



Dynamics of
**LIBRARY AND
INFORMATION
SCIENCE
PRACTICES**

in the 21st Century

EDITED BY
**UDO NWOKOCHA
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INFORMATION

SCIENCE

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Preface

Dynamics of Library and Information Science Practices in the 21st Century is a take-away from the first ever virtual conference of the Nigerian Association of Library and Information Science Educators (NALISE) held via Zoom at the heat of the Covid-19 pandemic. The conference was historic, memorable, and successful as it produced great papers that we are proud to present in this scintillating book.

In line with the tradition of NALISE, the papers presented at the conference were not just accepted after presentation but subjected to full scale blind peer review mechanism before publication. A total of forty (41) papers were presented via Zoom during the conference while only twenty-eight (28) survived the peer review process. Therefore, this book consists of twenty-eight (28) chapters representing the number of papers accepted following a rigorous peer review exercise.

The galaxy of academics and librarians that contributed chapters to this book makes it a masterpiece especially in dealing adequately with the theme: “Responding to the Dynamics of Library and Information Science in the 21st Century”. In addition to contributions of various authors, a lot of effort has been deployed by the editors in bringing this book to the standard we can all be proud of as librarians and academics.

Dynamics of Library and Information Science Practices in the 21st Century is not only worth reading but should be purchased and owned by librarians and all lovers of knowledge. We therefore proudly present this engaging book to all librarians, information scientists, documentalists, archivists, media practitioners, data analysts and all lovers of books for their reading pleasure.

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DOMESTICATING GREEN LIBRARIES IN NIGERIA: CHALLENGES AND STRATEGIES

Udo Nwokocho
Millie N. Horsfall

Abstract

The paper defines the term Green Library as not only a term but an activity, a process or movement which is synonymous with sustainable library services. Green library is an environment friendly or eco-library system. It discusses the characteristics and objectives of a Green Library in Nigeria which include minimizing the negative environmental effects on natural environment and maximizing the benefits of using disposable natural building materials and environmental products by careful selection of library locations. It also highlights the strategies of domesticating Green Libraries in Nigeria to include proper siting of the library building, planting of green trees and flowers around the library environment, using electronic/digital communication storage devices and tools or media, and teaching both children and adults the need to clean up the library and the park near it. It identifies challenges confronting domestication of Green Libraries to include the financial difficulty of reconstructing libraries towards a green outlook, the training and education of staff to become a Green Librarian so as to maintain the green posture of the library, among others. The paper recommends among others that there should be a national policy to work towards domesticating Green Libraries in Nigeria.

Keywords: Domestication, Green Libraries, Green Librarian, Nigeria, Strategies, Challenges

Introduction

The advancement of technology in these modern times is influencing and changing the life style of human beings rapidly. The concept of green is totally changing because of the modern technological development and information demands or anything can be reached within the snap of one's fingers. Nikam (2017) opines that the demand for information and its fulfilment through qualitative supply can be achieved within a fraction of second. The desire for knowledge and creation of awareness in innovative technologies are at par consecutively to fulfil the unending demands, be it information needs or information demand. Libraries are gateways to knowledge, and are responsible for disseminating the idea of sustainability. Libraries are known to support the mission of their university by sustaining information sources and services and ultimately domesticating a green library culture. Taking small steps in domesticating green libraries can produce big results over a period of time. There is need for continuous growth and expansion of library materials and services since the library is a growing organism.

The idea of making an eco-friendly library, green library or sustainable library has not been seen as a brand-new concept, however, there have been attempts by existing libraries to develop a higher level of environmental friendliness. OPAC use in libraries was considered eco-friendly by replacing paper lists with online lists to save natural resources and to help users search and borrow materials. It also helped reduce the amount of physical activity necessary within the library, which saved energy (Noh and Ahn, 2018). This paper seeks to address the fact that domesticating green libraries in Nigeria will not only reflect the architectural aspects but also take into consideration the characteristics and features of green libraries (green services and programmes) in the technology driven society.

The concept of green is a recent change because of the modern technological development which has impacted the society greatly. Due to global warming and climate change, green libraries are very much needful for the betterment of the society. Many libraries are initiative for eco-friendly green library, as Saha (2019) puts it, the word 'Green' has become the buzz word in every field as it has a great importance for healthy services. Green Libraries are designed to minimize negative impact on the natural environment and maximize indoor environmental quality by means of careful site selection, use of natural construction materials and biodegradable products, conservation of resources (water, energy, paper), and responsible waste disposal especially the recycling system. (Online Dictionary for Library and Information Science, ODLIS, 2020). Green Libraries, also called sustainable libraries, are always sustainable environmental protection libraries. The term Green Library is not only a term but an activity, a process or movement which is synonymous with sustainable library. As posited by Miller (2010), a green library begins with a sustainable building. A sustainable building is a building that meets the needs of today's users but does not compromise the health and availability of Earth's resources. Green library is an environment friendly or eco-friendly library system. Eco-friendliness is referred to as having little to no damaging or polluting effects on the natural environment. An eco-friendly green library is a structure that is designed, constructed, renovated, operated, and reused in an ecological and resource-efficient way. Therefore, construction of green library buildings should be a priority, as well as other eco-friendly aspects such as printed materials, non-book materials, library operations, and library service (as cited in Noh and Ahn, 2018).

Greening encompasses all initiatives that promote an environmentally stable climate, while in libraries it refers to re-planning, re-designing and better utilization of library facilities to reduce its negative impact on the environment. Therefore, the green library focuses on utilization of natural or renewable energies like solar; less dependence on fossil fuel, planting trees around the library to reduce overheating and the utilization of cooling equipment, water conservation; printing less; promoting digital library and e-books; and providing e-learning platforms to foster sharing of good practices between global north students and global south students (Oyelude & Alabi, 2013).

Accordingly, the first step in becoming green is to develop an action plan that can serve as a road map for the directions and choices your library makes. Your action plan does not have to be detailed; it can simply be an outline of your library's goals and assessment (Miller, 2010). According to Aulisio (2013), library and information science literature make it appear that the hallmark of a "green library" is an environmentally friendly building. According to him, a green library is something more than just the architecture arguing that by using initiatives and providing recommendations for green library operations, it can be determined that a green library does not necessarily entail a green building, but it does involve a green mission. He went further to recommend that the term "green libraries" should refer to those libraries that are actively working to promote sustainability. Reynolds et al. (2010) opine that greening can be attained through the practice of sustainable technologies or "greening operations" in the way of architectural designs,

waste management, renewable energy generation and use of energy efficient lighting. Librarians can make their library green simply through education, exemplary leadership (leading by example) and outreaches.

The creation of Green Libraries is important to develop the users' satisfaction. Notwithstanding, having a healthy library environment means having a 'Green Library' which is a part of the larger green building movement. Green design is an emerging trend in the 21st century library. Environmentally conscious people and library users around the world are looking at and expecting that libraries should not be only information resource centres but also a green place. Many librarians and other information professionals are taking action to ensure that their workplaces will be environment friendly (Nikam, 2017).

Noh and Ahn,(2018) in a research,identified cases of green libraries in foreign countries and concluded by suggesting that in order to establish eco-friendly libraries, there is need to increase the amount of digital materials over printed ones, expand access to information through the internet, reduce user visits to the library, and find new and more effective ways to save energy. However, it was difficult to find eco-friendly examples of libraries with these features domestically. All of the certified green libraries by the G-SEED (Green Standard for Energy and Environmental Design) system focused on architectural elements without consideration of green services or programs.Mok and Cho (2014) stated that G-SEED is adomestic certification system evaluating the environmental-friendly buildings for residential building types as multi-residential housing and detached house and non- residential building types as office, school,hotel and other buildings divided with new and existing constructions.

Going green has become a national issue,and patrons expect their library to respond in the sameway many corporations have. Libraries are going green with logos on their Web sites, programmes for the public, and a host of other initiatives(Miller, 2010).Mulford and Himmel (2010), in their book, "How green is my library" argues that while there is a broad spectrum of ecological sophistication within libraries nationwide and some regions are at the forefront of sustainable design and operations, others are just beginning or have yet to integrate materials recycling into their daily practice.

A green librarian also called an eco-librarian is someone who is in charge of a [green] library, a person who has training in green librarianship and works in an eco-friendly library environment(green library). Green librarianship is not only an aspect of the study of organizing and retrieving information as to make it accessible to other users but also for sustaining information sources and services by domesticating a green library. Green librarians can handle budgets to support the library organization, to make their library a green library simply through education, exemplary leadership (leading by example) and outreaches. This will enable themto provide information services to users hence make room for eco-friendly library services.Nikam, (2017) asserts that the green librarian should always keep in their minds that a green library is not just about taking care of the environment, it is about taking care of the health and well-being of those who work in it and patronise it. Furthermore, in the venture of making green library, librarians should ensure efforts to promote green library movement by the following ways among others:

- Encouraging users to use e-books, e-journals, etc which can work as space, paper saving tools
- Understanding practices like making soft copies, microfilming of old and scares books and by weeding-out of old and outdated books.
- Using different electronic media and online communication tools like social media

- Working under eco-library system and identifying those who are willing to work under such environment
- Promoting green library tools, techniques and encouraging others to use the same
- Encouraging other librarians towards green library by discussions, seminars, and conferences
- Making suitable plantation including lawn both inside and outside of library to minimize dust and make environment cool (Meher and Parabhoi, 2017). They went further to submit that:
 - Reading room, children's reading room, story, novel, entertainment purpose books, maps, atlases, gazette, encyclopaedias, new arrivals, newspaper, magazine, OPAC should be in ground floor of the library.
 - Book shelves should not exceed 110 cm in heights.
 - Arrangements of library should be made by considering physically handicapped patrons.
 - There must be a parking lot for the patrons and staff to smoothly run the library.

Characteristics of Green Library

The features and characteristics of a green library in a technology driven era are that of environmentally friendly library or sustainable library/eco-library system. It minimizes the negative environmental effects on natural environment and maximizes the benefits of using disposable natural building materials and environmental products by careful selection of library location.

Nikam (2017) opines that every green library necessarily possesses certain essential features as enumerated below:

1. Proper location or most suitable site
2. Use of natural, recycled and regionally available materials
3. Use of reflective roof and ground
4. Use of insulating windows
5. Conservation of resources like water, energy and paper
6. Use of energy efficient lighting minimizing consumption
7. System for optimum cooling
8. Suitable plantation both inside and outside of building
9. Circulation of fresh and healthy air

Similarly, Gandhi, (2020) outlines some the advantages expected of green libraries including:

- To control the pollution and green-house gases in environment.
- To play a greater role in becoming the planet green.
- To work for the betterment of mankind.
- To establish a new image of the library in the modern world.

Awareness and Adoption of Green Library in Nigeria

Awareness involves moving from a state of ignorance or being unaware to being aware of a new innovation. The centre for discussion in the world of library in this technology-driven age is on environmental awareness and sustainability. As awareness on the importance of buildings in sustainability efforts grows, many reports have emerged to support these efforts. Ideally, Carr, (2013) affirms that these documents are a good place to start understanding the rationale for green building in general and for green libraries in particular. Some of these reports include;

- The Green Libraries forum on ALA Connect: this forum for members of the American Library Association allows participants to discuss environmental stewardship within our profession and in the communities where we work, live, and play. The topics covered range widely, from solar technologies and greening library programs to academic sustainability curriculum planning.
- IFLA Statement on Libraries and Sustainable Development: this is a brief text by the International Federation of Library Associations and Institutions which states the IFLA's commitment to sustainability in the library field.

These documents are useful to read because they provide a sense of the public's and library profession's growing commitment to sustainability and provide the philosophical foundations of the green building movement.

Librarians and employees of domestic libraries had less awareness of the green library in a study on the status of green libraries carried out by Hong and Noh (2014), which investigated librarians' awareness of the green library, including the necessity for a green library that was performed for the first time. The study showed that library employees were not as aware of green libraries and the certification system necessary to qualify for this designation but were interested in the concept and appreciated its necessity. Furthermore, according to the survey results, library employees rated prevention of environmental pollution as the most important G-SEED assessor, followed by energy, ecological environment, and interior environment.

Another study was carried out by Oyelude & Alabi, (2013) on Greening: Pluses and Minuses of Nigerian Libraries in Promoting Environmental Sustainability. It examined green initiatives within the context of Nigerian libraries with emphasis on analysis of related policy and practice of green librarianship, and pluses and minuses of Nigerian libraries in the green initiatives. It investigated the level of awareness of librarians of greening, attitude to greening libraries, efforts at greening libraries, greening policy in the libraries and ways of further advancing greening for sustainable development. The study however revealed that there was an exciting emergent library discourse on "green" policy and actions, it went further to reveal that Nigerian libraries were implementing "green" measures at minimal level and rather unconsciously. That the level of awareness of greening initiatives among Nigerian librarians was still relatively low and therefore, recommended for increased awareness and environmental literacy among library users and the entire community to build better green momentum in Nigerian libraries.

Modern environmental education focuses on environmental literacy, a green parallel to information literacy. According to one definition, "To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information." As "information literacy is the ability to find and use information," environmental literacy is the ability to identify a sustainable choice and make that choice (Brey-Casiano as cited in Miller, 2010). More so, the 21st century librarians'/library's role comprise teaching environmental awareness through library programmes and services, environmental education towards societal progress and exemplary leadership by making pro-environmental decision and adopting pro-environmental practices. In leading by example, the library/ librarian is well positioned to effect change. The key to change human attitude and action is to educate people about their environment and this will enable them make environmentally sound decisions about their environment.

Sahavirta (2018) submits that libraries can make it easier to find environmental information through search guidance, but also by collecting it on eco-shelves or green corners. However, the library through material recommendations and exhibitions would take an

active grasp on supplying environmental information. Advocacy and propagation of environmental awareness would also include the organisation of environmental events, conferences and exhibitions. Awareness and adoption of environmentally friendly practices would also increase through library programming ideas such as special events (like contests) and projects that can promote sustainability in the environment and also seeking environmental grants to raise awareness so as to become greener libraries/librarians. Libraries/librarians as professionals in this new age of greening effects are adopting the strategies of new smart technologies in promoting Green Library Movement (GLM) and in so doing, they make the library 'as Green as' possible. For the development of countries, towns, institution in general and library users in particular, the green library is very needful as it gives users pleasure and satisfy their information needs and demands. The adoption of such an active role means that the library commits itself to green values and raises them in its community; this is a part of the library's marketing, which should not be avoided. It would be appropriate for libraries to remind their users that visiting the library reduces their carbon footprint, especially if they use public transport for journeys. Such a reminder will certainly arouse a positive reaction in environmentally aware library users.

Singh and Mishra, (2019) carried out a study on environmental sustainability in libraries through green practices/services. It examined the role of green practices/services incorporated within libraries towards environmental sustainability, and discovered that continuous use and easy availability of new technologies like computer printers, faxes, and photocopiers etc., was very important to protect the environment, not undermining that all these machines have an impact using paper, ink, and electricity on the environment. The paper explained sustainability, environmental sustainability, green printing, and copying etc. It further highlighted various sustainable strategies for overcoming the impact of paper use, ink use and electricity as follows: (i) Provision of a different approach for librarians to achieve green practices/ services.(ii)The adverse impact of new technologies on the environment also increases the requirement of green practices/ services within libraries.(iii.) Reducing the carbon footprint, which will automatically enhance the environmentally sustainable practices, a valuable step for enhancing the lifestyle of society generally and libraries in particular.

Awodele, Malasowe and Onuri as cited in Oyelude & Alabi, (2013), measured the green footprint in the Babcock University, Ilishan, Remo and developed a Generic Green IT model for possible adoption. This model proposes the use of various methods to ensure green IT in organizations and mentions a Greening game board somewhat akin to the game of Monopoly that could be used for greening awareness.

The University of Port Harcourt and Abia State University respectively, embarked on greening, with people who perform the duty of keeping the environment green. The UNIPORT Campus Environmental Beautification and Sanitation (CEBAS) Unit and the ABSU Environment Maintenance Officers are domiciled in physical planning Units in their respective universities. They have an Environmental Policy and strive to keep the university campus environment clean, beautiful and pollution free and among other objectives, use and recycle materials when feasible; and, stimulate research on matters relating to environmental protection.

The Benefits of Domesticating Green Library in Nigeria

Services benefit the community through integrated planning and cumulative, accessible, and affordable green choices which result in a building and the environment. Understanding the philosophy and principles of sustainability will not only help librarians make effective decisions for their libraries but will also allow them communicate the importance of green library buildings to the academic community. Sustainable development of the digitized libraries is a necessity for the betterment of the environment. Libraries however, incorporated green practices to protect the

environment through their green library initiatives. The need for greener services (printing and copying) to the environment has been on the increase daily. Libraries lead to eco-friendly or environmental sustainability practice, re-using and recycling of materials, reducing waste and toxic products and developing alternative technologies (Singh and Mishra, 2019). Through the practice of sustainable technology or greening operations, greening can be attained. Some benefits of domesticating green library in Nigeria which deals with greening operation include waste management, architectural designs, use of energy efficient lighting and renewable energy generation.

Nevertheless, benefits of domesticating green libraries bring about the following;

- Eco-friendly or environmental sustainability practices
- Using and recycling of materials
- Reducing waste and toxic products
- Developing alternative and smart technologies.

Challenges of Domesticating Green Libraries in Nigeria

The challenges confronting domestication of Green Libraries include the following;

- i. Financial difficulty of reconstructing libraries towards a green outlook: Funding is one of the key factors for the smooth running of any organization of which the library is not excluded. Inadequate funding has made most Nigerian libraries not to be involved in special events like contests and environmental grants to raise awareness to become a green library /green librarian
- ii. Improper location/unsuitable library site: If the library site or location is not properly located, it will not achieve its aim of being an eco-friendly library.
- iii. Lack of appropriate training and educating staff to become a Green Librarian: maintaining the green posture of the library may be one major challenge confronting the domestication of green libraries in Nigeria due to lack of appropriate training and education.
- iv. Inappropriate buildings: This can have negative effects on libraries especially the interior design. Good interior design can have a significant impact on library use making it eco-friendly. This will give staff the enablement to manage the diverse needs and behavioural range of users as well as creating study space and managing spaces that provide access to materials.
- v. Inadequate equipment and facilities: For green library to be achieved beyond funds, unsuitable library site, among others there should be appropriate resources, facilities and infrastructure to support it.
- vi. Green library policy: This is the foundational problem that is affecting the adoption of green library in the world. Before green library can be adopted in any library, there must be sufficient and planned policies that will guide the implementation. This will ensure a proper step to step execution of a green library plan. In Africa, providing and establishing an accurate policy for green library is a very pressing challenge. This is because it is a new development in the world of library setting. The essence is to save a dying ecosystem.

Strategies of domesticating Green Libraries in Nigeria

The strategies of domesticating Green Libraries in Nigeria include the following:

- i. Proper siting of the library building: Site selection of library building should be properly sited in a university/community one wish to serve because it has large impact on how friendly the library will be ecologically. The library should be located in a densely populated area. In addition, it should be centrally located where it will be easily accessible.
- ii. Adequate financing of the library: The library should be adequately financed to achieve the goal of the green library initiatives.
- iii. Planting of green trees and flowers (organic gardening) around the library environment: This can give the library a good face lift thereby making it more eco-friendly.
- iv. Using electronic/digital communication storage devices and tools or media can create more eco-friendly space and eco-friendly services in libraries.
- v. The green library is in the business of recycling and reusing weeded materials for sustainability: The library should recycle and reuse its weeded materials. Therefore, selection and de-selection is necessary as selection is about building up collection on environmental issues which include green computing, energy conservation, organic gardening etc., whereas de-selection is weeding of outdated or worn-out library materials. Recycling and reusing of weeded materials deal with 'green de-selection'.
- vi. Green Print Initiative (GPI): Publishers should be able to participate in Green print Initiative by using recycled paper and harvesting fewer trees.
- vii. Green library policy: The government and library management need to put green library policy standard in place.

Recommendations

Government should encourage the green libraries and provide guide to all libraries for making all libraries green in Nigeria. There is need for the government to have Nigerian Green Library Council (NGLC) (a national policy to work towards domesticating green libraries in Nigeria). The green library which is eco-friendly and sustainable must be built as a modern library which minimizes electricity consumption and maximizes the use of renewable sources (like air, sunlight, etc). Librarians should take the initiative of creating awareness through the social media and participate in Green Library Awareness Campaign, to make Nigerian libraries green.

All agencies and organizations interested in the development of libraries should join hands to propose a bill in the National Assembly not only to ensure the proper funding of libraries at all types but to make them green. Nigerian library agencies and organizations should also reach out with international bodies for collaboration on how to domesticate and sustain green libraries in Nigeria.

Conclusion

Domesticating green libraries in Nigeria would be possible if and only when libraries pursue and achieve their goals to provide information in an eco-friendly manner to users of information and library services. A variety of options should be considered in domesticating green libraries including buildings, materials, services and interior of the library. However, the road map for domesticating green libraries should be have roots in the provision of guidelines by governments, library organizations and librarians for that purpose. These guidelines must be dynamic, robust and sustainable because the domestication of a green library is a continuous processes.

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REVITALIZING LIBRARY AND INFORMATION SCIENCE EDUCATION IN NIGERIA FOR SUSTAINABLE QUALITY IN THE 21ST CENTURY

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Abstract

The library as an organization, as well as Library and Information professionals are intermediaries and the engine house of knowledge generation, dissemination and use. The utilization of library resources serves as a catalyst to uncommon development of any nation. The journey to developmental success is immeasurably buried in the heart of available information resources and services in the library. This paper examines the concept of sustainable development of Library and Information Science (LIS) education and how this could be achieved through dynamic and productive strategies employed by the relevant academic stakeholders within the field. The role of LIS educators as key stakeholders towards achieving comprehensive and sustainable development of qualitative LIS-education in Nigeria in the 21st century is paramount, and has been highlighted. The study equally explores some of the challenges militating against LIS education in Nigeria, which can have negative implications on the sustainability of LIS education. As a way forward, the study recommends a comprehensive revitalization of the value of LIS education through curriculum reform, standardized uniform LIS education curricula in all tertiary institutions in Nigeria to ensure quality outputs. To ensure that this goal is achieved, all library schools in Nigerian tertiary institutions should be provided with modern infrastructure such as ICT-driven teaching and learning facilities, and all other relevant instructional materials and learning space, to ensure that effective teaching and learning is enhanced for sustainability of quality LIS education in Nigeria.

Keywords: Library, Information science education, Revitalization, Sustainable development, Nigeria

Introduction

Library and Information Science (LIS) education may simply be referred to as education given to would-be information professionals in a formal school system, so as to equip and nurture them for the great task of information and knowledge management. In this vein, Akwang (2017) observed that, the main goal of LIS education is to train individuals that will be able to manage the information environment effectively and efficiently. This is hinged on the fact that, LIS education is designed to equip students with the knowledge, skills and competence needed to effectively and efficiently manage information and knowledge-based environment.

LIS education is geared toward the attainment of knowledge-economy, growth through its key functions of producing information professionals to deliver quality library and information delivery services to energize teaching, learning, research and community development in the academic institutions and other sectors of the economy. To buttress this assertion UNESCO cited in the Punch (2018) identifies higher education including LIS education as crucial to the attainment of economic wellbeing, innovation and knowledge-driven growth. The irrefutable fact is that LIS education plays a pivotal role in assisting the country in the achievement of her national developmental objectives and in re-positioning the entire sectors of the economy through knowledge generation, dissemination and the production of high-level manpower to manage the nation's information and knowledge-based institutions. Consequently, the need for sustainable development in LIS education becomes inevitable in a knowledge-driven world.

LIS Education and Sustainable Development

Conceptually, sustainable development was first used in the Brundtland report released in 1987, by the United Nations and Commission's definition of the concept has become the most frequently used definition of sustainable development. The Brundtland Commission (1987) defines sustainable development as the development, which meets the needs of the present (people) without compromising the ability of future generation to meet their own needs.

Nwosu (2016) explains that the core concern of sustainable development is the pursuit of development through means devoid of potential injury to future generations. In plain terms, sustainable development is a way of making decisions that meets the needs of today without conceding the ability of future generations to meet their own needs. This implies that caution must be taken in making and implementing decisions that have to do with LIS education in order to ensure that decisions made and implemented meet the needs of today LIS graduates and the society in general without sacrificing the ability of the unborn LIS graduates to accomplish their own generational needs.

The heartbeat of sustainable LIS education is the achievement and sustainability of quality LIS education for the present-day LIS graduates without compromising the future of the unborn Library and Information Science professionals. The point here is that if the LIS graduates today would be the LIS educators tomorrow, quality LIS education for sustainability of the profession and programme should be enhanced. This implies that the curriculum must be structured in line with international best standards, LIS educators must be trained and retrained to meet the demand of the profession, library schools must be adequately funded, modern teaching facilities and equipment must be provided for effective teaching and learning of Library and Information Science. However, reverse is the case of LIS in Nigeria today, LIS education is bedeviled with myriad of challenges, which make sustainable development unachievable.

Challenges of LIS Education in Nigeria

Lack or inadequate basic facilities, equipment and infrastructures: One of the myriads of challenges that has bedeviled LIS education is that of lack or inadequate facilities, equipment and infrastructures for the teaching and learning of LIS education. It is worrisome that some library schools lack departmental libraries. Basic cataloguing and classification tools are either not available or outdated; computers, multi-media projectors, electronic white boards and internet facilities for the teaching and learning of LIS appear to be in existent only during accreditation exercises to impress the accreditation team in order to pass accreditation. After the accreditation visitation, grossly inadequate and deteriorated or dysfunctional state will then envelope the libraries. As if these are not discouraging enough, Professors and graduate assistants share common

office and toilet facilities. This perhaps corroborates Falola (2020) assertion that in no developed country in the world are teachers treated with the level of disdain with which Nigerian academic members are treated. The question is, how can sustainable development in LIS education be realized under such unpleasant conditions? Where are the incentives for sustainable development in LIS education in Nigeria? The questions are endless.

To compound the situation is the issue of inadequate funding of the education sector. LIS education requires funding from those who established them. But they are not immune to the problem of inadequate funding of their parent institution. This is where Nigeria problem lies. Nigerian government appears not to have seen the need to allocate a reasonable proportion of budget to higher education, and indeed, LIS education. The point here is that over the years, budgetary allocation to the education sector in Nigeria from which LIS education derive its funding is yet to attract public commendation. To lend credence to this assertion, World Bank cited in Asiyai (2015) analysis of budgetary allocation to education in selected countries of the world indicates that Nigeria is the least country in terms of budgetary allocation. The analysis shows that Ghana allocated 31%, Cote d'Ivoire 30.0%, Uganda 27.0%, Morocco 26.4%, South Africa 25.8%, Swaziland 24.6%, Mexico 24.3%, Kenya 23.0%, Botswana 19.0%, USA 17.1%, Burkina Faso 16.8%, Norway 16.2%, Colombia 15.6% India 12.7%, Nigeria 8.4%. This is a huge disparity, but it has been the noxious trend. The culminating effect is that LIS education is exposed to unhealthy financial constraints.

