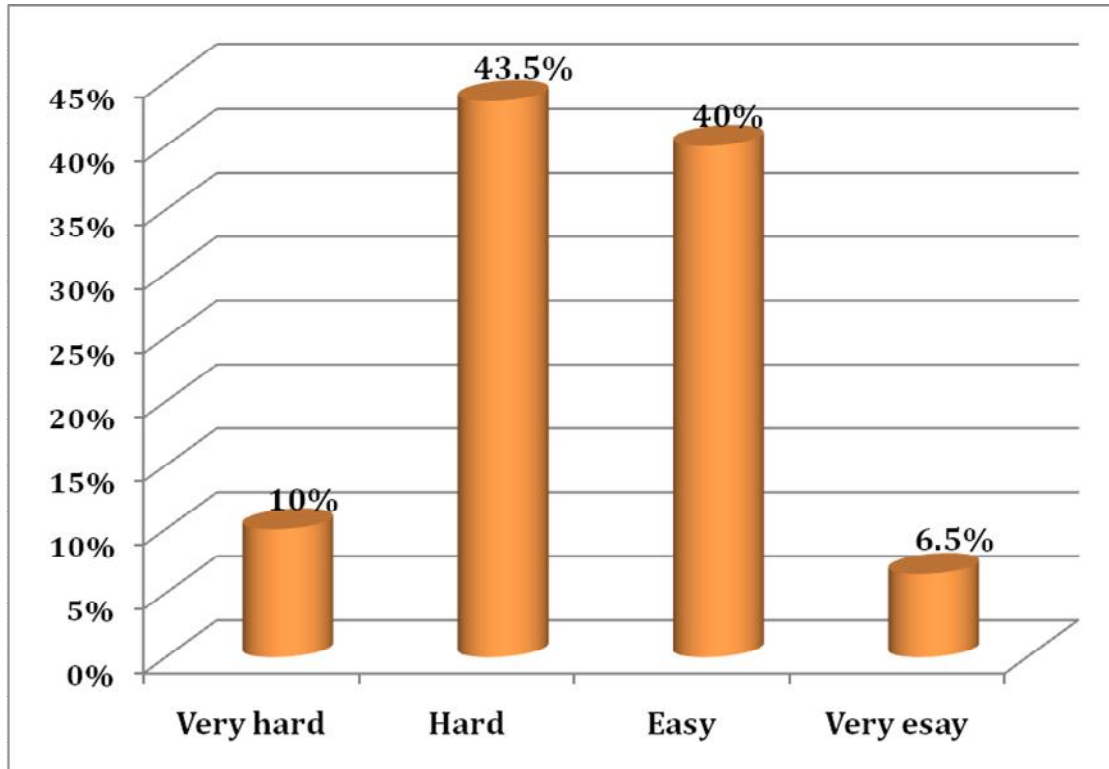


Figure 4.13 ABCD circulation modules

As the above figure shows, 43.5% of respondents indicated that ABCD circulation module was hard and 10% indicated very hard. On the other hand 40% and 6.5% of respondents replied that the circulation module was easy and very easy respectively. From the study result one can say that the circulation module was not good enough for use in their library system. This implies that the ABCD circulation module was not properly customized and adopted; as a result the librarians should make corrections on error handling and working together with ICT staff for full implementation of library services.

4.1.2.9 Respondents opinion on ABCD data entry / cataloging module

In order to determine ABCD data entry module provision, respondents were asked a question, which most respondents revealed that the data entry part of the ABCD software was very good; few respondents indicated that the data entry system was poor. Responses were summarized below.

Table 4.20 ABCD data entry module

Respondents	Rate scale frequency and percentage				Total
	Poor	Good	Very good	Excellent	
Jimma University	0	4 13%	9 30%	2 6.5%	49.5%
Mekelle University	1 3.5%	6 20%	7 23.5%	1 3.5%	50.5%
Total	3.5%	33%	53.5%	10%	100%

The above table 4.20 reflects that 53.5% of respondents indicated that ABCD data entry module was very good, 33% of respondents indicated good and 10% of respondents reflected excellent. Only 3.5 % respondents indicated poor. The findings showed that majority of respondents convinced with the relevancy of data entry module provisions. This implies that the ABCD open source integrated library system was very effective for bibliography record registration and cataloging purpose in JU and MU libraries

4.1.2.10 Status of Automated library sections

In order to know the current status of automation functions of library sections in both universities, the questionnaire asked library staffs, which majority of respondents indicated that cataloging and OPAC are functionally automated. On the other hand, acquisition section was not yet automated. Responses were summarized in table 4.21 below.

Table 4.21 automated of library sections

ABCD Module	None	25 percent	50 percent	75 percent	100 percent	X	SD
Acquisition	88.9	11.1	0	0	0	.11	.320
Cataloguing	0	3.6	28.6	32.1	35.7	2.96	.922
OPAC	0	13.3	16.7	33.3	36.7	2.93	1.04
Circulation	36.7	26.7	16.7	20	0	1.2	1.15
Serial control	44.8	37.9	13.8	3.4	0	.76	.830
Report generation	10.3	17.2	31	17.2	24.1	2.28	1.30
Over all automation	0	13.3	33.3	50	3.3	2.43	.774

The above table 4.21 shows that 88.9% respondents claimed that acquisition module of ABCD integrated library system was not yet functionally automated, 44.8% of respondents said that serial control was not automated and 37.9% respondents stated that the implementation was achieve only twenty five percent, 36.7% of respondents indicated that circulation part was not yet automated. On the other hand 36.7% and 33.3% of respondents indicated that hundred percent and seventy five percent of the OPAC service of the libraries have been functionally automated respectively. 35.7%, 32.1% and 28.6% of respondents stated that hundred percent, seventy five percent and fifty percent of the cataloguing part of the libraries are automated respectively. It was found that only OPAC and cataloging parts of ABCD integrated library system are 100% (hundred percent) automated.

4.1.2.11 Satisfaction Level of librarian on ABCD library software

In order to find out the current status and main reasons for Libraries satisfaction or unsatisfied using open source ABCD library software Some respondents replied that they were satisfied with the current system. On the other hand respondents indicated dissatisfaction with ABCD library system. Responses were summarized in table 4.22 below.

