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Use of Innovative and Emerging Technologies for Sustainable Library and Information Service Delivery

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Abstract

This paper is conceptual one and investigated the use of innovative and emerging technologies in ensuring sustainable library and information service delivery in libraries, information centres and educational institutions. Four research questions were formulated to guide the conceptual/documentary research to include types, use, advantages, challenges and strategies to overcome the challenges in the use of technologies. The innovative technologies used in providing information services include:- closed-circuit television, and the radio frequency identification (RFID) as tools or technologies for preserving and securing library collections, as well as determining the circulation status of collections; facilities and resources; use of webcam in the provision of online reference services; video conferencing for enlightenment of rural dwellers on the aspect of socio-economic, health and democracy; technology for a national union catalogue, media technology (radio, television and video); mobile technology, social media platform; digital technology; commercial and library websites; marker space and training laboratories in libraries respectively. Other innovative technology, includes the use of assistive technology devices. The information services include: circulation, current awareness services, selective dissemination of information, outreach/extension, information services, bibliographic and referral services that are used in conjunction with the innovative and new technological devices and gadgets. Advantages of innovative technologies include: efficient provision and use of effective and meaningful service delivery as well as conservation of space. Challenges to provision and use of innovative technologies for LIS delivery include: funding, power supply, infrastructural and ICT facilities; digital divide, manpower, skills, technophobia and network issue. The paper concludes that library and information science curriculum has responded to the dynamics of LIS practices in the 21st century through timely curriculum review. The paper recommended separate and adequate budgetary allocation to libraries of all kinds; provision of automatic stand-by generating plants and manpower training.

Keywords: *Classroom teaching, Information centres, ICT, Information services, Innovative technologies, Libraries.*

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Introduction

Libraries and librarianship have witnessed and responded to dynamic processes and issues relating to practices in the 21st century. The dynamism is made possible through the use of information and communication technology. As this tool is used in various library practices. Innovations are discovered as libraries are now challenged to provide innovative technologies/areas that enhance library and information service provision, delivery, dissemination and access through this popular technology-ICT, it is an acronyms that are used to denote the convergence the computer - it's hardware, software and accessories. The broadcasting telecommunication technologies to provide information. The computing technology encompasses the computer - it's hardware, software and accessories. The broadcasting technology include: radio, television, video, public address system (PAS), etc. While telecommunication technologies include those of telephone, facsimile, etc. The coming telecommunication technologies produces information for the benefit of mankind. Actually, innovative technologies are technologies that are either newly invented or are being utilized in new ways.

As a result of changes and complexities in the LIS practices being brought about by the advent of ICT, libraries and librarians are compelled to look for innovative areas and tools that would enhance or speed up the information service provision and delivery not only in libraries but also related information units or agencies such as classroom teaching, agriculture and health extension services, etc. Although, the coming of ICT does not completely erode the traditional library practices but ICT is being used to support the provision and add value to information service provision.

The current trend in any discipline is the issue of innovation; this is because societies are not static but undergo changes and developments which are usually brought about as a result of research and developments. Saka (2018) conducted a study to determine the undergraduate and postgraduate research output and innovations in Federal University of Technology, Minna library school in Nigeria and the study discovered higher percentage of innovations in the field of ICT application to library practices and services.

Variety of information services are now offered with the aid of emerging technologies enumerated earlier. These services include but not limited to technical services (acquisition, cataloguing and classification, indexing and abstracting), specialized services (current awareness services, mobile library services through the use of GSM, Tabs, laptop and lot of /extension services, selective dissemination of information, literature research), outreach others. These services are efficiently offered with the support of the emerging technologies such as CCTV and RFID, software packages (webcam and Dspace), video conferencing, media, mobile and digital technologies; commercial website, maker space, etc. To Emokhiovo and Okunribi (2014), the use of computers in information processing has introduced products and services as well as preservation of the mass of information.

Research questions

This paper seeks to provide answers to the following research questions:

1. What types of innovative and emerging technologies are used in the provision of information services in libraries, information centres, and educational institutions?

2. Are there any advantage in the use of innovative and emerging technologies to provide information services in information and educational institutions and agencies?