Lack of a uniform/common curriculum: one of the major challenges and criticism leveled against LIS education is that its curriculum contained a lot of irrelevant contents. It appears there is no standardized LIS educational curriculum in Nigeria. Nwosu (2016) observes that many scholars have observed the obsolescence of the curriculum; the research further contends that although the curriculum was revised in 2007, the resulting curriculum is not particularly appealing to the library schools because of its inadequacies in its course contents.

Another contending issue in the LIS education curriculum is that the National University Commission (NUC) and Librarians' Registration Council of Nigeria (LRCN) curriculum and the benchmark for LIS education vary considerably. This gives room for different university LIS schools to have different curriculum. Owing to this, many LIS schools' curricula require extensive review to meet the international standards. In particular the curricula need to be reviewed to incorporate ICT-based courses. In a similar way, Amini-Philps (2015) in a related study points out that lack of regular and continuous review of LIS curriculum in most Nigerian LIS schools is the problem affecting LIS education in Nigeria. The issue here is that most library schools' curriculum seems to be static and unable to accommodate recent development.

The issue of inadequate LIS educators in library schools is also a big challenge. Many library schools across the country are inadequately staffed with qualified and experience LIS educators. While Vice-Chancellors, Provosts and Rectors in state public institutions have to pray and wait for the mercy of the presidency and state governors (the visitor) before they can recruit, employ and even promote academic staff. Possibly because of lack of autonomy, so Heads of institutions cannot employ academic staff without the approval of the presidency and state governors (the visitor) in the case of public institutions of higher learning.

In addition, the issue of undue interference by politicians on academic staff employment: Politicians, especially those in government seems to dictate who and who the head of institutions should employ as academic staff and should not be conceded. This is not indicator of sustainable development in education. Rather a show of neglect of quality education in both decisions and actions. The truth is that there is no development without sustainability or sustainability without development. For LIS education to be sustainable, there must be incentive for sustainable development. Hence, the need to revitalize LIS education for a sustainable quality education.

Revitalization of LIS Education

The term revitalization implies making something or anything that has lost its activity become active again. This simply means, strengthening and empowering what has become weak and unattractive to become strong and attractive again. To give new life or vitality to something that is weak to be resourceful again.

To this end, to revitalize LIS education means to strengthen LIS educational programme in order to make it sustainable. In view of the challenges that have bedeviled LIS education in Nigeria and the attendant threat on its sustainability, there is need for a comprehensive revitalization of LIS education to make it more resourceful and purposeful for a sustainable quality education that would outlive the present generation. This paper therefore proposes the following measures to be adopted in order to revitalize LIS education for sustainable development.

The role of LIS educators: This group has a cardinal role to play in revitalizing LIS education for sustainable development, without them, every dream of advancement and sustainability is a mere wishful thinking. It is an incontestable fact that majority of LIS educators are already doing their teaching with passion and efficiency. Many do conduct their research within the limits of available resources. Most LIS educators participate in one service or the other; thus, the objectives of services are met. However, the senior LIS educators should provide leadership and mentorship services to the young LIS educators in research, publications, teaching skills, professional ethics, among others. Senior LIS educators are very much required in revitalizing LIS education if for no other reason than to help in research and development of young LIS educators in postgraduate works.

The use of modern technology in teaching and research: LIS educators should employ the use of modern technologies in teaching and researches. It would be degrading to the knowledge profession that some LIS educators in this age do not have smart phones and personal computers for the mere fact that the government has not provided them with such ICT facilities. This is not to say that, it's not an obligation of government to provide LIS educators with modern technology for teaching and research. But it betrays logic for the LIS educators to fold their hands and wait for the government to provide all the ICT facilities needed before they can apply the use of modern technology in teaching and research.

Classroom management: LIS educators should be effective and efficient in classroom management and display a high sense of discipline and professional ethics in the conduct of examinations, students' research supervision and grading, knowing that the sustainability of LIS education is unarguably in their hands, as ones training the LIS educators of tomorrow. The future of the students should also mean well to them, if they are really thriving for sustainable development in LIS education. LIS educators should equally steer clear of allegations of sexual harassment, totalitarianism and arrogance linked to a number of academic staff. There is no dignity in linking students' (graduates or undergraduates) success in their academic activities to their ability to compromise their moral standards or professional ethics. Forcing students into immoral conducts is unprofessional. LIS educators should be the custodians of sound moral behaviours, but not to be against sound moral values. They should however set the standards for such moral behaviours by their personal conducts to achieve sustainable development in LIS education.

Collaborative research: aimed at enhance the quality of LIS education for sustainable development should be encouraged, especially between LIS educators and the younger ones. There are young academics who are hardly able to cut their teeth in research and publication. Collaborative research with veterans LIS educators would no doubt enable them to improve on their research and publication skills and as well contribute meaningful toward the sustainability of LIS education.

Training and re-training of LIS educators: should be vigorously pursued if sustainable development of LIS education in Nigeria would be achieved. LIS educators must be exposed to research through local and international seminars, workshops and conferences in order to update their knowledge. This is a point that cannot be overstated. The reason is simple, LIS educators are not magicians and do not function with magical means. They give what they have and cannot give what they do not have. What this simply means is that for LIS education to be revitalized for sustainable development, the LIS educators as a major player in the revitalization process should be energized to be more productive. This can be attained through training and re-training.

Adequate funding of LIS education: is a driving force that cannot be compromised. The reason is that no academic programme can effectively thrive and actualize its objective and sustainability without funding. Consequently, funding plays an energetic role in LIS educational planning, management and implementation. It is an integral part of the main plan, achievement and sustainability. This implies that for LIS education to be sustained, it must be adequately funded to meet its basic needs.

Facilities, equipment and infrastructure: the provision of adequate facilities and equipment for the teaching and learning of LIS education will assist in the effectiveness of the programme in terms of delivery and sustainability. The need to create workroom in every library school in Nigeria where modern learning equipment for LIS education will be provided cannot be over emphasized. Presently, the programme is constrained due to lack of appropriate facilities needed for its effective teaching and learning. Many LIS schools appear to be lagging behind in basic facilities and equipment and may hinder its sustainability.

LIS education curriculum should to be reformed, improve upon in content and in methodology in line with modern trend and reality of our time. It must be relevant to the society to satiate the thirst for knowledge and empowerment. In addition, the curriculum should be in line with the international standards for a sustainable quality LIS education in Nigeria. Above all, there should be a standardized uniform/common LIS education curriculum for all tertiary institutions in Nigeria to ensure uniformity in the quality of overall outputs.

Conclusion

Sustainable development in LIS education in Nigeria can be achieved if the Programme is properly organized to develop the manpower and capacity for exponential growth. The fundamental role of LIS education as an instrument of training and nurturing students that will be able to function effectively and efficiently in information and knowledge-based environment requires huge financial and intellectual investment to ensuring that the desired result is achieved. Government(s) and other relevant stakeholders must ensure that all factors militating against positive policy formulation and implementation of LIS educational programmes are properly addressed.

Some challenges plaguing LIS education and hindering its development and sustainability were identified as inadequate funding, inadequate infrastructure and facilities, lack of uniform curriculum across the country and inadequate teaching staff should be tackled with utmost sense of sincerity to achieve the fundamental objectives of the programme and make it sustainable. LIS education curriculum should be reformed and improve upon in its contents and methodology in line with modern trends and reality of contemporary age.

Recommendations

Based on the above discussions, the following are recommended for the revitalization of LIS education for the achievement of quality and sustainability.

- LIS education curriculum should be reformed and improved upon in its contents and methodology to accommodate modern developments in the discipline. In addition, the curriculum should meet the international standards for a sustainable LIS education in Nigeria. Above all, there should be a standardized LIS education curriculum in all tertiary institutions in Nigeria to ensure uniformity in the quality of overall outputs. The situation where the LIS educational curriculum varies from one university to the other should be discouraged to ensure quality output. To ensure a uniform curriculum for all LIS schools in Nigeria, the Nigerian Association of Library and Information Science Educators (NALISE), the National University Commission (NUC) and the Librarian's Registration Council of Nigeria (LRCN) and other relevant stakeholders should come up with a common curriculum and benchmark for LIS education in Nigeria for a sustainable quality education.
- There is a need for an adequate number of LIS educators in LIS schools both in quality and quantity. In addition, LIS educators should be actively involved in the struggle for university autonomy where Vice Chancellors and other heads of institutions would be given opportunity to employ academic staff without political interference.
- LIS education programmes should be adequately funded. Hence, government should be more responsible in providing adequate funds for the educational sector and indeed LIS education in particular.

DIGITAL CONSERVATION AND PRESERVATION PRACTICES OF ELECTRONIC INFORMATION RESOURCES IN UNIVERSITY LIBRARIES IN KATSINA STATE

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A. A. Maidabino

Abstract

This study investigates digital conservation and preservation practices of electronic information resources in university libraries in Katsina State, Nigeria. Survey research design was employed in this study. The population of the study comprised of 51 professional librarians in the three university libraries in Katsina state and a sample of 15 was selected using purposive sampling technique. Interview guide was used as the instrument for data collection. The data were coded using thematic analysis. The findings showed that all the types of electronic information resources listed in the study are available with electronic books and electronic journals having the highest. The study revealed that migration, replication, use of standard, analogue backups and technology are the major strategies for conservation and preservation of electronic resources in the libraries. Virus attack on digital resources, lack of digital conservation and preservation policy, lack of trained staff on digital conservation and preservation strategy, technological obsolescence, legal barriers and unreliable source of power supply in the libraries were identified as the major challenges of conservation and preservation of electronic information resources. Based on these, recommendations were made such as installation of license and strong anti-virus in the library, implementation of preservation and conservation policy, training and retraining of the library staff on issues of digital conservation and preservation, obtaining copy right permission improve funding for purchase, subscription and management of e-resource and constant power supply.

Keywords: Digital conservation, Digital preservation, Electronic Information Resources, Academic library.

Introduction

Information resources in the 21st century appear in digital form. Non- print information resources are electronic information resources that can be accessed electronically via the internet or digital media (Jonathan and Udo, 2015). Electronic information resources include electronic books, electronic journal, digital libraries, electronic newspapers, full text databases, CD ROM, online databases, internet resources, audio and audio visuals materials. For these resources to be used affectively for a long period of time and for present and future generations, it is the responsibility of the library staff to ensure preservation and conservation of the e-resources so that they are free from any form of deterioration. Digital conservation and preservation of electronic information is the treatment and management of digital information resources so that it can be accessed and used in

the future it involves a number of organized tasks associated with a variety of technical approaches or strategies for ensuring that electronic resources are not only stored but also adequately maintained and consistently usable over a long time. Brown (2013) stated that digital preservation is the process of maintaining digital object for as long as required in a form which is authentic and accessible. With the development in the 21st century librarians must reinterpret traditional library skills of conservation and preservation of information resources, and explore new ways of putting these skills to work through the use of information and communication technology (ICT). Therefore, this study explores the digital conservation and preservation practices of electronic information resources in the university libraries in Katsina State.

Statement of the Problem

Electronic information resources are essential and vital in the libraries. They support the effective dissemination of knowledge to users of any library. However, for electronic information resources to be accessed and utilized properly, such resource must be preserved and conserved from being deteriorated by biological, environment, natural, and chemical factors. However, evidence from the literature indicates that most of the electronic information resources are not being conserved and preserved for long period of time as such they got damage and destroyed easily. This is likely caused by some factors such as poor funding, lack of preservation policy and inadequate planning of preservation and conservation of e- resources (Timothy, Dangwara and Oluwabunmi, 2017). Therefore, it is against this backdrop that the study aims to investigate digital conservation and preservation practices of electronic information resources in university libraries in Katsina State.

Objectives of the Study

The objectives of the study are:

1. To find out the types of electronic information resources provided in the University libraries in Katsina State.
2. To determine the strategies for digital conservation and preservation of electronic information resources in the libraries.
3. To identify the challenges of digital conservation and preservation of electronic information resources in the libraries.
4. To identify the measures taken to overcome the challenges.

Literature Review

Concept and Significance of Academic Libraries

Academic library is a library attached to the higher institution of learning to support the teaching, learning and research activities of the parent institution by providing adequate information resources to the students, staff and workers of the university community to fulfill the objectives of the library. Rubin (2010) defined academic libraries as libraries situated or found in institutions of higher learning such as Universities, Polytechnics, and Colleges of Education. Okiy, (2005) in Eze and Uzoigwe, (2013) observed that university libraries are now expected to provide to users a range of ICT and e-resources necessary for retrieving information quickly from both local and remote databases, as well as creating a need for library cooperation and consortium initiatives.

Electronic Information Resources

Electronic information resources are multimedia and digitized information source that can be consulted and accessed to obtain information; they include electronic books, electronic journals, online databases, internet resources, C.D ROMs, and audio-visual materials. Adeleke and Nwalo

(2017) defined electronic information resources as “resources in which information is stored electronically and which are accessible through electronic systems and networks”. According to Yakubu and Olatoye (2015) electronic resources are the information on devices such as net, hard disc, flash drive and CD ROMS. Bankole, Ajiboye and Otunla (2015) corroborated the above views that electronic information resources consist of information resources provided in electronic formats such as internet, CD-ROM databases, e-books, e-journals, Online databases, Online Public Access Catalogues, and other computer –based electronic networks.

Types of Electronic Information Resources provided by university libraries

In the 21st century, electronic information resources are provided in electronic form, and they include e-databases, e-journals, e-books, e-data archives, e-manuscripts, e-maps, e-magazines, e-theses, e-newspapers, e- research reports, and e-bibliographic databases (Ankrah and Atuase, 2018). The E-electronic books (e-books) are book publications that consist of texts, images made available and accessible in digital form. According to Johnson, Elevesen, Geland, Lammer, Sipe and Zilper (2012) electronic books are books that are provided in a digital format for checkout or use via an internet browser, a computer, or another electronic device like an e-book reader. Electronic Journals (e- journals) constitutes important category of e-resources provided by the university libraries that can be accessed via electronic form. Johnson et. al (2012), noted that e-journals provided in a digital format activate access via an internet browser, a computer or other electronic devices. Another type of e-resources provided by university libraries are the Online Databases. Online databases are databases accessible from a local network or the internet and are effective way of providing access to electronic books and journals in university libraries. Online databases are collection of electronic information sources (e-journals/e-books) by publishers from various fields and disciplines (Afolabi, 2007 cited in Dongardive, 2015). Compact Disc-Read Only Memory (CD-ROM) database is a flat, plastic disc with digital information encoded on a spiral form. It digitally store large amount of information in a way that enhance easy searching and retrieving the information. According to Gakibayo, Odongo and Obura (2013) CD-ROM databases are of immense value over print if the system is networked, as patrons at their terminals could access information without coming to the library. Internet and internet resources enables users of a university to access and link to millions of information resources content in the global information environment. Nnadozie (2016) reiterate that the internet is in reality, an international network of computers which are physically separated. Audio visuals information resources are another type of electronic information resource provided by the university libraries. They are information resources that can be listen, view or read they include audio tapes, cassettes and discs, Online Public Access Catalogue (OPAC) is a library database where library users can have accessed to the resources of the library through online terminals in the library (Alabi and Inuwa, 2010). While e-magazines and e- newspapers, are periodicals that exists on the World Wide Web or internet. E-reference as another type of electronic information resource that include: Dictionaries, Almanac and Encyclopedia which are available on the internet.

Strategies Use by University Libraries for Conservation and Preservation of Electronic Information Resources

Conservation and Preservation strategies are well considered and documented approaches when it comes to electronic information resources, for the information resources to survive and remain accessible. Preservation strategies are important because of the technological landscape that changes so rapidly (Gbaje, 2011). The conservation and preservation strategies include:

- i. **Migration:** This is the process of transferring data from a platform that is in danger of becoming obsolete to current platform. Supporting this Kavishe and Dulle (2016) defined Migration as the process of transferring electronic data/ information resources from one technology to another, without losing its properties.
- ii. **Emulation:** Is the process of preserving the old environment of electronic information resources by using latest technologies. According to Ngoepe and Vander Walt (2009) Emulation is the process that seeks to preserve the old environment by using up to date technologies to be like the original environment.
- iii. **Use of standards:** This strategy involves the use of preferably open, widely available, supported or agreed standards and file formats, such standards or formats may either be formally agreed or may be de-facto standard formats that have been widely adopted by industry. Velmurugan (2013) mention working with producers (creators and distributors) to apply standards that will prolong the effective of life of the available means of access and reduce the range of unknown problems that must be managed.
- iv. **Refreshing:** Refreshing is the transfer of data between two types of the same storage medium so that there is no bitrates changes or alteration of data. According to Mit (2005) refreshing is a periodically moving of files from one physical medium to another in order to avoid obsolescence or degradation of the storage medium.
- v. **Replication:** is the process of creating duplicate copies of data on one or more systems. The purpose of replication is to enhance the longevity of digital document and maintaining their authenticity and integrity through copying and the use of multiple storage locations supporting the view according to Kolle, Reddy, Parmeshwar and Basavaraj (2014) Replication is nothing but creation of duplicate copy of data on more than one system that are situated in different location.
- vi. **Analogue Backups:** Analogue Backups combine the conversion of electronic resources into analogue form with the use of durable analogue media. An analogue backup preserves its content and protect it from obsolescence.
- vii. **Technology Preservation:** Technology Preservation is keeping and maintaining the technology environment that is used for creation of contents including operating system, original application software and media drive.
- viii. **Metadata attachment:** Metadata is a strategy for portraying/ retrieving electronic resources, electronic resources discovery, organizing e-resources and enhancing access to them. Metadata is key to ensuring that electronic resources survive and continue to be accessible in to the future by using several metadata standards like Preservation Metadata Maintenance Activity (PREMIS) is completely dedicated for this purpose (Haynes, 2018).
- ix. **Cloud computing as a strategy for the conservation and preservation of electronic information resources:** Cloud computing are software applications that exist on-line and are available to users via internet according to Gosavi, Shinde, and Dhakulkar (2012) consider cloud computing as an emerging computer paradigm where data and services reside in massively scalable data centers in the cloud and can be accessed from any connected device over the internet.
- x. **Digital Curation:** This involves selection, preserving, maintaining, collecting and adding value to digital research data throughout its life circle. According to Wikipedia digital curation is the process of establishing and developing long term repositories of digital assets for current and future reference by researcher and scholars.

Challenges Faced with the Conservation and Preservation of Electronic Information Resource

There are several challenges facing the conservation and preservation of electronic information resource. Timothy, Dangwara and Oluwabunmi (2017) identified that the most common problems with conservation and preservation of library resources are mutilation of books, poor funding, lack of preservation policy, inadequate planning of preservation and conservation of e-resources and virus attack on digital resources. In the study of Matthew, Shadare and Musa (2017) found that the challenges facing digital preservation are lack of institutional support, lack of standards, lack of fund, lack of skilled manpower and lack of equipment.

Measures Adopted to Overcome the Identified Challenges.

Timothy, Dangwara and Oluwabunmi (2017) recommended that government at all level should provide closed- circuit television (CCTV) cameras and alarm, improved funding by university management, enacting and implementing preservation and conservation policy, creating back up files onsite and off-site including installation of strong anti-virus software should be made in the university libraries and also Matthew, Shadare and Musa (2017) stated that there should be institutional support, provision of standards, provision of adequate fund, training and retraining of the library staff on issues of digital conservation and preservation and provision of metadata.

Methodology

The researchers adopt a qualitative research paradigm to explore the phenomena of the study. In particular survey research design was employed to conduct the study to its logical conclusion. The population for this study comprised of the 51 professional librarians in the university libraries in Katsina State. In all a total of 15 staff working in the e-library section of the university libraries in Katsina State were selected using purposive sampling strategies. An interview guide was designed and used to collect data relevant for the study.

Table 1 provides the distribution of the professional staff of the university libraries and the participants of the study.

S/N	Names of University libraries	No of Professional Librarians	No of Staff At The E-Library
1	Federal University Dutsinma Library (FUDMA)	33	6
2	Professor Bello Daura Library, Umaru Musa Yar'adua University Katsina (UMYUK)	10	4
3	Bilya Sanda Khadimil Islam Library. Al-Qalam University, Katsina (AUK)	08	5
	Total	51	15

Results and Discussion of Findings

Table 2: Information about the Participants

S/N	Name of University Library	Code	Gender	Educational Qualification	Working Experience	Date of interview	Time of Interview
1	FUDMA	P1	M	Masters	1-5 years	29 th 07 2020	10:00-10:10am
2	FUDMA	P2	M	Masters	5-10years	29 th 07 2020	10:00-10:20am
3	FUDMA	P3	M	BA/BSC	5-10years	29 th 07 2020	10:00-10:30am
4	FUDMA	P4	F	BA/BSC	5-10years	29 th 07 2020	10:00-10:40am
5	FUDMA	P5	F	BA/BSC	5-10years	29 th 07 2020	10:00-10:50am
6	FUDMA	P6	F	BA/BSC	10-15 years	29 th 07 2020	10:00-11:00am
7	UMYUK	P7	M	Masters	1-5 years	2 nd 08 2020	2:00-2:10pm
8	UMYUK	P8	M	Masters	1-5 years	2 nd 08 2020	2:00-2:20pm
9	UMYUK	P9	M	BA/BSC	1-5 years	2 nd 08 2020	2:00-2:30pm
10	UMYUK	P10	M	BA/BSC	5-10 years	2 nd 08 2020	2:00-2:40pm
11	AUK	P11	M	Masters	1-5 years	3 rd 08 2020	11:00-11:10am
12	AUK	P12	M	BA/BSC	1-5 years	3 rd 08 2020	11:00-11:20am
13	AUK	P13	M	BA/BSC	1-5 years	3 rd 08 2020	11:00-11:30am
14	AUK	P14	F	BA/BSC	20-25years	3 rd 08 2020	11:00-11:40am
15	AUK	P14	F	BA/BSC	20-25years	3 rd 08 2020	11:00-11:50am

Table 2 provides the information of the participants in all the University libraries studied by the researchers. In all, a total number of 15 library staff participated in the study with male participants dominating the study. Five of the participants have Master degree as their educational qualification while the remaining possessed BA/BSC educational qualifications respectively. In addition, all the participants of the study had been coded to ensure anonymity of conducting and reporting the interview in line with ethical requirements of qualitative research.

1. Interview Results on the Types of Information Resources provided by University Libraries in Katsina State.

The participants reported different types of electronic information resources provided by their libraries. In all, it is evident that, e-books, e-journals, internet resources, Online Data Base are the predominant types of electronic information resources available in the university libraries as reported by all the participants (P1-P15). Other types of electronic information resources reported

by P1,P2,P3,P4,P5,P6,P7,P8,P9,P10,P11,P14,P15 includes OPAC and CD-ROM Database, E-Newspapers, and Online Reference sources. However, few numbers of participants mentioned electronic Information Resources like E-bibliographies, E-conference proceedings and E-magazines in their libraries (P1, P9, and P11, P13).

2. Strategies for conservation and preservation of electronic information resources

Participants in this study reported different strategies used by their libraries for the conservation and preservation of electronic information resources. From the finding of the study, it can be seen that all participants except for (P7), (P5, P11), (P1, P2) and (P3, P4, P14) agreed with Replication, Migration, Use of standard and Analogue Backups as the main strategies for the preservation of electronic information resources in their libraries. Additionally, other strategies reported by some of the participants include Refreshing (P1,P2,P4,P5,P6,P9,P10,P13), Technology Preservation (P1-,P6, P11, P12, P13, P14 and P15), Digital Curation (P1, P3,P5,P6, P9, P11,P12,P13) and Cloud computing (P1,P2,P3, P7,P8,P9,P10, P14,P13,P15).

3. Challenges associated with conservation and preservation of electronic information resources.

Participants in university libraries in Katsina State reported different category of challenges encountered in conservation and preservation of electronic information resources. P1,P2,P3,P4,P5,P7,P8,P9,P10,P11,P12,P13,P14,P1 indicate virus attack on digital resources, lack of digital conservation and preservation policy, P1,P2,P3,P4,P5,P7,P8,P11,P12,P13,P14,P15 lack of trained staff on digital conservation and preservation strategy, P1,P3,P4,P5,P6,P8,P9,P10, P11, P12,P13, technological obsolescence and legal barriers while P1,P2,P3,P4,P5,P7,P10,P13,P14,P15 unreliable source power supply

4. Measures to be adapted to overcome the identified challenges.

The participant's expressed their opinion as to the measures to be taken to overcome the identified challenges. Some of which includes installation license and strong anti- virus in the library, implementation of preservation and conservation policy, training and retraining of the library staffs on issues of digital conservation and preservation, improve funding for purchase or subscription and management of e-resource, obtaining copy right permission and constant power supply (P1- P15).

Discussion of Findings

The study revealed that more than half of the electronic information resources listed are provided in the university libraries in Katsina State, with e-book and e-journals with highest appearance. The finding is in line with studies of Manjack, Dangani and Fari (2019), who found out that all the types of electronic information resources listed in their study are available with e-books having the highest responses. On the Strategies for conservation and preservation of electronic information resources the study revealed that migration, replication, use of standard, analogue backups and technology preservation are the major strategies used. This finding is in sequence with the studies of Shimary and Ramaiah (2018), on digital preservation strategies: An overview that stated Migration, Use of Standard, Analogue methods and technology preservation as digital preservation strategies. The major challenges associated with the conservation and preservation of electronic information resources in university libraries in Katsina State are virus attack on digital resources, lack of digital conservation and preservation policy, lack of trained staff on digital conservation and preservation strategy, technological obsolescence and legal barriers and unreliable source of power supply. This finding is similar to that of Timothy, Dangwaran, and Oluwabunmi. (2017), and Matthew, Shadare and Musa (2017) who reported that, lack of preservation policy, inadequate planning of preservation and conservation of e-resources, virus attack on digital

resources, lack of institutional support, lack of standards, lack of fund, lack of skilled manpower and metadata standard was the major challenges faces in conservation and preservation of electronic information resources in university libraries in Katsina state. The study recommends installation of strong Anti- virus in the library, improve funding for purchase or subscription and management of e-resource, training and retraining of the library staff on issues of digital conservation and preservation and constant power supplies as measures to be taken to overcome the challenges are implementation of preservation and conservation policy. This finding is comparable with the findings of Timothy, Dangwara and Oluwabunmi (2017), and Matthew, Shadare and Musa (2017) that recommend there should be enacting and implementing preservation and conservation policy, creating back up files onsite and off-site including installation of strong anti-virus software should be made in the university libraries, institutional support, provision of standards, provision of adequate fund, training and retraining of the library staffs on issues of digital conservation and preservation and provision of metadata.