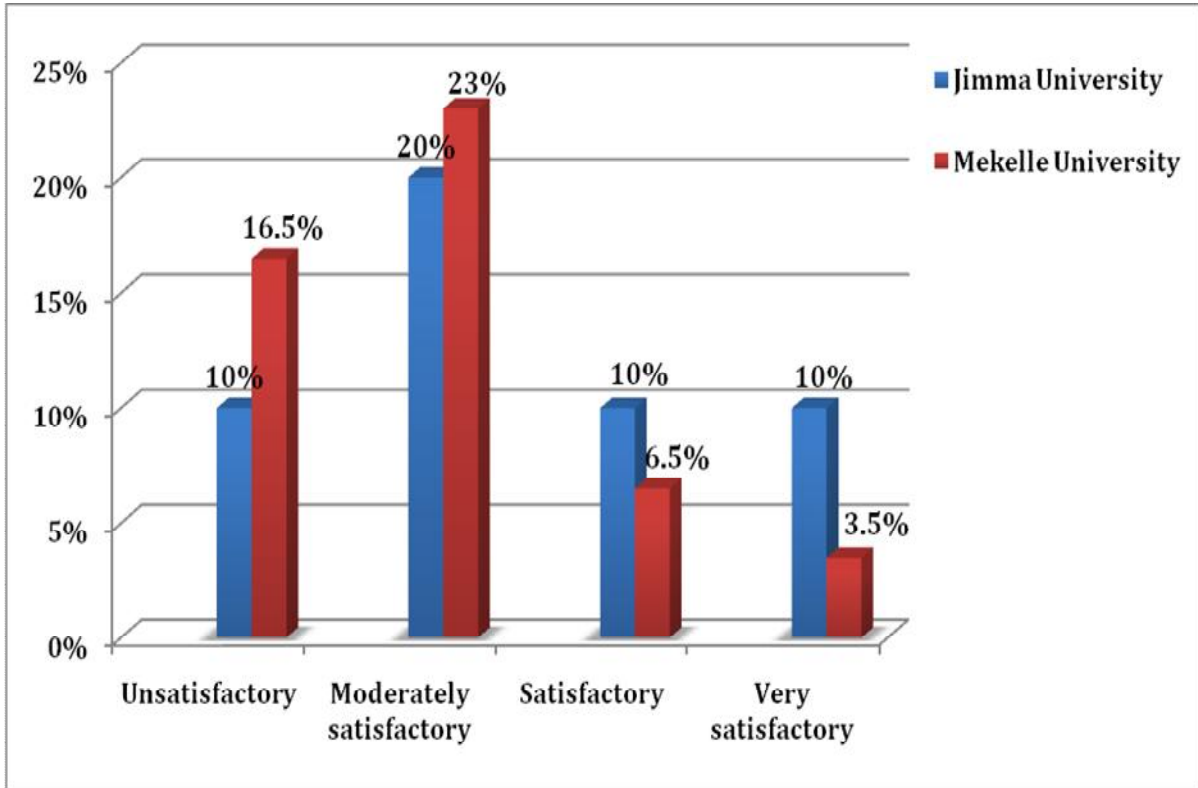
Table 4.22 satisfaction on ABCD library system

Reasons/ statements	Frequency	Percentage
YES	16	53.3
Easy to use	2	7.4
Customizable	5	18.5
No additional charge when the library needs to upgrade	2	7.4
Availability of training and documentation modules	3	11.1
Availability of application module	2	7.4
The system is flexible and additional functions can be added as required by the library	2	7.4
NO	14	46.7
Difficult to fully implement and use	3	11.1
Difficult to customize	1	3.7
System problems have not been dealt with promptly	2	7.4
No guarantee of quality or fitness	5	18.5
Total	27	100.0

The above table 4.22 shows that 53.3% of respondents indicated YES and satisfied with the use of open source ABCD library software. On contrary 46.7% of respondents stated NO, they were dissatisfied with the use of ABCD open source library management system. Respondents were also asked to select their reasons to saying Yes or No. Based on these; 18.5% indicated ABCD software was customizable, 11.4% respondents choose because of ABCD library system availability of training and documentation modules and 7.4% of respondents indicated easy to use, no additional charge and the system was flexible with additional functions respectively. On the other hand those respondents who said NO or dissatisfied justify these reasons. 18.5% of respondents said no guarantee of quality and fitness of ABCD library system, 11.1% indicated that it was difficult to fully implemented and use, 7.4% of the respondents indicated ABCD

system problems have not been dealt with promptly and 3.7% respondents indicated difficulty in customization.

Figure 4.14 overall satisfaction levels



The above figure 4.14 shows that 43% respondents were moderately satisfied with the current status of ABCD integrated library system in JU and MU libraries, on the other hand 36.5% of respondents claimed they were unsatisfied, 16.5 % and 13.5% of respondents indicated that they were satisfied and very satisfied respectively. Comparing Jimma University 10% respondents were more satisfied than Mekelle University 6.5%. This implies that Jimma university library was performing better. But the overall findings showed that ABCD open sources integrated library system used in both universities library was fairly satisfied.

4.1.2.12 Challenges and constraints of ABCD open source integrated library system

To determine the challenges and constraints on the adoption of open source integrated library system at Jimma and Mekelle university libraries for efficient and effective implementation, the questionnaire asked librarians about the challenges and constraints faced for full implementation of ABCD library system. The responses given by respondents were summarized in table 4.23 below.

Table 4.23 Challenges and constraints faced on full implementation of the ABCD integrated library system

Challenges and constraints	Rate scale frequency, mean and SD							
	SDA	DA	N	A	SA	X	SD	DN
Lapse/failed in service	2	4	7	15	2	3.62	1.04	A
Data loss	4	3	9	14	0	2.53	1.04	N
Problem with Cataloging module	12	11	3	4	0	1.97	1.03	DA
Security (Viruses /worm problems)	1	15	6	8	0	2.70	.915	N
More technical ability needed	0	7	4	15	4	3.53	1.00	A
Lack of system support and maintenance	0	4	6	14	6	3.73	.944	A
Lack of Training and documentation	8	7	7	7	1	2.53	1.22	N
Problem on update of new version	2	4	6	12	6	3.51	1.16	A

The above table 4.23 revealed that respondents were agreed and strongly agreed on challenges and constraints faced to include: lapses/fall in services, more technical ability needed, system support and maintenance and update of new version with mean = 3.62, mean = 3.53, mean = 3.73 and mean = 3.51 respectively. Number of respondents also indicated neutrally on security and viruses with mean = 2.7, data loss mean = 2.53, training and documentation mean = 2.53. Some respondents disagreed on problems of cataloging module with mean value of 1.97. While

majority of respondents were either agreed or disagreed on the above mentioned challenges and constraints faced in their libraries; this implies that the adaption and customization of ABCD integrated library system faced different challenges and constraints that blocked full implementation and integration of all library sections effectively.

4.2 Qualitative data result

The researcher carried out interviews with Mekelle and Jimma universities library Directors and four technical processing staffs from the two universities.

The researcher wanted to know how Mekelle University came about the ABCD software. The Director gave a brief history by saying that: “Mekelle University was introduced library automation activities since 2003 G.C in collaboration with VLIR/ MU - IUC library project. The objectives of the project were to change the service providing systems of the library from manual to automated system, enhancing the capacity of library staff and equipped information technology resources as said by the Directors. Based on the library project annual plan, two library staff members attained training in Belgium in 2004 in order to identify and select appropriate open sources library software.

