

Conceptualization of information communication technology (ICT) from the scholars' point of view: A theoretical review

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Abstract

This paper reviewed conceptualization of information communication technology (ICT), its uses and application to librarianship, the need for the effective application of ICT as the best tool for libraries to use in assisting educational researches and students in this age of information explosion to ensure effective service delivery and among other things discusses various ICT resources that can be used for effective library operations and services. The paper discusses the different dimensions of ICT and gives an awareness of technology in the library and why there is need to understand the use of ICT in the library for rendering enhanced library services and information to users. It also highlights where ICT can be applied.

Keywords: ICT, Librarianship, Library service

Introduction

Information and communication technology (ICT) is universal and similar concept with information technology (IT) that signifies not only a distinct unit of technology but a collection of technologies like telecommunications facilities, data processing facilities, semi-conductors, consumer electronics etc. The impression has come about with an amazing transformation in the information gathering, storage, preservation and dissemination outlook of the world for librarianship. Much current information is recorded in electronic formats. ICT has also tremendously helped librarians in the discharge of their duties such as in cataloguing, reference services delivery, circulation operation, serials control etc. Remarkable development has been achieved in the profession of library

and information science due to the rapid advancement in technology. In the recent times, with the application of internet and technology, the library operations have become very fast. To satisfy user's needs, rapidity and accuracy are the most two crucial proportions. Essentially, Information and Communication Technology (ICT) improves the efforts of the library in minimizing manual activities. ICTs have transformed conventional libraries into modern information centers and librarians to consultants of information or knowledge managers. The new technology has carried significant transformation in various aspects of library operation; from interior operation to clientele's management. Thus all these have been enormously achieved through the employment of library software and the internet. Primarily, ICT is used in libraries

to provide various services for instance, access to library databases, automated circulation of library books and access to online public access catalogue (OPAC) etc. Therefore, ICT facilities have enormously impacted on each sphere of academic library activities and have also provided the chance to achieve critical information services and realization to an extensive varieties of digital based information materials to its clientele. Application of information technology (IT) is embraced to reduce costs, enhance effectiveness, and above all it is used to enhance service quality.

By and large, the vital activities of libraries comprise collection development, reference services management, document delivery service, access to organized collections held by the library and assist users in information search and retrieval (Husain & Nazim, 2015; Cholin, 2005; Malhan, 2006). Information technology is very essential in managing the large collections of library and to make library services faster, easier and in reducing cost of running different operations. In this regard, libraries are facing a new generation of online users who are technologically savvy and integrate information access and use in all spheres of their lives to an unprecedented degree (Thomas & McDonald, 2005). It is however apparent that all these advancements are contingent on the contentment of the clientele with the library's services. In line with this, Berners-Lee et al (1992) asserted that in the present scenario, the quickest library service is more approachable through the world-wide-web and internet. To provide information to the 'right users' at 'any time', from 'anywhere' in the 'right way' as (Fischer, 2012) stated is achievable with employing web based information technology.

Concept of information communication technology

ICT has been variously researched by many scholars in this modern and rapidly changing global community. Thus, Information Technology is considered in the library to be concerned with acquisition, processing, organization and dissemination of information-textual, numerical, photographic and vocal. In other words, it is considered as a broad-based term comprising the acquisition, organization, storage and retrieval of information that can be in textual or numerical, vocal and photographic forms or audio-visual or integration of all of the above, which could be best described as multimedia, using a coalition of computer and telecommunication gadgets. According to Marshall (1984), IT is the coming together of computing and telecommunications for the purpose of handling information; the application of technologies to information handling; including generation, storage, processing, retrieval and dissemination. Emuakpor (2002) described IT as all forms of technology applied to the processing, storing and transmitting information in electronic form; stressing that the physical equipment used for this purpose include computers, communication equipment and networks; fax machines and electronic, pocket calculator etc. Essentially, Ayo (2001) viewed it as the use of computer system and telecommunications equipment in information handling; consisting of essentially three basic components which are: electronic processing using the computer; transmission of information using telecommunication equipment; and dissemination of information multimedia. Therefore, IT in libraries consists of all electronic infrastructure and equipment engaged by librarians for an efficient service

delivery. Such equipment, in broad term, consist of hardware, software and communication networks between the service channels of different libraries to facilitate the sharing of available materials; particularly the library webs. In a related development, Osundina (1973) pointed out that the library of today should not merely store documents and preserve them, it must also devise means by which the contents of such documents can be rapidly and effectively transmitted for use. Ogunsola (2004) observed that the pace of change brought by new technologies has had a significant effect on the way people live, work and play worldwide.