Conclusion

Based on the findings of the study, one would conclude that no library can exist without conservation and preservation of its resources. University libraries in Katsina State provide electronic information resources and those electronic information resources are conserved and preserved using conservation and preservation strategies such as migration, replication, and use of standard and Analogue backups. However, lack of digital conservation and preservation policy, virus attack on digital resources and financial constraints are the major challenges faced in conservation and preservation of electronic information resources in university libraries in Katsina State.

Recommendations

Based on the findings of the study, the following recommendations were made:

1. More electronic information resources such as e-magazines and e-conference proceedings should be provided in the libraries.
2. University libraries should adopt cloud computing and emulation technology for conservation and preservation of electronic information resources.
3. The management of Universities libraries in Katsina State should ensure implication of digital conservation and preservation policy to avoid virus attack on the e-resources

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EFFECTIVE MANAGEMENT OF ACADEMIC LIBRARIES IN NIGERIA: THE NEED FOR A GREEN APPROACH

George Azubuike Onwueme
.Ebisemen Patience Lulu-Pokubo

Abstract

There have been several calls for nations and the various aspects of human endeavours to take drastic actions in protecting the environment and the world at large in order to achieve sustainable development goals. With each passing time, the continuous depletion of natural resources places more responsibilities on humanity to care more in having a healthy planet for the next generation. Hence, steps should be taken to promote a green environment in every field of life including the library. The importance of having a green library cannot be overemphasized because the library is the central hub in any academic institution for knowledge transmission to future generations. The library requires significant amount of deliberate policies, commitment, energy and other resources to survive and make it a friendly and stable environment for long-life learning. The protection of the library environment becomes very necessary for the users, staff and information resources because the library environment is also been affected and threatened by some of the global environmental degradations such as greenhouse effects, ozone layer depletion, global warming and carbon dioxide. Environmentalists and library users are now interested in seeing measures being taken by library managements of today in embarking on keeping their libraries green and in tuned with nature while ensuring sustainability.

Keywords: Green Library, Sustainable environment, Librarians, Library Management

Introduction

The first international Earth Summit held in Rio de Janeiro, Brazil in 1992, at the insistence of the United Nations Organization (UNO), did not only raise awareness of the emerging threats to the global environment and climate change due to increasing human activities and explorations, but more importantly, galvanized actions towards protecting and sustaining the planet and its resources. While the globe continues to witness the depletion of natural resources and further degradation of the planet, there have been several follow up calls and action plans for humanity to demonstrate more responsibilities in showing greater care in ensuring a healthy planet and protecting the environment and the world at large for future generations. These calls and action plans are also geared towards promoting a green environment in every sphere of human endeavours including librarianship. The protection of the library environment equally becomes very necessary for the users, staff and information resources because the library environment is also affected and

threatened by some of the global environmental degradations such as greenhouse effects, ozone layer depletion, global warming and carbon dioxide.

Nevertheless, there has been a growing awareness of environmental problems and discussion towards environmental protection and sustainability, which has led many libraries across the world to take measures in reducing their damage on the environment. This development saw the emergence of the Green Library Movement in the early 1990s. The movement's main concern was in reducing libraries' environmental impact (Kurbanoglu & Boustany, 2014; United Nations Conference on Environment and Development [UNCED] 2014).

The importance of setting up a green library cannot be overemphasized because the library is considered the epic center of any academic institution for the preservation of information resources and knowledge transmission, which requires the correct quality and quantity of human resource, significant number of deliberate policies, commitment, energy and other resources to survive and make it a suitable place for lifelong learning. In this difficult moment of dwindling funding and limited resources, Starks (2011) stated that librarians have been trained at managing shared, common and public collections but they have not fully integrated issues of sustainability into their information literacy activities.

There is not many literature or previous studies on Nigerian libraries involvement in green libraries practices or projects. Therefore, this paper intends to raise awareness and give an understanding of the concept and practice of green libraries, address some challenges faced in implementing a green library and advocate on the need for library management in Nigerian academic institutions to bring about a green approach to the effective management of their entire library structures and resources that are in tune with nature and further the culture of green thinking and living.

What are Green Libraries?

Green library is a recent concept in librarianship especially in developing countries like Nigeria. There is no specific definition of a green library. But there are a number of central themes and shared views that run through all of them, which seek to generally minimize the negative and maximize the positive effects the building will have on the environment and the library resources. According to the Online Dictionary for Library and Information Science (ODLIS) (in Hauke, 2019), the term "green libraries" is synonymous with "sustainable library". The sustainable library is defined as "designed to minimize negative impact on the natural environment and maximize indoor environmental quality by means of careful site selection, use of natural construction materials and biodegradable products, conservation of resources (water, energy, paper), and responsible waste disposal (recycling, etc.)." Scherer (2014) defined the green library as a "library designed to maximize the positive impacts on the social, cultural, economic and environmental aspects of a community", while Kurbanoglu and Boustany (2014) noted that the green library could be a multi-faceted concept with several components, like green buildings, green operations and practices, green programs and services, green information systems and green collections. Green libraries also direct their services, activities, events, literature and projects related to any kind of sustainability programme that follows the United Nations Agenda 2030, demonstrating the social role and responsibility of libraries as leaders in sustainability education. Kurbanoglu and Boustany (2014) further stated that the term green library refers to a library that is environmentally conscious in many ways which include a wide range of actions such as:

- Using nontoxic, and therefore, environmentally friendly cleaning products instead of toxic chemical cleaners,
- Reducing energy use,

- Collecting and promoting materials with environmental themes, adopting green practices such as recycling
- Developing information services that can produce fewer carbon footprints throughout the lifecycle of the generation, publication, organization, distribution, access, use and disposal of information.

Kurbanoğlu and Boustany (2014), while trying to form a distinction between going green and sustainability, cited Mulford and Himmel (2010) who indicated that there is a difference between green and sustainable. Environmental sustainability means using resources and interacting with the natural environment in ways in which won't reduce what's available to future generations. On the opposite hand, going green means to "pursue knowledge and practices that may result in more environmentally friendly and ecologically responsible decisions and lifestyles, which may help protect the environment.

Libraries are not only repositories of knowledge, but are also very important places of information resources for raising awareness about environmental concerns. Green libraries educate the public about environmental issues through their collections, sustainable and environmentally friendly facilities, and public library programs. Among other things, green libraries maximize the effects of natural sun light and natural air flow; green libraries are thoughtfully designed while taking into account site selection to structural design, energy use, materials used and human health effects (Stoss, 2010).

Green libraries seek to reduce the use of water and energy by designing the building to maximize the use of natural and renewable resources. They also integrate actual plants into the building design, preferably with drought resistant and/or native vegetation. Furthermore, the maintenance of high standards of indoor air quality to help ensure the health of the people who inhabit the building. It is not merely a term but it is an activity, a process, and a movement. In simple words, green library is nothing but environment friendly or eco-library. Green or sustainable libraries are the structure that is designed, built, renovated, operated, or reused in an ecological and resource efficient manner. It is one of the many collective efforts of all mankind to make green planet by reducing global warming effect (Nikam, 2017).

Green Library Movement started in the early 90s, and it absorbed much interest in the library profession since about 2003. A growing number of librarians, libraries, municipalities, provinces, universities and schools tended to create green library to be able to reduce environmental impacts. This innovation takes place by creating library's green building, making existing library equipment into a green one, providing green library service, and taking environmentally sustainable and supportive measures in the library (Antonelli, 2008).

Green library buildings are not only saving money in terms of energy but also in terms of health, productivity and morale of employees. A green library design is less expensive because of reduced upfront costs energy and water conservation and increased efficiency. Therefore, librarians should always keep in their minds that a green library is not just about taking care of the environment, it is about taking care of the health and well-being of those who work in it and patronize it. They should always make efforts to promote green library by: encouraging users to use e-books, e-journals, etc. which can work as space, paper saving tools, undertaking practices like making softcopies, microfilming of old and scarce books and by weeding-out of old and outdated books, using different electronic medias and online communication tools like social media and imbibing maintenance culture to minimize dust and make environment cool (Meher & Parabhoi, 2017).

Why Build and how do I build Green Libraries?

According to Purohit (2013), not everyone will be so lucky on have a brand new, environmentally ambitious library building. But it is highly effective to test all aspects of the building, management and services which may be seen as environmentally sustainable. What you'll be able to consider with a brandnew library building - sustainable aspects of the structure of the building, the doorway, the building climate, ventilation, heating and cooling, the lighting, the inside fittings, green information and communication technology - are all features that you simply can point to for green marketing after opening and from which you'll be able to benefit for years. And you'll be able to also check your existing building, your renovated or second-hand library building, to spot all the areas that may be made sustainable.

so as to choose the key points to incorporate in your strategic plans, search for areas that lend themselves to cooperation with partners in sustainable activities and projects and also the unique green features to make a selected green identity for the library. And for all this, the library needs no budget – just make use of what you have already got. Alternatively, the library administration can check the user services, the library management and therefore the facility management to work out what is planned; a checklist is a straightforward thanks to identify what the library can do on a coffee level. an honest checklist could be a tool to spot the green potential for further steps to attain a convincing green image. The strategic management of the library can easily be linked to sustainability objectives. it's advisable to adopt strategies from the whole body of the library: the university, the community or the parent organization to which the library belongs. Create your own “eco-action plan” consistent with the aims of the full organization.

The protection of the environment may be a necessary part of our attribute within the present world, which is littered with some reasons like greenhouse effect; ozonosphere depletion, global warning and greenhouse gas are the most concerns for the environment. Time is changing from day to day so, our natural resources are limited. We all are responsible to depart a healthy planet for next generations. Now days, people are plagued by various natural disasters like flood and drought. These are considerably affecting the human's health and life. The importance of green library is additionally included within the ongoing green system because the library is the central hub for knowledgetransmission for future generation which needs significance amount of energy, water and other resources to survive and make a stable environment.

Anotnelli (2008) enumerates several reasons for libraries' tendency toward the development of green building or green equipment in their buildings. Firstly, the price to construct green buildings is low. it's now possible to make green buildings for libraries with a coffee budget. Secondly, easily-available energy resources are non-renewable resources and that they are vital for the earth health, and because of library limited budget, it's more rational to use energy resources more wisely. Thirdly, it's important to scale back carbon effects on the buildings.

Consistent with Marcum (2009), green library approach underlines facilitating energy productivity, reduction in environmental impacts and avoidance of environmental materials and chemicals for creating a healthier building and environment. Positive impact on the health and productivity of employees is that the value added hidden in Green Library process. However, libraries are something apart from a mere building, and overcome printable and digital problems is that the main challenge to Green Library. Rodney and House (2010) enumerate one amongst the key consequences within the Green Library texts because the must encourage the library to form a sustainable building for the library. during this kind of buildings, less resources and energy are consumed, and that they are more integrated with societies and locations. Use of them is easier; they cash in of natural light, and are easier and more attractive for clients and employees.

Connell (2010) proposed practical ideas that significantly reduce energy consumption in the library, which include the selection of computer equipment labeled with energy productivity, integration of servers in large enterprises, the use of virtualization and thus increased sharing of computing power of the computers between users, conscious management of equipment replacement and repair of old computers, finding ways to recycle electronic waste, recycling printer cartridges and selection of green varieties, decreasing the overall paper consumption and using recycled products without chlorophyll and green paper.

Similarly, Bhattacharya (2017) in his work on why and how to go green, explained that the library sector should create models and systems that facilitate sustainable development. Libraries have considerable opportunities to improve their customers' environmental awareness through communication and environmental education. He further stated many ways to go green, including as follows:

Proper way of using electric power: Turning off lights during bright daylight, turning off fans, computers when not in use, use of CFL lights instead of tube lights with proper maintenance can minimize expenses.

Indoor Air Quality: Lack of ventilation at public places can cause many harmful effects such as bacterial infections etc. The air should be recycled and should not be stagnant. Least use of air conditioners will reduce emission of harmful gases responsible for holes in ozone layer and in a way curb global warming. Some of the green design elements which can be incorporated into libraries are: Community collaboration, Green materials, Green roof, Raised floor system, Energy efficiency, Natural ventilation, Green power and renewable energy, Indoor environmental quality etc.

Reducing pollution: Use public vehicles for transporting; avoid machines as much as possible. It is important that we reduce the carbon footprint of our buildings. The term carbon footprint is defined as "the total amount of greenhouse gases produced to directly and indirectly support human activities usually expressed in equivalent tons of carbon dioxide (CO₂)".

Effective way of paper usage: Papers are prepared from woods. If single paper is saved the tree is saved. Papers should not be wasted. Two sides of the paper should be utilized. Papers should be reused or recycled effectively. More e-books and e-journals should be used in order to save papers. Digitization of rare books also can be done to save papers.

Recycling non-biodegradable products: Put a separate container next to your trash can or printer making it easier to recycle your bottles, cans or papers. Plastics should be avoided. Reusable pens can be used instead of ball point pens. Polythene covers should be avoided consciously. This is also kind of saving earth.

- Use of maximum Natural light and wind can save electricity.
- Eco friendly pesticides can be used at time of pest control.
- Eco friendly materials can be used for stacking purpose.
- Using network printers instead of personal printers.
- Installing a new server and running multiple servers on one server box.
- Re-fill toner cartridges instead of buying new.
- Putting computers in sleep mode when in not use.

Limited Budget: Green Library does not require any high budget allocation. It is now possible for libraries to build green buildings on conventional budgets. Green Libraries make use of finite energy resources which is readily available and also fit into the library budgets. Here technology does not become a barrier.

Social Responsibility: As Green Libraries play a paramount role towards the welfare of mankind; this could be used as a part of the marketing strategy of the library as a socially responsible body which can have a big impact on the library's image.

Challenges of Having Green Libraries in Nigeria

Despite the realization of green libraries practices across the globe today, Nigeria is still having some setback in initiating it. Bhattacharya (2017) outlined some challenges faced in India which could be similar to that of Nigeria. They are:

- Green practices in sustainable manner require considerable degree of expertise or competency from general management to ordinary level of maintenance throughout library functions. It is likely to expect lack of awareness in green technology and among the employees who have been recruited with traditional knowledge and skills.
- Library buildings are most neglected part. Sometimes, librarians are helpless as he has to work in an allotted space even when new buildings are being proposed or are under constructions. Architects too do not bother for well-constructed green library buildings.
- Though cost of constructing green building has become affordable to other entities, libraries will face issues in meeting green goals as they are subject to stringent budget cuts especially when reengineering or reconstructing library structures one cannot forget the cost associated with it.
- Attitudinal barriers play significant role in slowing down the sustainable practices in libraries. There are possibilities to convince the administration who would otherwise object the idea executing green library practices due to their unawareness. A well laid plan for green library building will remove resistance to change.

Other challenges by Oyelude and Alabi (2013) are:

- Indoor plants are rarely planted or kept within the library.
- There is hardly any recycling of computers, rather they are thrown away or abandoned in some rooms.
- There is no conscious recycling of items such as paper and ink cartridges which often constitute nuisance in the environment. This habit is only creeping in slowly through some suppliers who have adopted the method of recycling the products but presenting them as brand new.
- Until recently, meetings and training workshops are rarely done online through the virtual world in Nigerian libraries. Instead, employees travel to or drive to conferences, unfortunately building up stress in the process.
- Many Nigerian libraries are not in the forefront of organization of programmes, special events and projects that can promote sustainability in the environment. This is because special events like contests and seeking environmental grants to raise awareness and become a greener library is not feasible in most Nigerian libraries due to inadequate funding.

Conclusion

This paper was aimed at creating awareness and promoting interest in Green libraries. A green library, which is also referred to as a sustainable library, is a library built with a lot of environmental concerns and considerations in mind. While it is a known fact that the concept and practice of green library is still relatively fresh and scarce in the Nigerian field of library and Information Science, Nigerian libraries especially academic libraries cannot ignore the many potential benefits of greening their libraries and practices. Academic libraries should begin

developing strategic plans on how to incorporate green library concepts and practices especially when taking future decisions about collections, library buildings, and the scale of preservation, digitalization, equipment, energy consumption, products, and library networking service. It will also be good to see Nigerian libraries incorporate greening and sustainability values into their users' education, information literacy programme and outreaches

Nigerian library and Information Science (LIS) schools and Educators should take up the challenge of inculcating a culture of "green or sustainable thinking" in her various courses or curricula. Though some of the LIS schools in Nigeria do have some existing courses on environment, conservation and preservation It will help the various librarians and information professionals currently in training, to acquire knowledge and practices that can lead to more environmentally friendly decisions and actions, which will ultimately impact positively on the quality of information resource and services provided to their clientele and the society at large.

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REPOSITIONING LIBRARY AND INFORMATION SCIENCE PRACTICE FOR THE KNOWLEDGE ECONOMY IN NIGERIA: THE ROLES OF 21ST CENTURY LIBRARY AND INFORMATION SCIENCE EDUCATORS

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Abstract

The 21st century is marked by the growing recognition of data, information and knowledge as the super resources that drive growth and sustainable socio-economic development. This gave birth to the concept of knowledge-economy which is an economy driven by the use of knowledge to effectively manage other resources at man's disposal to achieve his societal goals. This paper addresses the quest of LIS educators in repositioning LIS practices for achieving a knowledge economy in Nigeria by playing roles such as repositioning the LIS curriculum in tertiary institutions in Nigeria, liaison with government to provide adequate policies and information infrastructure, among other strategies in order to meet the demands and dictates of the 21st century knowledge economy which will then help maximize the potentials of the country's vast human and mineral resources. It also highlights challenges such as poor funding, technophobia, infrastructural deficiency and digital divide as the major hindrances to achieving the desired goals. Public-Private partnership and a robust campaign for the implementation of contemporary practices among librarians are recommended as parts of the solutions to address such challenges.

Keywords: 21st Century, Educators, Library and Information Science, Knowledge Economy, Nigeria, Practice.

Introduction

In the global economy, knowledge is rapidly gaining more recognition as a key factor and resource for sustainable socio-economic development in societies than natural and material resources like oil and gas, gold, agricultural resources, all combined. This is based on a logical premise that data and information, which are the unrefined aspects of knowledge, hold the keys to the full maximization of all other factors of production, including human resources in private organizations and even in the public sector of the economy. Knowledge-intensive economic activities are important factors of production in the leading economies and this has led to a new description of economies as knowledge-based, as against the traditional natural resource-based economy (Oluwadare, 2015). All disciplines, fields of study and areas of human endeavor, including the non-formal sectors are realizing the place of knowledge in managing and coordinating their other resources for the effective maximization of other resources in achieving their objectives. Ogundeinde and Ejohwomu (2016) state that the growing realization of knowledge as critical driver of economic growth and development is, no doubt, driving nations into harnessing the benefits of a knowledge economy.

As a result of these recognitions, coupled with the advent of technologies that can facilitate rapid transfer and exchange of knowledge, the present society is increasingly being understood and rightly named the knowledge-based or Knowledge economy, that is, an economy that is driven by knowledge. According to Hayes (2020), the knowledge economy is a system of consumption and production that is based on intellectual capital, a situation whereby a significant component of value may thus consist of intangible assets such as the value of workers' (human resources) knowledge or intellectual property. It is defined as production and services based on knowledge-intensive activities that contribute to an accelerated pace of technical and scientific advance, as well as rapid obsolescence (Powell & Snellman, as cited in Ogundeinde & Ejohwomu, 2016). Data, information and knowledge have been established as the three basic concepts and foundation of a knowledge-driven economy (Jones, 1999, as cited in Enache, Marin & Vechiu, 2009).

Piotrowski (2015) states that information is widely believed to be the future source of prosperity. Library and Information Science, an integral aspect of information-based professions, is part of the fields of studies where information, and indeed knowledge are regarded as the major commodities. According to Anyanwu, Oduagwu, Ossai-Onah, and Amaechi (2013), in our contemporary society, where education has become the hub upon which economic development rotate, the place of library and information services cannot be ignored. How then, can Library and Information Science as a discipline at the central position of providing information and knowledge for the members of the society, contribute its quota to the ailing Nigerian economy, which has largely relied, without commensurate results for decades, on a mono-resource, oil? This paper therefore seeks to present a pathway for repositioning the practice of Library and Information Science for the knowledge economy, highlighting the roles to be played in achieving this by Library and Information Science Educators.

Library and Information Science in the 21st 2tyCentury

Library and Information Science is a multidisciplinary field of study which focuses on the management of information resources, human and material, in libraries and information centres with the sole aim of getting the information resources and their contents across to a target group of users, i.e matching the right information with the right people and for the right purpose at the appropriate time. Cheong (2008) as cited in Martínez-Arellano (2016) defines Library Science, or Librarianship as the preservation and transfer of knowledge in all recorded forms across time and space for the benefit of humankind; the discipline concerned with the principle and practice of selecting, acquiring, organizing, disseminating and providing access to information in accordance with the specific needs of groups of people or an individual. To emphasise the position of Librarianship in the 21st Century, Koganuramath (2012) submits that “like all professions at the thresholds of change, librarianship also accepted this challenge and went into overdrive to adapt to the changing contours of information environment” (p.3).

Binta (2013) asserts that digital librarians of the contemporary era are knowledge-based practitioners who use research as a foundation for their own professional practice and who support the conduct of research through their professional associations. Scholars in the 21st century have often underlined the relationship between Library and Information Science and Knowledge. Richardson, (as cited in Nwosu, 2018) notes that philosophy of librarianship is defined as a systematic attempt to understand the basic concepts related to library and information science, by studying the essence, nature, and value of discourses in librarianship. It provides answers to questions about the essence of the library (connecting readers with books), the meaning of a generic book (as recorded knowledge), the nature of its patrons (storing information in their memories), and knowledge (a metaphysical reality in patrons' minds).

Library and Information Science (LIS) is the study of knowledge production as it is materialized in documents, and of through which channels this knowledge is communicated and how one can make access to this knowledge in terms of organization and representation of documents (Andersen, 2011, as cited Hjørland, 2018). The domain of information science is the transmission of the universe of human knowledge in recorded form, centering on manipulation (representation, organization, and retrieval) of information, rather than knowing information (Saracevic, 2009). The philosophy of Library and Information Science is humanitarian. It is focused on providing the vital information and knowledge necessary for the society to continue to thrive; develop sustainably. One unique feature of all the definitions of LIS is that they show that the relationship between Library and Information Science and knowledge cannot be overemphasized. The 21st Century itself is marked with information explosion, as such, Library and Information Science, a discipline that considers information and knowledge as its major commodities definitely has a huge role to play in the present information environment.

The Knowledge Economy: The Place of Nigeria

The Knowledge economy, according to Pettinger (2017), described as the sector of the economy which is increasingly based on knowledge-intensive activities, creating a greater reliance on intellectual capital rather than physical inputs, has the following characteristics:

- Knowledge and information as key driver of productivity.
- Growth in high technology investment and industries.
- Growth in knowledge intensive service sectors such as education, communications and information.
- Knowledge is a non-finite resource. Capital gets used up but knowledge is not limited and can be shared without losing it. In fact, sharing can help boost overall knowledge.
- Growth in demand for higher skilled labour / University degrees.
- Increased importance of tacit knowledge – the skills and ability to implement codified knowledge.
- Innovation is driven by producers and users (for example, open source platforms/ customer feedback) rather than top-down linear systems.
- Knowledge spillovers from one industry to another
- Nature of knowledge economy, related to the process of globalisation and global diffusion of knowledge.
- Knowledge economy and high-tech industry raise scope for increased automation of production processes leading to rapid changes in the labour market.

Kolesnichenko, Radyukova, and Pakhomov (2019) identify *institutional structure*; an *innovative system*; *education and training*; *information infrastructure* as the basic elements of the Knowledge economy. But there are obvious indications that a 200 million people with a budget for education below the UN/UNESCO benchmark has left much to be desired. It is clear from the above features and indices that Nigeria still has a long way to go in achieving sustainable development through a decent knowledge economy. For instance, in 2012, the knowledge economy index for Nigeria was 2.2. Knowledge economy index of Nigeria fell gradually from 2.53 in 1995 to 2.2 index in 2012 (Knoema, n.d).

In the 12th edition of the Global Innovation Index released in 2019, Nigeria ranked 114th, performing largely below development expectations (Adesoji, 2019). For a country with such a huge potential in human resources, that is a waste. Under business sophistication (knowledge workers, innovation and knowledge absorption) Nigeria ranks 85th in the world, Creative output (101st), Infrastructure (122nd), Human capital (119th), and Market Sophistication (88th), For the institutional categories that include political, regulatory and business environments, Nigeria ranks 114th.

Library and Information Science and the Knowledge Economy

The provision of opportunities to meet the basic learning needs of information professionals is a first step towards preparing library and information science schools in Nigeria for the emerging global society (Edegbo, 2011). This is hinged upon the position of Library and Information Science as a major discipline in the information environment saddled with the responsibility of providing the needed information and knowledge for achieving a sustainable development. The knowledge driven countries have been able to process convergence aimed at integrating conventional strategies and leveraging ICTs to mass produce and 'commodify' knowledge, information, solutions, innovative products and even their cultures for sale to the outside world (Agbata, 2016).

If Nigeria must reap from the potentials of the knowledge economy through its various information professionals, especially Librarians in practice, there must be adequate provision of training facilities for future Librarians. At its 21st AGM and National Conference at the Ignatius Ajuru University of Education, Port Harcourt, Rivers State, Nigeria, the Nigerian Association of Library and Information Science Educators, under the Chairmanship of Professor Udo Nwokocha made a resolution to reposition Library and Information Science education in the country by setting up a Professor Zakari Muhammed-led Committee to draft a policy that the association will deliberate upon to align LIS Education in Nigeria with the realities of the 21st Century making it not just attractive for the public, but to also position the field for practices that will endear governments at all levels into investing in Library and Information Services thereby giving the practitioners the deserved recognition and respect it deserves in the Nigerian economy. This feat can only be achieved if Librarianship presents itself as a discipline that is fundamental to the quest for Nigeria to establish herself as a major force in African development through the development of a sustainable knowledge economy.

Implication of the Knowledge Economy for Sustainable Development in Nigeria

In spite of Nigeria's vast natural resources which range from crude oil, copper, gold and tin, to arable soil, abundant water resources and a large population, its Global Competitiveness Index Rank is 127th out of 144 countries (Oluwadare, 2015). In 2017, after coordinated efforts by the Presidential Economic Recovery Team under the Economic and Growth Plan (ERGP), Nigeria moved 24 places to 145th from 169th in the global Ease of Doing Business Ranking by the World Bank (Udo, 2018). This came after exiting an economic recession amidst a crash in global oil prices that left several oil-producing/oil-dependent countries in comatose. It also indicates that there is massive work to be done in harnessing and managing the vast resources at the country's disposal.

