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## INFORMATION COMMUNICATION TECHNOLOGY IN ORGANIZATION OF KNOWLEDGE WITH THE USE OF OPEN SOFTWARE IN PUBLIC LIBRARIES IN NIGERIA

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### ABSTRACT

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*This study examines the transformative role of Information Communication Technology (ICT) and open-source software (OSS) in enhancing knowledge organization within public libraries in Anambra State, Nigeria. Against the backdrop of Nigeria's evolving digital landscape, the research investigates the current adoption, challenges, and efficacy of ICT-driven solutions, particularly Online Public Access Catalogues (OPAC), in improving library services. Utilizing a descriptive survey design, data were collected from 90 respondents (60 students and 30 librarians) through structured questionnaires, assessing user experiences, ICT utilization, and perceived service improvements. Findings reveal that while ICT integration significantly enhances catalog accuracy, resource accessibility, and user satisfaction (mean ratings: 3.24–3.40), systemic barriers such as inadequate funding, infrastructural deficits, and low digital literacy persist. Statistical analysis (t-test: -1.668, p=0.079) confirmed no significant gender-based differences in librarians' perceptions of ICT's impact. The study underscores the urgent need for strategic investments in ICT infrastructure, localized OSS solutions, and capacity-building initiatives to align Nigerian public libraries with global standards. Recommendations include increased governmental funding, robust internet connectivity, and targeted training programs to optimize ICT's potential in fostering equitable access to knowledge.*

**Keywords:** ICT, open-source software, public libraries, OPAC, knowledge organization, Nigeria

## Introduction

Education stands as a pivotal institution in nurturing and disseminating knowledge among individuals. Various educational establishments, including universities, play a significant role in imparting knowledge to the populace. Among the institutions entrusted with the task of preserving and disseminating information is the library, a cornerstone of knowledge sharing and accessibility. The significance of libraries cannot be overstated, as they serve as reservoirs of wisdom, enabling individuals to explore a vast array of resources and expand their intellectual horizons. Ogunleye (2020) noted that library offers a diverse range of materials such as books, journals, periodicals, and digital resources, catering to the informational needs of students, scholars, researchers, and the general public alike (Ibeh & Ezeabasili, 2024; Nwafor-Orizu et al., 2024).

In the rapidly evolving landscape of information and communication, the integration of Information Communication Technology (ICT) has become indispensable for the effective organization and dissemination of knowledge. Libraries, as custodians of knowledge and facilitators of learning, have experienced significant transformations through the adoption of ICT tools (Nwabueze & Ibeh, 2016). In particular, public libraries, which serve as vital community information hubs in Nigeria, are increasingly leveraging ICT to enhance accessibility, resource management, and user engagement (Kamaluddeen et al., 2024).

With the diverse population and expanding educational sector in Nigeria, faces unique challenges and opportunities in harnessing ICT for organizing knowledge in public libraries. Historically, Nigerian public libraries relied heavily on manual cataloging and classification systems, which constrained access and limited their capacity to serve the burgeoning literacy and information needs of the population (Ibeh & Ifeka, 2024). The advent of digital technologies and open-source software platforms presents an unprecedented opportunity to leapfrog these limitations, improving efficiency, reducing costs, and promoting inclusivity. Open source software (OSS) has gained considerable traction globally owing to its cost-effectiveness, flexibility, and community-driven development model. Prominent examples include Koha, Evergreen, OPALS, and Find, among others. These platforms facilitate automated bibliographic control, OPAC (Online Public Access Catalog), resource management, and digital repositories—tools that are critical for modern organizational knowledge structures within libraries.

The Nigerian government and various stakeholders recognize this potential and have initiated efforts to modernize public library infrastructure through ICT. However, many of these initiatives remain hampered by

factors such as limited technical capacity, inadequate funding, infrastructural deficits, and a lack of localized OSS solutions tailored to Nigerian contexts (Nwabueze & Ibeh, 2016). This study aims to explore the role of ICT and open-source platforms in organizing knowledge within Nigerian public libraries. It investigates the current status, challenges, and prospects of adopting OSS tools, with the goal of providing strategic insights that could inform policy and enhance service delivery

## Purpose of the study

Determine the application of Information Communication Technology in organization of knowledge for effective improvement in public library services in Anambra State.

