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Full Length Research Paper

A study of the level of awareness, extent of use, challenges and prospects of the use of open source software in Nigerian libraries

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This descriptive survey study was conducted with the main objective of identifying the level of awareness, extent of use, challenges and prospects of the use of open source software in Nigerian libraries. Questionnaire was the main instrument used for data collection. The data collected was subjected to descriptive statistical analysis using simple percentages and frequency counts. The result of the study which listed 19 different OSS revealed that most librarians in Nigeria have limited awareness on the availability of the varying OSS hence, do not significantly utilize them in their libraries. Out of the 42 libraries involved in the study, only 7 are presently using CD/ISIS while 5 others utilize KOHA. The study also identified some inhibitors to include that the management does not see the use of the software in those sections as relevant (54.8%), fear of service support problems (64.3%), and unavailability of Internet access in the libraries to enable downloading of software 61.9%. Recommendations such as embracing the "Sister Libraries" programme, engaging in continued professional development, joining concerned software's user group and contacting colleagues who are knowledgeable about the software were made.

Keywords: Open Source Software, Library services provision, Software awareness, Availability, Utilization, Nigeria.

INTRODUCTION

The 21st century has ushered in a lot of changes in the way library and information services are carried out. Library profession is now at a crossroad as traditional library services appear to be on the decline while new technology-based services are on the rise as a result of the adoption of software in the management and service provision of libraries. Over the years, library practice in Nigeria as in other African countries has had an endless pioneering effort aimed at achieving progress and effectiveness. The quest to completely satisfy the varying needs of library and information users has always been hindered primarily by insufficient fund required for the procurement of resources as well as facilities needed for efficient service provision to the users. During the era proceeding the advent and development of Open Source Software, it was universally recognized that very few libraries were able to acquire software as a result of their overall high cost.

Presently, access and acquisition of these software are achieved with little or no fund via the Open Source Software Initiative. The advent and development of Open Source Software in the present age, has made the transition from "traditional" to "technology based" library services which gives room for more efficient service provision very easy and cost effective hence, libraries are now adopting them in their technical services, digitization processes, and general library content management. A study conducted by Glance, Kerr and Reid (2004) on the extent of use of OSS by Tertiary Education Institutions TEIs in Australia, New Zealand and UK revealed that all the TEIs who responded to the survey were already using OSS in their services provision.

This feat is yet to be achieved in Nigeria and many other developing nations as revealed from interaction with colleagues during five different conferences and workshops attended in Nigeria between May and

November, 2010. These revealed that Librarians know very little about availability of the varying OSS as well as their uses. From extensive literature search also conducted, the result showed that no research had been undertaken to examine the awareness of librarians, the status, progress, prospect and challenges of the use of Open Source Software with specific reference to Nigerian libraries. Hence, this study was designed to overcome this apparent gap.

Objectives of the study

1. To find out the level of awareness of Open Source Software by the respondents.
2. To find out the varying open source software that are available in Nigerian libraries
3. To determine the extent of use of open source software by libraries in Nigeria
4. To identify factors inhibiting the optimal utilization of open source software in the service delivery of libraries where they are presently available
5. To establish issues related to non-utilization of open source software in libraries where they are not patronized at all
6. To make recommendation based on the outcome of the study

Conceptualization of Open Source Software

Open Source Software is not a brand of software, but a philosophy of software development. Several definitions abound in relation to the concept of Open Source Software. According to Wikipedia (2010) Open-source software (OSS) is computer software that is available in source code form for which the source code and certain other rights normally reserved for copyright holders are provided under a software license that permits users to study, change, and improve the software. Perens (2000) who in February 1998 founded the Open Source Initiative (OSI) alongside Eric S. Raymond , describes open source software as a broad general type of software license that makes source code available to the general public with relaxed or non-existent copyright restrictions. In the terms of Engard (2011) open source usually refers to an application whose source code is made available for use or modification in line with users' needs and requirements while Global Investment Recovery defines Open Source Software as an operating system and/or applications software for which the code is open for alteration by the public. From the forgoing, OSS are computer software that are produced by Programmers and distributed under a licensing arrangement which allows the source code to be openly shared, viewed and modified by others to suit their purpose of usage. They are programs whose licenses give users the freedom to run the program for any purpose, to study and modify the program, and to redistribute copies of either the original or modified program (without having to pay royalties to previous developers) (Wheeler, 2007).