In a society that is totally dependent on information but as well on the growth of the number of organizations, knowledge seems to be the only power which guarantees the social, economic and democratic progress, progress that does not eradicate in time, a sustainable form of growth and development (Enache, Marin, & Vechiu, 2009). The above argument is a clear indication that asserts the place of information and knowledge in driving sustainable development in any society.

According to the Masters Intelligence Economique et Strategies Competitives (2018), Knowledge Economy presents the following benefits to an economy:

- The scientific knowledge contained in the knowledge economy is the basis for wealth generation and accumulation. The implication of this is that the more people have access to information and knowledge, the greater the prospects of making informed socio-political and economic decisions at the individual and communal levels.

- To contribute to improving performance, raising productivity and reducing the cost of production, and improving its quality through the use of advanced technical means and methods, especially in the industrial fields, which highlight the industries of precision electronic devices and equipment and computers and software. This implies that the required knowledge to effectively manage the other factors of production will be available at the disposal of the citizenry. This will help curb wastes and plug the loopholes associated with corruption.
- Contribute to the generation of jobs in the areas that are using the advanced technologies included in the knowledge economy and generate employment opportunities that are constantly expanding for employees with specialized scientific skills and abilities. As more knowledge is generated and shared, the possession of tacit and explicit knowledge readily available will enhance a spike in innovation and thus increase self-employment opportunities thereby allowing a thinner recurrent expenditure by government while expanding the base of capital projects on critical infrastructure.
- Contribution of the contents of the knowledge economy and its data and techniques in providing the necessary basis for stimulating the expansion of investment, especially investment in scientific and practical knowledge in order to create knowledge capital that contributes to the production of knowledge. More knowledge stimulates inquisitive citizenry, which in turn inspires more creativity.
- The contribution of the knowledge economy to achieve clear and tangible structural changes in the economy. Such as the relative importance of knowledge, production and increased investment in knowledge to increase knowledge capital and to increase the relative importance of workers in the fields of knowledge associated with the use of advanced technologies and to increase the importance of exports of knowledge products. In the long run, this implies that there will be massive healthy competition, especially in the private sector which is usually responsible for the employment of a greater percentage of labour.

Importance/Roles of LIS Educators in Repositioning LIS Practice for the Knowledge Economy in Nigeria

As a pillar among information professions in the knowledge economy and in the digital era, the need for LIS to align with the realities of the 21st century is more paramount now than ever. The following roles are hereby identified as strategic to the repositioning of LIS practitioners for the challenges and requirements of the knowledge economy:

i. Provision of a Strategic Blueprint for Repositioning LIS through Curriculum Development

According to Varalakshmi (2006), there is a need to audit the LIS curriculum for its relevance to the twenty-first century hybrid environment. There are some courses treating concepts that are outdated and superfluous in the 21st century. They can be merged while concepts, issues and themes that are highly relevant for the knowledge economy should be integrated into the new curriculum. This is even more needed in the National Board for Technical Education Curriculum for LIS education in Nigeria where there are courses like Types of Libraries treated in two semesters at the National Diploma level while such courses are still being separately treated at Higher National Diploma levels. In the midst of all these little consideration is given to concepts like Virtual Reference Services under basic Reference Tools and Services. The Machine-Readable Catalogue is also not receiving adequate attention while BIBFRAME, a newer concept is not yet considered. It should be noted that the present NBTE curriculum for LIS schools in Nigeria was last revised in 2002, long before Social media became part of tools used to offer Library Services.

ii. *Repositioning LIS Education and Students for Self-Employment Opportunities*

It is not a secret to Library and Information Science educators in Nigeria that a greater percentage of courses being taught in Library Schools from the present curriculum are targeted towards the provision of library and information services from the Library system. This is why most 'freshers' in Library schools often ask career questions like "Where can I work apart from the library?" Infopreneurship should be given an expanded scope in Library schools so that innovative students who prefer being self-employed can embark on employment creation opportunities rather than waiting for white collar jobs from government and the private sector. The private sector, and indeed the SMEs are major stakeholders in global economic systems. The Library and Information system must look towards achieving this as well.

iii. *Repositioning LIS Education and Students for Technological Practices*

Library Information Science Education in Nigeria today cannot be relevant without effective preparation of new generation of librarians to effectively use the new information and communication technology in their professional practices (Edegbo, 2011). Banking and finance, insurance, the military, law, art, medicine, and other fields of endeavour are evolving with the use of information and communication technologies to enhance their services. The present and future crop of librarians must be given a mentality that abhors technophobia. Rather than seeing technologies as a threat to their job opportunities, the prospective librarians must be trained with a philosophy that emphasizes technologies as part of their job.

iv. *Repositioning LIS Education and Students for Indigenous Knowledge Management*

There is an area in the African information and knowledge system that is yet to fully receive the needed attention. It is the indigenous knowledge system. It is like an untapped mine for LIS students and practitioners. By focusing on the selection, collection, preservation, organization and dissemination of indigenous knowledge, we will not only expand the scope of our field, we will create another employment / career opportunities for LIS students and graduates who may wish to embark on freelance works. Indigenous practices in the health sector for instance is gaining rapid relevance as orthodox medicine is now incorporating some traditional medical practices into conventional medical practices, especially in the areas of treatments and pharmacology.

v. *Liaison with LIS Practitioners for the Implementation of Contemporary LIS Practices*

While focusing on training and development of prospective Librarians, Library and Information Science educators should create a better synergy with colleagues on the field who are presently practicing to integrate contemporary practices in their activities. For instance, most of the Librarians presently managing our libraries attended Libraries schools before the advent of social media. It is evident that very few Libraries in Nigeria, including the national library branches of the country and the headquarters deliver library services with the social media which has a potential of reaching even rural dwellers. LIS educators do not have to wait till the future librarians take the mantle of leadership before this is done. Working with the present practitioners will go a long way in a robust and rapid implementation of these relatively novel ideas in repositioning Library and Information services for the challenges of the knowledge economy.

vi. *Liaison with Governments for Adequate Library and Information Infrastructure*

Irrespective of the magnitude of efforts put into the training of LIS practitioners at undergraduate and postgraduate levels, the absence of the needed information infrastructure to drive or execute the practices will render the entire process useless. The World Bank has 4 major indices for rating a Knowledge Economy. Information infrastructure comes second after education/training. A dynamic information infrastructure [consisting of television, radio, telephone, internet] is required to facilitate the effective communication, dissemination and processing of information [and knowledge] (Bashir, 2013). Library and Information Science Educators must ensure that governments at all levels understand and provide the necessary infrastructure for modern library and information services, especially in academic institutions and public libraries. This can be done with the support of the National Library, which is under the umbrella of the Ministry of Education, which also, fortunately, supervises academic activities in the country.

Government may cite dwindling economic resources as a major challenge, but the government must be convinced that the Library has a major role to play in reviving the economy in the long and short term basis. We are in a knowledge economy, we also have a Ministry of Communication and digital economy, the absence of a government funded and supported robust information infrastructure will mean we have a tripod, standing with a missing leg; having material resources and a communication/digital economy ministry without an effective and efficient mechanism for the citizenry to access strategic information for result-oriented decision making is incomplete.

vii. *Liaison with Governments for Effective Library and Information Services Policy*

Governments at all levels must have a robust, practical and pragmatic policy on Library and Information services that must be effectively implemented. This should involve all the types and forms of libraries all over the country. The criteria for establishing all kindergarten, nursery, elementary, primary, secondary schools, public or private must include the establishment of standard libraries. Just like the Federal Government, State Governments must be made to establish decent libraries within their Ministries, Departments, Agencies, Commissions, etc to provide crucial information services for members of the staff. All Local Government Areas must have standard council libraries to provide information services for members of the public. This is the only guarantee for having a society where information is available to every member of the public. A knowledge economy cannot be achieved in the presence of a wide digital divide.

Challenges and Prospects of Repositioning LIS Practice for the Knowledge Economy in Nigeria

i. *Infrastructural Deficiency*

With an estimated population of over 200 million people, Nigeria has an evident infrastructural deficit. The academia, where Library and Information Science educators operate from, is recognized as an integral aspect of establishing a working knowledge economy by the World Bank. Yet, it is one of the most affected sectors of the economy in terms of infrastructural challenges. Piotrowski (2015) argues that the lack of infrastructure in many African countries does not help the situation as far as knowledge economy is concerned. Despite a thicket of undersea cables that have been lying along the coast of Africa since 2009, an African Development Bank *Report Connecting Africa* report from 2013 points out that access to high-speed broadband for the average African citizen remains patchy at best (Butare, Adam, Okello, & Mulamula, 2013). This further creates a digital divide among the populace

who need to bridge the gap in order to have adequate and timely access to reliable and accurate information for result-oriented decision making.

ii. Political Instability

Several projects and plans in Nigeria have been dropped by new governments, only to embark on another without a plan for continuity with successive government. There is a visible outright lack of political will and initiative to migrate into a knowledge economy as evident in the policies of government on infrastructure across all levels. Recently, the Federal Government of Nigeria attracted the CEO of Social Media giant Facebook, Mark Zuckerberg to invest in start-ups in Nigeria. But such efforts are only visible at the federal level. State governments need to embark on similar projects. It also remains a puzzle if successive governments will continue on such paths.

iii. Conservatism and the Fear of Change

Technophobia and the fear of job loss in the face of emerging novel technologies have made several librarians fear the transformation of library and information services using digital technologies. There is an apparent proliferation of digital information outlets but Librarians are yet to be at the forefront. Unlike their colleagues in Mass Communication and Journalism, Librarians are yet to fully tap into the potentials of social media in delivering library services. Apart from the poor funding and budgetary cutbacks that have highly impacted the use of technologies for the delivery of library services, librarians are not maximizing the potentials of digital technologies to deliver their services.

iv. Economic Challenges

The Nigerian economy, amidst the dependence on dwindling oil prices is really struggling. At the same time, the government is struggling to provide infrastructure for the most populous black nation in the world. It is evident that the government which had to review its benchmark of \$57/barrel of oil prices which later crashed to about \$20/barrel during the Covid-19 outbreak will definitely feel some strain while trying to embark on an overhaul of the library and information system in order to position it for the challenges of a truly knowledge-based economy.

Conclusion and Recommendations

The 21st Century is an information and knowledge age marked by the emergence of digital technologies used in better management of data, information and knowledge, which are the new factors driving global economies. Library and Information Science is a major field of study at the centre of the knowledge-driven economy of the present era. However, the Nigeria case is still far from the standard as the nation grapples with economic challenges despite having a huge base of human, agricultural and mineral resources. The human capital is not receiving the adequate attention that is needed to drive the management of all other resources. Knowledge has been identified as the major resource needed to maximize the full potentials of other resources in order to create a sustainable economy. Library and Information Science educators therefore have major roles to play in repositioning the practice of Library and Information Science for the knowledge economy in Nigeria. Such roles will be played in areas such as embarking on the development of a curriculum that addresses the challenges of a global knowledge economy, liaison with governments to create effective policies and information infrastructures to provide library and information services for the knowledge economy and preparation of librarians who will tap into the massive untapped indigenous knowledge.

In the midst of challenges such as economic downturn, technophobia, infrastructural deficiency and political instability, the following recommendations are suggested to address the issues raised:

- i. Public-Private Partnership: Government can incorporate with corporations to embark on library projects within their areas of operation or even nationwide for multinational corporations. Funding and maintenance responsibilities can be shared to make it easier for both parties to deliver. Library Educators, through a vibrant synergy with the Nigerian Library Association and the Librarians' Registration Council of Nigeria can come together to advance this position. This will help reduce the financial burden on government in the quest to bridge the gap created by infrastructural deficiency.
- ii. Robust advocacy for incorporation of contemporary library practices among practicing librarians. This should be done through direct interaction with practicing librarians and through their post-graduate education. They should be made to see reasons in the prestige and honour associated with innovative ideas using digital technologies. Librarians should be told that they do not have to wait for special interventions before using Social Media to offer Current awareness to their users. Journalism has not fallen since the advent of social media. Rather, it has leveraged on the potentials of the social media. Librarianship should do the same.

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DIGITAL PRESERVATION AND CONSERVATION OF LIBRARY MATERIALS

Amina Suleiman Hamza

Abstract

The paper attempts to explore digital preservation and conservation of library materials in Nigeria as a measure of achieving sustainability of the library materials so as to ensure that their context is retained in order to provide a better library services to users. It explores the causes of deterioration of digital library materials in Nigeria. The paper examines the current trends in digital preservation and conservation techniques as well as challenges affecting digital preservation and conservation in Nigeria. Finally, the paper recommends that the provision for long term planning for digital preservation and conservation, provision of more constant and ongoing attention regarding the digital preservation and conservation of digital library materials as well as the formulation of digital management policy should serve as some of the tool that can be integrated to digital preservation and conservation as a means to better library services in Nigeria.

Keywords: Conservation, Digital library materials, Library services, Preservation.

Introduction

In the last two decades, the World Wide Web and subsequent associated developments like computers, broad band, web 2.0 and related technologies have shaped the old and created new means of information organization, access, transmission, and dissemination as well as preservation of information resources. As we are now living in the digital world, computers now far outnumber office workers in many parts of the world. We bank by phone, fax carryout orders and communicate with each other through keyboarded thoughts, and it has now become the responsibility of libraries and information centers to assemble, organize and protect documentation of human activities.

Traditionally, libraries consisted only of collections of books, manuscripts, journals and other information resources in printed format (Gindhani, 2017). Traditional libraries lay emphasis on storage and preservation of physical items, particularly books and periodicals with the information physically assembled in one place where users must travel to the library to learn what is there and make use of it. In such libraries, the documents deteriorate at a rapid rate, the collected information are not easy to locate and procure and as such, information does not reach the user of the libraries on time. Again the traditional libraries are confined within a physical boundary and users cannot easily locate a piece of information and have to spend more time in searching information.

Traditional preservation, as a responsible custody, works only when an information resource has a physical form. Today, the digital world has transformed traditional preservation concepts from protecting the physical integrity of the object to an umbrella term for many actions including conservation treatment, acquisition, organization, and distribution of resources to prevent further deterioration or renew the usability of selected groups of materials (Micheal, 2018), while conservation is treatments in the form of repairs or application of chemicals for various purposes such as removal of adhesives or pollutants. Therefore, preservation and conservation in the digital world must be a shared goal that leaders and followers engage in together. It is the responsibility of many people in many institutions fulfilling many roles, (Micheal, 2018). Digital preservation and conservation of library materials is an active safe keeping of information materials to ensure that information materials maintained their integrity, authenticity and prevent data loss from medium failure and software obsolescence, as the preservation of valuable information is an important responsibility that libraries must now bear for the sake of future generation.

While attributes and the dynamics of the digital age are subject to study in several domains, they have received relatively little attention from scholars focusing on digital preservation and nature of digital conservation in particular, Therefore, in this work the concept of digital preservation and digital conservation so as to have a better understanding of its impact as well as method of digital preservation and conservation. Finally, it identifies challenges affecting proper digital preservation and conservation of library materials and way forward to overcome the identified challenges.

Digital Preservation and Conservation of Library Materials

Making library collections to continue to have authenticity and integrity and retention of context is what the preservation of information resources is about. It can also be seen as all measures taken to retard or prevent deterioration or damage to documents (Manicka, 2012); while conservation is the treatment of damaged materials in the library in order to bring it back or close to original form. At one time, advocates for the protection of cultural artifacts and museums objects used the terms “Conservation” and “Preservation” interchangeably. Today preservation is an umbrella term for the many policies and options for action, including conservation treatments as digital world has now transform the traditional preservation concepts.

Digital preservation is a set of processes and activities that maintain information stored in digital formats in order to ensure continued access to information. Digital preservation is a formal endeavor to ensure that digital information of continuing value remains accessible and usable (Barman, 2020), digital preservation and conservation of library materials is an active safe keeping of information materials to ensure that the materials maintained their integrity, authenticity and prevent data loss from medium failure and software obsolescence. When a library, information centers, archives or any other cultural or historical institution with preservation mandate starts experimenting with digital technology and decides to use it to improve services or transform operations, then that institution has embarked on the digital preservation path. Digital conservation involves preventive care, examination of the materials, treatment as well as documenting any method that may prove effective in keeping that materials as its original format. Libraries and information centers in Nigeria needs to embark on preservation and conservation of digital materials for the following reasons:

- i) **Wide range of users:** people from all works of life, from children to old men; and from laymen to researchers, they all turn to the library for information resources so digital preservation and conservation will provide better access to library materials and also solve the problem of deterioration of books.

- ii) **Continuous and future use:** digital preservation and conservation provide continuous and wider even after hundred years of the publication of the material.
- iii) **Prevention from lost/damage of materials:** library materials especially those in digital format or optical media have their own physical and chemical properties and lifespan, so preservation and conservation prevent those materials from damage and deterioration.
- iv) **Rare materials:** materials of immense value from historical and cultural of view must be preserved as well as risk materials of national interest.
- v) **To reuse the information:** digital preservation convert information into different formats for example to use image in slide show and to adopt the content for a different purpose.

However, digital preservation and conservation of library materials requires more constant and ongoing attention than preservation of information resources in printed format. This is supported by Mcleod's (2008) who stated that the preservation and conservation of digital information is widely considered to require more constant proactive and ongoing attention than the preservation of other media which require constant input effort, time and money to handle rapid technological and organizational development which is considered the main stumbling block for preservation and conservation of digital information especially in developing countries like Nigeria.

Factors leading to deterioration of Digital Library Materials in Nigeria

Preservation and conservation of valuable information is an important responsibility that libraries must now bear for the sake of future generations. While we are still able to read our written heritage from several thousand years ago, the digital information created merely a decade ago is in serious danger of being lost because of environmental conditions such as temperature, humidity and exposure to light. Therefore, taking sufficient measures to protect materials in a controlled environment where such variables could be maintained within range of damage limiting levels should be taking in to consideration by librarians, information professionals as well as conservators.

Another important factor leading of deterioration of library materials is digital obsolescence. Digital obsolescence as identified by Rothenberg (2014) as a situation where a digital resource is no longer readable because of its archaic format. In this case, the materials becomes out of fashion and no longer useful. Which means the hardware and software that runs on the media is no longer readable and not available because digital technology is developing extremely fast which make the materials to become obsolete in a matter of years when faster, more capable and cheaper storage and processing devices are developed, the older version gets replaced almost immediately which are being replaced by new version of software or completely new hardware. Therefore to ensure proper preservation of conservation of digital library materials, the following must be taken into consideration:

Methods/Techniques of Digital Preservation and Conservation of Digital Library Materials

Many digital preservation strategies have been proposed, but no one strategy is appropriate for all digital library materials, situation or institutions. Below are the different range of current preservation of digital information materials options that libraries in Nigeria may adopt to ensure proper preservation and conservation of digital library materials

1. **Refreshing:** This is the transfer of data between two types of the same storage medium, so there are no changes or alteration of data. That is to copy digital information from one long-term storage medium to another of the same type with no change whatsoever in the

bit stream. For example, transferring census data from an old preservation CD to new one. Refreshing will likely become necessary due to the deterioration of physical media. Therefore refreshing is a necessary component of any successful digital preservation and conservation program as it addresses decay and obsolescence.

2. **Bit-stream copying (backing up data):** Bit-stream copying is more commonly known as “backing up your data” and refers to the process of making exact duplicate of the original digital object and it should be followed by remote storage so that the original and the copy of the document does not become victims of the same disastrous event. This is an essential preservation strategy to prevent data loss due to hardware and media failure, normal malfunction and decay, malicious destruction or natural disaster.
3. **The use of standard file format:** file formats should be widespread, backward compatible often upgraded and ideally open format. The national initiative for networked cultural heritage cites uncompressed Tagged Image File Format (TIFF) and portable document format (PDF) and American Standard code for information interchange (ASCII) and Rich Text Format (RTF) for text as “de factor” formats that are unlikely to be rendered obsolete in the near future.
4. **Avoiding physical deterioration of media:** the media on which digital contents are stored are more vulnerable to deterioration and catastrophic loss than some analog media such as paper. The recording media for digital data deteriorate at a much more rapid pace, and once the deterioration starts, in most cases there is already data loss. This characteristic of digital forms leaves a very short frame for preservation and conservation, so it should be avoided as far as possible by maintaining an appropriate environmental condition and using durable media such as Gold CDs may reduce the need for refreshing. Also, librarians should ensure proper handling and proper storage.
5. **Digital Archeology:** This includes methods and procedures to rescue content from damaged media or from obsolete or from damaged hardware and software environments. Digital archeology is explicitly an emergency recovery strategy and usually involves specialized techniques to recover bit-streams from media that has been rendered unreadable, either due to physical damage or hardware failure such as head crashes or magnetic tape crinkling. Digital archeology is generally carried out by for-profit data recovery companies that maintain a variety of storage hardware including obsolete types plus special facilities such as clean rooms for dismantling hard disk drives.
6. **Migration:** Migration is the transferring of data to newer system environments (Garreth, 2016). This may include transferring contents from floppy to CD and then to DVD and then to Blue ray etc. likewise conversion of resources from one file format to another (e.g. conversation of Microsoft word to PDF or open document) or from one operating system to another (e.g. windows to linux) so the resource remains fully accessible and functional. As the biggest problem to the digital media preservation is the storage format evolution and its obsolescence.
7. **Replication:** Replication is the process of creating duplicate copies of data on one or more systems and keeping them in multiple locations. Sometimes it is the best means of preserving cultural resources by lowering the risk of loss. Data that exist as a single copy in only one location is highly vulnerable to software or hardware failure, intentional or accidental alteration and environmental catastrophic like fire, flooding, earthquake etc. Digital data is more likely to survive if it is replicated in several locations

8. This goal may be facilitated by following standards and guidelines that mandate producing a master copy for long term storage and preservation, and producing used copies derived from the master copy in the format that best satisfies the user's needs.
9. **Emulation:** combines software and hardware capabilities to reproduce in all essential characteristics the performance of another computer of a different design,. This allows programs or media designed for a particular environment to operate in a different, usually newer environment. Emulation is the replicating of functionality of an obsolete system. Emulation requires the creation of emulators, programs that translate code and instructions from one computing environment so it can be properly executed in another. According to Vander (2017) "Emulation does not focus on digital object but on the hard and software environment in which the object is rendered". It aims at (re) creating the environment in which the digital object was originally created. Emulation is a hardware or software that enables one computer system to behave like another computer systems. Emulation refers to the ability of a computer program in an electronic device to emulate another program or device. Emulations may also be built for applications, operating system or hardware platforms.
10. **Encapsulation:** This may be seen as a technique of grouping together digital objects and metadata necessary to provide access to the objects. The grouping process lessens the likelihood that any critical component necessary to decode and render a digital object will be lost. This method maintains that preserved objects should be self-describing, virtually "linking content with all of the information required for it to be deciphered and understood". The files associated with digital object would have details of how to interpret that object by using logical structures called "containers" or "wrapper" to provide relationship between all information components that could be used for future development of emulators.
11. **Audio preservation:** This includes guidelines on the production and preservation of digital audio objects, which sets out the international standards for optimal video signal extraction from variety of audio source materials. You can digitalize sound carries into CD and DVDs tape and regular cleaning and re-housing of the cover. Also paintings, photographs demand special preservation techniques.
12. **Email preservation:** Email poses special changes for preservation. Email client software varies widely, there is no common structure for email messages; email often communicate sensitive information. Approaches to preserving email may vary according to the purpose for which it is being preserved. Some of which include normalizing email into Xml format, migrating email to a new version of the software and emulating email environment.
13. **Web resources preservation:** Archiving is the process of collecting portions of the World Wide Web and ensuring that the collection is preserved in an archive, such as an archive site for future researchers, historians and the general public. Example <https://www.archive.org> which is a nonprofit digital library with the stated mission of universal access to knowledge. It offers permanent storage and access to collections of digitalized materials including websites, moving images, music and books.
14. **Analogue Backups:** Analogue backups is the process of the conversion of digital objects into analogue format. It is useful to the document that deserves the highest level of merit and protection from being lost. The analogue backup of printed document can be created by taking a printout of the document and then binding it. An analog copy of a digital object can protect it from obsolescence while sacrificing any digital qualities. In addition to the

above strategies, security of digital information should also be area of concern as it is vital in protecting digital preservation and networking systems/services from exposure to external/internal threat etc. rigorous security for information sources will include:

1. ensure compliance with any legal and regulatory requirements;
2. Protect digital materials from inadvertently or deliberate changes.
3. Provide an audit trail to satisfy accountability requirements.
4. Act as deterrent to potential internal security breaches.
5. Protect the authenticity of digital materials
6. Safeguard against theft or loss
- 7.

Several information security techniques may be applied to protect digital material, some of this includes:

- 1) **Encryption:** Encryption is a cryptographic technique which protects digital information materials by converting into a scrambled form. Encryption may be applied at many levels from a single file to an entire disk. Many encryption algorithms exist each of which scramble information in different ways. These require the use of a key to unscramble the data and convert it back to its original form. The strength of the encryption method is influenced by the key size.

It should be noted that encryption is only effective when third party does not have access to the encryption key in use, and all encryption by a repository must be actively managed and updated over time to remain secure. The loss or destruction of encryption keys will result to data becoming inaccessible.

- 2) **Access control:** Access control allows an administrator to specify who is allowed to access digital materials and the type of access that is permitted.
- 3) **Redaction:** Redaction refers to the process of analyzing digital resources, identifying confidential or sensitive information and removing or replacing it. Common techniques applied include anomisation and pseudonymisation to remove personally identifiable information as well as cleaning authorship information. Libraries should always carry out reduction on a copy of the original and never on the original itself.
- 4) **Securing Hardware:** Hardware security is the security of such equipment as computer, printers, monitors etc. which libraries find indispensable for their day to day functions especially in this digital era. There is the need to keep such hardware in secure rooms under physical lock and key and an inventory system should be implemented for easy tracking, preventing unauthorized access to the servers thereby preventing tampering with server settings, corrupting data or gaining access to programs and confidential information (National Forum on Education Statistics, 2003)
- 5) **Network security:** In digital library “resources are accessed via the internet and network are playing a vital role in connecting these information sources” (Sing, 2003). In the digital age, availability of secure efficient and cost effective network of access would be the core competency of the libraries. It would be vital for libraries to secure network so that the integrity of data can be maintained. To ensure security of physical network it is important not to allow users to install unauthorized network equipment, use secure password for root access, and ensure proper cabling and cable protection.
- 6) **Database security:** Database is very critical parts of the library information system as the key hosts of metadata, and other administrative information. Database security can be maintained discretely or can be integrated with operating systems. This implies that users will require only one logon into the system. A database should also have a tracking

features that can be track when the database was accessed by whom and what change took place. For instance it must be possible to trace who added an article to the collection and when. Data transmission should be secured using protocols such as secure socket later (SSL) or secure shell (SSH) SSL “is a public key cryptographic based confidentiality mechanism” which is historic associated with web pages via the secure hyper transfer protocols (https).