3. What are the challenges to the provision and use of innovative and emerging technologies?

4. What are the strategies to overcome the challenges to provision and use of innovative and emerging technologies?

Methodology

This is opinion, documentary and conceptual paper as it reviews the literature related to subject of discussion as they support arguments and related research(es) conducted. It attempts to explain each concepts or subheadings in relation to the objectives formulated and support the arguments raised hence explanatory research is adopted to explain each concept (Saka, Mommoh and Yusufu). Each of the technologies are discussed with their corresponding services being render and the supporting related sources and literature.

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The advent of ICT has brought positive changes and innovations in the information profession and hence has promoted the efficient information service delivery. Innovative Technologies use in libraries, information centres, educational institutions and related information agencies are review with supporting sources.

Closed-Circuit Television (CCTV) and Radio Frequency Identification (RFID)

These are new technologies that are used to determine the circulation status of library collection; preservation and safeguarding of library collection against theft, mutilation and vandalization. The preservation and security of library collection have taken another dimension in the 21st century. Within the library arena, the CCTV technology stationed with closed watch and monitoring of users and staff activities with the head of library or sectional heads watching. The RFID technology contains the bibliographic information of library collection and users information contain in the system. With these two technologies, any attempt to smuggle out material from library or attempt to damage library materials, alarm will raise. The CCTV cameras, RFID and Barcode scanners keep track of library materials lawfully or unlawfully remove from /within the library (Saka & Aliyu, 2017;Shehu et.al, 2018; Ajav, Ago and Akorchuz, 2018).

Webcam

This technology is in most cases applicable to reference and virtual library services more especially in this era of COVID-19 pandemic. This is a technology and software that is installed in computer to facilitate the communication between library user and staff especially in sending and answering query. Research was conducted whereby two laptops are stationed 50 metres away from each other, one laptop is being handled by the user and the other by reference staff and audio-visual dimension took place. Communication and

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visual display i.e. the two laptop users do not only communicate but also see each other. Through this online interaction, quick reference service has taken place with the help of webcam (Adegboye, 2014).

Video/Virtual conferencing

This is also applicable to virtual conference and reference service provision. The generality of mankind has been rescued from the menace of COVID-19 pandemic through the virtual means using zoom. People can now hold meetings and conferences without physically coming in contact but by virtual reality. The 21st century has revolutionized mobile-library practices and services and mode of social interaction without necessarily coming together physically in one location. Video and virtual conferencing is a technology designed to cover meeting or conference participants over geographical location from different parts of country(ies) without necessarily coming together in one location. With COVID-19 pandemic, public libraries (being the libraries most closer to rural dwellers) should organize and provide video and virtual conferencing technology for enlightenment programmes particularly on democracy, health and agriculture extension services for selected rural dwellers and settlements; Selected chairmen of political parties; co-coordinators of primary health care and agriculture extension officers; as well as INEC staff be invited to give talk on topical issues. The Librarian in public libraries is the overall facilitator thus providing information services to rural dwellers through video-conferencing. Because of the COVID-19 pandemic, most 2020 and 2021 conferences held within Nigeria and abroad were organized through virtual means.

Media Technology

This is a technology that educates, inform and entertain people. In libraries especially academic and special libraries possess this technology while it is absence in most school and public libraries. It can also be called broadcasting technology. In the media section of libraries, it is expected that radio, online newspaper, computer, video/television are only available but also patrons be allowed to use them to meet their information needs. Computers can also be used to play games, watch movies, share ideas, for social information, etc. The media technology strives to provide recreational services. However, public libraries are expected to provide recreational services in addition to information and cultural roles.

Mobile Technology/M-Libraries

This is applicable in the area of reference and circulation sections/services. The advent of ICT has brought about mobile services. As the name implies, it is a technology that is portable, movable and can be carried about /along by library staff and users. This technology encompasses personal computers, mobile devices such as smartphone, etc. This is a technology that brings library services to door-step of users regardless of their locations with easy access to information without physically coming to the library from level of awareness on the available library collection and social media platform through the use of smartphone technologies; OPAC provision and benefiting from reference services as well as web-browsing and social networking (Akintunde, 2016; Abdulladir, 2013; Oladel-Ololadel, 2019; Aliyu, 2021). Smartphone is now used in library and information science delivery in

such a way that its level of adoption and use by undergraduate students mostly for assignment is very high as the technology enhances student learning even though insufficient power supply is a major obstacle in its usage (Bashorun, Ifeoluwa and Funmilayo, 2019).