Open Source Software offers more flexibility and freedom than software purchased with license restrictions. Both the OSS programmers and the user community share and promote open standards and believe in sharing. Open source software are very often developed in a public, collaborative manner. These software often provide greater freedom of choice and are considered by many as more cost-effective as little or nothing is usually paid for their acquisition. Although certain costs are associated with OSS such as the cost of technical support, training and further development, it is argued that OSS remains less expensive than many proprietary choices. However, the major reason to choose an OSS application is the freedom it confers to change the source code for individual requirements. It gives room for alteration of the program to suit your purpose. This is the reason why a software can be utilized for varying services once it is modified to suit those purposes. Other terms that are interchangeably used with OSS include “libre software” (where libre means free as in freedom), and “Free Software (FS). It is worthy to note that these terms are however slightly different from OSS as they connote “free software that cannot be modified and redistributed without further limitation, but whose source code is visible”. In other words, libre and free software are software which even though they are distributed with their source code and without any fee attached, restricts modification and redistribution.

Characteristics of Open Source Software

Open Source Software are known with some Characteristics which make it distinct from proprietary software. According to gbdirect (2011) the characteristics include:

Source Code

These software come with the source code, and allows distribution of same. Where some form of the product is not distributed with the source code, there is a well-publicized means of obtaining the source code which is usually downloading it via the Internet without charge. The source code is provided in the form in which a programmer would be able to modify the program. Obscure source codes or Intermediate forms such as the output of a preprocessor or translator are not allowed for OSS.

Free Redistribution

The license does not restrict any party from redistributing or giving away the software as a component of an aggregate software distribution containing programs from several different sources. The license does not require a royalty or other fee for such distribution.

Derived Works

The license allows modifications and derived works, and also allows them to be distributed under the same terms as the license of the original software.

No Discrimination against Persons, Groups and **Fields of Endeavor**

The license does not discriminate against any person or group of persons. It does not also restrict anyone from making use of the program in a specific field of endeavor. For example, it does not restrict the program from being used in a business, or from being used for genetic research. It is meant for everyone and, in every field of endeavor.

License Must Not Restrict Other Software

The license does not place restrictions on other software that is distributed along with the licensed software. For example, the license does not insist that all other programs distributed on the same medium must be open-source software.

License Must Be Technology-Neutral

The provision of the license is never predicated on any individual technology or style of interface.

Benefits of Using Open Source Software

The benefits that motivated the use and development of open source software are numerous and mixed. This benefit ranges from philosophical and ethical reasons to pure practical issues. For the purpose of this work, we shall be concentrating on the practical issues which are summarized by Gonzalez-Barahona (2000) as follow:

Reliability

Open Source Software could be said to be reliable because it does not manifest defects which can cause incorrect operation, data loss, sudden failures, or failure to meet specification or appropriate published standards which is generally termed as ‘bug’. This is not to say that problems are never encountered with the use of OSS but, each problem is usually addressed with speedy fixes, a process which is undoubtedly assisted by the availability of the source code. Hence, Open Source advocates claim very rapid time-to-fix characteristics for software. The pattern with closed-source software is typically that a defect report needs to be filed and then there will be a delay before the vendor determines when or whether to issue an updated release. Users of the closed-source software are much more at the mercy of the vendor's internal processes than with the Open Source arrangement.

Stability

Proprietary Software vendors can apply a number of tactics to persuade their customers to upgrade more or less willingly. Typical tactics include moving to allegedly new and improved file formats (which require the new and improved software to read them) or to withdraw support and bug fixes for older versions after a short period. The problem for users of such software is that they rarely have much control over that process and are left isolated if they choose to remain with the older versions. This has cost and control implications for the business whereas with OSS, the worst effects of vendor-push can be mitigated. Having access to the source code can allow a business to choose to support itself on an old version where necessary thereby giving more options and choice to the users.