The library had not any written library software evaluation and selection standard documents. The good thing was that the library was supported by MU -IUC project, accordingly two library heads were sent to Belgium Universities to visit their library software experiences. After discussions and observations of different libraries they decided on the choice CDS/ISIS open sources library system that was freely available by UNESCO. Mekelle university library Director added that the selection of integrated library management system was done with the help of the project members of Belgium Professors.

The library installed CDS/WINISIS version and organized training for cataloguers, data entry and system administrator and then the library started data enter into the system side by side the library request the purchase of desk top computers for users online public access catalogue (OPAC) services .

After operating for few years, WINISIS, the open source library software developer group of UNESCO released a new version called WEBLIS. Mekelle University library also customized the new version in 2008 into their operation. The data was successfully transferred with technical assistance of Belgium experts. Until these years, OPAC was the only functional services been provided to users. A year later ABCD was developed by BIREME (WHO, Brazil) in collaboration with the Flemish Interuniversity Council of Belgium, and using UNESCO's ISIS database technology. Mekelle University library customized in advance the ABCD integrated library system in 2010 and properly managed the existing data to the new system. The library organized training related with ABCD integrated library modules of cataloging, data enter, circulation, acquisition, serial control and statistical report for library staffs at Mekelle University and abroad.

Mekelle university library Directors and two technical processing staffs mentioned that “currently the library was using new version of ABCD integrated library system, but the only function in the library was only OPAC. Cataloging and circulation services were partially tested. The library also customized Greenstone digital library software and organized softcopy full textbooks, journal articles, theses and teaching modules and made available and accessible to the university community from the library system. In addition to these the libraries systems provided free e-resources journals collaboration with International Network for the Availability of Scientific Publications (INASP).”

The Jimma University library Director and two technical processing staff mentioned that: “the library started integrated library management system since 2006. The university library took previous experience of Mekelle University IUC library project to perform different activities of library automation as an input. The library sent four staffs to MU for participated training on open sources integrated library management system and the team also learnt how MU libraries implemented WEBLIS library system.”

The Director said that “Jimma university library was a member of JU - IUC project. Based on the aim of the project the library did various activities. One of the main objectives of the library

was to upgrade the services system of the library using information technology. Thus the library currently uses ABCD integrated library system for in - house operation, while Greenstone digital library and DSpace for institutional repository were customized and properly installed. At this time the library integrated different library functions that included cataloging and OPAC were accurately automated and provides services to users. While circulation and serial control are having partial implementation, and the acquisition part of the system is not yet tested.”

Interviewees were asked the role of their university colleges; departments and IT center in their libraries systems. The library Directors of both universities said that “nowadays Information and Communication Technology (ICT) play a great role in public and private organizations to facilitate the operations of different activities. Like other service provider sectors, libraries also embrace and adopted ICT in order to manage in - house operations and provide efficiently, rapidly, and adequately and quality services. Based on this fact the contribution of Mekelle and Jimma Universities IT center was significant by installing network cable, wireless access point, installed operating systems for server and other IT infrastructures.”

Regarding colleges and department’s contribution to the current library system, the researcher found that there was variation from department to department. Some colleges have good participation on sending of softcopy textbooks, teaching modules, research articles and giving valuable comments on services provided by libraries. On the other hand some colleges were not actively participating. So the contribution was dependent on individual commitments and willingness.

The interviewees were asked a question about human capacity and participation on integrated library system development of Mekelle and Jimma Universities libraries staff. The library directors and technical processing staff’s responses reflect that “most of the staffs have diploma in information technology and some of them are degree in information science and related field of study. Very few numbers of staff have master’s degree.” The respondents said that “the libraries have lack of technical experts especially in library automation and digitization activities.” Comparing Jimma and Mekelle University libraries staff on academic status and assignment of technical staff on automation activities, Jimma University has better staff than

Mekelle; Mekelle University currently has only one staff with master degree in information science. Concerning the participation of staff on library automation the activities of the library was supported by VLIR-IUC project in both universities the project gave more value on capacity building through short and long term training on ABCD library system as a result library staff attended training in - house and abroad.

The respondents stated that “the libraries have more than three hundred staff so it required more time and money to give detailed training on ABCD; because of this the training mainly focused on awareness creation.” That “only very few number of staff those who work in technical processing and digital library participated in continuous training with the implementation progress of integrated library system.” The library Directors concluded that “training and experience sharing for library staffs were provided in the past seven years.”

During the interview a question was asked to library Directors and technical processing staffs their opinion on current existing integrated library system satisfaction of users need. Response of JU and MU indicated that the libraries showed progress on service provision from time to time by providing 7/24 hours service, organized e-resources, and free journals and article web sites, users had access to wireless internet services in addition to this the library had internet lab room in each library. For in- house service operations the libraries used ABCD integrated library system and OPAC) functional properly. Users easily access and know the library collections and the status of the books. Circulation and serial control module of the system had partial functioning. Respondents said that measuring level of users’ satisfaction needed continuous assessment. But from the libraries service facilities and progress as well as comments and a feed back of some users; respondents concluded that users were averagely satisfied with the existing integrated library system.

A Question was asked to library Directors and technical processing staff challenges faced on the application of ABCD open sources integrated library system. Respondents gave the libraries faced challenges of “lack of high skilled digital librarian or experts staff; those who are working in the digital library section - continuous leave the universities, less library budget, less of IT

infrastructures, lack of standards and policy, less participation of ICT center and less support and follow-up of higher officials were the major challenges”.

On challenges regarding ABCD integrated library system, respondents said that the software frequently upgrade its function and released new version thus the librarians were faced with challenges of customization of the new version and transferred the data from old to new, at that time of data budge, some data lost their value. This is because of the erratic power / electricity supply the system used to fail many times as a result data get corrupted and missed some information. Accordingly, data entry / cataloging staffs work on editing and registering again and again. Respondents of Mekelle university library indicated that “after phasing out of MU - IUC library project sustainability of the project activities are in question mark due to lack of budget.”

4.3 Summary of findings

According to the result of the study depicted that Jimma and Mekelle University libraries have used open sources integrated library system which is ABCD, the system is partially implemented only OPAC (Online Public Access Catalogue) were properly functional and users effectively using to search library collections, circulation module of the system is partial working users were not able to renew books online and reserve. Acquisition and serial control of ABCD system was not functional.

In general both university libraries have not standard and written document for selection of open source library software, ABCD library system have all features of library in house operation functions but not fully implemented in their libraries . Librarians were moderately satisfied with the current ABCD system.

Users access library services using wireless and internet lab. At each library, internet facilities are fair and internet speed needs improvement, free e-journal were used, no subscribed journals were available for users, institutional repository was available and have started organizing theses and dissertations for users. The study result showed that users were averagely satisfied with some integrated services facilities in both university libraries.

The finding of the study depicted that Jimma and Mekelle university libraries faced challenges and constraints the implementation of ABCD open sources integrated library system low participation of ICT center, lack of top management support and participation, lack of appropriate fund, weak team spirit and commitment of librarian, the system is continuously updated and update of new version is difficult, constantly system failed or interrupted and inadequate skilled digital librarian. These challenges create difficulty in order to full implementation of ABCD library system in both universities.