Technology for National Union Catalogue (NUC)

This is applicable in the area of cataloguing of library collections. For libraries to effectively identify their holdings. National Union Catalogue needs to be well-organized and managed. There is the need for effective and efficient communication which can further be achieved with the application of communication technology or tools. Communication tools encompass the Internet connectivity and telecommunications facility. In building the NUC, Internet connectivity is necessary to enable librarians and libraries interact, cooperate and share resources. The National Library of Nigeria being the National Bibliographic Centre (NBC) should strive hard to ensure that the NLN headquarters and branches are well-connected with efficient Internet network which will be used to facilitate data communication. The second communication tool is the telecommunications facility using telephony (landline and mobile communication system)which can be used to facilitate voice to store and forward (Akintunde,2016).

Commercial website

Online selection and ordering of library collection are made possible through commercial website called Amazon, This is a multi-purpose and commercial website and thus library collections are selected, ordered and acquired and payment is done online although shipment of collection is carried out and deposited at designated centres within Nigeria. Obviously, the transaction is done online (Saka & Aliyu, 2017).

Makerspace

This is an emerging technology designed or created for people/library users coming together to acquire IT skills and knowledge sharing. It is a section or unit in library whereby users come together to share ideas, acquire skills, learn more and also manufacture tools and machines to construct projects (Kalu and Okezie, 2019).

Digital Technology

Technology that transform analog to digital materials i.e. transformation of print document through the use of computer, scanner, camera, etc. to digital document. Digital technology has helped in transforming printed research projects and theses to electronic materials as well as help in the preservation and security of library materials. Digital technology utilize Dspace software is used in the digitization of theses and dissertations in Nigerian universities (Saka, 2013; Saka, Yusufu and Mommoh, 2020)

Multimedia Technology

This is mostly used in classroom teaching and learning processes. Modern teaching and learning take place through the use of multimedia technology. They are used in practical teaching thereby making learning more permanent in learner's memory hence in this digital era, instructional delivery is through the use of white board and smart board which has

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replaced chalk board even though conventional method of teaching and learning practice has not changed in this digital era(Patner, 2015). Multimedia is used in information service as well as lecture delivery as it is the integration of text, graphs, video into a computer system; the inclusive use of high-tech and low-tech devices such as tape recorder (electronically operated) as well as pencil grips and mouth sticks (manually operated) disabilities involving the use of assisted technology devices (ATD) in teaching students with (Ugoli, 2019) and (Adaka, Ezigwu and Jibrin, 2020). Magic Board is a typical example in modern classroom teaching and being a means of information service delivery to students and library users respectively. There is tremendous increase in the use of power point as multimedia presentation in classroom teaching delivery in few years back world-wide more so that Eteshe (2020) reported that students taught through power point presentation performed better than those taught using lecture method.

Advantages in the use of Innovative technologies

The use of innovative technologies in the information service delivery has several advantages, among which are:

❖ Efficient and effective usage: Unlike the traditional model/technologies, innovative technologies are very efficient and effectively used in the information service delivery i.e.no manual labour in their usage.

❖ Conservation of space: Some of innovative technologies store mass amount of data, information and electronic information resources which are print and mobile hence save space. The print documents (journals, encyclopedia, catalogues, etc.) occupy spaces (shelves, tables, spaces, etc.) are now being digitized and stored in a system or storage media as opposed to arrangement on shelves, cabinets, etc. (Saka, 2013).

Challenges to the provision and use of innovative technologies

Funding

This has been a topical issue in all ramifications with special reference to developing nations of the world and particularly to Nigeria as far as ICT facilities are concerned. ICT facilities are very expensive and budgetary allocation to education sector, for example, cannot cater for the adequate supply and provision of all the needed ICT facilities and technologies. Adequate financial support is necessary not only for the procurement but also to train those that are to implement the new technologies in libraries, information centres and virtually all organizations. While some organizations are averagely equipped with facilities and technologies, some are still lagging behind (Momoh and Saka, 2019, Osineta, 2019).

