

Review

Utilization of library and information and communication technology tools in medical research

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The adoption of information and communication technologies (ICT) is on the increase in Nigerian higher institution of learning. The paper examines the role played by the medical library and the information and communication technology (ICT) tools in medical research. The study highlights the role of the medical library as an information resources centre in meeting the information needs of health professionals. The study also described information technology tools such as search engines and social networking tools that can be used by physician and health information professionals in decision making. The study advocated the formation of consortium by medical libraries in Nigeria and adequate funding of medical institutions by their parent bodies. Guides to medical resources and internet searching tips were recommended in the study.

Key word: Medical research, library services, library consortium, information and communication technology, medical database, Nigeria.

INTRODUCTION

The world book dictionary (2008) described information as knowledge given or received in some facts or circumstances. Raji (2008) sees information as processed data that is purposeful and meaningful to a user. In other words, various businesses and professions in every sphere of life rely heavily on information. Jiyane and Mostert (2010) further asserted that both developed and developing countries are investing in information and communication and its technologies for improving life styles and business practices.

Information system services serve the objectives of their parent bodies. The library deals with the acquisition, organization, processing, storage and dissemination of information. The advent of information communication technology (ICT) has revolutionarized information systems which are now linked to one another and to the larger organization or society. When we talk of information management and other relevant issues, the library is the bedrock.

THE LIBRARY AS INFORMATION SERVICE CENTER

Library stood as places where business, legal, historical and religious records of civilization kept. The use of information communication technologies such as computers, telecommunication, biomedical equipment, etc have changed the earlier concept of the library and has made it possible to store and retrieve information in many different forms, format and in different places. The advent of e-library, (virtual library) or library consortium, have made it possible for people to access vast collection of information over the internet, cable television or some other type of remote electronic connection. Library and information centres world wide are built to provide value added information services to users. As a result of these, Librarians and information managers within an information system are concerned with identification and utilization of certain factors that could facilitate the production of information and information services that will maximally satisfy the needs of the users. Services offered by modern library and information centres now include:

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1. Abstracting and indexing services (AIS),

2. Selective dissemination of information (SDI),
3. Current awareness (services) (CAS),
4. Document delivery services (DDS),
5. Referral services,
6. Consultancy services,
7. Records management services,
8. Loaning or rental services,
9. Bindery services,
10. Reprographic/photographic services..

However, the provision of these services depends on available manpower infrastructure and level of available resources, which also include machinery and money.

THE LIBRARY AND INFORMATION TECHNOLOGY IN MEDICAL RESEARCH

Medical libraries are regarded as a special library whose sole objective is for the purpose of providing the information and knowledge resources which are vital to the parent organization, and clientele in the achievement of that organizational goals and objectives. As a repository of knowledge, libraries in healthcare institutions ought to play a leading role in knowledge-based information management. Essentially, the information professional (librarian) is to use his professional skills of information access, retrieval and packaging coupled with computer literacy to provide support services to researchers especially in the area of bibliographies compilation, literature searches of relevant health information, and clinical information in aid of patient care, etc (Onatola and Oduwole, 2006).

The past two decades have witnessed a tremendous increase in the availability and use of electronic information resources across the globe. These sources include online databases, online public access catalog (OPAC) e-conference, e-mail, discussion forums, full text databases, books, scholarly websites, pre-print and archives and bulletin boards amongst others (Sansnee and Wallin, 2002).

Despite the increase in use of electronic information resources in developed countries, access to published biomedical journals is a major problem for researchers and scientists in lower income countries, especially in sub-Saharan African (Ajuwon and Olorunsaye, 2009). One major initiative to solve this problem was the introduction of World Health Organization's led health internet work to research initiative (HINARI).

Launched in 2002, HINARI provides health workers and researchers with free or low cost access to a collection of over 3800 online full-text articles of the world's leading biomedical journals from many of the largest publishers of scientific, technical and medical (STM) journals. Also, available through HINARI are databases and other information resources covering medicine, Nursing and related health and social sciences.