4.4. Discussion

4.4.1 Integrated library functions using open sources software

The finding of the present study on the current status of integrated library functions in the universities showed 67% partial automation in both university libraries. Out of the libraries services functions, cataloguing and Online Public Access Catalog have been fully functional, while circulation and serial control are partially working; the acquisition services are not yet tested. This shows that both university libraries' ABCD integrated library system implementation activities are still ongoing. The finding shows that in both universities only OPAC is effectively providing services for their users. The comparison of the implementation status of ABCD integrated library system between universities was explained under table 4.20 and figure 4.14, which showed that the overall automation statuses in Jimma university library is better than Mekelle university library.

Academic staff and Students opinions on ABCD library system issues related with basic search and usefulness and user interface functions of the system agreed in these issues. But respondents disagreed with stability, spelling error check, linking and remote access. This means that users disagreed in most functions of the library system. Regarding circulation services facilities like fast and ease to borrow library resources, online renewal of books and e-mail feedback in table 4.10 showed that in most services respondents disagreed. This indicated that users have not got effective and proper services from the current integrated library systems in both universities.

Regarding ABCD data entry module of the system the study found in table 4.19 showed that 75% of respondents indicated that the data enter system modules were very good. This implies

that the data entry and cataloguing staff did their task easily. The study showed in figure 4.9 that majority of respondents indicated that the ABCD system has all features they need; in relation to the overall performance of the universities library integrated system the study result showed in figure 4.14 (46.5%) respondents were averagely satisfied and very few 3% of respondents were very satisfied with the ABCD library system. These indicated that most library staffs are moderately satisfied with the current integrated library system; the finding of this study is in agreement with Ahmed (2006) stated that 44% of private university libraries in Islamabad circulation and cataloging sections were automated. His study was compared public and private universities library automation status the study showed that circulation, acquisition and serial control were partially automated only cataloging and OPAC were functionally automated sections of the public university libraries. Sharma (2007) stated that, majority of the academic libraries 17 (56%) out of 30 used free software CDS/ISIS and WINISIS. Only 9 (30%) libraries used other commercial software and 5 (16%) used in-house software which have been made by students as their project work for the automation of their library. It is clear that the librarians of public institutions are more conscious and aware about the library automation rather than the librarian of private institutions.

Kiriyamamt (2012) stated in his study survey adoption of open source integrated library system of Thai university libraries in Bangkok and Pathumthani. The survey found that majority of respondents (93.1%) used library automation. From the respondents who currently used library automation, 63% were satisfied whereas 37% were dissatisfied with the library automation system being used. Riewe (2008) pointed out that open source integrated library system more cost effective than proprietary ILSs. Libraries using open source ILSs chose them mainly for affordability, users of open source ILSs experienced difficulties with installation and incomplete documentation, and they were modestly more satisfied than users of proprietary ILS.

Macan (2012) study compared two open source integrated library system (Koha and ABCD), were compared in-depth according to their functionalities and characteristics. A checklist was created for each module acquisition, cataloging, serials, patron management and circulation, reports and statistics, and administration. He also defined an additional set of criteria which could influence the decision process and selection of appropriate ILS like funding, metadata

schema, preferred ILS functionalities, provided support, and the role of the IT department, and computer and network infrastructure in the library. His study result showed that Koha had more functionalities than ABCD, especially those connected with the “next generation library catalog Uzomba (2014) stated in his study that there are various justifications for the adoption of open source software. These includes: User-friendliness, flexibility, re-usability, adaptability, robustness, low cost of purchase, low cost of maintenance, efficiency, unified management, stability, reliability, ability to manage privileges, availability of search options and web based OPAC. The only justification that recorded low frequency of 9 (36%) in this study is supported with the model, which shows one of the arguments against open source software.

4.4.2 Staff capacity use of open source library software

One of the major roles of university library is to organize information sources in different format and provide quality services to the university communities in particular and the societies in general. In order to achieve the objectives of the libraries- hired professionals, adequate and trained library staffs are very essential. The findings of the present study on staff capacity and education level in the universities (66.6%) of technical processing and digital library staffs are first degree holders and few numbers are master holders, table 4.2 indicated that comparing JU and MU libraries, Jimma university library have more master holders than Mekelle University library. Regarding employment period in their libraries majority of respondents have been more than six to ten years of work experience in both university libraries.

The research finding indicated in table 4.15 that training on integrated library system for library staff (86.5%) was participated and majority of respondents were attended training, workshop and experience sharing on library system twice. Table 4.11 showed that the level of awareness and familiarity with ABCD library system most respondents are familiar, very few numbers 13% of respondents were not familiar with integrated library system of their libraries. This study is in agreement with these, Samuels and Griffy (2012) indicated in their study 36% first degree in library Science and (10%) were master’s degree holders in library and Information Science (27%) diploma library science holders. majority of the respondents were attended training once.

Chakraborty and Maisal (2005) in their study have revealed that library automation and networking do not depend only on the capacity of the computer or the networking server or even the software used since they are only tools. Much were found to depend on the quality of manpower of the libraries and the perfection of the work they do, librarians and library staff must arm themselves with the necessary skills in the use of various software packages. They concluded that training offered for librarians were not satisfied with the programmes because it was irregular. (Breeding, 2009) stated that human expertise has always been, and will remain as one of a library's greatest assets. Thus, recognizing that staff and their collective knowledge is key in academic libraries is an important first step in promoting opportunities for staff to reach their full potential through well designed human resource development plans and training. Parvez (2011) noted that major portion of training were conducted for few days only as more than 57% training were conducted for one day and 24% training were conducted for two days. This may be due to finances involved in the arrangement for residence of employees. Time constraints and institutional hindrances may also have hampered the conduct of long training sessions.

4.4.3 Users service facilities and access of information sources using integrated library system

On the basis of analysis and interpretation of collected data from respondents, it is clear that most of the respondents from both universities have good computer literacy as per their own assessment. Majority of respondents have experience on use of integrated library services table 4.7 showed that 80% of respondents have used OPAC effectively and user's manual of OPAC is easy. Concerning circulation services facilities the opinion of users showed. in Table 4.10 that 75% of respondents disagreed with most circulation service delivery using ABCD integrated library system. Respondents disagreed and strongly disagreed with spelling error check, stability and linkage. This study is in agreement with Parvez (2011). He noted that circulation is one of the most affected area of library services, which saved a lot of time of users as well as staff; with the help of web OPAC, users can search information from anywhere at any time; users can easily do the reservation of library sources. Rajput and Gautam (2010) noted that automation enables easy access; that users are able to search for materials within the library and from remote

locations via search items as author, title, subject, and keyword allows staff to better serve users and facilitate a multitude of tasks.