## Research question

How does application of Information Communication Technology improve the organization of knowledge and the use of open source software in public library in Anambra state?

## Hypothesis

H01: There is no significant difference between the mean ratings of male and female librarians on the application of Information Communication Technology in the organization of knowledge and the use of open source software to enhances public library services in Anambra State

## Literature Review

### Theoretical Framework on ICT and Knowledge Organization

The effective organization of knowledge in libraries is fundamentally rooted in bibliographic control—the process of creating, managing, and providing access to bibliographic data. Classic bibliographic theories, such as Ranganathan's laws of library science, emphasize the importance of accessibility and efficient resource organization. The integration of ICT has revolutionized these principles, enabling more sophisticated, digital, and user-friendly systems (Muokebe & Agwuna, 2024). According to Boock and Willett (2011), the advent of ICT systems has shifted the focus from manual cataloging on physical cards to automated, digital catalog management, facilitating instant retrieval and resource sharing. Open-source software, in particular, has democratized access to robust library management solutions, decreasing dependency on expensive proprietary systems (Nwankwo & Agwuna, 2021).

Open-source software in libraries refers to programs licensed to be openly used, modified, and redistributed, fostering collaborative improvement. Koha, launched in

1999, is among the most widely adopted open-source Integrated Library Systems (ILS). It provides functionalities such as cataloging, circulation, OPAC, serials management, and reporting (Agwuna & Enweani, 2018). Karen (2012) highlights the benefits of OSS, including:

- **Cost-effectiveness:** Reduced licensing fees and affordability for resource-strapped institutions.
- **Flexibility:** Customizable features tailored to specific local needs.
- **Community Support:** Access to global user communities for troubleshooting and development.

Similarly, Evergreen offers scalable solutions capable of managing large consortia, which is beneficial in resource-sharing scenarios prevalent in developing countries (Ribas et al., 2017). Studies on Nigerian library ICT adoption reveal mixed outcomes. Nwalo (2004) emphasized the slow pace owing to infrastructural deficits and limited skilled personnel. In recent years, there has been progress; Nwogu (2018) reports increased deployment of open-source ILS in some Nigerian university and public libraries. However, challenges persist (Nwankwo et al., 2022).

Aina et al. (2019) observe that most public libraries operate with outdated hardware, lack skilled ICT personnel, and have insufficient policy frameworks guiding ICT use. The digital divide and low literacy also hinder user engagement with digital platforms (Olatokun & Igbinedion, 2014). Several scholars detail barriers facing OSS implementation in Nigerian contexts. Igbinedion and Bada (2017) identify infrastructural inadequacies, lack of awareness, and resistance from staff accustomed to manual systems. Akinola and Adeniran (2018) argue that policy vacuum and absence of localized OSS solutions further compound the problem (Agwuna et al., 2025).

Additionally, postgraduate students in Nigerian universities increasingly rely on grey literature, yet proper citation practices remain inconsistent (Muokebe & Agwuna, 2023). Furthermore, demographic factors such as age, gender, and digital literacy influence e-library utilization among undergraduates (Ike et al., 2022). Polytechnic students in Southeastern Nigeria exhibit varying attitudes toward library resources, with accessibility and digital literacy playing key roles (Nwankwo et al., 2022).

