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EXTENT OF IMPLEMENTATION OF THE OPEN-SOURCE INTEGRATED LIBRARY MANAGEMENT SOFTWARE (OSILMS) IN LIBRARY OPERATIONS AMONG FEDERAL UNIVERSITY LIBRARIES IN SOUTH-EAST, NIGERIA

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Abstract
The study investigated the extent of implementation of open-source integrated library management software in the operations of federal university libraries in the South-East of Nigeria. The study was guided by four (4) research questions. A descriptive survey research design was adopted for the study. The population for the study was 487 library staff, with a sample size of 183 drawn using a purposive sampling technique. The instrument for data collection was a structured questionnaire. Out of the 183 copies of the questionnaire distributed, 155 were retrieved, giving a return rate of 85%. The data collected were analysed using mean and standard deviation. The findings of the study showed that open-source integrated library management software (OSILMS) is implemented mostly in the areas of technical services and Readers / Public Services, but in Administration, it is implemented to a low extent. The challenges associated with the implementation of OSILMS include: poor planning before software adoption, epileptic power supply, and high installation and customisation costs, among others. Based on the findings, it was recommended that libraries should ensure the implementation of OSILMS across all library operations to reap the full benefits of library automation, thereby broadening and improving their services.

Keywords: *University Libraries, Open-Source Library Management Software, Library Operations, Automation.*

1.1 Introduction

Open-source integrated library management software has become widely accepted among libraries. Open-source software adoption helps to achieve lower cost, higher quality, better performance, robustness, higher reliability and above all, effective service delivery in libraries (Jabeen et al., 2018). These advantages imply that those challenges, such as the exorbitant cost of proprietary software and library budgetary constraints, are being eradicated by the open-source integrated library management software, which also contains modules that automate library management, as well as routine processes of the library when properly implemented.

Implementation of open-source integrated library management software (OSILMS) involves technical tasks to set up the software, integrate it with existing systems, and make it operational. It, therefore, refers to the actual process of installing, configuring, and deploying the selected

software solution within the library. The implementation process according to Lutkevich (2022) includes: installing the software on the appropriate hardware and servers; configuring the software to align with the library's requirements; integrating the software with other systems and databases; testing the software to ensure its functionality and usability; training users and staff on how to use the software effectively; rolling out the software to the intended users or departments; monitoring the software's performance and addressing any issues that may arise.

The implementation of an open-source library management software in libraries involves several steps to effectively manage the organisation, cataloguing, circulation, and patron management aspects of library operations. Otunla (2016) posited that libraries can only enjoy the full benefit of automation if all the modules are implemented instead of complementing the automation process with manual processing. It helps to simplify library workflows, giving staff the tools to effectively deliver library services efficiently and effectively, irrespective of time and space.

Despite the inherent benefits of the full implementation of OSILMS in the automation process of libraries, university libraries in Nigeria are still struggling to successfully utilise the deployed systems to maximise the libraries' adoption objectives (Uzomba et al., 2015). Emasealu (2019) established that the functions of library management software are abysmally underutilised in academic libraries in Nigeria. Amidst all these, there is a lack of empirical evidence detailing the current functional state of these systems across various library operations. Without a systematic assessment of the prevailing implementation levels, these libraries risk remaining in a state of technological stagnation that diminishes their capacity to meet the evolving information needs of academic users (Anene &Idiedo, 2023). This study, therefore, seeks to bridge this existing literature gap by systematically evaluating the implementation status of such software and identifying the specific constraints hindering effective implementation of OSILMS in these federal institutions.

1.2 Statement of the Problem

The rapid advancement of information and communication technologies (ICTs) has transformed library operations globally, compelling academic libraries to adopt automated systems that enhance efficiency, accessibility, and service delivery. Among these innovations, Open-Source Integrated Library Management Software (OSILMS), such as Koha, NewGenLib, Evergreen, and other automation platforms, have gained prominence due to their cost-effectiveness, flexibility, scalability, and capacity to support modern library functions (Moruf et al., 2020). Consequently, many university libraries across the world have increasingly embraced OSILMS as a viable alternative to proprietary software to improve operational efficiency and user satisfaction.