Regarding internet facilitates table 4.4 indicated that 35.5% of respondents of MU and JU replied that the internet services were good, only 5.5% of respondents said that the internet facilities was poor. Concerning internet lab room each library had lab room and 70% of respondents used desktop computer to access automated library services and majority of respondent's computer literacy skill was good. Regarding provision and availability of various e-library resources, the opinion of users (students and academic staff) showed in table 4.13 respondents disagreed on availability of subscribed journals and respondents agreed on the availability of institutional repositories and Library ABCD site was easy to navigate, respondents were neutral for most e-resources services. Concerning retrieval of documents from the integrated library system, figure 4.7 indicated that 34% of respondents replied that fairly successful on retrieval of documents. This study was in agreement with Jange and Samy (2006), which evaluated the use of the Internet as an information source by libraries of National Institutes of Technology in India. It is observed that all the libraries perceived Internet as a communication tool and see it as a supplement to the online library. Among the Internet services, email, online databases and WWW are the most frequently used Internet services by the librarians. The results indicated that, the libraries made use of Internet mainly for identifying latest books and journals in acquisition and serials control activities of library.

4.4.4. Challenges and constraints faced on implementation of open sources integrated library management system

It was found that the major challenges and factors associated with effective implementation of open sources integrated library system as indicated in table 4.17, showed that most respondents agreed and strong agreed on factors like lack of appropriate funding, lack of top management support to the current library system, lack of maintenance support, low participation or contribution of ICT center and inadequate skilled digital librarian as obstacle for effective implementation of open sources library software in both universities. The respondents also agreed and strongly agreed on the following challenges faced; regarding the use of ABCD library

software in both university libraries (See table 4.22), which reflected that repeatedly interrupted and failed in services, data loss, problem on update of new version, lack of system support and maintenance. These challenges have created a problem in both university libraries on the effective use of open source ABCD integrated library system. This study is in agreement with Chisenga (2004) also in a survey of ten countries in Anglophone Africa, which identified the initial challenges facing library automation projects in sub Saharan Africa to include; lack of budgets, inadequate ICT facilities, lack of ICT strategies, low skills levels of users, lack of qualified staff in ICT, lack of commitment by institutional management, and reluctance among staff to use ICT. In a survey of the status of university libraries by Tamilnadu, et al. (2011) identified paucity of funds for initiating computerization, lack of trained staff, hesitancy in learning computer, and lack of administrative support as pre-implementation challenges.

Uzomba (2014) stated in his study major challenges as witnessed from the findings include: Inadequate funding, inadequate managerial support, inadequate power supply, maintenance cost, lack of training and re-training of staff, cost of procurement of the hardware/software, lack of consortium, lack of supervision, proximity to virus, crashing problem, insufficient manpower and compatibility with hardware devices. Chudnov (2005) indicated in his study that most libraries in Africa faced automation problems of lack of funds, reluctance among staff to use ICT, lack of trained staff as well as erratic power supply. On the other hand, few libraries are faced with challenges such as lack of commitment by institutional management, serious technical problems encountered and software not being user friendly. Haider (2007) stated in his study the question now arises, why the desired progress has not been made? There are, in fact, several constraints, in particular the absence of systematic planning for automation; constraints encountered in software and hardware selection; nonexistence of standards; financial limitations and uncertainties; and, most important, lack of willingness and competent human resources.

From the above enumerated challenges faced in Jimma University library system and Mekelle University libraries, the researcher finds it necessary to propose a framework for effective implementation of the ABCD open source library software.

4.4.5 proposed framework for effective implementation of ABCD open sources library system

The estimation of usage of open source software and its impact on libraries is difficult. However, there are several literatures available about success of open source installation in libraries from every corner of the world. In fact some studies show that open source ILS form a significant portion of automation industry (Breedings, 2013) From this result the researcher recommends possible combination of universities departments or sections for effective implementation of open source integrated library system. Open sources library software enables libraries to customized into their compatible system and provide services to users in better ways. In order to fully adapt and effectively implement the open sources integrated library system, librarians must consider the involvement of different stakeholders. The following framework shows that the contribution or involvement of managements, ICT pool center and student affairs for effective and successful use of open source library software.

1. Technical staff: The technical staffs are responsible on technical issues related with library automation come up with compatibility and installation of server operating system, installation and adopted of integrated open source library software code, maintenance, infrastructure of ICT and training on software management etc activities.

- ✓ **Library:** The library should take the initiation and commitment of the library automation project the library first discusses how library automation activities were done in the past and look on the SWOT analysis of the ABCD integrated library implementation process, based on the result the library prepare draft proposal document the document should be organize by the following library staffs library director, technical processing head, digital library head and branch librarians must participate as a team and lead the library director as chair person. The library team also identifies their gap on technical and non technical skill related with library automation how stakeholders will participate and contribute to library automation process.