All targeted at health workers, researchers and others in not-for profit institutions in developing countries (Press Release figures, 2006). HINARI is targeted at government offices, educational institutions and not-for-profit organizations involved in health care, research, teaching and policy making for free. HINARI is very popular in Nigeria. To date, a substantial number (125) of educational, health and research institutions in Nigeria have registered for access to HINARI (www.who.int/hinari/). Many capacity building workshops have also been organized in Nigeria to promote the use of HINARI resources which are currently being provided free of charge (Ajuwon and Olorunsaye, 2009).

Lagos State University College of Medicine (LASUCOM) web- based electronic resources

The Medical Library has access to a number of electronic resources. Some are free while some need user identification and password. Through the library website, a lot of e-resources in biomedical fields were aggregated on the site for users to have access to. In addition, a list of electronic based resources available for biomedical researchers at the Lagos State University College of Medicine (LASUCOM) is presented in Appendix A.

Efforts have been made by the Medical Library to assist faculty members to have access to these entire databases by aggregating them on a website developed for the Medical Library (www.lasucomlib.org). The aggregated biomedical databases are among the world's largest collections in the biomedical field. The databases provide current and back issues of literature to support the University academia in their research work.

The college library website was developed and it is available to staff, students and users. The address is: www.lasucomlib.org. A lot of e-resources in biomedical field aggregated on this site for users. Also the HINARI database link was included (This needs password and user ID which the college has provided to staff and students).

Internet and medical research

Agbonlahor (2007) opined that the internet is a system that is made up of thousands of smaller networks that are linked together to form a global network. It is otherwise known as an International Networking of computers and the basis of global connectivity. It is more advanced than telephone, fax and e-mail technology. Inter connectivity otherwise known as World Wide Web (www) is a super high wave invention, which is already advancing in the course of humanity to the greatest height especially in this millennium. According to Agbolahor (2007) the services offered by internet are communication and information. For the purpose of this paper, we are much

more interested in the information service provision of internet.

The internet provides an ever increasing quantity and range of information in a number of different formats. It is also possible to make available personal information (research papers, announcements, organizational information and so on) to a worldwide audience by using the internet. It is pertinent to note that as internet tools become more powerful, there is an increasing overlap in these services and the distinction between services that provided access to information and those that allow communication is becoming blurred (Mckenzie, 1997). The information resources that can be found on the internet include:

1. Documents
2. Graphics; audio and video files
3. Software
4. News directory services
5. Library catalogues
6. Databases
7. Blogs
8. Junks

For information search on the internet, the use of search engines is ideal. Search engines are the tools that provide subject access to websites. There are many search engines available but all of them search differently and none of them search the entire World Wide Web. Basically, there are four types of search engines:

1. Directory search engines: These search engines operate like a library card catalog. Although they allow word or term searching, the websites included in the directory have been studied and organized into topics and sub-topics. A good example of a directory search engine and two of the best to select for a beginning search are Yahoo (www.yahoo.com) and the [www.virtual library \(http; /vlib.org\)](http://www.virtuallibrary.org).
2. Robot/spider search engines: The majority of the existing search engines employ a technology in which a robot or spider (software) searches through the web or the search engines own database to capture search terms. As a result, a large number of responses are given to the searchers, many of which are not useful e.g. (www.google.com).
3. Meta search engines: Meta search engines are also referred to as "search engines of search engines". This is because they send a search query to several search engines at the same time and display the result found by each search engine. This simplifies the work of the searcher and also allows for comparisons between search engines on their work with a particular topic. Example is (www.dogpile.com).
4. Specialized search engines: Specialized search engines for websites in a particular area only, for

example, law, medicine, education. Some can only be used to search for sites originating in a particular country or using a particular language country or using a particular language, e.g. (www.education.world.com) and Google scholar (www.scholar.google.com). Tips on how to search the internet is presented in Appendix B.