In Nigeria, particularly within federal university libraries, the need for automation has become more pressing as libraries strive to meet the growing information demands of students, researchers, and academic staff in a digital era. Observations indicate that while some federal university libraries in South-East Nigeria have introduced open-source library management software, the extent to which these systems have been fully integrated into core library operations remains uncertain.

Although several studies, such as Olatunji et al (2018), Omopopa et al. (2019), and Oche (2023), have examined library automation in Nigerian academic libraries, there appears to be limited empirical research specifically focusing on the extent of implementation of Open-Source Integrated Library Management Software in library operations among federal university libraries in South-East Nigeria. Existing studies have largely concentrated on awareness, adoption,

or challenges of automation, with insufficient attention given to the actual level of implementation across different library operations in federal university libraries in South-East Nigeria.

It is against this background that this study seeks to investigate the extent to which OSILMS has been implemented in library operations among federal university libraries in South-East Nigeria. This is imperative if library automation is to make progress despite cost challenges associated with it.

1.3 Objectives of the Study

1. identify the extent to which the open-source integrated library management software has been implemented in the Technical Services Unit of the federal university libraries in South-East Nigeria;
2. ascertain the extent to which the open-source integrated library management software has been implemented in the Readers' Services Unit of the federal university libraries in South-East Nigeria;
3. identify the extent to which the OSILMS is being used in the administration of the federal University Libraries; and
4. examine the challenges encountered in the implementation of Open-Source Integrated Library Management Systems, as well as proffer strategies for improvement.

2.1 Literature Review

Implementation is the practical procedure of making the software functional within an organisation's operations or an individual's work process. This encompasses activities like setup, configuration, and the integration of the software to ensure its effective operation. Hamisu (2020) described implementation as the actual use of the innovation, thereby putting the innovation into use or practice. Therefore, Hane (2021) posited that developing a comprehensive, well-defined implementation plan is essential for the success of library automation systems. Obiokafor et al. (2023) posited that the implementation plan should clearly outline the goals and objectives of the automation project, the scope of the project, the timeline for implementation, and the resources required for the project.

At the implementation stage, Obiokafor et al. (2023) posited that this involves the actual deployment of the library automation system, including installation, configuration, and testing. Panda (2013) opined that the implementation phase of software adoption in libraries consists of retrospective conversion, database of members, operations, statistics generation and training for staff and users. Mallipudi et al. (2018) stated that open-source integrated library management software is usually implemented in all library operations such as acquisition, circulation, cataloguing, serial control, online public access catalogue (OPAC) and administration. Uzomba et al. (2021) opined that the implementation of software is designed to streamline various library functions, thereby enabling libraries to perform the primary functions efficiently. The implementation of the library management software permits librarians to manage all the activities and work related to the library on one platform (Oyovwe-Tinuoye&Omosekejimi, 2022; Ashikuzzaman, 2014).

Despite the vast benefits of open-source integrated library management software, there is low implementation across the system modules in university libraries. Jabeen et al. (2018) noted that open-source software in developing countries has yet to find its optimum place, despite its uniqueness, fast growth and applicability in all sectors. Felderer and Ramler (2016) posited that certain challenges make the implementation and use of OSS difficult. Gireesh-Kumar (2016) reported that the lack of technical know-how and support, along with skilled staff

to install and manage the system, may have an impact on the implementation of open-source systems. Todd (2018) stated that open-source integrated software is designed for technically adept users, and so technical expertise is key. Oyelude (2016) and Tripathi and Pandey (2019) posited that the lack of technological skills could be the main reason implementation has not been as expected. Omeluzor (2020) also identified issues of inadequate training, inadequately skilled personnel, high cost of implementation, inadequate ICT facilities in the library, lack of vendors' support, and frequent system failure, and technical know-how as the impediments to the successful implementation of library management software.