- 7) **Operating system security:** The operating system is the underlying system on which application programs run. Therefore, the choice of an operating system plays a critical role in securing system security. The system must be hardened or secured by removing unnecessary functions, restricting access and tracking changes and processes.
- 8) **Email:** Email presents a special security problem for a number of reasons, but the first step you can take is not to store your emails on any web server longer than necessary. “Download and delete” protocol where every three months or so, you download all of your emails that are more than a few months old and archive them locally. After you have backed them up to an external hard drive delete the copies on your web based email provider. You will still be able to save and search your old emails, but since they reside on your own physical computer, they will better be protected against subpoena based searches.
- 9) **Preservation of storage medium:** Tapes, hard drives and floppy disc have very short life span when considered in terms of obsolescent. The media used to store digital materials becomes obsolete in anywhere from two to five years. Libraries will have to keep moving digital information from storage medium to storage medium.

Challenges of Digital Preservation and Conservation in Nigerian Libraries

The unique characteristics of digital forms make it easy to create content and keep it up to date, but at the same time raises many difficulties in the preservation and conservation of the content especially in developing countries like Nigeria. Despite evidence of increasing concern about digital preservation, there are numerous technical, organizational and economic barriers to a comprehensive infrastructure for protecting and preserving digital library materials which as outlined:

1. **Physical deterioration:** the first challenge digital preservation faces is that the media on which digital contents stand are more vulnerable to deterioration and catastrophic loss. This is supported by Cooper (2012) who attested to the fact that the most familiar problems in digital preservation are media failure deterioration. While acid paper is prone to deterioration in terms of brittleness and yellowness, deterioration does not become apparent for at least six decades, and when it happens, it happens it is also highly possible to retrieve all information without loss after deterioration is spotted. However, the recording media of digital data deteriorate at much more rapid pace, and once the deterioration starts, in most cases there is already data loss.
2. **Hardware and software obsolescence:** one of major problems of digital preservation and conservation is rapid changes in computer hardware and software which make older systems obsolete on a regular basis. Crespo (2010) states that digital obsolescence is one of the most pronounced problems in digital formats therefore measures must be taken to handle the rapid and constant changes in software and hardware environment.
3. **Lack of technical support:** There is also lack of technical support in many Nigerian libraries, in most cases only one (1) person is formally trained to initiate, develop, implement and maintain digital library materials, therefore staff training and retraining need to be given attention to.

4. **Insufficient fund:** Poor funding is a major challenge to libraries in Nigeria. Many libraries in the country derive their funds from government, and the budget of many libraries continues to dwindle from government budget. The effect of global economic depression and local currency devaluation continue to water down the budget of digital libraries.
5. **Lack of backup standard:** digital preservation and conservation require several ICT facilities for backup in order to ensure proper preservation. However, many if not all Nigerian libraries lack the essential hardware and software, which in turn make the libraries to have poor back up standard
6. **Poor maintenance culture:** There is poor maintenance culture in Nigeria. The management of libraries and information centers in Nigeria has poor maintenance of the infrastructural facilities including hardware and laboratory equipment. Therefore there is the need for regular and constant maintenance and upgrade of computers which is the problem to most digital libraries in Nigeria because of insufficient fund to carry out the activities.
7. **Policy:** many libraries in Nigeria lack proper management policy regarding the proper preservation of digital library materials as well as the digital library itself. (Atanda, 2017).

Way forward

1. Libraries should provide more constant and ongoing attention regarding the preservation and conservation of digital library materials to handle the rapid technological advances.
2. Libraries should make provision for long term planning for digital preservation barriers to handle constant changes of software and hardware.
3. Librarians should constantly be trained and retrained to handle constant changes in technology
4. Provision of annual budget allocation for digital preservation strategy and resources
5. A digital preservation management policy needs to be formulated. This may be done by adopting digital preservation policy of International Federation Of Library Associations and Institutions (IFLA).
6. Regular and constant maintenance upgrade of computer hardware and software as well as raising enough funds to ensure proper preservation maintenance culture
7. Governments, university management and library stakeholders should create a standard policy to ensure needed skills for librarians.

Conclusion

This paper established that libraries in Nigeria need to ensure sustainable efforts in order to ensure proper sustainability of digital preservation and conservation. This is in order to ensure proper provision of a better 21st Century library services to their users. It also identified that digital preservation is a daunting set of challenges to libraries for several years now, hence, libraries in Nigeria need to overcome the inhibitions associated with it and look ahead for the betterment of their information services. This could be achieved through financial sustainability, awareness, training, policy as well as proper maintenance of the digital library materials.

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DETERMINATION OF PRESERVATION AND CONSERVATION OF LIBRARY MATERIALS IN COLLEGE LIBRARIES IN BORNO STATE

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Anthonia Peace Joel

Abstract

This study determined preservation and conservation of library materials in college libraries in Borno State. Three research questions were raised for the study. The population of this study comprised of 245 librarians and information professionals in the four colleges of education in Borno State. The entire population was used as the sample size because it was considered manageable. The instrument used for data collection was a structured questionnaire developed by the researcher titled “Preservation and Conservation of Library Materials” (PCLM). The reliability of the instrument was computed using Cronbach Alpha and yielded a co-efficient of 0.78, the instrument was therefore deemed reliable for the study. The instrument was subdivided into three clusters. Frequency counts and percentages were used to analyse the data. The analysis was done using statistical package for social sciences (SPSS) version 23. The finding revealed that preservation and conservation practices commonly available in the colleges of education include audio CDs, digitization, CD-ROM, online database and e-mail. The finding also revealed that audio CDs, CD-ROM, e-mails and e-projects are to a great extent available. Based on the finding of this study, it was recommended among others that the digital resources (e-resources) preservation and conservation practices in college libraries in Borno State include: Audio-CDs, Digitalization, CD-ROM, Online database and e-mail.

Keywords: Preservation, Conservation, Library, Library materials, College Libraries

Introduction

A library is a repository of wisdom of great thinkers of the past, present and the future. Any loss to such materials might be irreplaceable; therefore, preserving this intellectual, cultural heritage becomes not only the academic commitment but also the moral responsibility of the librarians/information scientists, who are in charge of these repositories. Preservation and conservation of library materials all over the world today is one of the major functions of the college library. The college library is the centre of academic activities in a college and it is the largest single source of knowledge and information within the college of education system and the world around it (Alex-Nmecha & Owate, 2019).

According to Edom (2012), college libraries are primarily established for support and enhance tripartite functions and the full realization of the education goals of the parent institutions. The United Nations Educational, Scientific and Cultural Organization (UNESCO (n.d.), also defined the college library as an organized collection of published books, periodicals and other reading and audio-visual materials, and the service of staff able to prove and interpret such

materials as are required to meet the informational research, educational, or recreational needs of the users. It is a place the information seeker or knowledge seeker communicates with authors both living and the dead (Alex-Nmecha & Owate, 2019). Therefore, it is important to note that the primary role of a college library is to support teaching, learning and research activities. Notwithstanding, Edoaka in Ozioko (2014) highlighted the following objectives of college library to include: (i) provision of information materials required for the academic programmes of the parent institution; (ii) provision of research information resources in consonance with the needs of faculty and research students; (iii) provision of information resources for recreation and for personal self-development of users (iv) provision of study accommodation in a useful variety of locations; (v) provision of protection and security for these materials.

In order to achieve these functions the library acquires library materials and organizes them in such a way that its retrieval is easy and faster. These materials can be retrieved early and smoothly when they are in good condition, and hence guarantee the function of education to the users thereby, making them literate. There is need therefore, by the college libraries to adequately preserve and conserve the materials in their collection to enhance information literacy (Amazi, 2015). Amazi further stressed that library materials in the libraries can only boost literacy when they are adequately preserved and conserved thereby creating stronger avenue and channel to the dissemination and retrieval of information. Library materials are the print and non-print materials collected, processed, and stored by libraries. They comprise books, periodicals, maps, manuscripts, motion pictures and all other forms of audio-visual records. Preservation and conservation are essential library activities which when well implemented has the capability of sustaining and promoting library activities for a very long time.

Preservation and conservation are two terms that are interwoven although with slight differences. The two activities go side by side to achieve the objectives of the library on proper handling of the materials in the college libraries. According to Oyeniyi (2015), preservation is defined as all efforts and actions taken to elongate the lifespan of information material. The efforts for preservation may include planning, following principles and practices directed at preventing deterioration, or restoring damaged materials to a usable condition. Similarly, Ifijeh (2014) explained that preservation is a means of taking care of library materials to avoid deterioration. On the other hand, conservation is the maintenance of documents in a usable condition through treatment and repairs of individual items to slow the process of decay or to restore them to a usable state (Ambika & Begum, 2017). Popoola in Ifijeh (2014) defined conservation as policies and operations embarked upon by the managers of libraries and with the aim of increasing the life span of their information resources by preventing damage or remedying deterioration. In the opinion of Harrison in Sunday (2015), conservation is about good house-keeping, learning how to handle and store resources to do the least damage, not subjecting it to unnecessarily heavy use and ensuring that back-up or safety copies exist. Therefore, in the context of this study, conservation is a preventive but active measure, for doing something to the material, not putting it in the wrong environment, not handling or touching the surface or running material through faulty equipment which will scratch and damage it. Conservation includes study, diagnosis, preventive care, examination, treatment, documentation using methods that may prove effective in keeping that property close to its original condition and for as long as possible (Ambika & Begum, 2017). Succinctly, the activity of one leads to the other that is, the preservation of library materials leads to the conservation of the materials.

Preservation and conservation of library materials are done to safeguard the library materials from further decay and disfiguration. Sule and Ademu in: Ozioko (2014) observed that preservation and conservation practices of library materials lead to the security of man's recorded knowledge. Through the process of preservation and conservation, man has been able to keep intact

the records of the past and the present into safe places. These ensure the continued and effective exploitation of resources in any given library. More so, preservation and conservation practices ensure the continued supply of information for the research purposes and for posterity. When there is a good preservation and conservation practices on library materials, efforts will not be a waste on replacement. Materials which should have been expanded on replacement are channeled to the acquisition of new resources to enrich the existing collection. The life span of the collections (books, journals, monographs, audio-visuals etc.) is safeguarded through the instrument of preservation and conservation.

Besides, Harvey in: Sunday (2014) noted that some of the important preservation and conservation practices in libraries for print and e-resources related materials include: binding of books/journals (serials), newspapers, repairs to bindings and simple repairs to torn or damaged pages, microfilming of newspaper, brittle or fragile paper based materials, copying photographs. The author further explained that library preservation and conservation practice of e-resource include; copying audiotapes, video materials and electronic digitizing. The extent of these practices depends solely on the users of college libraries and factors necessitating the adoption of preservation and conservation practice.

It is therefore instructive to understand the factors that necessitate libraries adoption of preservation and conservation practice. Dyal in: Ozioko (2014) highlighted some of the factors to include among others; to provide equipment to promote the original materials while in use; to make library resources accessible; to enhance long term survival of library resources; to provide security and safety of library resources; and to provide an extremely attractive environment for the use of both printed and non-printed materials. Unfortunately, the study of Ozioko (2014). entitled preservation and conservation of library resources in federal universities in South-East Nigeria, explained that many libraries encourage the premature deterioration of their collections by simply being unaware of proper preservation and conservation practices.

The general problem hinged on the deterioration of library materials in recent times is alarming (Akin-Fakorede, Eno & Ubong, 2017). Although it has been recognized as a problem for many centuries, it is particularly acute today. The crisis has been attributed to many factors; the resources in the libraries, the form/type of these resources and the format in which these are preserved. The authors stressed further that although colleges employ librarians to organize, control and maintain information resources in the libraries, and cleaners and gardeners to clean the environment, as well as security measures which were put in place in case of any emergency, the problem still persists. Hence, the increase in the vulnerability of library resources and the preservation problem is still of great concern. This concern therefore informs the researcher to embark on this study in determining the preservation and conservation of library materials in college libraries in Borno State.

The Problem

A visit to college libraries in Borno State revealed that not every segment of the library is clean and neat. These dirty segments could attract insects, rodents and pests that will start destroying preserved materials. Observation also revealed that some of these library resources have lost their back cover and as a result of this, they are just floating in the shelves as they can no longer be identified with their area of specialization. The spine of some of these resources have been pulled out as a result of rough handling of these resources. It has also been observed that some of these resources have no hard-cover, they are not laminated and there is no provision for duplicate copies for these resources. Sometimes, the pages of these resources will be incomplete as a result of constant and frequently used by the users and as a result of this, the information contained in them will also be lost. The consequence therefore is that these libraries are faced with the risk of losing

the intellectual contents as well as cultural heritage and other sources of information available with these libraries. This could be as a result of little or no preservation and conservation policy in these college libraries in Borno State. This problem and its consequence therefore served as the basis for this study which sought to identify preservation and conservation of digital and printed resources as well as determine the extent of use. On this note, this backdrop for this study will help determine preservation and conservation of library materials in college libraries in Borno State.

Objectives of the Study

The study was guided by the following objectives:

1. Identify the digital resources (e-resources) preservation and conservation practices in college libraries in Borno State.
2. Determine the extent to which available digital resources preservation and conservation practices are used in college libraries in Borno State.
3. Examine the prevailing factors necessitating college libraries adopting preservation and conservation of digital resources in Borno State.

Research Questions

1. What are the digital resources (e-resources) preservation and conservation practices available in college libraries in Borno State?
2. What is the extent of availability of available digital resources preservation and conservation practices used in college libraries in Borno State?
3. What are the prevailing factors necessitating college libraries adopting preservation and conservation of digital resources (e-resources) in Borno State?

Methodology

The design adopted for this study was the descriptive survey design. The population of this study comprised all the 245 librarians and information professionals in the three colleges of education in Borno State (Kashim Ibrahim College of Education, Maiduguri; Umar Ibn Ibrahim El-Kameni College of Education Science and Technology, Bama; College of Education, Waka-Biu). The entire population was used as the sample size because it was considered manageable by the researcher. The instrument used for data collection was a structured questionnaire developed by the researcher titled "Preservation and Conservation of Library Materials" (PCLM). The reliability of the instrument was computed using Cronbach Alpha and yielded a co-efficient of 0.78, thus the instrument was deemed reliable for the study. The instrument was sub-divided into three clusters. The first cluster contained nine items structured on available (A) and non-available (NA); the second cluster contained seven items structured on four point scale of Very Great Extent (VGE) (3.50-4.00); Great Extent (GE) (2.50-3.49); Low Extent (LE) (1.50-2.49); Very Low Extent (VLE) (1.00-1.49); the third cluster contained eight items structured on a four point rating scale of Strongly Agree (3.50-4.00), Agree (2.50-3.49), Disagree (1.50-2.49), Strongly Disagree (1.00-1.49). In collecting data, the researchers trained three research assistants and adopted direct approach in administering the questionnaire to the respondents. Frequency counts and percentages were used to answer research question one while arithmetic mean and standard deviation were used to answer research questions two and three. The standard deviation scores were used to determine how close or spread apart the respondents ratings are. Decisions were taken thus: items with mean score of 2.50 and above were accepted while items with mean score of 2.49 and below were rejected. The analysis was done using statistical package for social sciences (SPSS) version 23.

Results

Research Question 1:What are the digital resources (e-resources) preservation and conservation practices available in college libraries in Borno State?

Table 1: Availability of digital resources (e-resources) preservation and conservation practices available in college libraries

S/N	ITEMS	Availability		
		KICE	UIE	COE
1	Audio-CDs	√	√	√
2	Digitization	√	√	√
3	CD-ROM	√	√	√
4	Online database e.g. AGORA, HINARI	√	x	√
5	Reformatting	x	x	x
6	Electronic information system	√	x	x
7	E-projects	√	x	x
8	e-mails	√	√	√
9	e-audio visual resources	x	x	x
Total		77%	44%	56%

Keys:√ (available); x (not available)

KICE= Kashim Ibrahim College of Education, Maiduguri

UIE= Umar Ibn Ibrahim El-Kameni College of Education Science and Technology, Bama.

COE= College of Education, Waka-Biu

Table 1 reveals that out of nine preservation and conservation practices of digital resources which is believed to be important to college libraries in Borno State, the researcher observed that seven items are available in Kashim Ibrahim College of Education, Maiduguri; four items are available in Umar Ibn Ibrahim El-Kameni College of Education Science and Technology, Maiduguri; five items are available in College of Education, Waka-Biu. The result also revealed that the preservation and conservation practices commonly available in the colleges of education include audio CDs, digitization, CD-ROM, online database and e-mail.

Research Question 2: To what extent are available digital resources preservation and conservation practices used in college libraries in Borno State?

Table 2: Respondents’ Mean and Standard Deviation Scores on Extent of Available Digital Resources Preservation and Conservation Practices Used in College Libraries

S/N	ITEMS	X	SD	Remarks
1	Audio-CDs	3.31	0.94	Great extent
2	Digitization	3.67	0.96	Great extent
3	CD-ROM	2.68	0.83	Great extent
4	Online database e.g. AGORA, HINARI	1.71	1.14	Low extent
5	Electronic information system	2.23	0.91	Low extent
6	E-projects	3.74	0.90	Great extent
7	e-mails	3.79	1.01	Great extent

Table 2 shows the responses of staff and information professionals on the extent available digital resources preservation and conservation practices are used in college libraries. Items 2, 3, 6 and 7 with mean scores 3.67, 2.68, 3.74, and 3.79 respectively means that these items were to a great extent available digital resources preservation and conservation practices used in college libraries. Also, items 1, 4 and 5 with mean scores 2.31, 1.71 and 2.23 respectively means that these items are to a low extent available digital resources preservation and conservation practices used in college libraries. Similarly, the standard deviation scores of 0.83 – 1.14 means that respondents’ ratings were homogenous in nature.

Research Question 3: What are the prevailing factors necessitating college libraries adopting preservation and conservation of digital resources (e-resources) in Borno State?

Table 3: Respondents’ Mean and Standard Deviation on Prevailing Factors Necessitating College Libraries Adopting Preservation and Conservation of Digital Resources (e-resources)

S/N	ITEMS	X	SD	Remarks
1	To provide/promote the original materials while in use	3.23	1.13	Agree
2	To make library resources accessible	2.71	0.94	Agree
3	To enhance long term survival library resources	3.13	1.09	Agree
4	To provide security and safety library resources	2.81	0.89	Agree
5	To promote and encourage rest practices in records management	3.00	1.15	Agree
6	To promote an end to wasteful use of non-renewable information resources	2.69	0.91	Agree
7	To enhance education of library users as well as members of library staff on the best way of handling library services	3.84	0.85	Agree
8	To train and develop staff appropriately in preservation and conservation techniques	2.42	0.86	Agree

Table 3 shows item by item analysis of respondents’ prevailing factors necessitating college libraries adopting preservation and conservation of digital resources (e-resources) in Borno State. The result revealed that all items (1 – 8) with mean scores 3.23, 2.71, 3.13, 2.81, 3.00, 2.69, 3.84 and 2.42 respectively means that all the items were agreed upon by the respondents. This is because all mean scores are above the criterion mean scores of 2.50. The standard deviation scores that range from 0.85 – 1.15 means that the respondents’ responses were homogenous in nature.

Findings

1. The digital resources (e-resources) preservation and conservation practices available in college libraries in Borno State include Audio-CDs, digitalisation, CD-ROM, Online database and e-mail.
2. The available digital resources preservation and conservation practices in college libraries in Borno State such as; Audio-CDs, Digitalization, e-mails and to a great extent CD-ROM. On items, items such as: Online Database and Electronic Information System are to a low extent.
3. Respondents agreed on all items necessitating college libraries adopting preservation and conservation of digital resources in Borno State.

Discussion

The finding in research question one revealed that preservation and conservation practices commonly available in the college of education include audio CDs, digitalization, CD-ROM, online database and e-mail. This finding is in line with the finding of Ozioko (2014) that we have a duty to preserve and conserve what went before us and that we have a human obligation not to forget. The author also explained that digital resources preservation and conservation such as e-mail, online databases and digitalization are well used in university libraries that it will be essential to scholars and educators who must rely on the availability of primary source materials as the basis for good teaching.

The finding in research question two revealed that audio CDs, CD-ROM, emails and e-projects are to a great extent available digital resources preservation and conservation practices used in college libraries. This finding reinforced the finding of Alhassan (2002) that preservation and conservation in Nigerian Libraries are of primary importance especially when they have to do with e-resources materials or print media. This means that the high extent of use of e-resources in libraries will increase the intellectual content contained and long-term memory storage.

The finding in research question three revealed that respondents agreed with all the prevailing factors necessitating college libraries adopting preservation and conservation of digital resources (e-resources) in Borno State. This finding is contrary to the finding of Dyal (2008) which states that overly warm storage conditions hasten chemical reactions and promote the aging or deterioration of all types of organic materials, including papers, book cloth and leather.

Conclusion

It is evident that respondents are in support of digital resources (e-resources) preservation and conservation practices in college libraries in Borno State. Available digital resources (e-resources) preservation and conservation practices cover items such as Audio- CDs CD-ROM, emails and e-projects. It could be concluded that digital resources (e-resources) preservation and conservation practices is available to a fairly high extent.

Recommendations

Based on the findings of the study, the following recommendations are hereby made:

1. College libraries in Borno State should consolidate their current preservation and conservation practices and explore the use of other practices.
2. College libraries in Borno State should improve their digital resources preservation and conservation practices on: Online Database and Electronic Information System in view of the revealed rating.
3. College libraries in Borno State should maintain the stated items they agreed on in their harmonised remarks as prevailing factors necessitating their adopting them in preservation and conservation of digital resources (e-resources).

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INNOVATIVE TECHNOLOGIES FOR ACADEMIC LIBRARY DEVELOPMENT IN THE FOURTH INDUSTRIAL REVOLUTION IN NIGERIA

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Ogechi N. Okorie

Abstract

Academic libraries are libraries found in universities, colleges and polytechnics. Their core role is to support academic activities in their settings. The academic library is conceived to be a very important appendage trained to the academic environment because it is where many researches are carried out and scholars to become experts in their different fields of knowledge. The whole world is now in the fourth industrial revolution (4IR), and for any particular revolution to impact its environment, there must be accompanying technologies to foster its accomplishment. In this regard, the 4IR has come up with highly advanced and sometimes unbelievable technologies, and the academic library, because of its position in knowledge acquisition must be ready to adopt and implement them. These technologies include but not limited to robotics, artificial intelligence, nanotechnology, quantum computing, the Internet of Things (IoT), Big data, open data technology, materials science, 3D printing and autonomous vehicles. It is the view of these authors that the adoption and use of these recent technologies by the academic library will lead to diverse developments in the areas of acquisition, management, dissemination and use of information resources. It will also engender creativity and library collaboration.

Keywords: Innovation, Fourth Industrial Revolution, Development, Academic Library, Innovative Technologies,

Introduction

From the 20th century, the whole world has witnessed many developments in the area of technologies such as the social media, web 2.0 and 4.0 technologies, automation software etc., and work in organisations has been changing from manual to digital where technologies like robotics, drones and guided missiles are being used to do some tedious and remote works done by man. Hence, innovative technologies of the 4th industrial revolution are shaping the lines between the physical, digital and biological spheres, and emerging breakthroughs comprising robotics, artificial intelligence, nanotechnology, quantum computing, biotechnology, the Internet of Things (IoT), open data technology, materials science, 3D printing and autonomous vehicles. Likewise, the library as a service based organisation is not left out because some of its services storage systems and operations have been grossly transformed by the advancement of new technologies.

Consequent upon this, academic institutions in Nigeria are getting ready for the changes brought along by the Fourth Industrial Revolution (4IR) to incorporate them in the development of their infrastructure, information resources, services delivery, staffing training, and maintenance.

Development is a multidimensional and sustainable elevation of an entire society or social system to a better level or more civilized life. It is a qualitative increase in capability that deals with the activities undertaken to prepare organizations, institutions, establishments and even employees to perform additional duties and assume higher positions in the organizational hierarchy. Development could be defined as the capacity of a state, organization and even institutions etc, to increase human and material resources with the aim of achieving higher outcome of production for the satisfaction of the basic needs of majority of its citizens and empowering them to make demands on the government. It can also be defined on the basis of three propositions – historical, policy related and post modernist. While some are historical, long term and relatively value free (i.e., development’ as a process of change), the second which is policy related and evaluative or indicator led, is based on value judgments, and has short-to-medium-term time horizons – (e.g., development as the Millennium Development Goals (MDGs). The third is post-modernist, drawing attention to the ethnocentric and ideologically loaded western conceptions of ‘development’ and raising the possibilities of alternative conceptions.

The first conceptualization of ‘development’ as, a process of structural societal change is according to Thomas (2000, 2004), ‘a process of historical change’. It is the aspect of development which innovative technologies of the 4IR is expected to bring into academic libraries. This is because it is focused on processes of societal change from traditional to modern structural characteristics on a long-term outlook. In this paper, we are interested in the concept of development as it relates to the innovations made available for operations of academic libraries in the 4th industrial revolution.

Innovation is a dynamic process that needs to be made available, put to use and implementation in all sectors of an economy. In a general sense, it is a new strategy that will to an extent change practices, workplaces, organizations and relationship with external stakeholders or consumers. As stated in Oslo Manual (2018), it is, “*a new or improved product and/or process that differs significantly from the unit’s previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process).*” In fact, it can happen, according to the UN System of National Accounts (SNA), in four broad sectors of an economy: businesses, the general government, households, and NGOs serving households. It can also take place on equipments or technologies.

Despite the fact that modern technologies have had huge impact on most aspects of our lives, and the society in general, they did not have the same transformative effect on the development of academic libraries in Nigeria. Furthermore, although the Nigerian government is presently fully committed to the widespread adoption of ICTs in all sectors of the society, including libraries, the question here is: how and in what areas will the adoptions help in the development of academic libraries in Nigeria? The answer to this question is the crux of this paper which is predicated on Thorstein Veblen’s (1857–1929) Technological Determinism Theory. The theory assumes that a society’s technology determines the development of its social structure, cultural values and the basis for all human activity. In relation to the paper, the introduction of technologies into the library environment will help to propel the development of the library infrastructure, information resources, library services, staffing, building and maintenance. On this premise therefore, academic libraries must start delivering on its promises of providing teaching, learning and research environments that engage and address the needs of the society and its immediate user community in the twenty-first century using innovative technologies.

