

A REVIEW OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) FACILITIES FOR THE IMPLEMENTATION OF VIRTUAL LIBRARY MANAGEMENT SYSTEM

¹Emakpor Peter Chucks; ²Yakubu Sani and ³Moses Timothy

^{1,2} Department of Educational Management, Faculty of Education, Nasarawa State University, Keffi - Nigeria

³Department of Computer Science, Federal University of Lafia, Nasarawa State - Nigeria

Abstract

Information and Communication Technology (ICT) has a long standing impact in practically all regions of human action. It goes about as an impetus in all circles of science and innovation. It has become inside a brief timeframe, one of the fundamental structure squares of a cutting edge society. The effect has been fairly notable in areas such as banking, health care, transportation, manufacturing and agriculture. ICT is critical to libraries to accomplish its objectives for the management of data, viable administrations and effective services and extension of boundaries from the four walls of the university/geographical location to the globe. They offer access to books in each conceivable structure and configuration. The approach of computerized PC progresses in media transmission and varying media advances has opened up better approaches for gathering, arranging and dispersing logical and specialized data. This paper intends to review the use of ICT for the implementation of a virtual library management system. The examination study will take a gander at how ICT items and administrations have helped in the administration of virtual libraries and how public and university libraries in Nigeria have entered into this positive pattern.

Keywords:- ICT, ICT based products and services, university libraries, virtual library, e-library, library management system, library facilities.

1.0 INTRODUCTION

There has been an extensive development over the last decades of a wide range of learning in which students, instructors, teachers and researchers all share the same virtual environment; though scattered from a land perspective [1]. There exist an extraordinary number of new apparatuses and an increasingly summed up access to PC systems which is altering learning frameworks, teaching models and research; and as a consequence, libraries and documentation centers as well [2]. This time of data blast has brought a colossal measure of data being created and transmitted from each side of the world as print materials, research articles, lectures, presentation, video conferencing, specialized reports, benchmarks and licenses (Ahmad, 2011). A new kind of library rises up out of this circumstance changing the conventional thought of the library. Starting now and into the foreseeable future, libraries will stop to be situated in a particular spot and will never again go about as compilers and

'storers' of fundamentally physical substance however will become spaces without physical area or substance. We presently have a new library focusing on different kinds of records and consequently, necessitate that we grow new frameworks to identify with the user. This model of library must make apparatuses, content and traditional service compatible with new capacities emerging from another method for learning at universities and at other educational centres. The new library must take on new roles like how to choose, sort out, recognize, prescribe, 'tutorize' and even train users [2]. The new library-narrative model being created from this reason has been named in different ways; electronic library, advanced library, library without walls, or just virtual library. We will allude to this new narrative model as a virtual library. For sure, 'virtuality' has made it conceivable in light of the fact that it utilizes digital documents as a significant piece of its benefits by which the library's aims can be accomplished.

Virtual library conceivable on account of its advanced substance in this manner make Information and Communication Technology (ICT) a critical and an indispensable part for accomplishing viable administrations and expansion of limits from the four-walls to the globe [3]. ICT has enormously helped in the administration of virtual libraries [4]. It has changed how assets and housekeeping activities like acquisition, cataloguing, circulation control, serials control are overseen [5]. It has additionally influenced the manner in which administrations are conveyed. Internet has been utilized widely as an asset to convey the Library and Information Services (LIS). With the usage of virtual library through ICT, libraries can connect all inclusive to offer their types of assistance 24-hours every day in an exceptionally cost effective manner. ICT has empowered users to avail many services with no human mediation [5]. This study therefore, looks to knowledge on how ICT has helped in the usage of virtual library. The study is divided into five segments. Segment two gives the theoretical framework of ICT for the usage of a virtual library management system; segment three reviewed the role of Nigeria in the implementation of virtual library management system using ICT. Segment four is the conclusion and five are recommendations that will help in effective and efficient virtual library management system in Nigeria.

2.0 THEORETICAL FRAMEWORK

The term 'Information and Communication Technology' (ICT) first showed up in the mid 1980's and was characterized as "a wide range of electronic frameworks utilized for broadcasting telecommunications and mediated communications [6]. ICT is made of PC and communication technology. The PC is the device for storing and processing information in digital form while communication technology helps to transfer and disseminate digital information [6]. The word ICT is a mix of two words; information and technology. Information implies knowledge while technology implies utilization of PC for communication of knowledge. The term ICT can be characterized as "the integration of computing, networking and information processing technologies and their applications" [7]. The author in [8] characterized ICT as a term used to portray a range of equipment (hardware: PCs, scanners and digital cameras), computer programs (software: database programs and multimedia programs), and the broadcast communications infrastructures (telephones, faxes, modems, video conferencing hardware and web cameras) that permit us to get to, recover, store, compose, control, present, send material and impart locally, nationally and internationally.