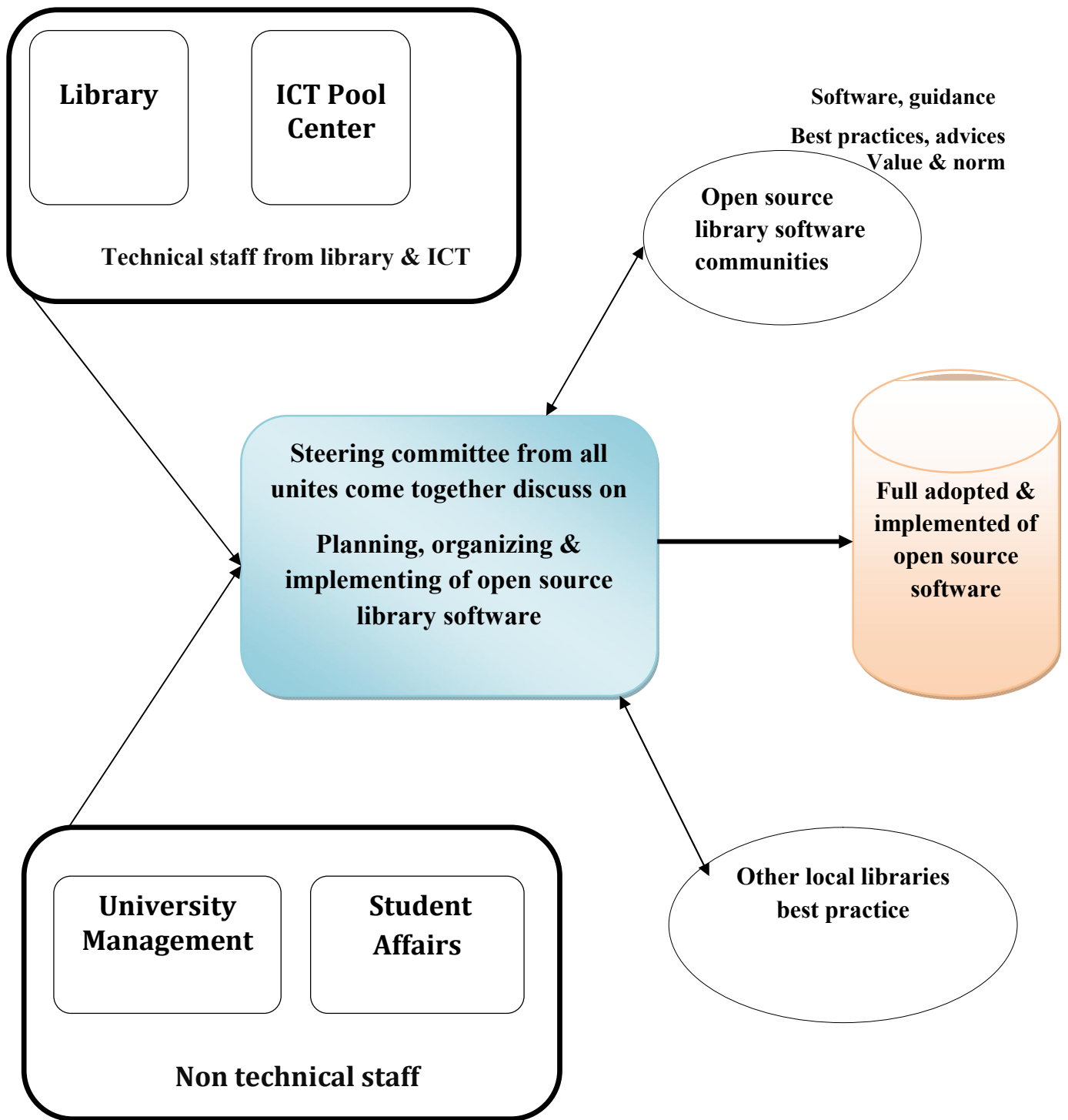


Figure 4.15 Proposed frame works for effective implementation of open Source integrated library software

- ✓ **ICT center:** The ICT center those who are expertise on open source software customization and related experience ICT staff will be selected based on librarians recommendation. After selected the ICT people would be participate on evaluation of the current existing library software, prepare standard guide line of open source library software selection criteria, installation of compatible operating system on server, customization and maintenance will be done collaboration with library staffs.

2. Non technical staffs: the non technical staffs are participating on strategic plan of the library, policy, guidelines and rules and regulations on integrated library management system or library automation.

- ✓ **University Management:** Jimma and Mekelle university libraries worked for long period of time using of open source software to integrate library services. Still the library system is not fully integrated without the direct participation of university administrations; the library system could not effective. So, the involvement of the university management is mandatory. The library automation project is complex tasks starting from planning, selecting appropriate open sources software, implementing and providing services needed actively involvement of top management. The management would participate on monitoring, controlling, budget and material allocation these create good understanding on colleges and department heads and encourage working with libraries. On the other hand librarians are motivated to work and easily address problems faced during the implementation. Therefore, the involvement of top management is very important for effective implementation of integrated library system.
- ✓ **Student affair:** the student affair office is concern on services issue of the university. Students are active users of library services, participation of users would be as an input to the library system. They are participating on awareness creation, rules and regulation and guideline and other related matter on library services and libraries also get feedback on service provision.

- ✓ **Integrated library automation Steering committee:** Both university libraries worked for the past ten years without committee. The digital library section took all responsibilities and tried to implement the automation process, but due to lack of collaboration with different helpful sections the libraries automation project was not effective even after ten years. Thus the formation of a steering committee is very mandatory for full implementation of integrated library system. The researcher tried to develop a framework of library committee as seen above with the responsibilities of the team to oversee the existing library system, planning, selection and implementation of open source integrated library system and other automation projects. The committee should meet once or more every month, depending on the urgency of the business, to review the overall progress of the project, to approve development plans and programmes, and to discuss administrative and technical issues related to the acquisition of software, hardware and other supplies. The successful implementation of the system and its subsequent progress are due to active and effective role played by the university's top management, library management and staff, the ICT center, student affairs and other stakeholders. The steering committee includes technical and non technical staffs those are

Table 4.24: library automation steering committee

S.NO	Committee members	Responsibility	Remark
1	University Academic Vice President	Chair person	1
2	University library director	Secretary	1
3	Digital librarian	Member	2 technical expertise
4	Technical processing librarian	Member	2 technical expertise
5	ICT center	Member	2 technical skilled and expertise
6	Student affairs	Member	3, 1 student center director 2 student representative actively participants in different university committees.

The numbers of steering committees depend on the automation library activities and interest of library, but I suggest at least the above mentioned number would be included in the committee.

CHAPTER FIVE

5. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Integrated library systems (ILS) are multifunction, adaptable software applications that allow libraries to manage, catalog and circulate their materials to patrons. 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. A library management system refers to the implementation of software that has been developed to handle the basic housekeeping functions of a library. OSS are becoming more and more user friendly through incorporating various features like easy and integrated access interface, searching and self service facilities. The goal of this study was focused on investigating the status of open sources integrated library management system implementation at Jimma and Mekelle university libraries. The researcher tried to address the current services facilities using open sources library system, status of ABCD integrated library and challenges and factors affecting implementation of open sources integrated library system. According to the research analysis ABCD library system is partially implemented in both university libraries. Catalogers properly entered data in to the system and OPAC was part of the library operation that was effectively functional and users were to search library collections and access services remotely. Circulation part of the system was partially working. On the other hand acquisition and serial control part of the system was not yet functional. Majority of respondents used ABCD library database once in a week and some times, small numbers of library users visit daily.

It can also be concluded that users agreed and averagely satisfied with OPAC services, facilities of the ABCD library system and claimed or disagreed with circulation services facilities. Most respondents indicated that they were not able to renew books online and the system was continuous interrupted/failed. The finding of the study concluded that different challenges have

occurred during the set up of the ABCD open source integrated library system due to these factors and challenges the library system was not fully implemented and functional; as a result users did not obtain complete services. Even if the integrated library system was partially implemented in both university libraries Jimma university library bit better in performance than Mekelle University library.

In general Jimma and Mekelle university libraries tried to upgrade and automate their library services facilities using open sources software and the libraries have ICT infrastructure facilities wireless and wired internet rooms. Both university libraries organized some free e-resources collaboration with International Network for the Availability of Scientific Publications (INASP) e-journals are available and the institutional repository tried to hold different masters theses and dissertation as well as e-books accessible to users but the collection was very few. Respondents had good computer skills; so orientation and training on information searching and how users were able to access information resources from library will be essential. Based on the challenges the researcher concluded by advancing a framework for effective implementation of the ABCD open source in both JU and MU libraries.

5.2. Recommendation

Based on the conclusions drawn from the findings of the study, the researcher forwarded the following recommendations for effective implementation of ABCD open sources integrated library system in both JU and MU libraries.

Open sources library software should offer opportunities to libraries to automate their library services. Jimma and Mekelle university libraries have got good opportunities to introduce automation or modern library services with the collaboration of the VLIR - IUC project. The project supports the implementation of ABCD integrated library system for housekeeping library operations and Green stone for digitization. But the study result showed that the system is not yet fully implemented. Thus the librarian should deeply evaluate how previous activities were done and prepare accurate automation planning and standards to accomplish the remaining tasks of their university libraries.