Fourth Industrial Revolution (4IR)

Industrial Revolution is the advance in power technology. It is an eye opener, a breakthrough and transformation from traditional ways of presenting things to using technology to empower the world with the necessary skills, designs and efficiency to work. It has passed through first, second, third to its current fourth stage hence the term fourth Industrial Revolution (4IR). The first industrial revolution of 1760 started with the invention of the steam engine which changed the world’s economy from an agrarian and handicraft economy to one dominated by industry and machine manufacturing. While, the 1900 internal combustion engine (oil and electricity) industrial revolution facilitated mass production in the second industrial revolution, implementation of electronics and information technology to automate production was the order of the day in the third industrial revolution of 1960s. Although the revolutions came successively as separate events, their targets were uniquely to improve upon previous revolutions leading to more advanced forms of production (Xu, David & Kim, 2018).

The term fourth industrial revolution also known as industry 4.0 or FIRE or 4IR (Tella, 2020), was coined by Klaus Schwab, founder and executive chairman of the World Economic Forum, to describe according to (Miller, 2015:3), “a world where individuals move between digital domains and offline reality with the use of connected technology to enable and manage their lives”. Hussain (2019) sees it as the technological integration of cyber-physical systems (CPS) in the process of production. It is a period where software, computers, materials and objects can think for themselves and do seemingly impossible things beyond human capacity using artificial intelligence (AI) e.g. search for cancer cells in seconds, transform professions, scan a whole library in minutes, process masses of data in the blink of an eye, among others. The era involves the adoption of cyber physical systems and emerging disruptive technological breakthroughs like robotics, Artificial Intelligence (AI), nanotechnology, quantum computing, biotechnology, the Internet of Things (IoT), internet of systems, 3D printing and autonomous vehicles (Change-HRL 2, 2017). All these advances promise huge developmental benefits to the society including libraries. According to Soni (2019), the revolution is different from the three other revolutions as it is characterised by the parallel development of a swath of seemingly independent technologies, each with world changing potential.

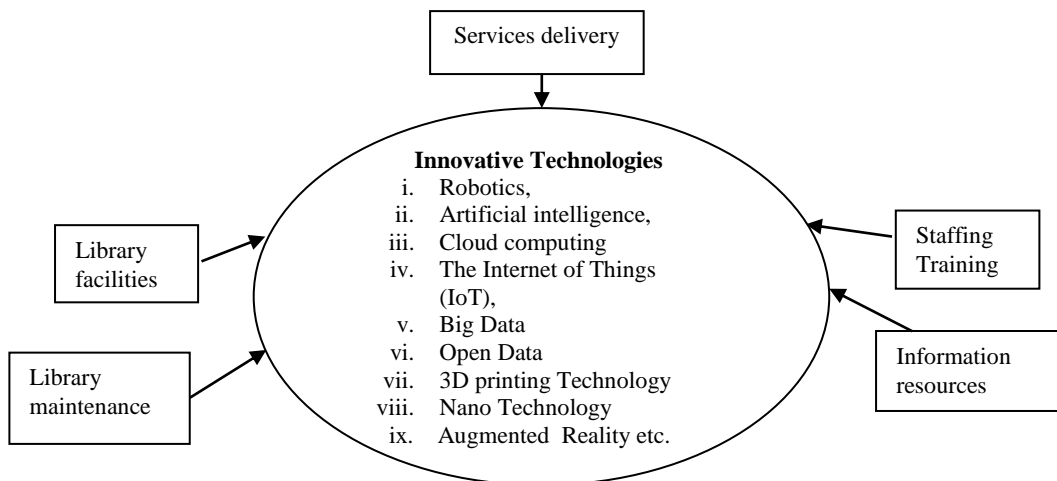


Fig. 1: Researchers' Designed Model of Technological Determinism Theory and areas of application in academic libraries.

Academic Library Development

Academic libraries are integral academic parts of tertiary institutions namely; universities, colleges (of education, agriculture, and technology), polytechnics, monotronics, and research institutes. They are established to take care of the information needs of these establishments. Murugan (2013) classifies them as libraries that serve institutions of higher learning, such as colleges or universities, whereas Idiegbeyan-ose, Ilo and Isiakpona (2018) describe them as the nerve centers upon which the activities of the mother institutions revolve. The history of academic library development in Nigeria is interwoven with the history and development of higher education which dates back to pre-independence time. Early higher institutions then were the School of Survey established in 1900 in Oyo, and the Yaba High College (now Yaba College of Technology) in 1934. These institutions had libraries but they were not adequately handled. Based on this flaw, the British government set up a commission to ascertain the pace of higher education in Nigeria. Their recommendation led to the establishment of the then University College now University of Ibadan and its library stocked with about 8,000 titles inherited from the Yaba Higher College in 1948. The private collection of late Henry Carr and Herbert Macaulay also contributed immensely in the development of Ibadan University library. Though the pace of the development of higher institutions was somehow slow at that period, an unrelenting upsurge in the establishment of educational institutions at all levels, started after the Nigerian independence in 1960 with successive governments and academic conscious individuals investing strongly in higher education. Interestingly, none of the academic institutions sprang without a mandatory library building as stipulated in the NUC guideline.

Academic libraries usually serve two complementary purposes: to support the curriculum and to support faculty and student research. Most of the academic libraries started rendering services with the traditional library tools like, card catalogues, thick note book accession registers, wooden catalogue cabinets, wooden shelves, racks and newspaper stands, wooden charging and discharging trays for book lending through either Newark or Brown's charging systems etc. All these were manually operated on face-to-face bases by the library staff, and in most cases under non-conducive library environment. Today, higher education system has diversified around poles of research, liberal education and career preparation. In the same manner, academic libraries are not fixed. They similarly will diverge to fit to the needs of the institutions they serve, not only on collection size or gate count but, with different service bundles using innovative technologies depending on the type of educational institution they serve. It should be noted that much as new library services are evolving in line with the arrival of innovative technologies it does not mean an end to the academic library as an institution.

Innovative Technologies for Academic Library Development

The academic library in line with its main purpose of providing library services for life changing experiences should always be ready to adopt new technologies that will enable them to provide dynamic and innovative services for its clientele. For academic libraries to appeal to their existing audience and, engage new ones, they need to offer services that meet the expectations of the new generation of hyper-connected patrons. This entails rethinking the library's traditional physical shape – moving from a quiet place filled with book shelves for reflective reading and working to something entirely different. The academic library should become a vibrant place for collaborative and innovative activities, alongside a quiet place for reflective studying. The new approach should view patrons as creators and the library as a creation hub, offering make Spaces with visionary resources such as 3D printing technology. Another integral part of remaining relevant in its setting depends heavily on providing current information resources and learning

experiences that their users require in this century. Academic libraries have realised that it is now imminent for them to adopt advanced technologies that will help them to serve their users in this fourth industrial revolution era, and invariably aid in their growth and development. Some of these technologies that can be implemented and used in the academic library are: robotics, cloud computing, big data technology, internet of things, artificial intelligence, block chain and 3D printing technology. These technologies will be discussed alongside their contributions to the development of academic libraries in Nigeria.

Robotics

The term connotes the use of robots in performing tasks that are traditionally performed by human beings. Robotics can be formally defined as the intersection of science, engineering and technology that produces machines called robots that substitute for human actions. As technology progresses so too does the scope of what is considered robotics. From 2000 -2005, 90% of all robots could be found in automotive factories assembling cars. They were tasked with welding or screwing of certain parts of cars. Today, the robotics technology has expanded and includes the use of robots in exploring earth's harshest conditions, assist in law enforcement, in health care and even in library service. It is believed that the deployment of robotic systems and their associated technologies would in turn minimize the demand for human interaction, help employees to reduce work pressure, and definitely attain efficiency.

It has been observed by some researchers that many librarians, especially those in the academic libraries are eager to receive robots into their work environment. In an interview with librarians/ICT professionals on potentials of robots deployment in their libraries, Odeyemi (2019) noted that they all agreed that robots should be used for various purposes in day-to-day life and become part of the library's innovative progress. The disruptive technology, economy and competition have created the desire for doing work in less time. Hence, the library management robot will mitigate the problems of collecting books from the library counter and arranging them on the shelves. This agreement was made in consideration of the fact that their libraries consist of thousands of books with only few staff to arrange them. It is believed that robotics will bring a whole lot of innovation into the library world especially in research and academic libraries.

Instances of robotics activities in the library system are sighted here to show how they can aid in library development.

- The recent issue on robotics deployment is the University of Pretoria's (UP's) Department of Library Services that employed the first client service robot known to be used in any university library in Africa. The president of the university says that the introduction of the robotic librarian is in keeping with the library's focus on evolving in line with the fourth industrial revolution.
- In Mountain View California, a bookbot created by Googles Area 120 will come to a select range of homes near the public library to pick up library materials from borrowers. The pickup must be scheduled in advance and for the first six months the bookbot was accompanied by a human. It is envisaged that the bookbot will be more efficient than man in carrying out the function as it will do it come rain or shine, and will not report sick at any time.
- In Singapore the robot librarian AuRoss is helping to automate shelf reading. The robot uses Radio Frequency Identification (RFID) to scan the shelves to help locate books that have been put in the wrong place. In a test at the Singapore Public Library, AuRoss performed its task of navigating around the shelves and finding misplaced books with 90% accuracy.

- Norwin (2020) conceptualized the use of robots in the library and reported as follows: robots can be used to help teach coding and computer programming skills, take verbal book request, work out where the hard copy is and lead to the relevant book shelve. In addition, the temperature and humidity controlled store is operated by robot crane and can retrieve Newspaper from any time and date (Davis, 2019).

Eventhough some of these robotic innovations have not been fully integrated into library operations, it will not be long before librarians will start working alongside robots.

Cloud Computing

Cloud computing is the delivery of different services/resources through the internet. These resources include tools and applications like data storage, servers, databases, networking and software. According to Dastagiri and Kumar (2017), cloud computing is an emerging computer paradigm, where data and services reside in massively scalable data centres in the cloud, and can be accessed from any connected device on the internet. Rather than keeping files on a proprietary hard drive or local storage devices, cloud based storage makes it possible to save them to a remote database. As long as an electronic devise has access to the web, it also has access to the data and the software programmes to run it.

The term cloud computing is derived from the way the technology works, as information/data is gathered and saved in the cloud or a virtual space. Companies that provide cloud service enable users to store files and applications on remote servers and access them via the internet. This means that the user is not required to be in a specific place to gain access to needed information, thereby allowing the user to work remotely. Cloud computing has brought revolutionary changes to the worlds of Information and Communication Technology (ICT) because of its potential benefits, such as reduced cost, accessibility (anywhere, anytime), as well as its elasticity and flexibility

Cloud computing is a new technology, and if properly harnessed by the academic library will bring a lot of changes and development into the system. In the first place, it has improved the functionality of the e-library. Although the e-library has grown very rapidly in the recent years, its growth and usage has been stiffened by poor infrastructure, high cost of running e-library and software development. Cloud computing offers a solution to the above problems by providing a cost effective way of running and managing the e-library. It equally offers a better and much more efficient way of collaborating users of the e-library within and outside.

Nevertheless, when the academic library fully adopts cloud computing, it will become an enabler of library services, enhance collaboration across departments, institutions and disciplines, relieve staff of routine, repetitive and technical tasks so that they can concentrate on delivering improved and innovative services to end users (Irenea, Tijani & Bakare, 2018). The academic library and its practitioners need to accept the fact that modern patrons have altered their information seeking behaviour to a great extent, which calls for new means of reaching these dynamic users. With the alternative at the beck of patrons today, and the seemingly reduction in the cost of technology, dependency of academic libraries will change. The only way to keep these patrons will depend on the innovativeness and creativity displayed in terms of services and relationship with patrons. Academic libraries need to explore and encourage the use of this technology to survive in the 4th IR environment.

Big Data

Big data is field that treats ways to analyze, systematically extract information from, or otherwise deal with data set that are too large or complex to be dealt with by traditional data processing application software. According to Daniel (2017), big data is the growth in volume and variety of data which can no longer be managed using the traditional data base due to its significant and different formats. It refers to a large volume of data that are structured or unstructured. Significant data analytics has been gaining much attention lately, as researchers from the industry and the academia are trying to effectively extract and employ all possible knowledge from the overwhelming amount of data generated and received. The major issue about big data is not just about the magnitude of data that comes in; rather it is more about the capability to handle huge amounts of data. Big data challenges include capturing data, data storage, data analysis, search, sharing, transfer, visualization, querying, updating, information privacy and data source.

A common way of characterizing big data is by using the 3V's – volume, variety and velocity (Conor, 2012). Volume refers to the amount of data that is generated from diverse sources, normal transactions, social media sites, the internet etc; Velocity deals with the speed of generation and processing of data to meet the demands of clients; while Variety is all about the different sources and formats that data comes from e.g. e-mail etc. In the earlier days spreadsheets and data bases were the only sources of data considered by most applications, however nowadays, data in the form of photos, videos, e-mails, monitoring devices, PDFs, audios, etc, are also considered in the analysis application.

There is now big data in all the branches of knowledge, e.g., big data in the hospital, big data in agriculture; big data in management and big data in the library. This shows that big data assist these organizations to achieve their objectives. In the academic library, the big data will help in providing services like inter-library co-operation, as it holds data concerning library transactions of all member libraries and individual users. This data can enable the system to know the entire holdings of each library and the information needs of members of these libraries. According to Kamupunga and Chuting (2019) some of the areas that big data can contribute to the overall development of the academic library are: reducing time of search for documents, supporting management plans, improving information accessibility, supporting research, understanding data analysis and providing opportunities for big data investment. It is an adequate tool for knowing the users reading habits, analysing of user behaviour, implementation of knowledge and improved services. Big data is very important for library development as its presence will always provide the library with information on where they are not performing well, which will lead to improvement.

Library work is mainly dependent on gathering of data and analysing them to help perform better services. Data gathered in the library may include information on the clientele of the library, their information needs and the resources in the library that will help to satisfy these information needs. Before now, the management of these data was cumbersome, but big data analytics has made it possible for libraries to analyse all these data and put them to good use. The term big data may be relatively new in the library, but the act of gathering and storing large amount of data for conventional analysis is age long.

Internet of Things (IoT)

Internet of things is a system of interrelated computing devices, mechanical and digital machines, objects, people and animals that are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction (McClelland, 2020). The IoT refers to the billions of physical devices around the world that are now connected to the internet, all collecting and sharing data. This is made possible because of the arrival of super cheap computer chips and the ubiquity of wireless networks which turns anything

from something as small as a pill to something as big as an aeroplane into a part of the IoT. Invariably, the IoT is a giant network of connected things which also includes people. The relationship is between people and people, people and things and things and things. This situation leads us to one of the rules of the future, which is – ‘anything that can be connected will be connected’ (Pujar & Satyanarayan, 2015). In IoT the things function like smart and living entities by sensing and communicating through embedded devices which interact with sensor.

The term Internet of Things was first coined by Kevin Ashton in 1999. Firstly, the term was introduced to describe how IoT was created by adding RFID and other sensors to everyday objects (Simoes, Filipe & Barbosa, 2019). Xu et al. (2014) state that RFID and WSN are the foundational technologies of IoT and service-oriented architecture as a key technology in integrating heterogeneous systems or devices that can be applied to support IoT, the identification and tracking technologies, the four-layer architecture of IoT (Liqing, 2019). Some examples of how the system works are:

- a. Someone’s alarm clock wakes him up in the morning and notifies the coffee maker to start brewing coffee;
- b. the radio starts reading news at a particular time (as programmed); or
- c. office equipment in the office may be programmed to know when it is running low on supplies and automatically re-orders for more.

One of the major convergences of all descriptions of IoT is that it requires very minimal or no human intervention to work/operate.

Internet of Things is one of the technologies of the 4th industrial revolution that will assist the academic library to offer reliable services to its client (or that will aid in academic library development). Even though IoT is still in a stage of infancy, it holds giant potentials for libraries. A survey carried out by OLLC (2015) indicates that practitioners opine that IoT is an emerging technology that can be used in such library operations as inventory control, access and authentication, and monitoring of collection storage. Pujar and Satyanarayana (2015) enumerated major areas of implementation of IoT in libraries to include – improved access to the library and its resources, collection management, information literacy, recommendation services, location based services, appliances management and usage statistics. Sheeja and Mathew (2019) support the above authors by stating that IoT will help the academic librarians to provide the following services to their clients; library orientation, personalized services, locating books and other materials and providing smart circulation control. The IoT can also be useful for sharing information, consultation and training, analysis and selection of collection, storage and marketing and promotion of information resources and services.

A pilot project of IoT is the Blu Beam application which is implemented by the Orlando Public library in USA. This application sends location triggered information to mobile devices, which helps users to search for resources as well as expand their interest with contextual hints. When fully embraced, it is envisioned that IoT will play a big role in the development of academic libraries.

Artificial Intelligence (AI)

Artificial intelligence (AI) refers to the stimulation of human intelligence in machines that are programmed to think like humans and mimic their actions. The term may also be applied to any machine that exhibits traits associated with a human mind such as learning and problem solving. AI is associated with the study and creation of computer systems that exhibit some form of intelligence: systems that learn new concept and tasks; systems that can reason and draw useful conclusions about the world around us; systems that can understand a natural language or perceive and comprehend a visual scene; and, systems that perform other types of feat that require human type of intelligence (Barakutty, Muhammed & Mohamed, 2006). Artificial intelligence today is

properly known as narrow AI (or weak AI), in that it is designed to perform narrow tasks, e. g. only for internet searches or facial recognition or thumbs recognition, and general AI (or strong AI) which can accomplish greater tasks. However, the long term goal of many researchers is to create general AI. While narrow AI may outperform humans in whatever its specific task is, general AI would outperform humans at nearly every cognitive task.

AI is continuously evolving to benefit many industries. Machines are wired using a cross disciplinary approach based on mathematics, computer science, linguistics, psychology and more. The applications of AI are endless as it can be applied to different sectors and industries such as healthcare, commerce and industry, the school system, the library, and so on. Man has used his natural intelligence to bring about civilization and has sustained it for a long time. It is now believed that with the addition of AI in the affairs of life, man will definitely attain a very great height. In the words of Max Tegmark, President of the Future of Life Institute, “everything we love about civilization is a product of intelligence, so amplifying our human intelligence with artificial intelligence has the potential of helping civilization flourish like never before – as long as we manage to keep the technology beneficial (<https://futureoflife.org/background/benefits-risks-of-artificial-intelligence/>).

Researchers like Wheatly and Amanda (2020), Vijayakumar and Shashairi (2019), Asemi & Asemi (2018), and Kote, Buckley and Zhong (2015), have proved that artificial intelligence is library friendly and can aid in library development especially the academic library. Here are few ways in which AI applications can bring measurable value to the academic library.

1. Improved operational efficiency: AI libraries can identify, and magnify operational efficiency by improving service effectiveness and reducing operational costs with process automation, optimized research data management and digital asset management (DAM). Implementing machine learning in academic library’s processes and digital resources can optimize collection analysis, visualization and preservation, and reduce expenses associated with delivering services.
2. Engage larger audiences through new services: By optimizing search engine results, AI can tailor content instantly from thousands of resources. It can also leverage data on user touch points, past interactions and habits to identify needs* and develop high-quality engaging experiences for patrons. This innovation will assist academic libraries to serve their clients better.
3. Help librarians achieve their new goals: By cutting manual daily routine search and reference operations down to a minimum, AI implementation in academic libraries can reduce human errors and inefficiencies. This automation also frees library staff to focus on higher value complex tasks, such as assisting lecturers in formulating reading lists, teaching students how to refine their research efforts, developing library collection and so on.
4. Establishing a strong foot hold for libraries in the new information age: AI Technology can enable cross – disciplinary alignment with academic research by helping to locate connections to large data sets. Also by joining hands with open publication organizations, along with implementing research systems that operate with other institutions, academic libraries can help create a seamless exchange of data and research across sectors and disciplines. By so doing, their collections become more discoverable, searchable and analyzable, ultimately supporting rich and high quality global network of resources.

AI can also be used in the library for reference services, whereby machines (advanced computer technology) are used to provide answers to queries, cataloguing and classification, indexing and acquisition processes (Vijayakumar & Sheshadiri, 2019).

Blockchain

A blockchain also referred to as Distributed Ledger Technology (LT) is essentially a digital ledge of transaction that is duplicated and distributed across the entire network and computer systems on the blockchain. Each block in the chain contains a number of transactions, and every time a new transaction occurs on the blockchain, a record of that transaction is added to every participant's ledger. This means if one block in one chain is changed, it would be immediately apparent that it has been tampered with, and this ensures transparency in the transaction (www.euromacy.com). A blockchain can also be described as a time-stamped series of immutable records of data that is managed by a cluster of computers that are not owned by any single entity. Each of these blocks of data is secured and bound to each other using cryptographic principles or chain.

A blockchain consists of six major components viz node, transaction, block, chain, minor and consensus. A transaction is requested and a block of the same transaction is created. Each block consists of certain data, the hash of the block and the hash of the previous block. A hash is a long record consisting of some digits and letters generated with the help of cryptographic hash algorithm. One block is further sent across the chain to all the nodes of validation. All the nodes of nodes inside the blockchain architecture create a consensus protocol which should be abided by all to get them self enforced in the chain. After the validation, each node gets a proof of the work done and the validation block is added to the chain. Any corrupt attempt will be notified to each node in the chain – which ensures transparency in the transaction. The blockchain works in a decentralized way. There is no single device to store the data but at the same time, data are distributed over the network to the participants (Vysakh & Rajendra, 2020).

Blockchain technology can be used to create a permanent, public, transparent ledger system for compiling data on sales, tracking digital use and payments to content creators, such as wireless users, publishers or musicians. This technology has been implemented by many organisations and industries across the globe, such as, Med Rec, in medicine, Bit property and Deed coin in real estate KickCity and Spotify in entertainment, IBM blockchain in logistics etc, but it is still very new in the library setting. It is believed by many librarians that this new technology will help them to accomplish many of their major tasks and transactions. Concerning blockchain application in academic libraries, Hoy (2017) in his study puts forward that the gathering, preserving and sharing authoritative information can be easily done with the help of blockchain technology. It can also be a solution to copyright issues as it produces a unique verifiable record which is difficult to be reproduced by an outsider. Further, he suggested the technology for creating a time-stamped verifiable version of journal articles.

The following are some of the ways the blockchain technology can help the academic library to develop in the fourth industrial revolution era:

- i. **Build a MetaData System for Libraries:** It enables academic libraries to build permissionless metadata blockchains in order to solve certain limitations in cataloguing. The problem of centralisation and tracability in cataloguing can be solved with the help of this technology. Sule Alman, a teacher on emerging technologies in an article explained that blockchain could be used to build an advanced metadata system for libraries, to keep track of digit first sale rights and ownership, to connect networks of libraries and universities, and even to support community based borrowing and skill sharing programmes (Innovative technologies for the library of the future: <http://princh.com/8-technologies-to-be-implemented-at-the-library-of-the-future/#.x41/600081/>)
- ii. **Protect Digital First Sale Right:** The application of blockchain technology will help in protecting the digital first sale right of authors. DECENT (2016), an online blog proposes

how e-books purchases and lending can be done with the help of blockchain. In this case, the an author decides whether or not to allow others to have access to his work.

- iii. **Connect the Network of Libraries:** The blockchain technology allows digital information to be distributed rather than just copied. Information is shared and reconciled continuously throughout multiple nodes and each node holds an identical copy of the data base as an evidence. Transactions within this database are audited and agreed upon by consensus. This decentralized method of keeping track of changes ensures the ledger cannot be practically controlled by any one entity, eliminates the possibility of single points of failure, and allows for the verification of transactions without the need for third party intervention (Cole, 2017).
- iv. **Host Digital Peer to Peer Sharing:** Peer to peer sharing makes it possible for two or more network participants to interact directly in a decentralized way with each other with the help of an intermediary. It ensures maximum transparency as the information transfer starts directly from the digital twin to the intended party (Deloitte, 2018). It is envisaged that in the near future, libraries will be a decentralized one where patron's records will be stored on the blockchain instead of in databases.

Three Dimensional (3D) Printing Technology

Three dimensional (3D) printing technology is an additive manufacturing process that creates a physical object from a digital design. The process works by laying down thin layers of materials in the form of liquid or powdered plastic, metal or cement, and then fusing the layers together. Since it was introduced, 3D printing technology has already increased manufacturing productivity. In the long term, it has the potential to massively disrupt both the manufacturing logistics and inventory management industries, especially if it can successfully be incorporated into a mass production processes. One of the key advantages of 3D printing is its ability to produce very complex shapes that would be otherwise impossible to construct by hand. Due to the fact that 3D printing can create intricate and complex shapes using less material than subtractive manufacturing processes, such as milling, it is used in hydro-forming, stamping, injection molding, and other processes (www.investopedia.com).

Academic libraries have always been at the edge of new technologies. Their patrons have always turned to them for instructions on how to acquire knowledge, gain expertise in handling new inventions and how to use innovative tools and techniques. For academic libraries to incorporate the 3D printing technology, they must adopt makerspaces. Makerspaces are spaces usually created by public libraries, which encourages new ways of learning and the opportunity to try new technologies (Fisher, 2012). They have evolved from the do-it-yourself (DIY) movement which involves crafting, woodworking etc, to include technology such as 3D printing. They can still be made up of anything that allows individuals to experiment, create and learn. The use of 3D printing in the academic library will support knowledge creation across departmental boundaries and also shift emphasis from normal traditional library services to creativity as its primary focus.

3D printing in the library of any kind opens opportunities for teaching, research, exploration and experimentation. The academic library has always been the perfect setting for creativity and innovations, and thus provides a conducive environment for new technologies like the 3D printing. There is no limit to what can be imagined and designed by using 3D printing technology across all disciplines (Colegrove, 2014). 3D printing will contribute to the development of academic libraries in the following ways:

- i. It will help the library to host entrepreneurial classes for students because according to a Pilot Project carried out by Nowlan (2015) the sample designs created by using 3D printing are linked chain, stretchy bracelets, snap-in-gear-keychain, nut and bolt and octopus tentacle smart phone stand. students can learn how to manufacture these designs on their own, using the 3D printer.
- ii. 3D printing in the library creates excitement among students, promotes problem solving skills, foster persistence and allows creative students to use technology to show their skills.
- iii. It will help the academic library to attract more users to its resources; as the library now opens to not only those who have come to read, but also those who have come to create, the library will now have more users. Students in architecture, engineering, fine arts, etc who will like to come and make copies of their designs will start patronising the library. It will also help students with design assignments and manufacturing activities. By so doing the words of Colgrove (2014) that the academic library is actively building an environment that nurtures creativity while stimulating and supporting learning and innovation across the university landscape come to play.

With careful planning and management 3D printing services will increase students confidence and interest in learning, and will contribute to the overall success of the academic library.