Auditability

A rarely-understood benefit of Open Source software (any software where the source code is published) is its auditability. Closed-source software forces its users to trust the vendor when claims are made for qualities such as security, freedom from backdoors, adherence to standards and flexibility in the face of future changes. If the source code is not available, those claims remain simply claims. By publishing the source code, authors make it possible for users of the software to have confidence that there is a basis for those claims. Without access to the source, third party inspection is impossible.

Cost

Most Open Source software are provided free of royalties and fees. Administrative overhead cost is drastically minimal as there is no cost attached to number of copies in use, unlike when proprietary software is used. There is

Table 1. Official Status of respondents

Official Status	Frequency	Percentage
Deputy Librarian	5	12
Principal Librarian	9	21.4
Senior Librarian	11	26.2
Librarian I	4	9.5
Librarian II	9	21.4
Assistant Librarian	4	9.5
Total	**42**	**100%**

also lower management cost as no upgrade fees are incurred. Near-zero vulnerability to viruses eliminating need for virus checking, data loss and downtime

Flexibility and Freedom

This software is flexibility as it gives users opportunity to be able to choose solutions suitable for their needs. Open Source software offers its users greater freedom to purchase other products, avoiding lock-in to particular manufacturers. Freedom from a single vendor and freedom to modify your software

METHODOLOGY

This study adopted the descriptive survey design. Questionnaire which was the main instrument used for data collection was administered during a workshop organized by the Cataloguing, Classification and Indexing section of Nigerian Library Association held at Akure, Ondo state in October, 2010. The choice of this venue as a place for questionnaire administration was made following the fact that this workshop draws participants from various kinds of libraries from all over Nigeria. The researcher believed that getting information relating to operations and services of the libraries can easily be achieved at such a gathering.

A self-developed questionnaire tagged Awareness and Use of Open Source Software in Libraries (AUOSSL) was used for data collection. The questionnaire was divided into five sections. Section A elicited information on the background of the respondents with questions such as name of institution, state location of institution, educational qualification, gender and official status. Section B explored information on the awareness of the existence of OSS while Section C concentrated on the use of these software in the libraries. Section D concentrated on identifying inhibitor to the optimal utilization of these software in the overall library services while Section E sought responses on factors responsible for non-utilization of these software at all in library services. The data collected was subjected to descriptive statistical analysis using percentages and frequency counts.

Findings of study

Questionnaire distribution pattern

A total number of seventy (70) copies of the questionnaire were administered out of which fifty-eight (58) were returned. On examination, it was found out that the fifty-eight (58) returned questionnaires were representing forty-two different libraries in Nigeria, implying that information on some libraries were duplicated as more than one participant was sponsored by such libraries. This left the study with forty-two (42) usable questionnaires. The data collected was subjected to descriptive statistical analysis using percentages and frequency counts. (See Table 1 for the tabular illustration of the official status of respondents).

The official status of the respondents presented in the table above indicates that they are all professional librarians and as such cannot be ignorant of services and facilities being utilized in the services provision of their libraries. By implication, any information obtained from this category of staff should be taken to be valid.

Open Source Software awareness and availability in libraries

To ascertain the level of awareness and availability of OSS in Nigerian libraries, the respondents were asked to identify from nineteen (19) OSS listed by the researcher, the ones that they are aware of their existence, the purposes for which they are meant for as well as their availability in the library. Their responses are tabulated in Table 2 below:

The result showed that over 90% of the entire respondents indicated that out of the 19 OSS listed, they are totally unaware of the existence of 11 which include; Eprints, Joomla, Drupal, Plone, KOfice, Evergreen, Chrome, PHP, Perl, Python and Jabber while CD/ISIS which received the highest awareness and availability

Table 2. Response on Open Source Software awareness and availability in the libraries.