Capron (2000) revealed that mail, telephone, television, radio, books, newspapers and periodicals are the traditional ways users send and receive information. However, data communication system (computer system) also transmits data over communication lines such as telephone lines since the mid-1960s. Internet use nowadays, metamorphosed access to information for the world where libraries enjoy its application in all aspects of their services. Some of the most widespread technological devices include e-mail, FTP (File Transfer Protocol), WWW (World Wide Web), Telnet and Usenet. All these technological devices are regarded as primary to the image of globalization. The internet persists to have extreme impacts on the advancement of information usage, particularly in the academic communities, making workable speedy communications among trades and holding up global cooperation among organizations and individuals. These technologies have the potentials to develop “virtual campuses” and “virtual libraries” thus, increasing students’ access and participation (Ogunsola, 2004). In a study conducted by Daniel (2000), it was revealed that Nancy Schiller was one of

the first writers to use the expression “virtual library” which she defined in 1992, simply as “libraries in which computer and telecommunications technologies make access to wide range of information resources possible”. Today, the concept is referred to variously as “digital library”, “electronic library”, “community network”, or simply “library without walls” (Ogunsola, 2004).

Recent advances in ICT have not only increased tremendously the ability to access, store and process information within the library but also have brought significant changes in the concept, organization, functioning and management of library and information systems (Peyala, 2011). The ICT revolution has facilitated the processes of searching for and retrieving information. ICT improves the efficiency of organizational management processes and provides new ways of improving the capacity of response to its users (López, Peón, & Ordás, 2009). Use of ICT applications can assist in creating, storing, transferring and using tacit and explicit knowledge (Okumus, 2013). Buarki, Hepworth and Murray (2011) undertook a review of information and communication technology skills and employability needs at the library and information science programme in Kuwait. They reviewed an enormous number of ICT related literature. They concentrated on ICT skills of library and information science students in global library and information science education and compared them with those skills needed by the job market in Kuwait. They found out that, “ICT skills have been recognized as essential qualities for Library and Information Science graduates’ employment”. Therefore, ICT expertise has now realized to be necessary and foremost in considering a candidate for the job opportunity.

Anunobi and Edoke (2010) have discussed how university library plays a pivotal role as an information providing system, how it supports teaching, learning, and research with information materials of various types. Amongst the different information materials, serials or periodicals are most obligatory mainly for faculties and researchers. Earlier, the serials operation was manual, but with the development of ICT the acquisition of serials or periodicals became easy as well as its retrieval. In line with the foregoing perspective, users' curiosity for seeking information changed from print to e-resources. Haneefa (2007) investigated the application of ICT in special libraries in Kerala, India. The study revealed that the library catalogue was the common section for automation. The study has proposed to improve automation process and to effectively and efficiently adopt of ICT. Chandrakar and Arora (2010) provided the Indian approach on the use of information technology on copy cataloguing from different trusted sources such as IndCat, and catalogue of Library of Congress. Therefore, the general review emphasized that the proper use of ICTs in library are much crucial.