Conclusion

The scope of the fourth industrial revolution is higher than the previous digital or information revolutions. This paper featured discussion on the concept of 4IR, development, and the academic library. It also identified some technological advancements and tools of the 4IR that are currently impacting academic library operations and services all over the world. Adopting these new applications will allow institutions to unite and relate across international borders and work towards common goals. This in turn will enable academic libraries to more effectively, preserve, mine their collections online and, offer improved and redefined access to scholarly materials and resources for their users. It is the opinion of the authors that academic libraries in Nigeria can only benefit from the use of these new technologies when they have good knowledge of the changes and speed in which they are occurring. From all indications, the adoption of these innovative technologies will definitely impact academic libraries in all dimensions, and lead to an overall development in all their settings.

Suggestions

1. For academic libraries to thrive in this era, they must make conscious efforts to incorporate the 4IR technologies (internet of things, artificial intelligence, robotics, etc.) into all their operations.
2. Their staff should be trained in line with detects of the new technologies so as to transform their abilities in the rudiments of the profession and prevent the fear of extinction.
3. Apart from training their staff, the management of academic libraries should spend money to acquire 4IR tools, and periodically organize training programmes for users, so that they can benefit from the services rendered using the innovative technologies discussed.

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EMERGING TECHNOLOGIES FOR LIBRARY SERVICES IN NIGERIA'S PUBLIC LIBRARIES: OPPORTUNITIES AND CHALLENGES

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Abstract

This paper discusses the opportunities and challenges in the emerging technologies for library services in Nigeria's public libraries. Emerging technologies (ET) for library services abound. ET comprise of technological tools that facilitate user services, instruction, library management and technical services. The emergence of these technologies has provided libraries across the globe great opportunities to enhance provision of library and information services to their users. Many libraries particularly of the developed countries have been providing library and information services through the use of ET such as computer, RFID and communication technologies. Public libraries in Nigeria should not be an exception in embracing and utilizing these technologies in order to serve their users in a more efficient and effective ways. Through the review of available literature, this paper seeks to identify various types of ET for libraries and their uses in public library services. It also explores Public libraries in Nigeria, opportunities for adoption and the challenges public libraries are likely to face towards the utilization of ET. The paper concludes with some vital recommendations.

Keywords: Emerging Technologies, Public Libraries, Opportunities, Challenges, Nigeria

Introduction

Libraries had been in existence as far back as the ancient times, although they were not the same as present day libraries. The long existence and the changes libraries experienced over time had never distorted their traditional roles of information acquisition, organization and dissemination. Today's libraries acquire and keep information in various formats as well as provide information services with the aid of computers, internet and other information and communication technology (ICT) facilities (Iwhiwhu, & Okorodudu, 2012; Jantti, 2016).

Public libraries provide access to their collections to members of their communities pursuing personal, social and public minded goals free of charge (National Research Council, 2000; American Library Association, 2020). Public libraries perform and provide wide range of activities that promote reading, learning and research among members of their communities. International Federation of Library Associations and Institutions IFLA (2001) refers today's libraries as avenues

where resources are kept in a variety of formats that are well organized by professionals for the purpose of educating, informing and entertaining as well as stimulating individual learning and advancing society as a whole. Summarily, public libraries acquire, organize and disseminate information resources in various formats for the purpose of advancing learning and research activities of members of their communities.

Information resources, the lifeline of libraries and the library users are becoming very complex. Information resources are now available in various formats due to technological advancement. They exist not only in print but also in electronic format. Some electronic books are not only in audio forms but in multimedia form with interactive properties (National Academy of Sciences, 2000). Public libraries cannot shy away from books in these formats, as many of them are scholarly in nature, intended for research, and undergo the peer-review process before publication. Other books are a source of **popular** information meant to entertain or inform rather than provide a citable source. Library is witnessing new set of users commonly referred as “digital natives” whose information usage and information search behavior entirely differs with older generation library users. According to Zimmerman (2012) “Digital natives are different in their search behavior, preferring to use web-based search engines such as Google, Yahoo and Bing.”

The ongoing changes in the world of information and information consumers make it imperative for public libraries to adjust their approaches to resources acquisition and library services in order to remain relevant. ET comprise of artificial intelligence (AI), biotechnologies, computer technologies, digital technologies, genetics, information technology, medicine, nanotechnology, networking technologies, telecommunications, web technologies, and so on (Li, 2009). ET are necessary tools that public libraries should embrace to enable them serve their users better, in a modern way. The objective of this paper therefore, is to assesses the state of public libraries in Nigeria, identify ET available for Nigerian public libraries, opportunities for adoption and possible challenges for further use of ET by the public libraries in Nigeria.

Nigerian Public Libraries

Public libraries had been in existence in Nigeria as far back as the early years of twentieth century. The Tom Jones Library in Lagos and the Lagos Library established between 1910 and 1930s had some elements of public library. The colonial government established reading rooms across the Nigerian regions, most of them metamorphosed into public libraries in the country. The growth and development of public libraries in Nigeria were facilitated by Ibadan seminar of 1953. The seminar was organized jointly by the Nigerian Government and the United Nations Educational, Scientific and Cultural Organization (UNESCO) (iProject, 2018). Eventually, public libraries were available in all the three Nigerian regions before the country’s independent. States’ public libraries were established in the new states following the dissolution of the regions (Olden, 1985).

Studies had reported the existence of public libraries in most part of the country offering varying degrees of services (Fuegi, Segbert-Elbert, & Lipeikaite, 2011). Although most of these libraries were small with limited space, resources and lack technology related facilities (Fuegi ... etal), yet they provided the traditional library services such as book lending. Despite the growth of public libraries in Nigeria from few number to hundreds, the availability of ICT facilities and other emerging technologies is lamentable. Only few libraries have ICT such as computer and internet service. Ariole (2017) and Bassey (2018) have reported the availability of few computers in the public libraries of South West, South-South and South East geo-political zones. This paper attempts to fill the gap, exposing public libraries to the opportunities of emerging technologies.

Emerging Technologies for Nigerian Public Libraries

Today, we are witnessing a world of emerging technologies (ET). ET have affected all spheres of our lives, ranging from office work, bank transactions, industries' operations, educational systems, training, business, health care, security, transportation systems to housekeeping. Library being an integral part of our community, it is equally affected by this technological revolution.

With the advent of ET, Mittal (2017, 1) argued that most of the library resources and services were transformed from analog to digital, for instance;

- i. printed library collection to Web based publishing like digital collection,
- ii. reference desks to Online/Virtual Reference Service,
- iii. closed access to anytime/ anywhere (24x7) access of material through internet libraries,
- iv. Manual indexing and Bibliographies to Full Text Databases,
- iv. manual Library Catalogue changed to OPAC (Online Public Access Catalogue) / Web OPAC, Manual sharing of information to Networking of Libraries (Resource sharing networks),
- v. inter-Library Loan Service to Electronic Delivery of Information

The new library technologies are available and many more are constantly emerging as the name suggests. ET for libraries are ubiquitous, libraries in Developed countries are leveraging ET to meet the needs of their users. Public libraries in Nigeria as well, need to have the aspiration in adopting the ET, they need to assess and adopt ET in order to promote their services. Scholars have identified different types of ET being used for libraries and library services. Despite the challenges, there are so many ET that are adoptable by the Nigerian public libraries due to their simplicity, affordability and importance (Khaisar & Ali, 2017). Mangano (2018) stated that public libraries must have basic ET such as Wi-Fi, electronic resources video conferencing, maker space and virtual reality facilities. Amrohi, Garg & Chauhan (2015) have specifically spoken on the Web Based ET and their applications in libraries and library services which attract little cost.

1. Web Based Emerging Technologies

Web Based library services are commonly referred as, Digital Library Services, Internet Library Services and Electronic Library Services. Web based technologies are of various types, such as portal, social networking sites, RSS, blogs and wikis (Ali & Khaisar, 2017). Web Based ET made library services become dynamic. According to Gavit (2019) users can access the library at anytime from anywhere. No need to go to the libraries physically and no time restrictions. With the advent of information technology and web based services, contents are now available to users on their desktop.

Libraries applies Web Based technologies to describe various information about the library, working hours, holidays, layout plan of the building, rules and regulation of the library for different categories of members, rules of circulation, details about different staffs, and responsibilities (Amrohi, Garg & Chauhan, 2015). Web OPAC gives various approaches of document access in the given library including by author, title, publisher, accession number and collaborators etc. The advantages of Web Based ET for libraries were summarized by Ali and Khan (2019) as follows;

- i. it saves the time of the users,
- ii. it gives equal opportunities for access to all users
- iii. it enables on-line real time communication with other side network users
- iv. there is Information dissemination for any number of users at any time
- v. it enables exchange of e-mail and e-resources files in a global environment
- vi. information can be made available in different locations and in different formats

Public libraries in Nigeria can identify and adopt Web Based ET at very little cost and technical requirement.

Cloud Computing

Cloud computing is very important technology that revolutionised the world of Information and Communication Technology because of its potential benefits such as reduced cost, accessibility anywhere anytime as well as its elasticity and flexibility (Kadli, & Hanchinal, 2013). Khaisar and Ali (2017) defined Cloud computing as, "The practice of using remote servers on the internet to manage, store and process data instead of using a personal computer". The authors added that Cloud computing is very cheap technology and easy to use, it involves a centralized data center, virtual server space, and secure transfer of data over the internet. Cloud computing have so many advantages and affordable by Nigerian public libraries. The advantages of cloud computing include low cost to own (CTO), agile updates, openness, zero initial investment, enables access to applications and data from any computer at any time (Yang, 2012). Cloud computing is the best for the libraries who cannot afford technology and staff, concludes Khaisar & Ali (2017).

Social Networking Sites

Maideen and Oke (2019), Jindaland Khan (2019) have further outlined the use of SNSs for public library services which is also a web based ET for public libraries. SNSs are Web Based ET that enable interaction and sharing via online. Users create content and interact with each other, forming online groups, sharing common interests or ideas. Libraries use these tools in carrying out professional services such as information delivery services, reference services, current awareness services and SDI. There are so many types of SNSs that are affordable by public libraries in Nigeria. Example of such SNSs are Facebook, Google+, Twitter, Instagram, these sites require cost little to make use of by libraries.

Electronic Information Resources

Electronic information resources are information resources that are available in electronic form, and these include resources available on the Internet such as e-books e-journals, online database, CD-ROM databases and other computer based electronic networks, among others, these resources that require a computer or mobile device to access are most. Today's information users particularly our users prefer accessing and retrieving information through their laptops and smart phones, in order public libraries to remain relevant they should have available ER and access points (Mangano, 2018). The interesting thing is the availability of electronic information resources at no cost.

Furthermore, libraries should digitize available and important manuscripts as well as establish Institutional Repository IR containing state and local government's publications that can be accessed remotely. Through this information storage and retrieval can be simplified if the resources are available electronically. It helps the libraries to reduce space utilization and budget. On other hand all the archived materials can be stored with the support of open source ET.

Video Conferencing

Video conferencing is an ET that is recommended for every library. The technology provides a video and audio connection between computers in one of four ways: "by ethernet over a Local Area Network (LAN); via the Internet; over regular phone lines, known as POTS (Plain Old Telephone Service); and by ISDN (Integrated Services Digital Network), a special digital phone line. (Folger, 2006) The cost of video conferencing technology also varies, from nothing to several thousand dollars (Folger, 2006). This technology need to be adopted by Nigerian public libraries, it makes connectivity easier and more accessible for a range of remote communication needs. Video conferencing is used for civic engagement, community organizations, small start-up businesses as well as connect homebound individuals to community meetings held at libraries (Austin Public Library), these services are as well applicable in the context of Nigerian public libraries.

There were ET for public libraries that were identified by Mangano (2018). According to the author makerspace, video conferencing and virtual reality are must ET for libraries in order to remain relevant and serve the Jindal and Khan (2019). Public libraries in Nigeria have the capacity to use them and improve their services. These are:

Makerspace

Makerspaces is one of the must used ET by public libraries (Mangano, 2018) Maker spaces according to Aiyebilehin, Onyam and Akpom (2018) are “Any area where people gather to make and create. These spaces often include 3D printers and other technologies, but do not necessarily have to. In makerspaces, people share supplies, skills, and ideas, and often work together on projects.” The importance of maker spaces cannot be over emphasized, it enables users to experiment with the ET as well as encourage social and creative engagement. Aiyebilehin, Onyam and Akpom (2018) concludes that Makerspaces help libraries remain relevant by allowing them to reinvent and market themselves as leading-edge, and to demonstrate their relevance in their users’ lives, by offering pathways to economically valuable skills and civic engagement.

Integrated library systems

Integrated library system (ILS) or Library Management System (LMS) has complex program/database that carries numerous library functions together. The specific functions, usually called ‘modules’, comprise such things as: OPAC (Online Public Access Catalogue), which acts as a search engine for the library users find the available information.

- i. Acquisitions module: It will be useful for managing the book orders and expenditures;
- ii. Serials module: It will help to manage the newspaper and magazine subscriptions, track the pending Issues
- iii. Cataloguing module: For encoding the MARC records through Z39.50/SRU and make the items available in the OPAC.
- iv. Circulation module: This module provides the details of entire library transactions like Checked out and Check in of library materials, due data and to holds information of the patrons such as phone numbers, addresses, email Id. The ILS supports the library employees particularly in the acquisitions and cataloguing departments. The library employee of the book processing unit does their work using the ILS. So ILS/LMS technology is doing the vital role in the library. There are many ILS technologies are available as commercial such as CodeAchi Library Management System, LIBERO LMS, LIBRARIAN, Access-It, Soutron and open source model such as OPALS, koha, Evergreen, OpenBiblio, PMB. OCLC’s, WorldCat, Web-Scale Management Services, which are technologies which will help the libraries to share data globally. ILS broadens the door for interlibrary loan.

Opportunities for Making Use of Emerging Technologies by Nigerian Public Libraries

Despite the numerous challenges Nigerian public libraries are facing, there are opportunities to identify and use ET for the provision of library services as well as remain relevant to the society. The availability of open sources emerging technologies OSET is one of the great factors that will salvage Nigerian public libraries. The aforementioned argument was supported by Savard and Dione (2007), The authors although believed that there is difficulty in the management of library automation systems as well as other technologies related to information management in the Developing Countries due to the lack of resources which allow them to access technological tools as effective as those we find in developed countries. The authors finally concluded that open source software may be a solution to these problems if well addressed.

Ray & Ramesh (2017) believes that with the OSET there is a great opportunity for public libraries and Nigerian public libraries inclusive in this regard. Moreover, there is an ongoing open source movement which is agitating for free and equal access to information. Several organisations are committed to supporting and developing solutions based on OSS for libraries (Jain & Sinnaraja, 2019).

With the increasing availability of open source software, Mutula (2007) is of the opinion that library will not only adopt and use these available technologies for library services, but they will eventually develop their own software packages. Mutula (2007) added that “The openness of the source code and collaborative nature of OS software development allows local talent to cooperate within the globally distributed teams of specialists and modify and adapt software for local needs.” This will stimulate the growth of an indigenous software industry.

In addition, the availability of free hosting and installation, support, and development services, libraries don't need an IT staff to deploy software or advice on development of new features. The OSS provides an opportunity for libraries to take control of library services and collections.

Another opportunity for adoption and use of ET by Nigerian public libraries is the recent development recorded by some public libraries in the country. Research has shown that some public libraries in Nigeria have some computers and ICT facilities in their libraries (Bassey, 2018). These tools provide a platform where free software packages can be installed, electronic resources can be searched, saved and accessed by users.

With the invention of Information and Communication Technology, libraries now use various types of technologies to aid the services they render. Everyday emerging technological advances affect the way information services are rendered to the community. Therefore, the impacts of these emerging technologies are felt by all libraries in every aspect. Therefore, the adoption of these emerging technologies into the operations of a library has the potential to provide a window of opportunities, changing the face of information services delivery of libraries including public libraries. Following this, Mahmood & Richardson (2013) outlined the opportunities of new technologies for libraries as follows:

1. Increased library's relevancy to users: improved library's image; allowed rich, interactive, timely, convenient services so as to improve service level and quality, and broaden range of services; increased users' participation, and increased interactions and communication with users; broadened librarians' perspective, draw on collective knowledge to better serve users; improved librarians' inter-departmental communication and expedited, information dissemination to the users; facilitated instant problem solving with the benefit of traceable services; and improved knowledge sharing and collaboration.
2. Building brand loyalty: Promoting library and information services with new technologies helps libraries to not just advocate the library but also brings library users to become library advocates. Social Networking is a center for engagement that would enhance two-way communication like never before. This in turn builds the library's image.
3. Saves Time: New technologies promoting library and information services save time and library staff hours. These technologies make it easier to reach a large number of library patrons in the most time effective manner. For example, using OPAC to search for a library resource is cost and time effective compared with the traditional way of searching through the card catalogue.
4. Enhances fast Two-Way Communication: One of the most important tenets of customer service is to be responsive to users concerns and show that the library is interested in and

- cares about their opinion. This is where social media come to play as social media create a forum for feedback in library promotion. For example, the use of e-SDI through e-mail to meet user's information need. This is a form of promotion that boosts the library's image.
5. **Saves Cost:** Many of these emerging technologies such as social networking, makerspace ILS (Koha), e-SDI cost next to nothing. Adopting the technologies for library and information services allows for a vast reach yet having very low cost. A library can perform actions/activities on social media like Facebook, blogs, twitter about products and services without investing a dime. The library can have patrons and the community and stakeholders to follow them or Twitter or "like" their Facebook account. Then, promotion can begin. In yet another vein, promoting libraries through social media increase revenue. Promotion of library resources and services through social media is becoming a necessity if librarians wish to raise revenue from stakeholders and the community.
 6. **Increases Library Users:** With the global transformation in every aspect of human endeavor, most of today's library users are technology savvy. The online community is opened to all as long as there is an Internet connectivity. Apparently, the adoption and use of these technology increases the number of users of the library. This can motivate a friend of a library fan to join the library. Also, the technologies can increase library patron's satisfaction with the library. This is to say that emerging technologies has become the catalyst in projecting library and information resources and services and maintain relationships with users

Challenges Toward Use of Emerging Technologies in Public Libraries in Nigeria

Today, technology delivers several opportunities to reach and interact with the society. In recent years, technology has grown amazingly which is being used all over the world. Consequently, libraries are using these emerging technologies and trends to make their services popular and user friendly. Hence, the concept of a library as physical place where one can visit to get information is rapidly changing to a social cyberspace where users access, communicate and contribute to exiting knowledge (Patel & Patel, 2018). These technologies are constantly promoting open access to knowledge. As libraries thrive on modern technologies, library staff are therefore, saddled with the responsibility of acquiring new skills and knowledge for onward adoption and use of the technologies to enable them to provide round the clock library services to their diverse patrons.

In spite of the opportunities presented by technologies for libraries, there are many constraints to the effective use of these technologies in public libraries in Nigeria and this also extend to emerging technology as identified in many literatures. However, the major constraints are considered in this article. The findings of Krubu and Asowaru (2011) revealed that inadequate training and retraining of staff by management; inadequate funding, epileptic power supply and lack of search skills are the major factors militating against the effective use of technologies in libraries. Amongst others, inadequate funding, capacity building, regular power supply were recommended. Similalry, Lucky, Umeji and Obue (2014) outlined the challenges of technologies to include:

- i. **Funding:** Funding of libraries especially public libraries is still nothing to write home about. This has really constrained public libraries in embracing emerging technologies as some of these technologies are costly to purchase and install. Hence, depriving information seekers the opportunities provided by the technology.

- ii. Erratic power supply: The effective utilization of information and communication technology depends largely on effective and constant power supply. This is so, because cannot function effectively. It is therefore necessary that the institution or external system that wish to operate these technologies should make adequate provision for constant electricity supply since the electricity corporation (NEPA) now known as PHCN has become so epileptic. A generating set should be made available to supplement (PHCN) irregular supply. One municipal facility that is the bane of Nigeria at the moment is supply of electricity. Electricity, which is an essential necessity for economic growth is lacking in Nigeria as a whole. Without electricity, it would be difficult to exploit the best that ICT could offer. Erratic supply of electricity has in some cases led to destruction of equipment in Nigerian libraries (Kadiri, 2004) as it does to domestic equipments in homes as well. Attempts to redress this with the use of generators is hampered by the high cost of fuel i.e. petrol and diesel.
- iii. Lack of trained personnel: Nigerian public libraries that have managed to tap into information technology resources lack trained information technology experts. This fact has left the information technology services of the library performing little or no of its functions.
- iv. Policy structure of the Government: The growth of any communication technology in a society and hence its applicability for distance education depend to a very great extent on the degree to which policy makers recognize the importance of ICT in promoting a knowledge based society.

Conclusion and Recommendation

In conclusion, ET have come to stay in libraries as a revolution in information service provision. They are seen as a transformation of libraries from the conventional to computer-generated technologies and information centers. There are quite a number of these technologies that the public library could adopt to make their services more effective than earlier. Additionally, ET have come with opportunities public libraries can leverage on to change the narrative of public library service in Nigeria. In doing so, it is therefore recommended that, since funding is the backbone of every development that comes into the public library, the public library board is expected to work out more and better ways of sustainable funding to the public library. This would go a long way to see to the utilization of these emerging technologies. Appropriate funding to public library can address other challenges faced in the library.

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MITIGATING CLIMATE CHANGE AND THE IMPACT OF GREENHOUSE GASES: CASE OF LIBRARIES GOING GREEN IN NIGERIA FOR SUSTAINABLE ENVIRONMENTAL PROTECTION

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Abstract

The paper focuses on militating climate changes and the impact of greenhouse gases on the environment using the application of green library revolution principles in creating friendly ecosystems embedded in sustainable environmental protection. It also focuses on the workflow, features, aims and objectives as standards of IFLA and LEED, scope and limitations. Extends to recommendations for the betterment of green libraries and the role of green or eco-librarians in creating friendly ecosystem embedded in sustainable library community environmental protection.

Keywords: *Mitigating, Climate Change, Greenhouse Gases, Green Libraries, Libraries Going Green in Nigeria, Sustainable Environmental Protection.*

Introduction

Life on Earth as it is relies on the natural atmospheric greenhouse effect. This is the result of a process in which a planet's atmosphere traps the sun radiation and warms the planet's surface trying to make the environment unfriendly and human life uncomfortable. Greenhouse effect leading to the depletion of the Earth's ozone layer, global warming and climate change, is produced by greenhouse gases (GHG). GHG are those gaseous constituents of the atmosphere that absorb and emit radiation in the thermal infrared range (IPCC, 2014). Traces of GHG, both natural and anthropogenic are present in the troposphere. GHG generally causes climate change which in effect brings about extreme weather events and threatens human health due to uncontrolled rising temperatures. There is also the negative effects on economic growth and development in general in developing countries. The social impact of climate is further aggravated by society's failure to prepare and adapt (Kiehl & Trenbert, 1997).

Yan, Zhong and Shangman (2017) opine that greenhouse effect is a natural phenomenon and is beneficial to mankind, because of the atmosphere retaining part of the thermal radiation emitted by the Earth's surface after being heated by the sun. This means the planets temperature at a level is suitable for the development of life. On the contrary, Kimball (2016) and Fancy (2017) are of the view that human action has increased the presence of gases in the atmosphere. These gases include carbon dioxide (CO₂), methan (CH₄), nitrous oxides (NxO) and ozon (O₃) causing

them to retain more heat and increase the temperature on the planet. “This is what we know as global warming”. It is instructive to note that it is global warming that cause climate change. This is aggravated by the anthropogenic activity of man in the environment through the release of additional greenhouse gases such as bush burning, emission of excessive CO₂ , excessive use of generating sets, power, carbon monoxide from vehicles and general environmental degradation, oil spill and gas flaring, etc. All singly and combined result to unbalancing the weather of Earth, the sustainability of the planet’s ecosystems is equally under threat, as well as the future of humankind and the establishing of the global economy (Mitter & Blumwald, 2010; IPCC, 2014).

Interestingly, it is also the humankind that caused climate change, greenhouse effect and global warming that is today fighting what started some 200 years ago through the planning and execution of some mitigating projects to stem the tide on the environment (Corlett & Wescott, 2013). These measures include tree planting (afforestation), landscaping and gardening, use of renewable energy, invention of electric and solar energy cars and of recent greening libraries (green libraries) among others.

The pertinent question at this juncture is how can greening the libraries (green libraries) project be applied to mitigate adverse changes on the planet’s Earth. This forms the crux of the second installment of this introduction. The consideration of the role of humanity in climate change and the notion of sustainable development are core concerns of society, and consequently of libraries. This is not just libraries, but libraries going green to manifest the qualities of green libraries, equally known as sustainable libraries that are built with environmental concerns in mind (Boyden & Weiner, 2000). According to Hornby (2000), the concept green as aligned to the design and development of libraries is the deliberate effort and concern of LIS professionals with the protection of the environment; supporting the protection of the environment as human activity. In the words of McElrath (2015) the term green pertains to, or supports environmentalism, and sustainable libraries (green libraries) in which sustainable relates to forms of human economic activity and culture that do not lead to environmental degradation, especially avoiding the long term depletion of natural resources.

The protection of the environment is a critical part of our human being in the present world which is affected by some reasons, ie greenhouse effect, ozone depletion, global warming, and carbon dioxide are the main causes of environmental degradation, which could as well be referred to as the depletion of the natural ingredients of the environment. Time is changing on daily basis like technology, so the natural ingredients (resources) are depleting and getting limited. It is the responsibility of the humankind to leave a healthy and habitable planet Earth for upcoming generations to survive. Nowadays people are affected by various natural disasters such as flood, drought, gully erosion, desertification, wild fire bush burning, ocean surge and the likes. These are most adversely affecting human’s health and life.

Premised on this, LIS professionals have volunteered themselves to import the imperatives of libraries going green (green libraries) into the global ongoing green system for the protection of green environment in every field of life. This is predicated on the understanding that the library is the central hub for knowledge for present and upcoming generations which require significant amount of energy, water and other resources to survive and make a stable environment. Again the advocates of the adoption of green libraries in mitigating climate change and the impact of greenhouse gases see the term green as aligned to libraries going green as the buzz word in every field. It has a tremendous importance to sustainable environmental protection and healthy lives of people.

“Green revolution” is being advocated and already ongoing in all spheres of human endeavours to overcome the burdens/challenges of environmental pollution and degradation from

society. The library therefore is one of the many areas LIS professionals and environmental scientists and advocates are working in so many projects for the development, maintenance and sustenance of green universe or planet's Earth. In all these, Shuhsien (2008) posits that the creation of green libraries is most imperative and critical to the creation and running of sustainable green library academic environment for users and all in society.

In view of the foregoing, it is therefore the intent of this paper to highlight the adoption of the tenets of libraries going green in Nigeria in mitigating climate change and impact of greenhouse gases for sustainable environmental protection or eco-friendly system.