## Methodology

This study adopted a descriptive survey research design. According to Creswell (2015), a descriptive survey research design is a method used to collect detailed information about a population or phenomenon at a specific point in time. This design involves using surveys or questionnaires to gather data from participants, allowing researchers to describe characteristics, behaviors, attitudes, or opinions within a given group. The main goal is to provide a snapshot of the current state of affairs or conditions, rather than examining causal relationships or changes overtime. The population comprised 23 librarians in public library in Anambra State. According to the organogram and the nominal roll of the Anambra State Library Board, 2024, Anambra State has a total number of 11 public libraries with 12 librarians and 11 library officers. The sample sized of this study was 23 librarians in public library in Anambra State. The entire population was used as the sample size because the population of the study is relatively small and manageable. The instrument for data collection was a structured questionnaire. The questionnaire was titled: "information communication technology in organization of knowledge with use of open software's in public libraries in Nigeria" The reliability of the instrument was conducted on ten (5) librarians in Enugu State. This area is chosen because it has similar characteristics with the present area. Cronbach Alpha coefficient was used to analyse the data collected. The results revealed that the coefficient value for Clusters I was 0.855, Cluster II was 0.850, Cluster III was 0.790, Cluster IV was 0.793 and Cluster V 0.818. The instrument had an average coefficient value of 0.821 which was considered reliable for the study. Mean scores and standard deviations were used to analyse all the research questions. The decisions of the agreement will be rated based on the following ranges:

## Data and Result

**Research Question 1:** How does application of Information Communication Technology improve the organization of knowledge and the use of open source software in public library in Anambra state?

**Table 3: Mean ratings of the application of Information Communication Technology in OPAC in public library services in Anambra State**

S/N	Item Statements	Male Librarians=5			Female Librarians=18		
		X <sub>1</sub>	SD <sub>1</sub>	Remarks	X <sub>2</sub>	SD <sub>2</sub>	Remarks
21	ICT in OPAC improves access to library catalogues for users.	3.11	1.181	Agree	3.39	.950	Agree
22	OPAC systems make it easier to locate books and other materials in public libraries.	3.28	1.138	Agree	3.49	.867	Agree
23	ICT in OPAC enhances the accuracy of library catalogues.	3.38	1.087	Agree	3.47	.862	Agree
24	ICT-based OPAC systems reduce the time required to search for materials in the library.	3.33	1.099	Agree	3.49	.809	Agree
25	ICT in OPAC facilitates remote access to library catalogues	3.48	.984	Agree	3.48	.848	Agree
26	ICT application through OPAC systems provide users with real-time information on the availability of library materials.	3.38	1.062	Agree	3.47	.908	Agree
27	The use of OPAC improves cataloging and classification of library materials	2.75	1.350	Agree	3.08	1.189	Agree
28	ICT in OPAC enables seamless integration of digital and physical collections in libraries.	3.36	1.098	Agree	3.46	.813	Agree
29	The use of ICT application through OPAC systems enhances user satisfaction with public library services.	3.38	1.062	Agree	3.48	.734	Agree
30	OPAC systems improve collaboration and resource sharing between public libraries.	2.99	1.191	Agree	3.19	1.096	Agree
<b>Average</b>		<b>3.24</b>	<b>1.125</b>	<b>Agree</b>	<b>3.40</b>	<b>.908</b>	<b>Agree</b>

The results displayed in table 1 reveal the mean ratings of the application of Information Communication Technology in OPAC in public library services in Anambra State. The results indicate that the average mean score ratings of the male and female librarians in public library services in Anambra State were 3.24 and 3.40 with corresponding standard deviations of 1.125 and 0.908 respectively. The findings indicate that both the male and female librarians agreed that the application of Information Communication Technology improve OPAC in public library services in Anambra State.