Application of ICT in libraries

Information technology application in library and information discipline has made tremendous achievement in the globe. Information Technology does not only influences the technical services of libraries but also designs the library services that are being provided to the public. Worldwide libraries have been exploring new technologies for providing better and faster access to vast information resources and efficient information services to their users. Information Technology has offered better solutions to achieve greater level of efficiency, productivity and excellence

services in libraries (Sahu and Rasul 2011). Similarly, the progress in the sciences and in the application of ICTs, especially the Internet, Intranet and other similar networks have continued to influence positively on the procedures of library and information service delivery, arts, education and teaching of information professionals and in the area of information seeking behavior and practice

Library and Information Science (LIS) education in this changing community where transformation occur due to the proliferation and progress in ICTs, demands the LIS professionals to seek for new IT skills for existence. Nigerian LIS schools are envisaged to drill up for this difficult condition. The influence of Information and Communication Technologies (ICTs) is now clear in every span of human undertaking including the library and information science discipline which is deemed prevalent. It has been noted that the application of ICTs into many fields has led to today's society being addressed as the Information Society. Many tertiary institutions' libraries in Nigeria are not computerized, and are not provided with internet facilities. It has been lamented that the application of ICTs in Nigerian higher educational institutions shows cognizance of the important role ICT can play in providing library services, although ICT is not fully adopted by most of the tertiary institution libraries of the country. The problem of plagiarizing other people's work and share volume of information available also makes selection of the most suitable information technology a complex task (Smith, 2005). ICT offers veritable solution in this regard.

Nowadays, there are various information communication technologies for technical services, organizational and administrative functions in the libraries. A number of electronic and digital media,

computer aided electronic appliances and internet have provided important role in retrieval and dissemination of information and render a critical part in effectively modernization of libraries. Prominent among these include the following:

Library automation

Library automation according to Mishra et al (2015) refers to use of computers, associated peripheral media such as magnetic tapes, disks, optical media etc. and utilization of computer based products and services in the performance of all type of library functions and operation. Computers are capable of introducing a great degree of automation in operation, function since they are electronic, programmable and are control over the processes being performed.

Library networking

It refers to activities that result from an agreement, formal or informal, among a group of libraries (usually a consortium or network) to share collections, data, facilities, personnel, etc., for the benefit of their users and to reduce the expense of collection development. Library networking is a mode of operation whereby the functions are shared in common by a number of libraries (Muthu, 2013).

Library Management System

Library Management System is an application which refers to library systems which are generally small or medium in size. It is used by librarian to manage the library using a computerized system where he/she can record various transactions like issue of books, return of books, addition of new books, addition of new students etc. (Kumar et al, 2014).

Digital library

A digital library is a library in which collections are stored in digital formats (as opposed to print, microform, or other media) and accessible by computers. The digital content may be stored locally, or accessed remotely via computer networks. A digital library is a type of information retrieval system (new world encyclopedia).

Technical communication

Technical communication consist of technical writing, editing, publishing, DTP systems etc. In technical communication, according to Desai (2009) specific information is to be conveyed in a written or an oral or a visual form, to the specific readers or audience or viewers. Technical communication should lead to some conclusion for decision making or some action to be taken for a plant, process, person or a procedure. It should impart some concrete factual information. Just like medical prescription, it should be specific.

ICT based user services in modern libraries

Saleem et al (2013) emphasized that some library users are adopting electronic habits, making increasing use of the new ICT including computers, the Internet, the Web, Intranet, Extranet and other technologies. As a result, library users are placing new demands on their libraries. They require access to the latest information, updated information resources and access to ICT facilities that they could use in their work.

Use of ICT in libraries enhances users' satisfaction. It provides numerous benefits to library users. Some of the benefits, according to Saleem et al (2013), are:

- Provides speedy and easy access to information
- Provides remote access to users

- Provides round the clock access to users
- Provides access to unlimited information from different sources
- Provides information flexibility to be used by any individual according to his/her requirements
- Provides increased flexibility
- Facilitates the reformatting and combining of data from different sources
- Libraries are also providing various ICT-based services to their user, including the following as itemized by Saleem et al (2013)
- Provision of Web access to OPACs
- Electronic document delivery
- Networked information resources
- Delivery of information to users' desktops
- Online instructions, and
- Online readers advisory services

Impact of ICT on libraries and librarians

Computer has brought in a new impact to the library and information usage. In libraries, information technology has assisted library professionals to provide value added quality information service and give more remote access to the internationally available information resources. Today's highly sophisticated information technology facilitates the storage of huge amounts of data or information in a very compact space. Information technologies promise fast retrieval of stored information and revolutionize our concept of the functions of a traditional library and a modern information center. Recently technological developments have dramatically changed the mode of library operations and services (Saleem, et al 2013).