Open source software	Aware of existence		Knows what it is used for		Presently available in my library		Not aware of its existence	
	F	%	F	%	F	%	F	%
Greenstone	12	28.6	3	7.1	3	7.1	24	57.2
DSpace	2	4.8	5	11.9	2	4.8	33	78.5
Fedora	2	4.8	3	7.1	-	-	37	88.1
Eprints	1	2.4	-	-	1	2.4	40	95.2
Joomla	1	2.4	2	4.8	-	-	39	92.8
Drupal	1	2.4	2	4.8	-	-	39	92.8
Plone	2	4.8	1	2.4	-	-	39	92.8
Open Office	4	9.6	3	7.1	1	2.4	34	80.9
KOffice	-	-	2	4.8	-	-	40	95.2
KOHA	5	11.9	7	16.7	5	11.9	25	59.5
Evergreen	3	7.1	1	2.4	-	-	38	90.5
ABCD	2	4.8	2	4.8	-	-	38	90.5
CD/ISIS	11	26.2	6	14.3	7	16.7	18	42.8
Firefox	12	28.6	2	4.8	4	9.6	24	57.1
Chrome	4	9.6	-	-	-	-	38	90.5
PHP	4	9.6	-	-	-	-	38	90.5
Perl	-	-	-	-	-	-	42	100
Python	-	-	1	2.4	-	-	41	97.6
jabber	1	2.4	-	-	-	-	41	97.6

Key: F= Frequency, %= Percentage

rate in the libraries got 26.2% and 16.7% respectively for awareness and availability. A number of 5 (11.9%) libraries accepted that KOHA, which is an Integrated Library System is available in their libraries while 3 (7.1%) other libraries indicated the availability of Greenstone, a digitization software in their own libraries. DSpace is available in only two libraries while Openoffice and Eprints are available each in a library. The implication of the outcome of this finding is that most of the libraries in Nigeria lack adequate knowledge and awareness on the existence of these software.

Extent of use of open source software by libraries

To determine the extent of the use of Open source Software in the libraries, the researcher grouped the software into Digital/Content Management and Integrated Library Systems and requested the respondents to select from the options; “Creation of Collection”, “Uploading collection to be accessed within the library”, “Uploading collection to the Web” and, “Not being used at all”. For the Integrated Library Systems, the respondents were requested to indicate the sectional services to which the four listed Integrated Library Systems (ILSs) are presently being put to use in their libraries. Their responses are provided in Table 3 below.

The result reveals an average of 97.3% not being used acceptance by the respondents. Two libraries (4.8%) accepted that they are presently utilizing Greenstone in uploading their collection to the web while a library (2.4%) indicated similar use for DSpace. The use of Joomla and Eprints in uploading collection to be accessed within the library was each indicated by a library.

Sectional services to which Integrated Library Systems (ILSs) are being presently put to.

The table below illustrates responses on sectional services to which these Integrated Library Systems (ILSs) are being presently put to use in Nigerian libraries.

The result shows that 2 (4.8%) libraries presently use KOHA for cataloguing only while 3 (7.1%) libraries use it for both cataloguing and circulation and, 2 (4.8%) other libraries use it in their Serials section. CD/ISIS is being used by 4 (9.6%) libraries for both cataloguing and circulation while 3 (7.1%) other libraries indicated that they presently use it in all their library sections. Evergreen and ABCD is presently not being used by any of the libraries

Factors responsible for non use of the software for all the services

To achieve the objective of identifying factors inhibiting the optimal utilization of open source software in the

Table 3. Response on extent of use of Digital/Content Management Open Soft Software in libraries.

Digital/Content Management OSS	Creation of Collection		Uploading collection to be accessed within the library		Uploading collection to the Web		Not being used at all	
	F	%	F	%	F	%	F	%
Greenstone	-	-	1	2.4	2	4.8	39	92.8
DSpace	-	-	2	4.8	1	2.4	39	92.8
Fedora	-	-	-	-	-	-	42	100
Eprints	-	-	1	2.4	-	-	41	97.6
Joomla	-	-	1	2.4	-	-	41	97.6
Drupal	-	-	-	-	-	-	42	100
Plone	-	-	-	-	-	-	42	100

Table 4. Response on sectional services to which these Integrated Library Systems (ILSs) are being presently put to use in Nigerian libraries.

Integrated Library Software	Cataloguing only		Cataloguing and Circulation		Serials		Acquisition		All of them		None at all	
	F	%	F	%	F	%	F	%	F	%	F	%
KOHA	2	4.8	3	7.1	2	4.8	1	2.4	1	2.4	37	88.1
Evergreen	-	-	-	-	-	-	-	-	-	-	42	100
ABCD	-	-	-	-	-	-	-	-	-	-	42	100
CD/ISIS	1	2.4	4	9.6	1	2.4	1	2.4	3	7.1	34	80.9

service delivery of libraries, the respondents were asked to identify the factors responsible for non use of the software for all the services/sections in the library. Their responses are tabulated below.