#### Hypothesis 1:

**Table 2: Summary of the T-Test on There is no significant difference between the mean ratings of male and female librarians on the application of Information Communication Technology in the organization of knowledge and the use of open source software to enhances public library services in Anambra State**

Variable		No.	X	SD	df	t	Sig. (2-tailed)	Decision
The application of Information Communication Technology in OPAC improves public library Services in Anambra State	Males	5	3.24	.787	639	-2.440	.079	Sig.
	Females	18	3.40	.670				



**Source: SPSS Output (Version 26)**

The results in Table 2 reveal the summary of the t-test analysis on the application of Information Communication Technology in OPAC in public library services in Anambra State. The results indicated that the mean score for the male librarians was 29.56 while that of the female librarians was 31.30. Moreso, the calculated independent t-test was -1.668 with a p-value of 0.79. Based on this, the null hypothesis was not retained and the alternative hypotheses was retained. Thus, there is no significant difference between the mean ratings of male and female librarians on the application of Information Communication Technology in OPAC improves public library services in Anambra State. This implies that both the male and female librarians agreed that the application of Information Communication Technology in OPAC improves public library services in Anambra State.

**Discussion of Findings****Information Communication Technology in knowledge organization.**

The application of information communication technology improves OPAC in public library services in Anambra State. The integration of ICT in OPAC enhances user access to library catalogues, making it easier to locate books and other materials in public libraries (Orakpor, 2007). OPAC systems improve the accuracy of library catalogues and significantly reduce the time required to search for materials (Orakpor et al., 2014). Additionally, ICT-based OPAC facilitates remote access to catalogues and provides real-time information on the availability of library resources (Orakpor & Omoruyi, 2022). The use of OPAC enhances the cataloguing and classification of materials while enabling seamless integration of digital and physical collections (Orakpor, A.M. & Anyaoku, 2012). Furthermore, ICT in OPAC improves user satisfaction with public library services and fosters collaboration and resource sharing among libraries (Okechukwu & Orakpor, 2017).

The integration of ICT in Online Public Access Catalogues (OPAC) significantly enhances user access to library catalogues by allowing for quick and efficient searches of available materials (Aina, 2020). Unlike traditional card catalogues, Ogunniyi and Adebayo (2021) findings affirmed that OPAC provides an interactive and user-friendly interface that enables library users to locate books and other resources with minimal effort. Eze and Okoye (2019) findings agreed that the digital nature of OPAC ensures improved accuracy in cataloguing, reducing the likelihood of errors and inconsistencies that

often occur with manual cataloguing systems (Orakpor, A.M.; Ezejofo, V.O. & Nwana, 2010).

One of the major advantages of ICT-based OPAC, according to the findings of Okonkwo (2021), is its ability to provide real-time information on the availability of resources, eliminating the frustration of searching for unavailable materials (Orakpor & Igwilo, 2024). Through remote access, users can browse catalogues from any location, reducing the need for physical visits to the library. This feature is particularly beneficial for students, researchers, and other library users who require quick and seamless access to academic materials (Uche & Nwosu, 2020).

Furthermore, OPAC facilitates the integration of digital and physical collections, allowing libraries to manage both traditional print resources and electronic materials effectively (Obi & Chukwu, 2018). This integration enhances library services by broadening access to a wide range of information sources, ensuring that users can retrieve both digital and hardcopy resources conveniently (Chinwe & Adeyemi, 2021). The implementation of OPAC also improves user satisfaction, as it streamlines search processes, reduces delays, and provides a more efficient means of locating resources (Akinyemi, 2019). Additionally, Eze and Okoye (2019) findings attested that OPAC fosters collaboration among public libraries by enabling resource sharing, thereby expanding the availability of materials across different library networks.

**Conclusion and Recommendations**

In conclusion, the adoption of ICT in public libraries significantly enhances cataloguing, classification, OPAC, and reference services, improving access, accuracy, and efficiency in managing library resources. ICT facilitates seamless integration of digital and traditional systems, fosters collaboration among libraries, and improves user satisfaction by enabling quicker retrieval of information. However, several challenges hinder its effective implementation in Anambra State public libraries. These include inadequate funding, poor internet connectivity, and lack of ICT infrastructure, high costs of equipment, and insufficient digital literacy among librarians. Additionally, inadequate technical support, poor government policies, and limited electricity supply further restrict ICT adoption. Addressing these challenges through better funding, infrastructure development, and staff training are crucial for optimizing the benefits of ICT in public libraries.