Today's IT is influencing on various aspects of libraries and the information discipline. Progress in ICT and its widespread use is coming about with digital information sources and digital media therefore resulting in the dominant form of information storage and retrieval. Saleem et al (2013) further stated that ICT also survives and makes true rules of Library Science 'Every reader his/her book/information', 'Save the time of the reader', 'Library is a growing organism'. Moreover, ICT with its remarkable information sources, speedy transmission and simple access ensures the fulfilment of the user with complicated needs, disintegrate the space hindrance and reduces the period needed and ensure the right information to the right reader at the right time. It also escalates and decipher the library's requirement of collection development.

Components of ICT facilities in libraries

Furthermore, (Saleem et al 2013) observed that ICT came about as a result of the digital convergence of computer technologies, telecommunication technologies and other media communication technologies. And they asserted that Patil, Kumbar and Krishananda categorized the components of Information Technology (IT), which are being frequently used in the library and Information centres are as follows:

Computer Technology,
Communication Technology,
Reprographic, micrographic and printing technology.

Conclusion

Effective application of information technology in library transmits users' satisfaction. The present scenario demands the updated technology for the faster and approachable library services. Gradually, new technologies are developed,

consequently there is the need to develop our skills and capacity to provide enhanced library services. Library resources must be used at a large amount. The successfulness of a library and the library professional always depend on the quality of the service. The emergence of ICT is the new paradigm to extend the level of library operation and services. So, it is inevitable for the library professionals to be updated with the technology for their own existence. Nowadays computer and related technologies have brought revolutionary changes in the whole world of information. Perhaps this is the most exciting period in the history of human race when world's most population is shifting from techno illiterate to techno literate. The society is undergoing a kind of transformation each and every day, it was discovered that ICT has affected almost every sector of our lives, bringing a change in the case of peoples thinking, interaction etc. This revolutionary change also affects libraries and information centers which makes it difficult to function without computers and information technologies. In today's world the library and information profession has been changed and adopted itself to development of information and communication technology. These technologies have acquired the do or die prominence, those who go with the advances will survive and others would become obsolete. A well-equipped library with the facilities of modern information infrastructure and technologies could satisfy the maximum demand of the present technology conscious users.

References

Anunobi, C. V., & Edoaka, B. E. (2010). Use of ICT facilities for serials functions in Southern Nigeria federal university libraries. *Library*

Philosophy and Practice (e-Journal), 355. Retrieved from <https://digitalcommons.unl.edu/cgi/viewcontent.cgi?article=1363&context=libphilprac>.

- Ayo, C.K. (2009). *Information technology: trends and application in science and business*. Lagos: Concept Publications.
- Berners-Lee, T., Cailliau, R., Groff, J., & Pollermann, B. (1992). World-Wide Web: The information universe. *Internet Research*, 2(1), 52–58.
- Buarki, H, Hepworth, M, & Murray, I (2011). ICT skills and employability needs at the LIS programme in Kuwait: a literature review. *New Library World*, 112(11/12), 499–512.
- Capron, H. L. (2000). *Computers: tools for an information age*. New Jersey: Prentice Hall.
- Chandrakar, R., & Arora, J. (2010). Copy cataloguing in India: a point-of-view. *The Electronic Library*, 28(3), 432–437.
- Cholin, V. S. (2005). Study of the application of information technology for effective access to resources in Indian university libraries. *The International Information & Library Review*, 37(3), 189–197.
- Daniel, J. O. (2000). Virtual library for Nigerian libraries. *Nigerian Libraries*, 36(2), 56.
- Desai, M. D. (2009). *Technical communication*. Ahmedabad: Institute of Technology Nirma University p.28
- Emuakpor, A. O. S. (2002). The impact of information technology in collection development and management in libraries. *Information science and technology for library schools in Africa*. Madu, E.C. et al. (Eds) Ibadan: Evi-Coleman Publications.
- Fischer, G. (2012). Context-aware Systems: The “Right” Information, at the