Further to this, other authors reported cost of configuration, necessary service and support, and staff knowledge and familiarity (Tetteh, 2019; Felderer& Ramler, 2016). Olatunji et al. (2020), as well as Tetteh (2019), included a lack of interest from library staff, problems with internet access, lack of constant power supply, and inadequate facilities, among others. Mishra et al. (2015) highlighted some of these challenges, including a lack of proper planning, a low budget, a lack of awareness of standard format, and a lack of skilled or trained manpower. Omopupa et al. (2019) reported that a lack of adequate training is responsible for the non-implementation of some of the modules in their library. Tella et al. (2017) also found that power supply and inadequate in-house experts are the major challenges. Uzomba et al. (2021) revealed that the major problems are inadequate funding, erratic power supply, cost of procurement of the hardware/software, inadequate managerial support, crashing problems, and insufficient manpower. Olatunji and Tiamiyu (2022), as well as Amando et al. (2018), also identified erratic power supply, lack of enough user education on the use of ILS services, internet network issues, lack of technical know-how, lack of technical facilities, and a lack of training and re-training of staff as the major challenges.

While reviewing other related empirical studies, Oche (2023) studied the challenges of implementing the Koha integrated library management system in state polytechnic libraries for effective service delivery in North-Central Nigeria. The findings revealed that there is poor implementation of the Koha integrated library management system in the libraries studied. A few of the libraries implemented Koha for online cataloguing and classification functions. It was also revealed, among other things, that lack of funding, lack of adequate training before installation of the software, hardware breakdown, lack of proper feasibility study, lack of technical skills among librarians (installation & customisation), technophobia, among others, are the major challenges associated with implementing Koha in the libraries studied.

Olatunji et al. (2020) studied the challenges to the implementation of open-source integrated library management software in academic libraries: a case of Kano University of Science and Technology library. Findings revealed the implementation in the cataloguing and classification operations of the library only. It also showed that the challenges affecting the implementation of the software in the library include lack of funds, technical expertise, power failure and poor ICT infrastructure.

Omopupa et al. (2019) carried out a study on the adoption and use of the Koha integrated library system in the University of Ilorin library. Findings showed that the University of Ilorin library only makes use of two of the Koha modules (cataloguing and circulation modules) fully, while other library operations modules are used to a low extent. It was established that the challenges faced in the University of Ilorin library in the use of Koha software are the low level of technical

knowledge and insufficient personnel.

This study differs from the other studies above regarding the methodology, area, scope, and population. The researcher further observed that no study has been carried out on the extent of implementation of open-source integrated library management software in federal university libraries in the South-East, Nigeria. This creates a gap in the literature as there is a need to provide empirical evidence on the extent of implementation of the open-source integrated library management software in federal university libraries in the South-East, Nigeria.

3.1 Research Methodology

This study adopted the descriptive survey research design. The area of the study is the South-East, Nigeria, which is one of the six geo-political zones in Nigeria. The population for the study consisted of 487 library staff of the five (5) federal university libraries in South-East, Nigeria. The sample size for this study was 183 library staff, made up of only professional Librarians and paraprofessional staff. The study adopted the purposive sampling technique. Using this method, only three (3) libraries that have adopted open-source integrated library management software were selected for the study. Secondly, in the selected libraries, only professional librarians and paraprofessionals were selected for the study. These categories of library staff were selected purposively to respond to the questionnaire because they are the ones mostly involved in the implementation of OSILMS.

The instrument used to collect data for this study was a structured questionnaire, designed on a four-point rating scale. The total number of questionnaires distributed was 183 copies, while the returned questionnaires were 155, giving a return rate of 85%. The data collected for the study from the respondents were analysed using the Statistical Package for the Social Sciences (SPSS) software package. It was presented in tables, and research questions were answered using mean scores and standard deviation. The collected data were organised and analysed based on each of the research questions for this study. Discussions were taken based on the real limits of numbers for deviation rules as follows:

3.50 – 4.00 -- VHE (Very High Extent), 2.50 – 3.49 --- HE, (High Extent), 1.50 – 2.49 ---- LE, (Low Extent); 0.50 – 1.49 -----VLE, (Very Low Extent). For SA (Strongly Agreed), A (Agreed), D (Disagree), and SD (Strongly Disagree), decisions were based on the criterion mean of: A: 2.50 and above (Accepted), D: below 2.50 (Rejected).