The improvement and execution of ICT in virtual libraries have today not just expanded and widened the effect of data assets but in addition; put more accentuation on viable and productive administrations [9]. Their applications in virtual libraries have indeed continued to

ease and promote quick and timely access to and transfer of information resources that are found dispensed round the globe [4]. The various services provided in the libraries are complimented by facilities some of which are technology driven. The use of emerging technologies lately in libraries worldwide has demonstrated beyond reasonable doubt that a library, whatever its services can perform better when facilities are enough given to improve access to the substance of the library [10]. The authors in [11] cited that ICT came to fruition because of the advanced combination of PC innovations, media transmission advances and other media correspondence advances. Some library users are adopting electronic habits, making increasing use of new ICT including PCs, the internet, the web, intranet, extranet and different advancements. Accordingly, library users are setting new requests on their libraries. They expect access to the most recent data, refreshed data assets and access to ICT facilities that they could use in their work.

2.1 ICT FACILITIES/RESOURCES USED IN EFFECTIVE VIRTUAL LIBRARY MANAGEMENT SYSTEM

Some ICT tools that can be utilized for successful virtual library operations and services are described below.

- i. **BAR-CODING TECHNOLOGY:** A barcode reader (or barcode scanner) is an electronic gadget for perusing printed barcodes. Utilizing barcode reader for dissemination and stock check is getting progressively normal, productive and helpful in virtual library management.
- ii. **BULLETIN BOARD SERVICES:** A Bulletin Board System, or BBS, is a PC framework running software that permits users to interface and sign into the system utilizing a terminal. Once signed in, a user can perform functions such as, transferring and downloading information, reading news and notices, and trading messages with different users, either through electronic mail or in public message boards.
- iii. **CAS and SDI SERVICES:** Introduction of Current-Awareness Services (CAS) or Selective Dissemination of Information (SDI) in the form of 'Table of Contents' (TOC) cautions, list of new arrivals of journals and books, press clippings, research digest, including abstracting and indexing services have begun by the library. Selective dissemination of information alludes to instruments and assets used to keep a library user informed of new resources on specified topics.
- iv. **CHAT SERVICES:** Online talk may allude to any sort of correspondence over the Internet, which offers a quick transmission of content based messages from sender to collector. In virtual libraries, it tends to be utilized for online reference administration and real time consulting service.
- v. **ELECTRONIC DOCUMENT DELIVERY SERVICES:** At present, a record conveyance administration commonly includes a mix of paper, advanced and electronic media; report conveyance is a "cross breed" medium. Virtual libraries are executing ICT-based interlibrary loaning framework utilizing electronic systems to convey duplicates of journal articles and different records in computerized position essentially in Portable Document Format (PDF)] to library users' work areas.
- vi. **LIBRARY MANAGEMENT SOFTWARE PACKAGE:** Software comprises of the bit by bit directions that guide the PC. In a virtual library, the most widely recognized PC software utilized are library automation software, database

management software, anti-virus software and application programming. Numerous product bundles for different applications in the field of library and information management are *CDS/ISIS*, *SOUL*, *LIBSYS*, *KOHA* and so forth utilized for automation purposes.

- vii. **MICROGRAPHIC and REPROGRAPHIC TECHNOLOGY:** These innovations are still broadly utilized innovation in libraries comprehensively. The vast majority of the research libraries have reprographic machine and give photocopies of any archive on request. Microform is a conventional term for all data transporters which use microfilm or comparative optical media for the high-density recording and storage of optically encoded information in the form of micro images of printed document, bit patterns or holograms.
- viii. **NPTEL SERVICES:** NPTEL provides e-learning through online web and video courses in engineering, science and humanities streams. The mission of NPTEL is to upgrade the nature of designing instruction in the nation by giving free online courseware.
- ix. **RFID TECHNOLOGY:** RFID (Radio Frequency Identification) is the most recent innovation being utilized in present day libraries to forestall robbery of library materials. RFID proof is a term utilized for advancements using radio waves for identifying individual items automatically. It is a quickest, least demanding, most productive approach to follow, find and oversee library materials and being utilized in the libraries for programmed registration and registration flow process and furthermore in stock administration. It is a rising, increasingly compelling, advantageous, and cost proficient innovation in library mechanization and security. RFID is utilized fundamentally the same as standardized identifications. Improvements in RFID innovation keep on yielding bigger memory limits, wider reading ranges and faster processing.
- x. **SMART CARD FOR MEMBER IDENTIFICATION:** A smart card is a polyvinyl plastic card (like an ordinary credit card) with an implanted chip on which information is stored. Brilliant cards can give ID, confirmation, information stockpiling and application handling. It can store multi applications and can be utilized for administrations like electronic handbag.