The progress in automation was slow. Both university libraries had taken a long period of time to automate their library functions. The circulation part of the library plays great role in managing all operations; users are unable to borrow/ renewal and return of library resources and do every communication with librarian through it. Thus both university libraries should give emphasis and maintain, customized properly and solve problems on time.

In order to avoid and minimize technical skills gap and effectively as well as efficiently implementation of integrated library system the librarians should work collaboratively with experts of IT pool center of their universities.

Both university libraries should employ adequate number of library staff with appropriate digital library skill needed in meeting with the challenges of providing the necessary services to the users. The libraries should identify the gap and organize specific training for library staffs and assign the right people at the right position.

It is clear that the implementation of open source integrated library system is on the shoulder of the library staff, but one big issue that libraries missed was the involvement of university top managements. The library must involve university managements and working together is mandatory

In order to properly customized open sources library software and provide fast and effective integrated library services, the libraries should have fast internet connection. The librarians should prepare information literacy mechanism on the use of open sources integrated library services. These leads to users obtaining detailed awareness and properly use the ABCD library system.

Libraries should be supported financially, to enable them acquire these necessary ICT facilities. Also, with these funds, adequate training should be provided for the library staff in order to effectively implement integrated library system and provide quality services to the users

Customization of open sources integrated library software needs proper internet services and speed. The libraries should improve their internet connection by increase bandwidth.

In both university libraries services were not effective and system interrupted due to irregular power supply. Therefore, the libraries should provide uninterrupted power supply such as generators, solar system, etc.

A major aspect of the implementation and management of integrated library system is its sustainability. Both university libraries should work on sustainability of their library automation activities.

Finally, Libraries should form collaboration or consortium with each other so as to discuss possible challenges and solutions encountered in the use of open source library software, exchange of experts and sharing of best practices. Through this forum, they can be able to manage the problems that may arise in the use of the software.

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Appendices

Appendix A: Questionnaire for Academic Staff and Student

Dear respondent

I kindly request to participate in this survey that aims to Investigate open source integrated library management system for effective library service in Jimma and Mekelle University libraries. Integrated library management system is the process of managing library services using open sources or commercial library software's, that is facilitate patron's data, cataloguing, circulation, acquisition and OPAC services are organize and provide in one integrated system. The research intends to investigate ABCD Integrated library system and users access of information sources through the system. So, to achieve the goal of the research, getting genuine information on the current situation of the library is vital. Hence you are kindly requested to give genuine answer for the questions presented below. Your confidentiality is assured. Whatever information you provide will be held in confidence and used only for the purpose it is intended. Please tick (√) in the appropriate box

Section A: General information

1. University of respondents

Jimma University Mekelle University

2. What is your gender? Male Female

3. Which best describes you? Please tick √ one box

Academic staff Postgraduate student Undergraduate graduating
class student

Section B: Awareness of users on library automated systems

1. What is the level of your computer literacy?

Excellent Good Poor
 Very good Fair Very poor

2. Do you have an experience to use automated inside your university?

Yes No

3. Which devices do you use? (You may tick ‘√’ one or more answers)

- Laptop _____
 Smart phone Mobile phone others, specify-----

4. How often do you use your University library database or ABCD software?

- Daily 2-3 time in a week
 Once in a week occasionally

5. What is the level of internet connectivity in your university libraries?

- Excellent Good Poor
 Very good Fair Very poor

6. How did you learn to handle or use the automated services of the libraries?

- Training /orientation from university library Self instruction
 Guidance from colleagues and friends any others _____
 External courses

Section C: use of ABCD Online Public Access Catalogue (OPAC)

7. Please indicate the extent to which you agree or disagree each of the following statements on Online Public Access Catalogue (OPAC): putting tick (√) mark in the appropriate box.

NO	Statements	Strongly agree	Agree	Strongly disagree	Disagree	Not sure
1	User interface/ friendly					
2	Integrity/interoperability					
3	Stability					
4	Reliability/ usefulness					
5	Spelling error check					
6	Basic search					
7	Easy to access remotely					

8. How do you access your library (Online Public Access Catalogue) OPAC?

- Stand alone system only library premises/ building
 Campus network wide area network

9. Are the Online Public Access Catalogue (OPAC) user's manual where available, clear and easy to use?

Very easy Easy Not so easy Difficult Not sure

10. How do you rate the search facility in your library OPAC? Putting a tick (✓) mark in the appropriate box

NO	OPAC search facility	Excellent	Very-Good	Good	Average	Below-Average
i	Author search facility					
ii	Title search facility					
iii	Search by keyword combined					
iv	Search by subject					
v	Search by using Boolean Operators					

11. To what extent do you agree or disagree about the following facilities of circulation services (Tick ✓ in the appropriate box)

NO	Statement	strongly disagree	disagree	undecided	agree	strongly agree
1	fast and ease browsing of library resources					
2	Online renewal of books					
3	Ease to return library resources/ books					
4	fast Overdue fine fee					
5	Ease to reserve reference books					
6	fast e-mail feedback					

12. if you searched library systems to retrieve documents, how successful was this?

Very successful not very successful
 Fair successful Not at all

13. Do you think that some orientation/workshop is essential to use automated library services?

- Very essential Essential
 Least essential Not essential

Section E: Integrated Library Services facilities

14. To what extent do you agree or disagree about the following facilities and support conditions of integrated library service at your institution (Tick \checkmark in the appropriate box)

No	Statement	strongly agree	agree	undecided	disagree	strongly disagree
1	Library has sufficient subscribed journals					
2	Library has enough e-information resource					
3	The available institutional repository system					
4	Services are accessed from any location					
5	The availability of internet service lab					
6	Linkage with various sources of information					
7	Ease of communication with library staffs					
8	Fast and easily download of e-resources					
9	The library ABCD site is easy to navigate					

What area of the library automated services would you like to be improved?

Thank you for your co-operation

APPENDIX: B

QUESTIONNAIRE FOR LIBRARY STAFFS

Dear respondent

I kindly request to participate in this survey that aims to Investigate open source integrated library management system for effective library service in Jimma and Mekelle University libraries. Integrated library management system is the process of managing library services using open sources or commercial library software's, that is facilitate patron's data, cataloguing, circulation, acquisition and OPAC services are organize and provide in one integrated system. The research intends to investigate ABCD Integrated library system and users access of information sources through the system. So, to achieve the goal of the research, getting genuine information on the current situation of the library is vital. Hence you are kindly requested to give genuine answer for the questions presented below. Your confidentiality is assured. Whatever information you provide will be held in confidence and used only for the purpose it is intended. Please tick (✓) in the appropriate box

Section I: General information

1. University of respondents

Jimma university Mekelle University

2. What is your gender? Male Female

3. Educational status

Certificate BSc/BA
 Diploma MSc/MA and above

4. What is your position/role in the library?

Library director Head of cataloging & classification
 Head of acquisition Head of digital library
 Head of library section System development coordinator

Others please specify _____

5. How long have you been employed in the library?

- Less than 1 year 1 - 2 years
 3 - 5 years 6 - 10 years
 More than 10 years

Section II. Library staffs awareness on ABCD integrated library system

1. What is the level of Internet connectivity for users to use in the university library?

- Excellent Good Poor
 Very good Fair Very poor

2. Please indicate your familiarity with ABCD library software?

- Very familiar somewhat familiar
 Familiar not at all

3. Do you obtain training in ABCD integrated library management system?

- Yes No

If your answer is yes how many times you participate?