The result reveals that more than 50% of the entire respondents did not identify any factor as being responsible for their not utilizing the software in all their library services. On the other hand, the highest percentage (23.8%) that actually identified some factors pointed their fingers at lack of knowledge on how to use the software for the other services where they are not presently being utilized. Management not seeing the need to use the software in the sections where they are not presently being utilized was indicated by 19% of the respondents while 14.3% others stated that relevant provision is not made for the other services by the software being presently used in their library.

Issues related to non-utilization of open source software in libraries

To find out the reasons why most libraries are yet to commence the use of OSS in their libraries, the researcher requested the respondents to identify the factors responsible for non-utilization of OSS in their libraries. Their responses are provided in the table below. A total number of 9 respondents being 21.4% of the entire population did not give any response. While 61.9% of the respondents stated that their problem has to do with unavailability of Internet access, 16.7% declined to this. Fear of replacement of software by a newer version received 71.4% acceptance, fear of service support problems received 64.3% and, inadequate ICT skill required for the adoption and utilization of the software was indicated by 52.3% of the respondents. Sporadic evolution of software was accepted by 64.3% of the population as a factor while lack of awareness on the existence of the software was acknowledged by 50% of the entire population. On the other hand, 3 respondents indicated that proposals on installment of software in about to be concluded in their libraries.

SUMMARY AND CONCLUSION

One of the findings of this study is that most librarians in Nigeria have limited awareness on the availability of the varying OSS hence, do not significantly utilize them in their library management and services provision. Out of the 42 libraries involved in the study, only 7 are presently using CD/ISIS while 5 others utilize KOHA. For digital/content management purpose, only 3 out of the 42 libraries are presently utilizing OSS. This is quite unfortunate especially when most of the libraries in the country with their rich local contents and institutional repositories are awaiting digitization as a result of insufficient fund for procuring software needed for digital

Table 4. Response on sectional services to which these Integrated Library Systems (ILSs) are being presently put to use in Nigerian libraries.

Integrated Library Software	Cataloguing only		Cataloguing and Circulation		Serials		Acquisition		All of them		None at all	
	F	%	F	%	F	%	F	%	F	%	F	%
KOHA	2	4.8	3	7.1	2	4.8	1	2.4	1	2.4	37	88.1
Evergreen	-	-	-	-	-	-	-	-	-	-	42	100
ABCD	-	-	-	-	-	-	-	-	-	-	42	100
CD/ISIS	1	2.4	4	9.6	1	2.4	1	2.4	3	7.1	34	80.9

Table 5. Responsible factors for the non-use of the software for all the services

Attributes	Yes		No		Indifferent	
	F	%	F	%	F	%
Unavailability of skilled personnel in the sections where it is presently not being used	5	11.9	21	50	21	50
Lack of knowledge on how to use it for such services	10	23.8	21	50	21	50
Provision not made for such services by the software	6	14.3	25	59.5	25	59.5
Management not seeing its use in those sections as relevant	8	19	23	54.8	23	54.8
Unaware of their existence/ Ignorance	3	7.1	28	66.7	28	66.7

Table 6. Factors responsible for non use of the software at all in the library

Attributes	Yes		No		Indifferent	
	F	%	F	%	F	%
Lack of awareness on their existence	21	50	12	28.6	9	21.4
Unavailability of Internet access to be able to download them	26	61.9	7	16.7	9	21.4
Inadequate ICT skill required for its adoption and utilization	22	52.3	11	26.2	9	21.4
Management's indifferent attitude towards its use/ adoption in the library	17	40.5	16	38.1	9	21.4
Fear of service support problems	27	64.3	6	14.3	9	21.4
Fear of replacement of software by a newer version	30	71.4	3	7.1	9	21.4
Sporadic evolution of software	27	64.3	6	14.3	9	21.4

content management.