2.2 ICT ENABLED SERVICES FOR THE IMPLEMENTATION OF VIRTUAL LIBRARY MANAGEMENT SYSTEM

2.2.1 Online Public Access Catalogue and User Services

Library cataloguing is the most significant instrument for finding material in the Library [5]. Unfortunately until recently, its worth has been confined by its physical structure, most regularly a huge card inventory or a lot of printed volumes. The appearance of PCs, with their capacity to process a lot of data and yield in an assortment of arrangements has at long last carried the library to the user, any place the person in question might be situated as Online Public Access Catalogue (OPAC).

OPAC permits looking through the whole list on the web, advantageously and rapidly, utilizing one or more search criteria. One can, for instance, search by author, title, keywords, class number or at least one of these consolidated together [5]. OPAC even shows the present status of a book, regardless of whether it is lent out, accessible on the rack or lying somewhere else. Another bit of leeway of OPAC is its capacity to

show index records in a collection of formats, for example, Anglo-American Cataloguing Rules (AACR2), Machine-Readable Cataloguing (MARC) and so on, and the records can be shown in an ideal request. For instance, one can show records organized (arranged) by author, title or call number. Most virtual library management packages offer printing of bibliographies from OPAC either on a printer or on a file. An OPAC terminal ought to be outfitted with search software, which is generally part of incorporated virtual library management systems such as *LibSys*, *EasyLib*, *NewGenLib*, *SOUL*, *Sanjay* and so forth. Some coordinated virtual library management systems use OPAC for other client administrations like reservation, participation enquiry and enlistment, interlibrary advances. A decent case of an Online Public Access Catalogue is the one utilized by Thapar Institute of Engineering and Technology described in Figure 1.

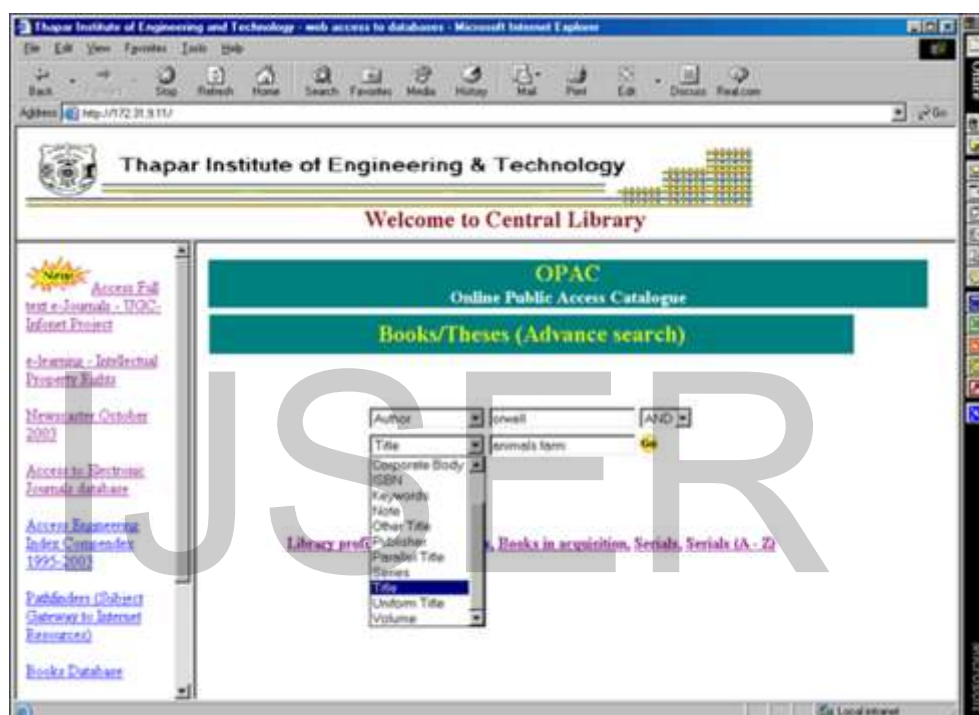


Figure 1: An example of Web OPAC [5]