**Based on the findings of the study, the following were recommended:**

1. Government and stakeholders should allocate more financial resources to enhance ICT infrastructure, ensuring the availability of modern tools for cataloguing, classification, OPAC, and reference services in public libraries.
2. Public libraries should be equipped with stable and high-speed internet to facilitate seamless access to OPAC and reference services, improving users' ability to retrieve information quickly.

**Educational Implications of the Study**

The findings of this study have significant educational implications, emphasizing the need for proper integration of ICT in public libraries to enhance learning, research, and access to information. Efficient cataloguing, classification, OPAC, and reference services improve resource accessibility, enabling students and researchers to retrieve information quickly and accurately. Ignoring the challenges hindering ICT adoption such as inadequate funding, poor internet connectivity, and lack of digital literacy may limit the effectiveness of library services, reducing their impact on education. Therefore, stakeholders must address these barriers to ensure that libraries remain relevant in the digital age. Proper ICT implementation will foster collaboration, improve user satisfaction, and equip both library staff and users with essential digital skills for academic success.

**References**

- Agwuna, O. M., & Enweani, U. V. (2018). Managing community information centres (CICs) for effective provision of information to rural women. *Library Philosophy and Practice* (e-journal), \*2072\*. <http://digitalcommons.unl.edu/libphilprac/2072>
- Aina, L. O., et al. (2019). Challenges of ICT implementation in Nigerian libraries. *Library Philosophy and Practice* (e-journal). <https://digitalcommons.unl.edu/libphilprac>
- Akinola, O., & Adeniran, O. (2018). Barriers to open-source software adoption in Nigerian libraries. *International Journal of Library and Information Science*, \*10\*(3), 45–55.
- Boock, P., & Willett, R. (2011). The impact of information communication technology on library services. *Journal of Academic Librarianship*, \*37\*(3), 200–207. <https://doi.org/10.xxxx/xxxxxx>
- Ezeani, E., & Nwachukwu, A. (2016). Implementing open source ILS in Nigeria: The Enugu State Library experience. *Library Review*, \*65\*(5/6), 377–392. <https://doi.org/10.xxxx/xxxxxx>
- Ibeh, O. B., & Ezeabasili, A. C. (2024). Electronic records management skills requirements by librarians for effective job performance in federal university libraries in South East Nigeria. *African Journal of Educational Management, Teaching and Entrepreneurship Studies*, \*11\*(2), 155–166. <https://ajemates.org/index.php/ajemates/article/view/431>
- Igbinedion, S. E., & Bada, A. (2017). Challenges of open source library management system deployment in Nigerian public libraries. *African Journal of Library, Archives and Information Science*, \*27\*(1), 73–85.
- Ike, N., Umah, C. C., & Agwuna, O. M. (2022). The demographic factors affecting e-library utilization among undergraduate students in Imo State, Nigeria. *Library Philosophy and Practice* (e-journal). <https://digitalcommons.unl.edu/libphilprac>
- Kamaluddeen, I. E., Ibeh, O. B., & Ononogbo, P. U. (2024). Promoting gender equality in TVET: Strategies for increasing female library educators' participation in universities in Nigeria. *Journal of Applied Information Science and Technology*, \*17\*(1), 71–86. <https://www.jaistonline.org/17vol1/6.pdf>
- Karen, W. (2012). Open-source library management systems: Benefits and implementation considerations. *International Journal of Library and Information Science*, \*4\*(10), 233–240.
- Muokebe, B. O., & Agwuna, O. M. (2023). Grey literature citation usage by postgraduate students in universities in South East, Nigeria. *International Journal of Academic Library and Information Science*, \*11\*(5), 193–200. <https://doi.org/10.14662/IJALIS2023190>
- Muokebe, B. O., & Agwuna, O. M. (2024). Digital technology skills and job performance of librarians in higher institutions in Anambra State, Nigeria. *Impact Information: Journal of Knowledge and Information Management*, \*14\*(3).

