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**LIBRARY WEB-BASED SERVICES IN INFORMATION, RETRIEVAL,  
UTILIZATION AND RESEARCH IN NIGERIAN EDUCATIONAL  
INSTITUTIONS**

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**Abstract**

This paper explores the role of library web-based services, how it facilitates information retrieval for library use, it also intensifies the call for the introduction of it in libraries in Nigeria. The paper enumerated the importance of information retrieval to all library users including students, lecturers, researchers, corporate organizations, government agencies and the general public and explained the methods available for information retrieval, particularly the ones aided by the use of Information and Communication Technology (ICT) such as cataloguing, classification, and indexing, abstracting, metadata among others. The paper further examines the web resources that aid Information Retrieval (IR) such as Online public access catalogue OPAC, Ask a Librarian, Search Engines, Web Forms, Electronic Journals among others, it also stated the roles or advantages of library web-based services, identifies its challenges like lack of finance to procure modern equipment, the risk of cyber-attack on gateway and lack of needed skills, and it discusses the strategies for enhancing library web-based services in Nigeria. The paper concludes that ICT based library operations are the modern trend worldwide with multiple advantages. It saves time for users, grants access to variety of contents, even in a remote area outside the library and provides 24hrs service. The paper recommends adequate ICT equipment must be procured, training of existing staff and hiring of competent staff to handle the services must be done, power supply must be improved in the libraries, and renewable energy could be brought in to buffer the electricity supply in libraries.

**Keywords:** Library, Web, Information, Retrieval, Education, Research

**Introduction**

The practice of storage and accessing information has gone beyond the traditional practice of arranging books and other information materials in shelves in the libraries, where the only way to access them is by physical visitation to the libraries, and the world has become a global village. The birth and the development of Information and Communication Technology (ICT) have aided library and information services delivery,

all in generation, storage, retrieval and dissemination. According to Olubiyo (2022) advances in technologies have ensured that library resources have gone beyond the print media-electronic, multimedia, the internet have made a lot of impact on the availability of reading materials, the electronic age has made users search beyond print media while looking for information resources. ICT is generic term that refers to the technologies that are used to collect, store, edit and communicate information in various format (Raji, 2018). The use of ICT improves access to digital information, narrows down the digital divide and also improves standard of living. Adoption of ICT in libraries is a way of improving on information services provided in libraries. This is an era, when people need to access timely information with ease, and this can only be done through the application of ICT to library services. The library plays a very significant role in information storage for educational delivery; the library is home for teaching aids and instructional materials and even in teaching and learning, we now have e-learning and open/distance learning (ODL) provided by institutions home and abroad where many of them have developed a web based library, where they made books and other instructional materials accessible. According to Perdana and Prasjo (2019), the essence of the digital library practice is the impact of information technology development. Digital library operations will certainly offer more advantages for each user, especially users from the education sector such as students who obviously need a library to support their learning process. Countries that want to develop educationally and economically must flow with technological and innovative trends, particularly the ones capable of promoting efficiency through times savings and skills development. Most of these new developments are anchored on ICT also have other benefits to learners and other users of information. It helps the development of soft skills, mostly in writing, listening and using the computer efficiently. The world is now experiencing knowledge explosion and there should not be barrier to access to intellectual works, the web based services of the library make available unlimited access to multiple resources and in addition, it is available anytime of the day on demand, there is no time barrier to access. All that is needed is the gateway.

#### **Need for information retrieval in libraries**

The principal function of any library is to make available to the users, the information they need. In order to fulfill this function, the information which is stored in the library must be retrieved from the library database. Information retrieval is the act of obtaining information resources relevant to an information need from a collection of information resources. Students, lecturers, researchers, members of the public, government agencies, need information as part of instructional materials; for additional knowledge; for educational, social, economic and scientific research; for update on events; for prices of items; for latest fashion trend and change in technology. No matter the class or creed a person belongs to, he needs information to survive and operate in his environment. According to Onwuchekwa (2011), an information retrieval system is designed to retrieve the documents or information required by the user community. It should make the right information available to the right user. Information retrieval is the science of searching for information in a document, searching for documents themselves, and also searching for the metadata that describes data, and for databases of texts, images or sounds. Engadi (2023) defined Information retrieval (IR) as the process of obtaining information system resources

that are relevant to an information need from a collection of those resources. Searches can be based on full-text or other content-based indexing. From the ongoing analysis, it can be deduced that information utilization is the need for information retrieval and now we are looking at how the use of Information and Communication Technology (ICT) has aided library services in area of information retrieval for use in our daily endeavours. Lack of information can lead to poor performance by students due to inadequate access to instructional materials, it can lead to taking wrong decisions, making wrong choices, going to the wrong place, losing money or investment, fall prey of fraud easily.