Another comfort that OPAC offers is availability from a remote PC, utilizing a local area network (LAN) or a wide area network (WAN). With present day library frameworks offering interface to OPAC, it is additionally conceivable to give access from anyplace on the planet through Internet. A web empowered OPAC is called Web OPAC. Web OPAC can be looked through utilizing any basic program, for example, Microsoft Internet Explorer or Netscape Navigator. Aside from searching in OPAC, a few libraries permit their remote clients to benefit certain online administrations like book reservations, advance solicitations for postal credit, membership application, suggesting books and so on.

2.2.2 Information Services

A portion of the significant changes that improvements in ICT have achieved in information services are:

- i. Reference Service: Asynchronous instruments, for example, email, subject portals, FAQs, and electronic libraries and intuitive apparatuses like talk rooms, virtual reference desk, and ask-me are replacing the ordinary methods for post, telephone or in-person reference enquiries [9]. Ask-a-Librarian permits the user to click on ask-a-librarian link to send an organized enquiry to the reference custodian. The reference bookkeeper either gives an answer, links to resources or link to a subject master. Interactive tools now permit a reference interview on the web [5]. A case of this administration is shown in Figure 2 from Calvin University Library.

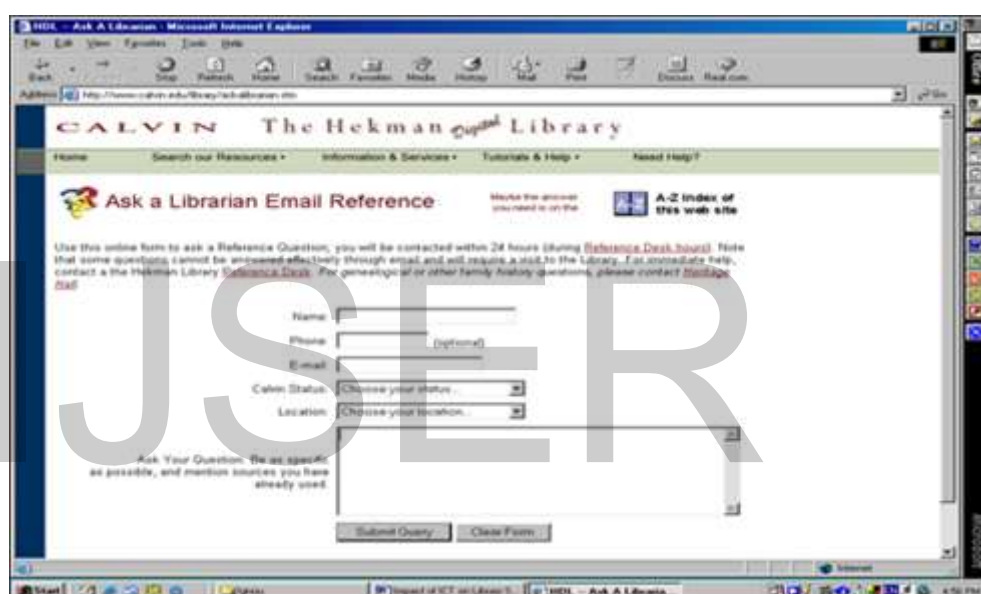


Figure 2: Ask-a-Librarian service at Calvin University Library website [5]

- ii. Bibliographic Service: Compilation of biographies, reading lists and state-of-art reports are very pieces of virtual library management system. Perusing through the manual lists and modified works is a dull and tedious work, and doesn't generally deliver exceptional outcome. Accessibility of databases in electronic structure on CDROM or on the web, offers helpful, productive and cost effective information retrieval [5]. Electronic databases additionally give unique search features such as searching multiple criteria (keyword, subject, author, source, classification code, year of production, language and so forth.), and variety of display formats and styles. Advance features like natural language query ranking the search results is likewise accessible in numerous databases. Web based services encourage full content hunts and connection to full content of the archives. *Dialog*, *STN* and *Silver Platter* are a portion of the famous database organizations that offer bibliographic and reference databases on CDROM and Online stages [12].