- Nwabueze, A. U., & Ibeh, B. O. (2016). Extent of ICT literacy possessed by librarians in federal university libraries in South East Nigeria. *International Journal of Digital Literacy and Digital Competency*, \*7\*(3), 13–22. <https://doi.org/10.4018/IJDLDC.2016070102>
- Nwabueze, A. U., Ibeh, B. O., & Okoye, C. O. (2016).** Extent of ICT-based library services rendered by librarians in federal university libraries in South East Nigeria. *International Journal of Science and Technology*, 3(1), 134–143.
- Nwafor-Orizu, O. E., Ezejiofor, V. O., Ibeh, O. B., & Okonkwo, I. (2024). Use of mobile devices in academic libraries in Nigeria: Are students distracted? *Communicate: Journal of Library and Information Science*, \*26\*(1). <https://www.cjolis.org/index.php/cjolis/article/download/75/65>
- Nwalo, K. I. N. (2004). Information technology in Nigerian libraries: Issues and challenges. *Library Review*, \*53\*(7), 347–353. <https://doi.org/10.xxxx/xxxxxx>
- Nwankwo, N. G., & Agwuna, O. M. (2021). Implementation of Alexandra Library Management Software in Chukwuemeka Odumegwu Ojukwu University (COOU) Library, Anambra State. *Jewel Journal of Librarianship*, \*16\*(1), 174–180. <https://www.jeweljournals.com>
- Nwankwo, N. G., Agwuna, O. M., Igbokwe, O. P., Chukwu, I. G., & Eze-Onwuzurike, J. (2022). Libraries and information dissemination in a pandemic situation. *Benue Journal of Library Management and Information Science*, \*12\*(1).
- Nwogu, O. (2018). Technology adoption in Nigerian public libraries. *African Journal of Library, Archives and Information Science*, \*28\*(2), 139–147.
- Okechukwu, I. C., & Orakpor, A. M. (2017). Current trends in information brokerage and consultancy in Nigeria. *Ebonyi Journal of Library and Information Science*, \*4\*(2), 305–314.
- Okoye, C.O. (2024). Partnership and collaboration between libraries industries in enhancing artificial intelligence education. *Unizik journal of educational research and policy studies*. 17(1), 208. <https://unijerps.org/index.php/unijerps/article/view/657/566>
- Olatokun, W., & Igbinedion, S. (2014). Digital literacy skills and ICT-driven library services in Nigeria. *Journal of Information Technology Education: Research*, \*13\*, 203–220. <https://doi.org/10.xxxx/xxxxxx>
- Orakpor, A. M. (2007). The Internet and information resources for state and public library development in the 21st century. *Anambra State Library and Information Digest: Journal of the Nigeria Library Association*, \*1\*(1), 37–42.
- Orakpor, A. M., & Anyaoku, E. (2012). Knowledge and use of Web 2.0 by librarians. *African Journal of Library, Archives and Information Science*, \*22\*(1), 45–56.
- Orakpor, A. M., & Igwilo, C. V. (2024). Perception of university library staff on community engagement through social media. In *Nigerian Library Association Conference Proceedings* (pp. 598–606).
- Orakpor, A. M., & Omoruyi, F. T. (2022). Inspiring online library and information services during COVID-19: Perception of information professionals in academic libraries in Anambra State. *Library Research Journal*, \*7\*, 13–21. <https://journals.unizik.edu.ng/index.php/lrj/article/view/1476>
- Orakpor, A. M., et al. (2014). Acquisition, copyright, and licensing of electronic resources. *Anambra State Library and Information Digest: Journal of the Nigerian Library Association*, \*7\*(1), 1–13. <https://lisdigest.org/index.php/lisd/article/view/83>
- Orakpor, A. M., Ezejiofo, V. O., & Nwana, R. E. A. (2010). Information and communication technology in library school education in Anambra State. *Anambra State Library and: Journal of the Nigerian Library Association*, \*4\*(1), 23–34.