4.1 Data Presentation and Analysis

Table 1: *The Extent to which software has been implemented in Technical Services*

S/N	Extent of Implementation in Technical Services	N	X	SD	Decision
1	Acquisitions	155	2.78	.87	**HE**
2	Cataloguing & Classification	155	3.16	.85	**HE**
3	Generation of Barcodes/ Accession numbers	155	2.28	.83	**LE**
4	Serials control & Management	155	2.39	.78	**LE**
5	Web-based OPAC	155	2.47	.88	**LE**
6	Binding	155	2.36	.96	**LE**
	Cluster mean		***2.55***	***.55***	**HE**

Key: N=Total; X=Mean, SD=Standard Deviation. VHE-Very High Extent, HE- High Extent, LE-Low Extent, VLE-Very Low Extent

The data presented in Table 1 revealed the mean ratings of the responses of the respondents on the extent to which the software has been implemented in technical services**,** had its mean value of 2.55. This value is within the real limit of 2.50-3.49, indicating that the software has been implemented **to a** high extent in technical services. However, this mean score was mostly accounted for by items 1 and 2, which had their mean values ranging from 2.78 to 3.16. Items 3, 4, 5 and 6 had mean values ranging from 2.28 to 2.47, which is within the real limit of 1.50 to 2.49, indicating that the software has been implemented across those elements **to a** low extent.

Table 2:*Extent to which Software has been implemented in Readers/Public Services*

S/N	Extent of Implementation in Readers/Public Services	N	X	SD	Decision
1	Circulation	155	2.59	1.05	**HE**
2	Reference services	155	2.54	.99	**HE**
3	Special collections	155	2.50	1.05	**HE**
4	Patron management	155	2.46	1.01	**LE**
5	Reservations	155	2.47	1.04	**LE**
	Cluster Mean		**2.51**	**.88**	**HE**

Key: N=Total; X=Mean, SD=Standard Deviation. VHE-Very High Extent, HE- High Extent, LE-Low Extent, VLE-Very Low Extent

The results in Table 2, Readers / Public Services, have a cluster mean value of 2.51. This indicates that the software has been implemented mostly in readers' services. Though some of the item means indicate otherwise, for items 1, 2, and 3,their mean values ranged from 2.50 to 2.59, indicating that the software has been implemented to a high extent for these items. Items 10-11 had mean values had their mean values ranged from 2.46 to 2.47, which is within the real limit of 1.50-2.49, indicating that the software has been implemented in these areas to a low extent.

Table 3: ***Extent to which Software has been implemented in Administration***

S/N	Extent of Implementation in Administrative Services	N	X	SD	Decision
1	Budgeting	155	2.40	.96	LE
2	Reports generation	155	2.33	.91	LE
3	Staffing	155	2.50	.95	HE
4	Visitor tracking	155	2.29	.96	LE
5	Library stock management	155	2.43	.99	LE
	Cluster Mean		*2.45*	*.77*	**LE**

Key: N=Total; X=Mean, SD=Standard Deviation. VHE-Very High Extent, HE- High Extent, LE-Low Extent, VLE-Very Low Extent

For Table 3, which is Administration, only item 4 has a mean value of 2.50, indicating that the software has been implemented to a high extent only for staffing. However, all other items had their mean values ranging from 2.29 to 2.43, indicating that the software has been implemented across those library operations to a low extent. The overall cluster mean value of 2.45 indicates that the software has been implemented just in library administration to a low extent.

Table 4: *Challenges Associated with the Implementation of the Open -Source Integrated Library Management Software in Libraries under Study***.**