- iii. **Current Awareness Service:** Current Awareness Services has been significant methods for staying up with the latest areas of interest. A current awareness service might be as straightforward as copy of table of contents or a bulletin containing bibliographic records, of articles chose from the present issues of journals and other material, and typically sorted out by subjects. Virtual libraries presently gather current awareness bulletins using predefined search technique and running on the database either on CDROM or online occasionally and getting the ideal result. Subject to copyrights, the result can likewise be stored on a local system, and disseminated online (web, intranet) and offline (print, CDROM, email). Table of contents of most journals are accessible free from the publishers' sites. A few publishers significantly offer free email update of list of journal titles [13]. An enormous number of electronic publishing sites presently offer current list of published articles by means of email to enlisted users. Web has empowered a great deal of developments in substance, techniques for creation and dispersion of current awareness products. Tools such as *Listserv*, *Weblog*, *Webzines* and *e-pamphlets* are common these days. *Listserv* gives the most recent information, intriguing issues, thoughts and conclusions, an opportunity to talk about issues, a wellspring of exhortation and help. *Weblogs* truly log the web. They audit, select and bundle the most recent applicable information in a branch of knowledge. A few instances of electronic current awareness services are *The NSDL Scout Report for Math, Engineering, and Technology* (<http://scout.wisc.edu/Reports/NSDL/MET/Current/>) and *Free Pint* (www.freepint.com).

2.2.3 Document Delivery Services

It is not possible for libraries to have everything that its customers may require. Libraries use document delivery services from other libraries and business associations for duplicates of research papers not held by them [13]. ICT has made document delivery services very simple and reliable; from looking through the property to requesting and conveyance have been profited by the utilization of ICT. An enormous number of virtual libraries currently have their journal holdings on their site and can be looked on web [5]. Numerous library systems, for example, *INFLIBNET* and *DELNET* maintain union catalogue of their member's journal holdings. One such document delivery service provider *British Library Document Supply Service (BLDSC)* offers an adaptable system of receiving orders and tracking documents. *BLDSC's* email based report supply framework *Artmail* permits enlisted users to send demands through an arranged email that naturally is handled by *BLDSC's* framework, which generates location of the sources. The reports can be gotten in print as well as electronic format. Online and web based database services such as *STN* provides link to document delivery services of their own or an outsider. Some of the commercial document delivery services are *Ingenta* (<http://www.ingenta.com/>), *BioMedNet*, *OCLC* (www.oclc.org/) and *Science Direct* (<http://www.scienceDirect.com>). Full content of electronic journal articles that are accessible in electronic structure may likewise be downloaded through links provided by aggregator or gateway services such as *Informatics' J-gate* (www.j-gate.informindia.co.in/).

2.2.4 Inter-Library Loans and Union Catalogues Service

No library can satisfy all the requirements of its users from its collection. Asset sharing through Inter-library credit is a necessity for the libraries [3]. Access to the inventory of accomplice libraries is essential inter-library loaning. Association indexes, institutionalization and machine readable catalogues are aimed at promoting resource sharing. Printed union catalogues and Computer Output on Microfiche (COM) indexes and CDROM are currently being replaced by web OPAC and web-based union catalogues. Librarians would now be able to get to indexes of thousands of libraries over the world utilizing Internet. Advancements in computerized library and web innovations have made it conceivable to consequently refresh the inventory records from part library frameworks, distributed searches using a single user interface, and value added services. *RedLightGreen*. (<http://www.redlightgreen.com/>) is one of the world's biggest electronic union catalogues. It contains around 130 million records from 160 part libraries of Research Libraries Group (RLG) in USA. In India, bodies like *INFLIBNET*, *DELNET* are additionally creating union catalogues of books, serials and theses.

2.2.5 Audio-Visual Services

Audio-visual materials are significant wellsprings of information, instruction and amusement. Numerous virtual libraries especially media libraries and enormous academic and open libraries hold audio-visual materials such as music, movies, pictures and photos etc. Old media of LP records and tape slide have for quite some time been replaced with sound and video tape. The new interactive media of audio CD, Video CD (VCD), and Digital Video Disks (DVD) have preferred position of higher stockpiling limit, arbitrary access and longer life than audio and video tapes [9]. Numerous virtual libraries permit their members to borrow these CDs. Multimedia documents can now be played on standard PCs; stand-alone or networked. Recent improvements in storage media, compression and encryption innovation have made it conceivable to store huge measure of multimedia documents on hard disk and deployed them through the web. Software such as *Quick Time Player*, *Microsoft Media Player* and so forth are currently unreservedly accessible to play or see these documents in a browser [5].