#### **Methods of information retrieval in libraries**

The information retrieval system serves as a bridge between the world of creators or generation of information and the users of that information. Two broad categories of information retrieval have been identified, they are in-house information retrieval and online Information retrieval. According to Onwuchekwa (2011), in-house Information retrieval systems are set up by a particular library or information centre to serve mainly the users within the organization. An example of an in-house database is the library catalogue. Online public access catalogue (OPAC) provides facilities for library users to carry out online catalogue searches, and then check the availability of the item required. By online information retrieval systems, we mean those that have been designed to provide access to remote databases to a variety of users. Such services are available mostly on commercial basis, and there are a number of vendors that handle this sort of service. Information can be retrieved via Cataloguing and classification, metadata, Indexing, Abstracting, users of information retrieval method.

Cataloguing and classification is simply a way of organizing library materials in such a way that the retrieval will not be difficult for library users. Therefore cataloguing and classification can be described as the index to all library collections. According to Adedibu and Akinboro (2012), the purpose of organizing library materials are: to make location of library materials easy, to save time and space, to facilitate easy accessibility to the materials, to enhance effective utilization of the materials to make the library attractive to its users.

Information retrieval looks at the existence or nonexistence of a document or information resource that matches the search criteria. This lends itself to document (information resource) descriptions, also known as metadata, it is referred to as data that describes other data, metadata is structured reference data that helps to sort and identify attributes of the information it describes. It allows the inter-operation of information systems improves retrieval performance and provides mechanisms for managing information resources (Kranz, 2023). Metadata is premised on five purposes which are: resource description (identifiers and descriptive elements in metadata schemas and their use); information retrieval (the semantic web, topic maps, subject retrieval, language control and indexing); management of information (in various applications ranging from records management to content management, intranets and library management systems); rights management, ownership and authenticity of data (including legal admissibility and security of data); and interoperability and e-commerce (important issues here include the organizational role of metadata and government initiatives to promote interoperability in the public sector).

Indexing is an important process in Information Retrieval (IR) systems. It forms the core functionality of the IR process since it is the first step in IR and assists in efficient information retrieval. Indexing reduces the documents to the informative terms contained in them. According to Lisbdnetwork (2022) an index is a guide to the items contained in or concepts derived from a collection. Item denotes any book, article, report, abstract review, textbook, part of a collection, passage in a book, an article in a journal. An index indicates or refers to the location of an object or idea. Indexing is regarded as the process of describing and identifying documents in terms of their subject contents. Here, The concepts are extracted from documents by the process of analysis, and then transcribed into the elements of the indexing systems, such as thesauri, classification schemes, among others. In indexing decisions, concepts are recorded as data elements organised into easily accessible forms for retrieval. These records can appear in various forms, e.g. back-of-the-book indexes, indexes to catalogues and bibliographies, machine files, among others. In a simple term, Indexing techniques are used for fast retrieval of data in search operations. There are many indexing techniques exists and each indexing technique is appropriate for a specific situation.

An abstracting database prepares a summary of the core content of documents to enable users to determine whether or not they need to read the entire text. An abstract is a shortened version of the original piece. They are often accessible via a subscription and will be on a particular subject, or selection of subjects. (Taylor & Francis, 2023). As further explanation, Manzer (2002) as cited in Inyokwe (2015) defined abstract as a summary of a publication or article that is accompanied by an adequate bibliographical description, to enable the user have access to the utilisation of publications or articles at ease.

Users of information for an academic library, as stated by Onwuchekwa (2011), the primary users are students, teachers, researchers, administrators etc. For special or research libraries, the primary users may be categorized as researchers, planners, policymakers, scientists and so on. In the public Library environment, anyone can be a user (members of the general public) Children, students, housewives, the literate, neo-literate etc.

User of information retrieval method Information can take great advantages and improvements considering users' feedbacks. Therefore, the user dimension is a relevant component that must be taken into account while planning and implementing real information retrieval systems. It is generally acknowledged that some techniques can help the user in information retrieval tasks with more awareness, such as relevance feedback (RF). Relevance feedback allows searchers to tell the search engine which results are and aren't relevant, guiding the search engine better understand the query and thus improve the results (Tunkelang, 2018).

#### **Resources for library web-based services and their usefulness**

Bhatnagar (2005) listed different resources for web-based library services, which are: Online public access catalogues(OPAC), Ask-A-Librarian, Real-Time Services, Gateways, Web-Based User Education, Search Engines, Web-Forms, Electronic Journals, Portals, Virtual Library Tours, Subject Portals, Bulletin Boards, Online databases and Subject Directories.

Online public access catalogues (OPAC), forms an important part of many digital library's collections. It allows users to search for the bibliographic records contained within a library's collections. Now days, some OPAC also provide access to electronic resources and databases, in addition to the traditional bibliographic records (Bhatnagar, 2005).