S/N	Challenges Associated with the Implementation of OSILMS	N	X	SD	Decision
1	There is a lack of proper planning before the adoption of software	155	3.23	.52	Accepted
2	There is an inadequate staff in the library	155	2.97	.75	Accepted
3	The cost of installation and customisation of the software is high.	155	3.36	.60	Accepted
4	The library's power supply is epileptic.	155	3.35	.59	Accepted
5	Available workforce lacks expertise in technology.	155	3.13	.63	Accepted
6	The library has inadequate ICT facilities.	155	3.19	.71	Accepted
7	There is poor internet access.	155	3.29	.53	Accepted
8	The open source software goes obsolete rapidly.	155	3.06	.68	Accepted
9	There is poor ICT training among the librarians involved.	155	3.16	.57	Accepted
10	The software has poor technical support.	155	3.16	.58	Accepted
11	There is a constant virus attack.	155	3.05	.72	Accepted
12	Absence of a local network to share experiences and get assistance.	155	3.13	.63	Accepted
13	Difficulty in retrospective conversion of the catalogue.	155	3.18	.69	Accepted
14	The funds allocated to the library is inadequate.	155	3.23	.55	Accepted
15	Lack of a proper backup system	155	3.16	.57	Accepted

Key:*N=Total; X=Mean, SD=Standard Deviation. SA (Strongly Agreed), A (Agreed), D (Disagree), and SD (Strongly Disagree)*

The result in Table 4 revealed the challenges associated with the implementation of the open-source integrated library management software in Federal university libraries in the South-East, Nigeria. Using the criterion mean of 2.50, the result revealed that the respondents agreed that all the items (1-15) are the challenges associated with the implementation of the open-source integrated library management software in university libraries. The decision regarding all the items as challenges was because all 15 items had their mean values above the criterion mean of 2.50 set for the decision rule.

5.1 Discussion of Findings

The Extent to which software has been implemented in Technical Services

The findings of the study revealed that the open-source integrated library management software (OSILMS) is implemented largely in acquisitions and in cataloguing and classification in federal university libraries in South-East Nigeria. This agrees with Otunla (2016), who reported that, of five libraries that adopted and used the OSILMS among

academic libraries in Osun state, all five libraries implemented a cataloguing module. Also, Omopupa et al. (2019) found that only the cataloguing module was fully implemented in the University of Ilorin library.

This finding is an indication that the libraries have embraced software tools that streamline cataloguing workflows, enhance data accuracy, and improve access to resources. This would allow librarians to maintain consistent metadata standards, thereby making it easier for users to search and find materials. Successfully implementing the software in the acquisition could lead to more efficient tracking of new additions to the library collection, better resource allocation, and timely updates to library holdings, thus improving overall service delivery. However, this success in only two specific areas of technical services also underscores the need to extend similar levels of implementation to other technical services such as generation of barcodes/accession numbers, serials control &management, web-based OPAC, and binding, where findings show that software use is still lacking.

Extent to which Software has been implemented in Readers/Public Services

In the areas of readers/public services, the extent of implementation is high in the areas of circulation, reference services, and special collections. This finding is in line with Chukwueke (2022), who found that the extent of use of the cataloguing and the circulation modules of OSS by staff in university libraries is high. Amando et al. (2018) also stated that the University of Jos library only implemented cataloguing and circulation modules. This level of implementation suggests that libraries have effectively integrated technology into key areas that are crucial for providing high-quality service to users. The use of open-source software in circulation services is often aimed at streamlining the process of borrowing, returning, and renewing library materials. This improves efficiency, helps with the integration of physical resources with digital resources, and enhances user experience. In reference services, this could assist librarians in managing queries, providing research assistance, and offering digital reference support through chat systems or online forms. This extends the reach of the library's services to users who may not be physically present at the library. In special collections, it could be utilised for digital preservation, cataloguing, and providing online access to unique or rare materials that are part of a library's specialised holdings.

The same level of implementation as shown above does not cut across other areas of readers' services, such as patron management and reservations. This is a concern because effective readers' services are highly dependent on adequate patron management and reservations. Library users would enjoy a better experience if they could save time at the circulation desk and even reserve required materials online when they are unable to come to the library at the time.

Extent to which Software has been implemented in Administration

In the area of library administration, which includes budgeting, report generation, staffing, visitor tracking, and library stock management, the software has been widely implemented only for staffing. The rest are implemented to a low extent. This finding agrees with Olatunji et al. (2018), who opined that, though there are several accounts of libraries that have adopted the open-source integrated library management system software in Nigeria, the level of implementation is still not satisfactory. In line with this, Jabeen et al. (2018) noted that open-source software in developing countries has yet to find its optimum place, despite its uniqueness, fast growth and applicability in all sectors. This underutilization of OSILMS has

several underlying challenges and implications for the libraries, affecting their ability to fully leverage the advantages of open-source solutions in delivering services to users.