2.2.6 Digital Library and Archive Services

Numerous libraries generally have been archives of local information and heritage of documents such as manuscripts, uncommon books, maps, photos and artworks and so forth. Archiving is likewise part of virtual library management system, especially in business and research organizations. In some cases, for example, university libraries; records created in-house like thesis, research papers and so forth speak to the scholarly quality of the institution. Virtual libraries are creating advanced stores of such assets, and giving Internet or intranet access to these resources. Huge open and academic libraries additionally give exceptional up-

to-date local information through web. Virtual libraries are a characteristic movement from electronic report sharing. The principal advantage of virtual library is the capacity to give 24-hour remote access to appeal or confined materials for various simultaneous users. Setting up a virtual library should either be possible utilizing 'off-the-rack' digital library items, document management products or library management products capable of digital library management; or in-house system development using open achieves software. Some of the leading open source digital management software (off-the-rack items) are from *Blue Angel Technologies*, *CONTENTdm*, *Crossnet Systems Ltd*, *Endeavor Information Systems*, *Epixtech*, *ESP*, *Ex Libris*, *Fretwell-Downing Informatics*, *IBM*, *Sirsi*, and *SydneyPlus*. *Greenstone* (<http://www.greenstone.org>).

3.0 NIGERIA SITUATION ON THE IMPLEMENTATION OF VIRTUAL LIBRARY MANAGEMENT SYSTEM USING ICT

Africa and Nigeria specifically, is exceptionally rich with a great deal of data assets that are helpful for researchers that can prompt an adjustment in the management of virtual library framework [14]. The emergence of information and communication technology in the 21st century has realized a huge way to deal with the administration of these assets in the academic environment through virtual libraries. Today users like to utilize virtual library by means of web as essential wellsprings of data, frequently depending on paper as last resort due to the issues of distance and time [14]. The greatest challenge in Nigeria however, is the ability of libraries especially those in the academic environment to manage these data assets and make them open to the widespread insightful network. Nigeria is quick assuming the statue of an electronic library; a library which is comprised of electronic materials and services as well as other organization of assets that need electronic devices to utilize, for example, video tapes, advanced cameras and barcode sensors among others. All things considered, the university library in Nigeria is charged with the duty of managing these data assets through the e-library to fulfil the regularly expanding necessities of the university community. In spite of the fact that university/public libraries have not completely grasped the new innovation, there is a sign through the improvement of virtual libraries that this innovative idea can be implemented through the provision of ICT. The author in [15] noticed that for university/public libraries in Nigeria, the strain to go electronic has never been increasingly obvious and substantially more so in this era of globalization. As stated by [16], Nigeria is accepting the virtual library through information and communication technology in their day-to-day activities. In any case, researches made in Nigeria are underutilized and access to these researches is troublesome. This is evidently on the grounds that data assets from universities need proper management which virtual library is out to handle.

In spite of the fact that both academic and open libraries assume significant roles in the manpower development of any Nation, open libraries are to serve the overall population information needs [14]. The author [17] in a study on ICT and collection management in public libraries however, finds that only a couple of public libraries in the south-south,

Nigeria are automated and do utilize web. Also, they are not sufficiently financed. PCs are not accessible and the libraries lack manpower [17]. In any case, special libraries in Nigeria understand the financial estimation of ICT in the development and advancement of their business consequently; they obtain PCs that are connected to the internet.

The degree of virtual library acceptance in Nigerian universities can be said to be of significant level. Notwithstanding, Nigerian universities are challenged by the patterns in the global digital society which are related with the utilization of ICTs. [18] talked about in subtleties and recorded the accompanying variables influencing virtual library management in underdeveloped nations: lack of access to power and telephone, illiteracy and limited skills, language barriers, low innovative skills, inadequate supply of PCs, limited number of content developers and absence of proper strategies. Likewise [19] distinguished the accompanying serious issues confronting ICT based libraries which incorporates: system downtimes, absence of adequate knowledge to develop internal IT and IT management skills, absence of IT strategies, the contrivances of merchants, absence of basic infrastructure and facilities, absence of maintenance culture and unhelpful government policies. The author [20] distinguished the difficulties to Internet, power disappointment, ignorance, absence of satisfactory manpower, insecurity and virus attack. More difficulties faced in Nigerian universities also, are some natural disasters such as fire outbreaks and flood like that of Usmanu Danfadio University Library, which was affected by flood in 2011. Attempts made by government to provide an efficient virtual library for communities have also failed in recent times. A good example is Ta'al E-Library projects developed in most of the local government areas by the Nasarawa State Government of Nigeria. These projects have the building structure but lack ICT facilities to implement a better and efficient virtual library management system.