As table 5 shows, even though many of the respondents refused to comment or select from the options provided in the questionnaire with respect to factors responsible for non use of the software in all the sections of their libraries, a high percentage, 54.8% indicated that their management does not see the use of the software in those sections as relevant while lack of knowledge on how to use it in the other sections received 50% acceptance. This implies that most libraries in Nigeria are still not ready to embrace the current trend in the profession as it affects the adoption of Information and Communication Technology in their services provision. Similarly, most Librarians in Nigeria are not exposing themselves to the acquisition of skills necessary for 21st century librarians.

The study also revealed the fear of replacement of software by a newer version as one of the major factors hindering libraries from utilizing OSS. This however is a pointer to the level of ignorance of librarians on the features and characteristics of OSS. Gonzalez-Barahona (2000) stated that one of the benefits derived from the use of OSS is that it is stable as against proprietary software whose vendors constantly releases newer versions of the product in order to make money from the customers.

The fear of service support problem accepted by 64.3% of the respondents could be averted by joining the various concerned user groups to enable interaction with other libraries globally who are also using the same software. Another factor established by this study as a major hindrance to the use of these software is

unavailability of Internet access in the libraries to enable downloading of software. Inadequate ICT skill required for the adoption and utilization of the software as well as lack of awareness on their existence were equally identified by this study.

In conclusion, the findings of this study have provided useful insights into the level of awareness, prospects, challenges and extent of use of OSS by libraries in Nigeria.

RECOMMENDATION

- Libraries in Nigeria should embrace the "Sisters Library" programme presently going on globally to be able to interact and know the latest trends in the profession. This form of relationship which could culminate into 'Exchange Program' will expose them to the knowledge of facilities and services being provided by other sister institutions.
- Continued education and professional development should be taken seriously by the libraries and librarians for the acquisition of skills necessary for 21st century librarians. This could take the form of going back to school to acquire higher qualifications, attending both local and international workshops and trainings, etc.
- Libraries which are yet to adopt the use of Software in their library management should consider the use of OSS against proprietary software as quite a number of studies have shown that they are reliable, stable, auditable, cost effective and flexible.
- Libraries where the use of these software is yet to be spread to all the sections due to lack of knowledge on how to go about it should join their software's user group to be more enlightened on the feature and general operation of their software.
- For awareness and knowledge of functionalities of the various available OSS, go online to search them or contact colleagues who are knowledgeable about them. The author of this work can be of assistance. Do not act in ignorance!

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APPENDIX-1

Table 1. Libraries covered in the study

S/NO	NAME OF INSTITUTIONS/LIBRARIES
1	Akwaibom State Polytechnic Library
2	Al-Hikmah University Library
3	Ahmadu Bello University Library
4	American University of Nigeria Library
5	Babcock University Library
6	Centre for Black and African Art and Civilization (CBAAC)
7	Covenant University Library, Otta
8	ECOWAS Commission Library, Abuja
9	Federal college of Education, Oyo
10	Federal medical centre, Abeokuta
11	Federal Ministry of Labour Library
12	Federal Polytechnic, Ilaro Library
13	Federal University of Technology, Akure library
14	Federal University of Technology, Owerri Library
15	Hydraulic Equipment Development Library
16	JABU, Ikeji Arakeji, Osun State
17	Kaduna Refinery Technical Library
18	Kaduna State University
19	Kogi State Polytechnic
20	Kwara State Library board
21	Lagos State University
22	Maritime Academy
23	Nasarawa State Polytechnic
24	National Board for Technical Education
25	National Engineering and Technical Company
26	National Library of Nigeria
27	National Metallurgical Training Institute
28	Nigerian Education Research and Development
29	Obafemi Awolowo University, Ife
30	Olabisi Onabanjo University, Ago-Iwoyo
31	Ondo State Library Board
32	Osun State College of Education
33	Osun State University
34	Pope John Paul II Major Seminary, Okpuno, Awka
35	Redeemer's University
36	Rivers State Polytechnic
37	School of Agriculture Library, Ahmadu Bello University, Zaria
38	University of Ibadan
39	University of Lagos Library
40	University of Nigeria, Nsukka
41	University of Uyo Library
42	Yaba College of Technology, Lagos