- 1- Time 2 - Times
3- Times 4- Times 5 and above times

If your answer is No, what is the reasons _____?

4. What criteria do you consider in selecting of library software? Please choose as many as possible answers

- Cost of system Accessibility of the vendor/distributor
 Distributor's reputation Ease of use
 Flexibility and versatility of the software Interface and integration
 Number of years the software has been in market Maintenance
 Support that vendor /distributor provides
 Rating of the software given by a recognized institution/body
 Reputation of the originator of the library software
 Technical considerations and compatibility with the operating system available in the library

Others (please specify) _____

5. Is your Library system integrated /automated?

Yes NO

If yes what is the present status of automation?

Full automated partially automated Initial stage

6. What operations of the library are integrated / automated? (Tick as many as apply)

Acquisition Cataloging
 Circulation OPAC /search
 Serial control Reference

7. How long have your library operations been integrated/ automated?

Less than a year 1 – 2 years 3-4 years 5 years and above

Section III: Implementation status of ABCD integrated library system

8. Please check \sqrt what percentages of your following library operations are automated?

i.	Acquisition	100% _____	75% _____	50% _____	25% _____	None _____
ii.	Cataloging	100% _____	75% _____	50% _____	25% _____	None _____
iii.	Circulation	100% _____	75% _____	50% _____	25% _____	None _____
iv.	OPAC /search	100% _____	75% _____	50% _____	25% _____	None _____
v.	Serial control	100% _____	75% _____	50% _____	25% _____	None _____
vi.	Report generation	100% _____	75% _____	50% _____	25% _____	None _____
vii.	Overall automation	100% _____	75% _____	50% _____	25% _____	None _____

9. How ABCD integrated library system is effective for data entry?

Good Very good Excellent
 Poor Very poor

10. How ABCD integrated library system is effective for circulation control?

Good Very good Excellent
 Poor Very Poor

NO	Factors	5	4	3	2	1
1	Inadequate funding					
2	Insufficient of ICT infrastructure					
3	Low participation of ICT center					
4	Inadequate skilled digital librarian					
5	Lack of feasibility study on the current open source software					
6	Lack of top management support to the library system					
7	Irregular Power supply					

Strongly agree=5, Agree=4, Neutral=3, Disagree=2 and strongly disagree=1

11. How would you rate the completeness features of ABCD circulation and patron accounts modules?

- Lacks all features we need has some but lacks some
 Lacks most features we need has most features we need
 has all features we need don't know

12. Regarding ABCD ILS's OPAC search engine, how would you rate its ease of use?

- Very hard to use somewhat hard to use
 Neither easy nor hard somewhat easy to use
 Very easy to use

13. Please indicate the extent to which you agree or disagree with the following factors affecting the implementation of open source integrated library system by putting a tick (✓) mark in the appropriate box.

14. Are you satisfied with ABCD integrated library system currently used, in terms of Efficiency, effectiveness and maintenance (Please tick)

- Satisfied with the integrated library system (please answer question no. (14.1)
 Not satisfied with the integrated library system (Please answer question no. (14.2)

14.1 You are satisfied with the current integrated library system for the following reason(s). (You can have more than one reason.)

- Easy to use
- Customizable
- No additional charge when the library needs to upgrade upon availability of new release.
- Availability of training and documentation modules
- Availability of application module
- The system is flexible and additional functions can be added as required by the library.
- Interoperability
- Others (please specify) _____

14.2 You are not satisfied with the integrated library system currently used for the following reason(s). (You can have more than one reason.)

- Difficult to fully implement and use
- Difficult to customize
- There is additional charge if the library needs upgrading when a new release is available.
- System problems have not been dealt with promptly by the software company.
- The integrated library system is not flexible additional functions cannot be added as required by the library.
- No guarantee of quality or fitness
- Others (please specify) _____

Section IV: problems faced library staffs in integrated library system (ABCD)

15. Problems do you face with ABCD (ILS) library software? To what extents are you agree or disagree with these problems. (Please rate in five point scale (√)

1- Strongly agree, 2- agree, 3 - Neutral, 4 - disagree, 5 - strongly disagree

NO	Challenges	1	2	3	4	5
1	Lapse/failed in service					
2	Data loss					
3	Problem with Cataloging module					
4	Security (Viruses /worm problems)					
5	More technical ability needed					
6	Lack of system support and maintenance					
7	Lack of Training and documentation					
8	Problem on update of new version					

16. Please rate the overall performance of ABCD library software you are using.

- Extremely satisfactory (96-100) Very satisfactory (90-95)
 Moderately satisfactory (75-79%) Unsatisfactory (74 and below)

If you have any further suggestion for the improvement, development and recommendation of ABCD open source library software, please mention briefly

Thank you for your co-operation

Appendix: C

Interview Questions for Library Directors and Technical Processing Service Heads

1. When your library system was starting integrated library services?
2. What type of software your library use?
3. How do you select the software your library currently uses?
 - i. Who participating the selection of the software?
 - ii. Do you have any standards and criteria to select library software?
 - iii. Do you think your library software feasible to integrate all library sections/ services?
4. Which library services are integrated?
5. How do you see current status of your library systems?
6. What do you think support and participation of ICT, Colleges and Management of the university to your library systems?
 - a) What is the role of ICT center of the university in your library systems?
 - b) How Colleges and Departments are participating in your library systems?
 - c) How university managements involved in your automated library system?
7. What do you think training and capacity building of library staffs on ABCD library software?
8. Do you think your integrated library system satisfied users need?
9. What are the difficulties faced in your integrated library system?

Observation Check List

NO	Function of ABCD Module	Yes	No	Remark
1	Data entry / cataloguing module			
2	Circulation module			
3	Acquisition module			
4	OPAC module			
5	Content management module / site			
	Services			
6	Availability and usability of Internet connection			
7	Library resources provision			
8	Availability of e-library system			
9	Availability / accessibility of digital library			
10	Availability / accessibility of institutional repository			
11	Availability of desk top computer internet connectivity for students in the library			
12	Availability of social network such as e-mail , web social media			
13	Enough ICT infrastructure			
14	Status of internet /portal			
15	system fully integrated			
16	Skill and man power			