4.0 CONCLUSION

Information and Communication Technology (ICT) have brought remarkable change and transformation to virtual library management system. It has made a domain where fast consistent change had become the standard. Gone are the days when library's collection was its pride and decided its worth. ICT has diminished the library from its stature as custodian of literary heritage to being a competitor among many others in the information society. The idea of library as a physical element is being dissolved by online access and the ascent of virtual libraries. Access has replaced ownership and the Internet has made remote access to databases conceivable 24 hours 7 days of the week. The university library ends up in a period of colossal test however it is likewise a period of unfathomable chance to utilize ICT inventively to improve service delivery to the user.

Conventional library information system such as OPAC, User Services, Reference Service, Bibliographic Service, Current Awareness Service, Document Delivery, Inter-library credit, Audio-Visual Services and Customer Relations can be provided all the more proficiently and successfully by utilizing ICT, as they offer comfort of time and place, cost viability, quicker and most state-of-the-art dispersal and end users' involvement in virtual library management system. OPAC and Web OPAC use intensity of PCs to discover the library material and

furthermore give numerous extra advantages, for example, online reservation of books, remote access, mentioning books for credit, advance restorations, books recommendations and so on. Effect of ICT on information services is described by changes in format, contents and methods of production and delivery of information products, development of Internet as biggest store of information and knowledge, changed role of library experts from mediator to facilitator, new apparatuses for dispersal of data, move from physical to virtual service environment, and extinction of some conventional information services and rise of new and imaginative electronic virtual library framework. Web enabled services are given through library web page. New administrations incorporate access to web and web based instruments and services, access to electronic data sources and computerized library of local and institutional reports. Journals, books, dissertation and theses, course material and patents are some of significant wellsprings of data that are presently accessible in electronic structure. Electronic assets give 24 hours anyplace, adaptability and comfort of utilization by numerous users and full content quests and quicker conveyance. Subject gateways are one of the valuable devices to give web access to internet resources. Virtual libraries provide local contents in the electronic form through internet to global clients.

In Nigeria, the presence of virtual libraries is a flow issue and overseeing virtual libraries is an on-going advancement yet handled in high esteem showing that Nigerian universities are not left out in the global trend to provide access to electronic resources to advance insightfully in teaching, learning and research. It is evident from this study that ICT has brought Nigerian libraries into a bigger pool of assets. The utilization of the web and its assets being a fundamental piece of ICT has added qualities to the administrations of Nigerian libraries. Securing of present and usable data benefits using ICT is relied upon to encourage community development. Community development can only be enhanced through the elimination of all inhibitions to and provision of ICT facilities in all the existing libraries in Nigeria. This finding is in agreement with [9] that there is an expanded degree of mindfulness towards the provision of electronic resources by shareholders of the university education in Nigeria. Difficulties faced by virtual libraries in Nigeria notwithstanding, should be tended to by giving required ICT items and administrations that will create a superior and productive virtual library management framework.

5.0 RECOMMENDATION

In the light of the discoveries of this study, the accompanying suggestions are made:-

1. Virtual library supervisory crew of any government ought to guarantee most extreme usage of ICT facilities and items particularly the internet. These facilities and items encourage quality library management frameworks without which virtual library can't be satisfactorily useful. They ought to likewise work together with libraries inside and outside Nigeria in order to share thoughts on how best to oversee virtual libraries.
2. Human limit decides the viability of any virtual library subsequently, the need to prepare and re-train librarians and ICT staff who are the primary staff working in

these libraries to get together with current patterns in information service delivery in virtual library environment.

3. On account of financing virtual libraries, the federal and state government should build spending allotment to libraries. In the interim, universities in Nigeria ought to keep away from overdependence on the administration to support their virtual library ventures. Rather, they have to glance in-house (both students and staff) who are ICT personnel to provide most ICT products that may not necessary require funds but skills to procure.