Ask-A-Librarian usually provides a free, quick reference service and the basic answers to brief, factual questions. This can be done on the web on real time basis, this is why libraries now have different social media channels, and the main work is to disseminate information and also for interactions between library users and workers. This is why Adetarami and Ugwoke (2022) emphasized that staff and students of institutions of learning must imbibe the use of social media and incorporate it into teaching and learning, especially the use of video-conferencing applications, blogs and other applications like twitter, facebook, instagram, whatsapp among others. The real-time library is socially networked, has an active presence and shares information in real time. The real-time library updates its status regularly; The real-time library is accessible on real-time communication devices; The real-time library is ready and waiting – all the time – to deliver information services; The real-time library monitors the multitude of emerging real-time web services and experiments to find those with the potential to enhance service in real-time mode; the real-time library designs information services specifically for delivery and use on the real-time web; real-time librarians are adept at creating relationships with real-time library users. Adetarami and Ugwoke (2022) suggested that in absence of constant electricity supply, renewable energies can be used to power the equipment to avoid interruption of services.

Gateways can be defined as some facility that allows easier access to network-based resources in a defined subject area. The simplest types of subject gateways are sets of Web pages containing lists of links to resources (Gajbhiye, 2020). This supports all services rendered by the library: Cataloguing, classification, storage, retrieval and utilization. Also, we have Web-based learning which refers to the type of learning that uses the Internet as an instructional delivery tool to carry out various learning activities. It can take the form of (1) a pure online learning in which the curriculum and learning are implemented online without face-to-face meeting between the instructor and the students, or (2) a hybrid in which the instructor meets the students half of the time online and half of the time in the classroom, depending on the needs and requirement of the curriculum. Web-based learning can be integrated into a curriculum that turns into a full-blown course or as a supplement to traditional courses (Igiglobal, 2023). This clearly shows that this service is essential for Open Distance Learning, where most information and materials are shared through the web. Most web searches are done using the search engines. Search Engine is a tool that is used to retrieve the information stored over the WWW. Typically Search Engine has the following main components: Crawling, Indexing, Searching, Ranking. The search engines, for example, Google, Yahoo, etc. match the keywords in the query with the web pages that are having those keywords, resulting into a result page set which has relevant and irrelevant results. Retrieving the relevant information from the information available is an important research issue in search engines. We also have the web form, a web form, also called an HTML form, Rouse (2016) described it as an online page that allows for user input. It is an interactive page that mimics a paper document or

form, where users fill out particular fields. Web forms can be rendered in modern browsers using HTML and related web-oriented languages. The forms assist in data gathering, retrieval and research.

Electronic journal is a periodical publication which is published in electronic format, usually on the Internet. Electronic journals have several advantages over traditional printed journals: You can search the contents pages and/or the full text of journals to find articles on a certain subject. No effective research can take place without reference to previous researches and literatures. We cannot ignore the role of the portal in information retrieval. According to Konnur and Kacherki (2006), A library portal is a single access point combining the library catalogues, subscription databases, subject gateways, electronic journals among others. Library portal meets the individual needs of users, which either the system itself can tailor the delivery and presentation of information content or the users themselves can customize the type and format of information displayed. Library portal is now the standard interface to generate library resources and services through a single access and management point for users. Portals are useful in all services of the web library. While a “subject portal” is an online gateway that helps users to quickly and efficiently find reliable, scholarly subject-based information in one place. This provides gateway to a specific area or service of the library. All these resources are only useable when you have an online database, an online database is a database that is accessed from a network, the most common example of this is on the internet, and unlike if it were a local database held on a computer only connected to an internal network or a computer. Online database supports information storage, retrieval, utilization and research activities.

Another resources is the Virtual Library Tours, it is a production of short videos that offers virtual tours of the libraries. In an effort to better familiarize users with the libraries on the facilities, structures, sections, departments and bookmobile team. This helps to know where to find what in the library. There is also the electronic bulletin board, according to Ramaiah (1995), Electronic bulletin board systems are vital tools for computer-mediated communication among computer users. These are similar to the bulletin boards that are displayed in a library. However, these are operated electronically on computer networks. On the board, you find information on new arrivals, new services and processes, events in the library and other information.

Lastly, we have the subject directories, according to Jessie Eury Library (2021), Subject Directories are catalogs of web resources organized by subject. Frequently, librarians or other subject experts select the included items which increase the usefulness of the resources. Some Subject Directories must be browsed by category rather than searched. Others allow you to search the catalog of included resources. It is a lead to storage on a particular subject where information and other materials can be accessed.