Digital divide

The last statement on funding brings about the issue of digital divide among organizations and nations of the world. This is a phenomenon whereby there is inequitable availability, access and use of ICT among users, organizations and countries due to one problem or the other. Some of the causes of digital divide include: funding, acute shortage of new technologies, training, network problem, etc. While academic libraries are adequately

equipped with ICT facilities and fully utilized, the public and school libraries are at disadvantage due to funding, personnel, geographical location, etc. Accessibility to ICT facilities are well pronounced in the developed nations while low in third-world countries due to funding, inadequate ICT facilities, technical know- how, power supply, unavailability of new /latest technologies, etc. So, there is digital divide among libraries, organizations, states, countries due to afore-mentioned issues (Mutula, 2008)

Power supply

Most of the latest technologies require adequate and regular electricity power support to properly put them to use. In the same vein, even where there is power supply but it is at low level, the technologies or ICT facilities cannot properly function. Data communications as it affects Internet connectivity and telecommunication can negatively be affected with or epileptic power supply as most ICT facilities cannot efficiently and effectively provide services without efficient, regular and uninterrupted power supply (UPS). However win a collaborative research conducted by Emokinidvo and Ogunrobi (2014) to determine the availability and use of electronic resources at the branch libraries under John Harris library, University of Benin, Nigeria, review among others the challenges to the use of electronic resources show that "electricity power outage" top the list among the challenges.

Technical skills/Technophobia

Some staff and users lack skills of operating and use of computer and related ICT facilities. Due to the resistance to ICT implementation by some LIS professionals with fear of job displacement and error-making coupled with conservative attitude, the use of innovative or new technologies may be affected. Some libraries still use the traditional mode of service delivery which cannot withstand the modern trends of information dissemination and use as most services in libraries are now offered with the support of ICT. For example, traditional reference service versus the online reference service (Emezie and Anunobi, 2019).

Infrastructural facilities

Even when ICT facilities are supplied, the building or laboratory to install them becomes a problem. Halls where ICT facilities are installed are not large enough to accommodate the teaching population of users, e.g. Computer Based Testing (CBT) centres.

Network issues

This is a problem to almost all organizations in Nigeria including libraries which may be as a result of low bandwidth or internet connectivity, server and satellite.

Results/Findings from the Study

1. The paper was able to explore/identify various innovative technologies that are used in ensuring sustainable library and information service delivery in various libraries, information centres, classroom teaching, and educational institutions. Innovative technologies identified include CCTV and RFID which are used in determining the circulation status of library collection as well as safeguarding against theft and mutilation of library materials by users. The study was able to identify the use of webcam as a strategy for providing reference queries more especially in this period of COVID-19

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pandemic, while internet connectivity and telecommunication facilities were the tools used for National Union Catalogue.

2. Advantages in the use of innovative technologies include ease in the use of technologies as well as conservation of space which most libraries face.

3. The study discovered funding, digital divide among libraries and LIS professionals; erratic power supply, technical know-how, infrastructure and network issues were the challenges to the provision and use of innovative technologies.

4. Adequate budgetary allocation couple with adequate funding, stand-by generating plant, regular training of staff, expansion of building, and regular subscription of data are some of the strategies to overcome the challenges in 3 above

Conclusions

The new and innovative technologies used in ensuring sustainable library and information service delivery could be deduced from the fact that library and information science curriculum have responded to the dynamics of the 21st century in the area of curriculum design and review by incorporating the new technologies in the LIS curriculum. This has necessitated practical application of these technologies in joining prospective LIS professionals in service delivery. Not only this but also research and development, as well as timely training programme in the topical issue of ICT and related areas are usually organized by various organizations and countries.

Recommendations

Based on the enumerated issues and conclusions above, the paper recommends to stakeholders in the LIS professional, among others :-

1. There should be separate and adequate budgetary allocation to libraries of all kinds, information centres and ICT units within organizations.

2. Provision of dedicated automatic generating plant to take care of epileptic power-supply. Computer systems installed in the organization's libraries be supported with un-interrupted power supply (UPS) to store and conserve power.

3. There is need for increase in bandwidth through subscription of data for easy accessibility to internet so as to meet users' information needs. This can only be possible through regular and adequate funding as well as subscription of data.

4. Manpower training and sensitization programme.

Every organization is expected to organize training programme for its staff and user communities on the use of new technologies and at the same time organize sensitization or awareness programmes on the new technologies through mass media, virtual conference, etc., and the need to fully embrace them. This will take care of the technophobia on the part of traditional libraries resistance to the adoption of new technologies.

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