REFERENCES

- [1] P. Adoracio, "Virtual library, a real library?" Biblioteca de la UOC. www.uoc.edu. 2002.
- [2] C. J. Stoffle, "The emergence of education and knowledge management as major functions of the Digital Library". Follet Lecture Series. (Consulted 22nd May 2000) <http://www.ukoln.ac.uk/services/papers/follett/stoffle/paper.html>
- [3] A. S. Tufail, "Application of information and communication technology in libraries: Prospects and challenges". *National Level Conference on web-based Library and Information Services in Academic Library*, February, 2019, Shindkhenda, India.
- [4] M. Lakshmikanth and M. Jyoti, "ICT Resources and Services in University Libraries". *International Journal of Digital Library Services*, Vol. 4, Issue 3, pp. 243 – 250, 2014.
- [5] P. C. Buddhi, "ICT enables Library and Information Services". Lecture note, Thapar Institute of Engineering and Technology, Patiala, 2004.
- [6] P. Ahmad, "Development in Library Services with the advent of ICT based products and services: A continuous process". *International Journal of Digital Library Services*, Vol. 1, Issue 2, pp. 1 – 9, 2011.
- [7] A. Riyasat and N. Fatima, "Impact of Information and Communication Technology LIS: major shifts and practices", *6th International CALIBER University of Allahabad, Allahabad 2008*, Vol 4, Issue 2, pp. 102-145, 2008.
- [8] M. D. Siddique, and K. Abul, "Use of Information and Communication Technology (ICT) for automated networking and resource sharing in the selected public and private university libraries in Bangladesh: A study", Thesis. Dhaka: Department of Information Science and Library Management. University of Dhaka, 2010.
- [9] C. N. Ekwelem, "Information Communication Technology (ICT) and the future of Library. A review of related literature". *Library philosophy and practice (e-journal)*, University of Nebraska – Lincoln, 2019. Retrieved from <https://digitalcommons.unl.edu/libphilprac/2232> on 31st January, 2020.
- [10] A. F. Afolabi, and J. A. Abidoye, "Integration of information and communication technology in library operations towards effective library services". *Journal of Educational and Social Research*, Vol. 3, Issue 1, pp. 23-35, 2011.
- [11] D. E. Krubu and K. E. Osawaru, "The impact of information and communication technology (ICT) in Nigerian university libraries". *Library Philosophy and Practice (E-Journal)*. Paper 515, 2010. Retrieved from <http://digitalcommons.unl.edu/libphilprac/515>.

- [12] J. Arora, "Library 2.0: innovative technologies for building libraries of tomorrow". *ETTLIS proceedings of Bridging the Digital Divide in IIIT University, Noida, 2009*, pp.49-65.
- [13] A. A. Odunola, O. A. Yakub and R. T. Adeniran, "The role of ICT in provision of library services: A panacea for sustainable development in Nigeria". *Library philosophy and practice (e-journal)*, University of Nebraska – Lincoln, 2018. Retrieved from . <http://digitalcommons.unl.edu/libphilprac/1951> on 20th January, 2020.
- [14] E. Gani, "Management of university electronic libraries in Northwest Nigeria". *IOSR Journal of Humanities and Social Science*, Vol. 19, Issue 8, pp. 72-80, 2014.
- [15] A. A. Ojedokun, "The Evolving Sophistication of Internet Abuses in Africa". *The International Information and Library Review*, Vol 37, Issue 5, pp. 11-17, 2011.
- [16] F. J. Ezema, "Building Open Access Institutional Repository for global visibility of Nigerian Scholarly Publications: Library Review", Vol. 60 Issue 6, pp. 103-133, 2011.
- [17] I. Oketunji, "Library development and the role of Information and Communication Technology". *Being a paper presented at National Workshop on Strategies for Managing Technology Services in Libraries and Information Centres, NLA Cataloguing, Classification and Indexing Section, held at Stella Obasanjo Complex, Lokoja, 17th-24th October, 2004*.
- [18] S. M. Mutula, "Local Content and African's Presence on the Web: Information and Knowledge Management in the Digital Age". *Printmark Ventures, Ibadan*. Pp. 61, 2008.
- [19] E. E. Woherem, "Information Technology in the Nigerian Banking System". Ibadan Spectrum Books Ltd. Pp. 267, 2000.
- [20] T. A. Ayo, "Information and Communication Technology and the Information Professional in the Information Age". A Compendium of Papers Presented at the 39th Annual Conference and AGM at Sam Mbakwe Hall, Imo Concord Hotel, Owerri 17-22 June, 2001.