#### **Role of library web-based services in information retrieval**

Library web-based services have importance and advantages, as stated by Onwuchekwa (2011), writers in times past have suggested that an effective and reliable information retrieval system must have provision for prompt dissemination of information, filtering of information, the right amount of information at the right time, browsing, getting information in an economical way, current literature, interpersonal communication and personal help. The role is further discussed thus: It saves the precious time of the users; it

makes available information in different places and also in different formats; it makes a wide variety of content accessible through continuous stocking; it allows readers to access materials effectively on demand; 24 hours library services, No opening or closing hours; Information and materials are latest and updated; It allows mobile use of the library; Location of laboratories/departments in different places in the campus; Cheap library services, millions of people from different locations can subscribe. This will make library charges cheap as this will make unit or marginal cost will be low; less dependence upon the library staff for getting the required information, that is self-services, this will reduce the number of staff required in the libraries; Cheap library services, millions of people from different locations can subscribe. This will make library charges cheap as this will make unit or marginal cost will be low; Library management automation in consonance with modern technology; Real-Time interactions; Materials hosted on the web are safe and preserved thereby eliminating deterioration of resources and preservation for knowledge for the future generation.

#### **Problems of effective library web-based services in Nigeria**

Some of the challenges facing Nigerian library operators and users are poor electricity supply, high cost of data, lack of equipment/Poor educational finance, lack of computer skills by both library staff and students, Risk of cyber-attacks, unattractive websites, Inadequate user education, rigidity of government policy on process and adoption of technology, lack of awareness of available library web services, copyright issues on digitalization. Aghauche, Udem & Ogalanya (2018) stated that challenges to use of web-based library services includes, lack of computer literacy skill on the part of the users, lack of ICT facilities, Attitude of the library staff, lack of fund for ICT acquisition and Copyright issues. While the changing nature of information resources had subjected libraries to new challenges, to date, despite the paraded development by government, inaccessible because of distance, resources and the availability of relevant technology still remain high among most of the institutions (Nnedi & Nwafor-Orizu, 2021).

#### **Strategies for enhancing library web-based services for information retrieval**

The first step is to accept the culture of web-based library services, by making it available in our libraries, this could also lead to final migration from the face-to-face service to web-based service. In Nigeria, Academic libraries are required to utilize these Web-based applications in their operations and service delivery. They need to shift from conventional library services where mainly books and other printed text are acquired, arranged, consulted and borrowed (Nnedi & Nwafor-Orizu, 2021). All the web-based retrieval methods must be available in our libraries. Since web is operated with equipment and software, they should be made available and then the gateway to the library web page must be easily accessible, and easy to navigate through, Kroski (2009) opined that libraries can build, test, and deploy web-based applications to offer services to users even outside business hours. Library staff needs to be trained and Information Technology units to be established in the libraries with basic duties to maintain both the soft and the hardware, they are also to monitor, troubleshoot and correct error in processes. Students are to be continually placed on assignments that require citations and references, and data service for students and information users should be affordable, this should be contribution of

government in area of policy making, government should also mandate institutions of higher learning to introduce library web-based services. One of the ways of enhancing library web-based services is through via cloud computing, Irenoa and Tijani (2018) defined it as a type of Internet-based computing that provides shared computer processing resources, data to computers and other devices on demand instead.

### Conclusion

The first and foremost function of the library is to provide quality information service in order to satisfy users at all times. Web-based library service is a modern and technology-driven trend whose central purpose remains the same, to serve and teach users to find, evaluate and use information effectively. To meet these obligations, the librarians must be part of the learning community as coaches and collaborators, to guide the students and other users, teach them how to search effectively and help them to judge the quality and usefulness of the information that they meet. This is the reason why librarians themselves must be trained and equipped to meet up with the challenges. The conversion of conventional library services to web-based library services in the present day has made users to reach their information needs on their go at any time. The internet has become a very important part of our day-to-day activities.

### Recommendations

In order to enjoy the benefits offered by library web-based services, libraries' managements, employees and regulators must ensure the following:

1. All employees of the library must be trained in the use of computer and the internet.
2. Computers and accessories must be procured adequately for library workers, and internet service must always be available, this should be backed by uninterrupted power supply.
3. Each library must have an *application* hosted on Google play or other online web hosts to be downloaded by employees, students and other users of the libraries for use.
4. Social media should be used to support library web services, it will enhance announcements and information sharing.
5. Provision of standards stand-by generator in libraries, to serve the computers and other ICT facilities in case of power outage. In addition to this, the Nigerian government in particular, should strive to permanently solve the challenges confronting the power sector.
6. Renewable energies, like solar and inverter should be used to power equipment when power problem persists.
7. Training and retraining of all categories library staff should be organized on regular basis. The ICT largely depends on ability of staff to operate ICT facilities. The training should include needed skills and techniques for data input into the computer, internet surfing and using different telecommunication facilities to exchange information.



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