Other information technology based research tools - web 2.0 and social media tools

Recently, it has been established that apart from HINARI, there are so many other resources that can be contacted by many medical researchers on the internet; they include, web 2.0 and social media tools. Social media and Web 2.0 represent the World Wide Web functionality and tools now utilized by individuals and businesses to connect people in order to boost their knowledge and their ability to learn, share information, facilitate commerce, and influence broad communities. A variety of social media and web 2.0 concepts and tools including social networks, blogs, wikis, podcasts. The Web 2.0 services tend to provide tools for helping users with their folksonomies. Examples of Web 2.0 and social media applications include communication (blogs, internet forums, Micro blogs etc), Collaboration (Wikis, social bookmarking and social news), Multimedia (photo sharing, video sharing and live casting) and entertainment (online gaming) (Source: Wikipedia).

The social bookmarking innovator del.icio.us automatically reminds users of previously deployed tags, suggests some tags, and notes tags used by others. Blogs are about posts not pages as we have in websites. Wikis are streams of conversation, revision, amendment and truncation. Podcasts shuttled between websites and RSS feeds, their contents can be saved, summarized, addressed, copied, quoted and built into new projects (Alexander, 2006).

CONSORTIUM BUILDING IN NIGERIA

Serious efforts at consortium building in Nigeria dates back to the 1970s when the idea of compiling a National Union Catalogue was sponsored by the National Library of Nigeria with the cooperation of Nigeria university libraries who were expected to contribute to the development of the catalogue by sending to the National Library of Nigerian a copy each of the catalogue cards produced in their libraries. Although not much came out of this effort in terms of the publication of a National Union Catalogue, the fact that the idea was floated and brought by the first generation Nigeria university libraries was a good pointer to the possibilities of a library consortium. In recent past, that is 2002 to 2004, Nigeria was a beneficiary of a very generous donation for a country-wide license of the EBSCOHOST which made it

possible for Nigerian universities with the necessary ICT facilities to access thousands of foreign e-journals free of charge (Ajegbomogun et al., 2008).

1. The Nigerian university libraries consortium (NULIB) was established in 2004 and designed to embrace all university libraries in Nigeria with the prospect of being expanded to include all academic and research libraries in the near future. NULIB has the following objectives:
2. To promote resource sharing among member libraries; to make the academic resources of each member library available to all the others.
3. To ensure that member institutions contribute meaningfully towards sustaining the consortium.
4. To make current and relevant information available to the university community.
5. To establish and maintain links with organizations and agencies world-wide.

CONCLUSION AND RECOMMENDATIONS

Learning is the act, process, or experience of gaining knowledge or skill. This can be through schooling or self pace study. Researching therefore aids learning. Research is any human activity based on intellectual application in the investigation of matter. The primary purpose is for the discovering, interpreting, and the development of methods and systems for the advancement of human knowledge on a wide variety of scientific matters of our world and the universe Adefule (2009).

In this age of information explosion, no library however big it may be is able to satisfy all the needs of its users due to various constraints. This phenomenon has aided the development of library consultation. Consequently, the study recommends the formation of a medical library consortium which will comprise of all the medical libraries in the country. The consortium will enable the participating libraries to share resources and stock on relevant materials. Consortium formation will also reduce the cost of acquiring electronic resources as it full cost will be shared among the participating institutions. Lastly, owners (private, states and federal government) of the medical institutions are encouraged to provide adequate funds for acquisition of information infrastructure.

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APPENDIX A

MEDICAL DATABASES

Essential databases

EBSCO MEDICAL JOURNALS (Available to LASUCOM staff only): <http://www.ebsco.com/>

HINARI (Health InterNetwork Access to Research Initiative): <http://www.who.int/hinari/en/> (Require password)

Medline plus: <http://medlineplus.gov/>
Health and Drug information for patients, family and friends

NLM's consumer health resource provides access to extensive information about specific diseases and conditions and also links to a drug information database, medical encyclopedias, dictionaries and doctor locators. Also have videos on clinical trials, surgeries etc.