- “Right” Time, in the “Right” Place, in the “Right” Way, to the “Right” Person. In Proceedings of the International Working Conference on Advanced Visual Interfaces (pp. 287–294). New York, NY, USA: ACM.
- Haneefa, Mohamed. (2007). Application of information and communication technologies in special libraries in Kerala (India). *Library Review*, 56(7), 603–620.
- Husain, S., & Nazim, M. (2015). Use of different information and communication technologies in Indian academic libraries. *Library Review*, 64(1/2), 135–153.
- Kumar, P., Kumar, R., Singh, R., & Singh, V. P. (2014). Library management system, Kochi (unpublished dissertation submitted to the school of computer engineering, Cochin university of science & technology Kochi) p. 7
- López, S. P., Peón, J. M. M., & Ordás, C. J. V. (2009). Information Technology as an Enabler of Knowledge Management: An Empirical Analysis. In W. R. King (Ed.), *Knowledge management and organizational learning* (Vol. 4, pp. 111–129). Boston, MA: Springer US.
- Malhan, I. V. (2006). Strategic Planning for Developing Indian University Libraries into Knowledge Resource and Service Centers (pp. 1–12). Presented at the World Library and Information Congress: 72nd IFLA General Conference and Council, IFLA. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.150.7515&rep=rep1&type=pdf>
- Marshall, C. (1984). *Beginner’s Guide to Information on Technology*. London: Butterworth & Co (Publishers) Ltd.
- Mishra, A. J., Thakur, S. K. & Singh, T. (2015). Library automation: issues, challenges & remedies *Times International Journal of Research*, 1.
- Muthu, M. (2013). Resource sharing in libraries: A vital role of consortia *International Research: Journal of Library & Information Science*, 3 (1), 212-213.
- New world Encyclopedia (n. d). Digital library system. Retrieved from https://www.newworldencyclopedia.org/entry/Digital_library
- Ogunsola, L. A. & Boucouvalas, M. (2004) Nigerian university libraries and the challenges of globalization: the way forward. *Electronic Journal of Academic and Special Librarianship*, 5(2-3). Retrieved from http://southernlibrarianship.icaap.org/content/v05n02/ogunsola_101.htm.
- Okumus, F. (2013). Facilitating knowledge management through information technology in hospitality organizations. *Journal of Hospitality and Tourism Technology*, 4(1), 64–80. Retrieved from <https://doi.org/10.1108/17579881311302356>.
- Osundina, O. (1973). The relationship between information science and librarianship: A viewpoint. *Nigerian Libraries*, 9(1&2), 47.
- Peyala, V. (2011). Impact of using information technology in central university libraries in India: Results of a survey. *Program*, 45(3), 308–322. Retrieved from <https://doi.org/10.1108/00330331111151610>.
- Sahu, A. K. & Rasul, G., (2011). Use of IT and its impact on service quality in an academic library. Retrieved from

<http://unllib.unl.edu/llp/libraryphilosophyandpractices>.

Saleem, A., Shabana, T. M., & Batcha, S (2013) Application and uses of information communication technology (ICT) in academic libraries: An Overview *International Journal of Library Science*, 2(3): 49 - 52.

Smith, M. Q. (2005). The impact of information and communications technology change on the management and operations of academic libraries (Doctoral dissertation, University of the Western Cape).

Thomas, C., & McDonald, R. H. (2005). Millennial net value (s): Disconnects between libraries and the information age mindset. Florida State University, Retrieved from https://www.researchgate.net/profile/Robert_Mcdonald4/publication/228452528_Millennial_net_value_s_Disc

[connects_between_libraries_and_the_information_age_mindset/links/00b7d5230d35bc0d7f000000.pdf](https://unllib.unl.edu/llp/libraryphilosophyandpractices/links/00b7d5230d35bc0d7f000000.pdf).

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