Challenges Associated with the Implementation of the OSILMS

The findings of the study identified several key challenges associated with the implementation of Open-Source Integrated Library Management Software (OSILMS) in libraries. These major challenges, including high costs of installation and customisation, epileptic power supply, poor internet access, lack of proper planning, inadequate funds, and inadequate ICT facilities in the library, among others, have affected the success of the implementation of the OSILMS. Proper planning is essential for the successful adoption of any new software system, especially for complex solutions like OSILMS. A lack of thorough planning can lead to several issues during implementation. Other challenges, such as poor assessment of needs, inadequate resource allocation, and limited stakeholder involvement, stem from a lack of proper planning.

On the challenge of the high cost of installation and customisation, while open-source software is typically free to download, the process of installing and customising OSILMS can still involve high costs. Libraries often need to customise OSILMS to suit their specific workflows, cataloguing practices, and user interfaces. This may require hiring external software developers or consultants, which can be expensive. Libraries are also faced with inadequate funds due to limited budgets. Initial set-upof an OSILMS involves costs related to server infrastructure, network upgrades, and possibly new hardware to host the software. These initial expenses can be prohibitive for libraries, especially when budget allocations are limited or unpredictable. Without adequate finance, these ongoing costs can strain library resources and hinder the sustainability of the OSILMS, thereby hindering effective service delivery to library users.

Another major challenge that was revealed in the findings is the issue of unreliable power supply. An inconsistent or unreliable power supply is a significant barrier to the successful operation of OSILMS, leading to frequent power outages, which affect the availability of the OSILMS and disrupt library operations. It can also lead to data security risks, especially if the system does not have reliable backup solutions or an uninterruptible power supply (UPS). This can compromise the integrity of library records and cause setbacks in managing collections. Also, the poor internet access in the library is revealed to be among the major challenges facing the successful implementation of the open-source integrated library management software for effective service delivery.

These findings are in line with Omopupa et al. (2019), who posited that inadequate ICT facilities and poor internet access are among the challenges associated with the implementation of open-source integrated library management software. Also, Uzomba et al. (2021) revealed that the major challenges include erratic power supply, cost of procurement of the hardware/software, among others. Tetteh (2019) also found that the problem of internet access, lack of constant power supply, lack of funds, and inadequate facilities, among others, are constituting challenges to libraries in the implementation of OSILMS. While the implementation of open-source integrated library management software offers numerous advantages, it also presents several challenges that libraries must navigate by taking proactive measures to solve these difficulties.

Conclusions

Despite the benefits that open-source

integrated library management software (OSILMS) offers, it is sad to note that this software has not been fully implemented across library operations in the federal university libraries in the South-East Nigeria. While open-source integrated library management software holds great potential for improving library services, its limited or partial implementation in federal university libraries in South-East Nigeria means that many of its benefits remain unrealised and thereby hampering service delivery. Partial implementation of open-source integrated library management software will mar the ability of the libraries to meet the information needs of the users.

Recommendations

University libraries in the South-East should strive to successfully carry out the implementation of open-source Integrated Library Management Software (OSILMS) across all library operations to achieve the full benefit of the automation project and improve service delivery to users. This will help in streamlining operations, expanding resource availability, enhancing collaboration, and improving user experience. Full implementation across cataloguing, circulation, acquisitions, and user services improves the efficiency of resource management, making academic materials easier to find and access. Full implementation supports the digitisation and integration of vast collections, ensuring that both physical and digital resources are accessible, broadening the services of the libraries and the knowledge base of the users. OSILMS enables interlibrary loans and resource sharing, allowing users to access a wider range of academic materials from other libraries, and promoting collective knowledge growth. With OSILMS implemented across all operations, users benefit from a seamless search, borrowing, and research process, fostering more efficient knowledge acquisition. Overall, the implementation of OSILMS across library operations boosts the availability, accessibility, and management of information resources, significantly enhancing service delivery in federal university libraries.

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