PubMed: Biomedical journal literature from MEDLINE/PubMed. The web based interface to MEDLINE. MEDLINE holds over 11 million citations from more than 4,000 journals.

Free Medical Journals:
<http://www.freemedicaljournals.com/>

Amedeo: <http://www.amedeo.com>

Bioline International: <http://www.bioline.org.br/>

National Library of Medicine database:
<http://www.nlm.nih.gov/databases/>

Other Useful Sites

Medical Conferences:
<http://www.medicalconferences.com/search.html>

Health on the Net (HON) foundation:
<http://www.hon.ch/egi-bin/confevent>

Physician's guide to the internet:
<http://www.physiciansguide.com/meetings.html>

Essential Health Links:
<http://www.nlm.nih.gov/databases>

APPENDIX B

Research planning tips

Keep a record of which catalogues, indexes and search tools you have used and the search strategy you used so that you can remember what you have done. You may want to go back and refine your searches – don't waste time by doing the same thing twice.

Print, or write down enough information about the book article, or Internet site so that you can remember what you have done. You may want to go back and refine your searches – do not waste time by doing the same thing twice.

Print or write down enough information about the book, article, or Internet site so that you can find it again! You

will also need this information for your bibliography.

Search for books

Use the library catalogue to find out what books and government documents are in the library on your topic. The library catalogue provides descriptions of the books video, documents maps and reports that are in our collection.

Search for articles

Use a periodical index to find out what articles have been published on your topic. A periodical index will give you the citations (author, article title, journal information) for articles. Some indexes will give, or link to, the full text of the article. Periodical indexes are usually subject specific so be sure you are not using a biology index to find articles about Romeo and Juliet.

Most periodical indexes are available in form of electronic databases.

Search the internet

Use an Internet search engine to search for free information on the Internet.

Learn how search engines work. Search engines are designed to perform in certain ways.

Do your search on more than one search engine – they all search different parts of the internet.

Internet searching tips

Learning basic search rules will help you get better results when you search a library catalogue periodical index or the Internet. Check the Help/Tips screens to find out if the search engine uses:

Controlled (thesaurus) terms or uncontrolled (keyword or natural language) terms. Is there a controlled list of subject headings (Sometimes called descriptors) or can you only search using the natural language keywords?

Boolean (included/excluded words. +/-) logic.

Can you combine terms using AND, OR, NOT?

AND or + requires all terms to appear in a record (children AND poverty retrieves records that contain the word children as well as the word poverty)

OR retrieves records with either term (e.g. poverty OR poor retrieves records that contain either the word poverty or the word poor)

NOT or – excludes terms (e.g. children NOT adolescents retrieves all the records that include the word children as long as the word adolescents is not also present)

Can you use parentheses () to carry out operations in a logical order? For example:

Children AND (poverty OR poor)?

Truncation/wildcards

Can you enter the first part of a keyword, add a symbol (such as * . \$. ? . //) and get any variant spellings or word endings? For example: child*retrieves child, child's, children. etc.

Does the search engine use automatic truncation?

Phrase searching

Can you search for more than one keyword, searched exactly as typed (all terms required to be in documents, in the order typed)?

Does the search engine use ADJ (or any other term) to form a phrase?

Does enclosing keywords in quotations (" ") form a phrase?

Field searching

Can you limit a search by requiring a word or phrase to appear in a specific field of the documents/ e.g. title or subject.

With some database, you can search by fields such as descriptor (de), language (la), or author (au).

With some Internet search engines, you can search by title, url, or image.

Case sensitivity (capitalization)

Does it matter whether you use capitals or not?

Most search engines (databases and Web) are not case sensitive or respond only to initial capitals, as in proper names. All lower case (no capitals) will retrieve upper case as well as lower case.

Result ranking

How are the results of the search shown to me?

Searches from library databases are usually shown with the newest items first.

Each Internet search engine has its own way of presenting the search results, usually based on computerized relevancy guesses