The Green Library: Conceptual Overview

The green library concept and movement or libraries going green globally did not just emerge extempore or from the blues. Advocates came up with it because of searching for the way out of the adverse effect of climate change and greenhouse gases (emission) on humankind and planet's Earth. Tseng (2007) posits that climate change is the global phenomenon of climate transformation characterized by the changes in the usual climate of the planet regarding temperature, precipitation, and wind that are especially caused by human activities. As a result of unbalancing the weather of Earth, the *sustainability* of the planet's *ecosystems* is under threat, as well as the future of humankind and the stability of the global economy.

The library going green is all about the sustainability of the environment by creating eco-friendly ecosystems for human habitation as well as conducive study environment devoid of the adverse effects of the vagaries of weather. According to the Online Dictionary of Library and Information Science (ODLIS), green libraries are “designed to minimize the negative impact on the natural environment and maximize indoor environmental quality by means of careful site selection, use of natural construction materials and biodegradable products, conservation of resources (water, energy, paper), and responsible waste disposal (recycling, etc.)”.

Tseng (2008) has it that green or sustainable libraries are the structure that is designed, built, renovated, operated, or reused in an ecological and resource-efficient manner...it is a collective effort of all mankind to make green planet by reducing global warming. The implication of the above definitions is that henceforth new library design and building can now and would now be built according to the specifications of green library principles or renovating existing ones, also providing green library services and facilities as well as embracing environmentally supportive and sustainable practices within the library. All buildings use resources such as land, energy, water and materials to fulfill the functional requirements of a space. As such there can be no building without environmental impact. A building is green when it is resource-efficient and fulfills the functional requirements of the space with minimum negative impact on the environment over the longest possible time (Prasanth & Vasudevan, 2019).

The demands of libraries going green is all embracing. It involves the ideas and contributions of librarians, libraries, towns, cities, colleges and university campuses committed to greening libraries and reducing eco-degradation. Environment destruction sets off a downwards spiral of ecological deterioration. Green libraries stand for libraries built with the intent to protect the environment and safeguard the community and inhabitants. Green libraries expound the needs of a library, sustainable design and real cost savings in energy consumption (Divya & Vijayakuma, 2017). The fundamental goal of libraries going green is to develop and use sustainable energy-efficient resources in construction, maintenance and overall life of the structure. Green libraries can serve the way libraries have always served as landmarks for their communities and in a way provide pleasant environment to the user community Green libraries are a part of the larger green building movement. Also known as sustainable libraries, green libraries are trending. They are

being built all over the globe with high-profile projects bringing the concept into the mainstream as the buzz world. Along with library 2.0, green design for libraries is defining the library of the 21st century. Many view the library as having a unique role in the green building movement due to its altruistic mission, public and pedagogical nature and the fact that new libraries are usually high profile community-driven projects.

According to IFLA (2013) as cited by Hauke and Werner (2018), the consideration of the role of humanity in mitigating climate changes, greenhouse gases impact and the notion of sustainable creation of friendly ecosystems and environmental protection are core concerns of society and consequently of libraries and libraries. Hence the thought of libraries going green in this 21st century. In line with the views held by IFLA, Saha and Padhan (2019) posit that nowadays the words Green and Green Renovation have become buzz words in all aspects of human endeavours in mitigating climate change and impact of greenhouse emission becomes of their importance in creating and maintaining sustainable eco-friendly systems. Greening the environment and green revolution with the created standard and approved infrastructures play critical roles in overcoming the burdens of pollution from society. Libraries going green is so fundamental in achieving this as well as enhance users satisfaction in studying in eco-friendly environments.

Objectives of Libraries Going Green in Nigeria

Organizations which set out to organize and execute programmes and projects do itemize standards and objectives as guide to achieving resounding success. Both IFLA (2013) as cited by Hauke Werner (2018) on what is a Green Library and IBERDROLA (online) on Greenhouse effect, have set out a number of objectives to be achieved by libraries going green. These include:

- The library shall be committed to environmental sustainability;
- The library shall take up social responsibility in creating awareness and leadership in environmental education;
- The library shall support the worldwide. Green Library Movement concerned with:
 - Environmentally designed and sustainable building
 - Environmentally sustainable information resources and programming,
 - Conservation of resources and energy.
- The library shall promote the development of Green Libraries initiatives locally and worldwide; and
- The library shall encourage Green Libraries to actively present their activities to an international audience.

The implication of the above is that libraries going green in a geographic area shall form a collaboration to streamline and standardize their design building, information resources, programmes and activities, especially in the areas of awareness creation and educating citizens on environmental sustainability.

Likened to the above objectives enumerated by IFLA are those of IBERDROLA on How to Solve the Consequences of the Greenhouse Effect:

- Going green entails the use of Renewable Energy
- Going green includes the use of Public Transport and other non-polluting means such as electric vehicles;
- Going green shall focus on promoting Ecological Awareness among citizens and different administrations; and
- Going green demands commitment to recycling and the Circular Economy.

IBERDROLA reiterates that reducing emissions of the so called greenhouse gases, such as carbon dioxide (CO₂) or methane (CH₄) from the ozone layer is not the only solution to curb the greenhouse effect. International organizations also agree on practical human approach as enunciated in the objectives of libraries going green and finding solutions to greenhouse effect.

Features and Importance of Libraries Going Green

The concept of library has totally changed today because of modern technological development. Green library concept is a new concept for library for energy saving, the efficiency of resource usage, increasing natural environmental exposure, environment load reduction, etc. Green libraries are eco-friendly because they protect the environment. They give pleasure to users of libraries and the pleasantly conduct their independent study, reading, and research in an eco-friendly library environment (Eileen & Susan, 2015; Zainab, 2017; Saha & Padhan, 2019). This succinctly presents what the features of green libraries look like.

Saha and Padha (2019) did go ahead to present the nitty-gritty of the components of the features of green libraries as follows:

Site Location: Prior to the design and building of a green library, the site should be appropriately considered. Site selection has a great impact on how ecologically friendly the library will be. It should be located in a densely populated area where some other allied services are provided. The library building should easily be reached or accessed.

Water Conservation: In as much as there are many ways to conserve water, good water conservation by green libraries is greatly dependent on proper site selection. Site for green libraries should be large enough as to give managers the leeway or latitude to apply strategies that can be used to capture rainwater runoff for irrigating the library's environment.

Energy Efficiency: This is one of the important features of turning libraries green. Energy can be produced by solar, hydro and wind sources. Using efficient renewable energy system is cost-effective and reduces greenhouse emissions, as well as decreases the dependency on conventional energy resources.

Building Materials: The primary intent for selecting materials for greening libraries is to avoid huge and unnecessary waste. Therefore the selection and use of local content materials is a sine-qua-non. This will not cause any damage to the environment.

Indoor Air Quality: Green libraries designers and builders should always ensure that they maintain high quality indoor air. The building should be properly ventilated. Cross ventilation with glass windows should the trend. The building is not expected to be air-tight because air-tight buildings cost more to cool, makes readers uncomfortable and not eco-friendly.

Community and Locality: As libraries are the heart of any educational project and academic institutions for scholars' independent reading, research and study its severity and quietude should consciously be maintained. It should be in a perfect locality that is away from the noise zone such as clubs, auditorium, centre of celebration, guesthouses and hotels and such other environments to make users concentrate on their study.

Area: Nigeria's diversity is not only on language, culture and traditions, but also differentiates itself by locality, weather and area. So before planning for a constructional set up, it is a most important duty of library management to think about all sides benefits and drawbacks.

Constructional Materials: As libraries go green, the foremost thought that comes to the mind of managers is the library building. There are lots of commons, standards and protocols created by

IFLA, LEED (Leadership in Energy and Environmental Design) and the likes to make a green building by using recyclable and environment sustained materials. For the purpose of clear understanding, LEED offers a variety of services which include green building rating programmes, certification service programme, etc. LEED is an internationally accepted Green Movement programme planning environmentally compatible high performance green building for a healthy environment. According to LEED, wastes should be minimized at every stage of construction of buildings.

Light: A library should have sufficient windows, glass windows and skylights which allow natural light abruptly into it with a properly, naturally light green library building. There would be no need for any light generated from electricity or independent power supply source during the day. Also using of low energy consuming bulbs and lights in non-reading areas at night helps green libraries achieve cost-effectiveness in electricity consumption management.

Air: It is an unarguable fact that air is one of the most important factors in libraries going green. Therefore, air for breathe in green libraries should be pure and breathable. Green libraries should be sited in areas that are characterized with natural air devoid of pollution. Libraries going green demand that management should ensure that proper gardens and plantations are maintained in the surroundings of the library to provide clean and pure air that will make library area cool. The implies that there is the need to plant, maintain and sustain such trees as whistling pines, *dogonyaro*, cashew, mango, umbrella trees and other ornamental trees, as well as maintain exotic flower hedges carpet grass for field and generally good plantation. All these will ensure sustainable eco-friendly environment with assured pleasant air that reduces room temperature. Also the more air ventilator planned, the more it reduces electricity consumption in powering air conditioners.

Electricity: The generation of electricity for the green library should be highly considered not to come from generating set that emits carbon monoxide that pollutes the air. This is not conducive for the green library environment and users. There should be the adoption of recycling energy consumption policy by stressing the use of solar energy (photovoltaic or solar panels), wind and hydro turbine systems. The use of these sources for electricity generation saves money (cost-effectiveness) in electricity consumption, reduces greenhouse emissions, and decreases the dependency on conventional energy sources.

- Specifically, green library managers and builders should:
- Use only star-rated electrical fittings and electronic equipment in the green library.
- Use glass technology in different parts of the library building so that natural light is maximally utilized thereby saving the cost of electricity consumption.
- Use motion and light sensor, timers and energy saving dimmers. All these benefit the green library in reducing temperature and electricity consumption.
- Should train library staff and users on how to use energy effectively to avoid wastage.
- Should optimize the use of natural light for eco-friendly library reading spaces and users comfort.
- Should design proper ventilation system (cross ventilation) with a plurality of glass windows that repel rays from the sun, climate and temperature controlling system, and energy-efficient light fittings. Passive heating and cooling policy of the green library controls room temperature to acceptable level and reduces cost of energy consumption. Though what run through electricity consumption and management of green libraries are reduction in electricity consumption, control room temperature and effective energy utilization. The fundamental aim of the green library and all about passive heating and cooling policy is the creation, maintenance and sustenance of friendly ecosystems embedded in the programme of sustainable environmental protection.

Water and Waste Management: Water and waste management are key to greening libraries. The focus is always on Green Principles which demand that every programme and activities on libraries going green including effective water and waste management should not be ignored by library managers. For a clean sanitation system, greening a library or building a completely new green library implies that the building should be made to have rainwater harvesters all through with storage tanks. Prior to this, the library should be in area(s) where regular water supply is guaranteed. This helps to keep the library clean, green, healthy and conducive for both staff and users.

It is also instructive to note that generally waste management plays an important role in making libraries green and sustainable. The focus here is repair, recycle and reuse of resources. For effective water and waste management library managers should:

- Provide (acquire) and install waste management apparatuses.
- Reuse and recycle water, paper, and other wastes.
- Get rid of waste by composting and should not use anything made of plastics including polythene/nylon bags and pure water sachets.
- Discard weeded books and other information resources by selling them to used book dealers, exchange library materials with participating libraries or donate to other libraries.
- Old furniture should be sent to smaller and poorer libraries who may need them. Alternatively, they could be refurbished and used again

Importance of Libraries Going Green in Nigeria

Protection of the environment is a necessary activity of the human-kind in the world of today which is adversely being affected by some of the same humankind activities which include greenhouse effect (emission). Ozone depletion, global warming and carbon dioxide. All these activities culminated into climate change and environmental degradation thus threatening the existence of man on this planet's Earth. Time is changing on daily basis thus making natural resources to shrink and be limited in serving present desires of man in his natural environment. All human beings are responsible and making frantic effort to leave a healthy planet for next generations to survive without shrinking and limited natural resources. Nowadays people are affected by various natural disasters like flood and drought, gully erosion, desertification, wildfire bush burning, ocean surge, etc (Bhattachar & Anindya, 2017).

Being that the above natural disasters adversely affect human's health and life librarians globally took this as a clarion call to join and contribute to the global programmed of Mitigating Climate Change and the Impact of Greenhouse Gases, and came up with the initiative and implementation of Green Library Principles (Green Library Revolution). Therefore, libraries going green is for the protection of the green environment in all spheres of life. The importance of libraries going green particularly in Nigeria is to achieve the global on-going green library revolution to create and maintain sustainable environment that is eco-friendly. This is because the library is the central hub for knowledge for both the present and future generations which requires significant amount of energy, water, and other resources to survive and make a stable environment (Suruil, 2016).

Role of Green or Eco-Librarians

For the fact that librarians have picked up the gauntlet, they are today re-christened Green librarians or Eco-librarians. They have become environmental activists thus making them eco-friendly. This is enormous and as they play tremendous in making libraries go green. According to Datta (2017), librarians need to be on the constant cutting edge in terms of technology, researching, web tools and even architecture and design. Libraries are great centres to educate the

general public and particularly scholars, researchers and students about the environment and eco-friendly lifestyle choices as to join in the promotion of green causes. Particularly, he maintains that:

- The green or eco-librarian should discern the need for standardization of the products and equipment which form the part of green library decorum.
- Should implant the convention of eco-friendly libraries among users by inviting them to participate in the Go Green Library Drive.
- Economy and Ecology are the notions in achieving cost-effectiveness in going green library programmes, so eco-libraries should always ensure this in making green libraries to flourish be prosperous and carbon neutral.
- Should simulate the green library trend in organizing workshops, conferences, in-house displays in the libraries (i.e awareness creation).
- Should popularize and familiarize the “Idea Green” by nourishing the practices in library displays publications, and library programmes relevant to going green (awareness creation).
- Should always achieve correct value positioning of patrons in order to be successful in the implementation of green libraries demands.

According to Miller (2010) and Agashe (2013), libraries are key to contributing to community learning efforts and it is appropriate for green libraries (eco-librarians) to play leadership role in sustainable green renovation in society. Seario and Oja (2012) posit that green librarians in libraries going green for sustainable environmental protection should play the following roles.

- Information must be distributed and established by bringing out best practices and introducing them to wide use and environmental guide and work methods that motivate patrons to actively participate.
- Indicators and monitoring methods should be for sustainable libraries
- Green librarians should support employers in implanting sustainability through commitment. Environmental training, tips for best practices and instructions on how to measure success and encouragement are essential.
- Eco-librarians should also encourage sustainability internally.
- Librarians should accord more attention to patrons communication because green libraries have considerable opportunities to improve patrons’ environmental awareness through communication and environmental education as well as acting as green library revolution models.
- The intrinsic role of the eco-librarian in cost effective management of resources in sustainable development should be played without compromise. Also library activities in itself ecological should be effectively highlighted by the librarian. Equally of note is that the librarian rather than sweep under the carpet, should reinforce his role in promoting social sustainability need.
- The green librarian’s role who is most extraordinarily here called eco-librarian should handle the budget and provide resources on site to help the people to locate information resources that are oriented towards a helpful sustainable future in continual greening library environment for readers independent study and comfort.

Going Green Challenges for Nigerian Libraries

According to Aulisio (2013,) notwithstanding that the green library movement and sustainable practices are being realized across the globe, different libraries at different Geolocations have their peculiar needs that raise some extra challenges.

- Though cost of constructing green buildings seems to have become affordable to other entities, libraries still have issues in meeting green goals as they are subject to stringent budget cuts especially when re-engineering or reconstructing library structures, One cannot forget the cost associated with this.
- Library programmes and buildings are best neglected in government educational and social welfare programmes. In most places librarians are helpless as they work in allotted space. Even when new buildings are proposed, the libraries are always being neglected. No befitting building or accommodation is provided.
- Green library projects demand that the librarian should be acquainted with sketching and design as to direct architects aright in constructing green library buildings.
- Green practices in a sustainable manner requires sustainable degree of expertise competency from general management to ordinary level of maintenance throughout library functions. It is likely to expect lack of awareness of staff in green library demands, practices, and technology because employees were recruited before the green library revolution based on traditional library knowledge and skills.
- Attitudinal barriers play significant role in slowing down the sustainable practices in libraries. There are possibilities to convince the administration who would otherwise object to the idea of executing green practices due to their unawareness and negative attitude towards green library development. A well laid plan for green library building will remove resistance to change.

It is instructive to note all these apply to the situation of libraries going green in Nigeria.

Conclusion

Going green and environment friendly, sustainable information systems and services are crucial issues that call for painstaking attention and actions considering the vagaries in whether and climate. Scientists have reasoned that our planet is at stake due to severe pollution. The various effects of Global Warming have already been shockingly felt including escalation in greenhouse gases, glacier retreat changes in timings of seasonal events, changes in agricultural productivity, etc. All these call for a change over from non-renewable and polluting energy systems to those that are renewable and non-polluting. It is noteworthy that the Nobel Prize Winning Intergovernmental Panel on Climate Change reported in their report that “global warming is unequivocal and that human activity is causing most of the rise in temperatures” (Rosenthal & Revkin, 2007).

With the green library revolution principles, this calls up the time for libraries and librarians to rise up to the challenge and assist communities to become green and sustainable. Green buildings are not only cost effective in terms of energy but also in term of health and productivity. Solar energy should be used and utilized to the maximum. In fact, energy options are right environmental aspect will be taken care of. The solar option (photothermal, photovoltaic and photosynthetic) and solar hydrogen. Solar option is non-polluting and perpetual. Library is a long term institution. A green library design is less expensive because of reduced upfront costs in energy, water conservation and increased efficiency. The role of the library is to serve its community. Communities need libraries and librarians to act as role models for sustainability by providing accurate information on all manner of green topics from alternative building practices to renewable energy options. Restorative strategies to reduce ecological deficit, environment impact management and environment management plans should be kept available to library users. The time is due for librarians in Nigeria to support and continue to grow the Green Library Movement for sustainable environmental protection.

Recommendations

Considering the various sections of the library and following the green library revolution principles the following recommendations are presented to make all libraries go green and protect the environment and thereby make libraries sustainable.

- First and foremost, government should make adequate budgetary allocation to categories of libraries within its purview.
- With adequate budgetary allocation manager of libraries should correspondingly and adequately provide other resources and facilities that enhance sustainable green library practices and service.
- Government and management alike generally should consider the adoption of sustainable in restructuring building construction, re-engineering and restructuring with the fundamental purpose of making services and practices reduce the negative impact on the environment.
- Spread awareness and popularize (marketing) libraries green activities through various programmes and using the conventional and social media regularly
- Incorporate into LIS curriculum and teach students all about the green library revolution principles, programmes, services and activities so that new generation librarians and libraries would adopt these ideas. Encouraged organic roof top gardening which decreases the heating of library buildings as well as increases staff team building skills development and fostering staff morale
- Encourage sustainable collection services such as e-books, e-journals and other electronic information resources which will all reduce paper consumption.
- Reuse and recycling concepts should be promoted and practiced.
- Government should take steps to promote green revolution principles through award and financial aid to maintain and sustain suitable libraries.
- Generally, like IFLA, NALISE, NLA, LRCN, CULNU, Committee of Directors of Public Library Services and all other affiliates should be conducting seminars, conferences, workshops on all aspects of green library concepts and other emergent issues as well as provide to library organizations and conduct other programmes and talks for readers on green library practices.

The aforerepresented recommendations are not just based on the identified challenges, but on the general overview of all about green library revolution principles, programmes, activities and services.

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SUSTAINABLE DEVELOPMENT OF LIBRARY AND INFORMATION SCIENCE (LIS) EDUCATION IN NIGERIA IN THE 21ST CENTURY

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Abstract

This paper discusses the strategic ways through which sustainable development of Library and Information Science (LIS) education in Nigeria can be achieved in the 21st Century. The paper stresses that sustainability can only be guaranteed when LIS education strives to move with the current global trends in all its ramifications mainly through the infusion of Information and Communication Technologies (ICTs) and other latest technologies to the LIS education. The paper provides an overview of LIS education in Nigeria with particular emphasis to university-based LIS education. It then chronicles the various ways through which sustainable development of LIS education can be attained especially through increased governmental support through proper funding, provision of critical infrastructure, public-private collaboration, development of proactive ways by the LIS schools to ensure the provision of quality, robust and dynamic LIS education as well as the establishment of strong partnership among LIS schools etc. which are in line with some of the prescriptions of the Sustainable Development Goals (SDGs). The paper identifies and analyzes the challenges in achieving sustainable development of LIS education in Nigeria. It suggests strategies for overcoming the identified challenges. The paper concludes by stressing that revamping and repositioning of LIS education in Nigeria has become inevitable if significant progress is to be made in ensuring sustainability of LIS education in this age of global competitiveness.

Keywords

Library and Information Science, Library and Information Science education, Sustainable Development, 21st Century, Nigeria

Introduction

Transformations in Library and Information Science (LIS) education globally have been profound, all-encompassing and diverse. This is because LIS education since its inception has always been a discipline concerned with the education and training of potential librarians and information professionals, which has been witnessing steady development worldwide. Additionally, the transition from the industrial age to the present-day knowledge economy has fundamentally revolutionized and permeated all aspects of human endeavor, which demands new skills and competence in all disciplines. LIS and LIS schools are no exception. According to Kerr and Stewart (2019), significant changes in LIS education in the last two decades have resulted into varied

impacts and drivers which fundamentally changed the roles of information professionals and the nature of their work and their competencies.

Similarly, according to Abubakar and Abbas (2014), scholars and professionals in the LIS discipline have for long concluded that the changing scenario requires new breed of information professionals that are equipped with the requisite skills necessary for survival in the dynamic and rapidly changing LIS environment. In the same vein, Raju (2019) noted that LIS professionals with both technology and pedagogical skills have become increasingly critical in a digitized information environment. For this reason, the LIS discipline is now changing into an interdisciplinary field of study which is integrating related areas and many new areas have surfaced that include knowledge management, information architecture, information management, information system, digitization, data science, web science, content management and archives and record systems.

However, it is worth stating that the pace of change in respect of the LIS education in both advanced and advancing countries is not the same in all parts of the globe. For example, it has been on comparative terms very slow in the developing nations where LIS schools still largely remain traditional in both their curricula and pedagogical approach, which could generally be due to their low level of infrastructural development as well as inappropriate manpower compared to what is happening in the advanced nations (Abubakar & Farouk, 2018).

The increasing pervasiveness of LIS education and the resultant epic changes in all its structures make it imperative for LIS programmes, particularly in Nigeria, to ensure its sustainable development. According to the International Institute of Sustainable Development (2020), sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Originally, the concept was considered as an organizational principle for global development that supports the well-being of both people and the planet, with the aim of bridging the gaps between environmental, economic, and social concerns (UNESCO, 2016 cited in Agbedahin, 2019). Sustainability, according to Umar, Ibrahim and Ibrahim (2017), is seen as a paradigm for thinking about a future in which environment, social and economic considerations are balanced in the pursuit of development and an improved quality of life. To this end, it is important to note that sustainable development is seen as a major pathway for achieving sustainability. Although advancing towards sustainable development remains a major global challenge (United Nations, 2016). Nonetheless, sustainable development of LIS education in Nigeria has become inevitable if the profession is to survive in the 21st Century.

However, sustainable development can only be guaranteed when LIS education strives to move with the current global trends in all its ramifications mainly through infusion of Information and Communication Technologies (ICTs) and other latest technological innovations to the LIS education. This is in addition to developing a market-driven curricular and the provision of critical infrastructure in order to produce information professionals that have the competencies that are in line with the current trends and perspectives.

In view of the foregoing, this paper offers and analyzes some strategic ways through which sustainable development of Library and Information Science (LIS) education in Nigeria can be achieved in the 21st century with particular emphasis to LIS education and training in Nigerian universities. It traces the historical development of LIS education in Nigeria, and the attendant challenges that are inherent in achieving sustainable development of LIS education in the country.

Development of Library and Information Science Education in Nigeria

Today, the discipline of Library and Information Science globally has recorded significant milestones from the establishment of Melvil Dewey's "School of Library Economy," which officially started on the 5th January, 1887 at Columbia University, to the emergence of the Williamson's Report in 1923 in the United States, to the KALIPER (ALISE, 2000) study findings,

to the European Association for Library and Information Education and Research (EUCLID) conference (2002; 2005), as well as other similar regional conferences and professional meetings (Abubakar&Auyo, 2019; Abubakar& Farouk, 2018). Since then, expansion and advancements have been most apparent. According to Tonta (2016), the emphasis of LIS education globally in the 21st century has been on information, people and technology. Additionally, users' ability to interact with information (e.g., sharing, tagging, rating, commenting) became more important than their access to information which consequently led to the emphasis on Information Schools (iSchools). From the Nigerian perspective, a glance into the history of LIS education revealed that the beginning of LIS education can be traced back to the 1953 UNESCO organized seminar on the "Development of Public Libraries in Africa" which was held at the University of Ibadan in Nigeria, which clearly identified the need for the establishment of professional courses, and the need for the development of libraries in the country. According to Uhegbu (2011), Library and Information Science education in Nigeria started as a response to the urgent need to develop indigenous manpower in librarianship. The objective behind Library and Information Science education in the country rests on the realization of the role of libraries in the educational system and the importance of information for technological transfer, government transactions, business and commerce, national planning and decision-making.

The root of actual university-based LIS education in Nigeria started with the establishment of the first Library School in 1960 at the University College Ibadan, (as it was then called), later on known as the Department of Library, Archival, and Information Studies. The LIS School was established with the support of the Carnegie Corporation of New York who sent Harold Lancour in 1957 to survey the library situation and advised how the Corporation can offersupport in terms of library development. After Harold Lancour's two months survey, he suggested that a postgraduate level LIS education be established, which was accordingly started at the Institute of Librarianship. In addition, the school commenced with a Diploma in Librarianship meant for graduate students.

It should be noted that the second school of librarianship in Nigeria was opened at the Ahmadu Bello University, Zaria which commenced with an undergraduate programme. The 1963 F.A. Sharr's report on library needs in Northern Nigeria was the brain behind the establishment of the second LIS School in 1965 with the objective of educating and training librarians at the undergraduate level as opposed to that of Ibadan's postgraduate Diploma programme (Abubakar, 2019). At its inception, the Ibadan LIS School strongly opposed the Ahmadu Bello undergraduate programme, on the ground that it was a "dangerous" deviation from the norm, an offensively conceived programming a subtle way to weaken the standards of the profession (Uhegbu, 2011).

Following the establishment of the first two university-based LIS schools, other LIS schools were subsequently opened in different universities in Nigeria which include among others: Bayero University, Kano (1977); University of Maiduguri (1978); Imo State University (1981); and University of Nigeria Nsukka (1983). Presently, there are 37 LIS schools in Nigerian universities (i.e. federal, state and private) (NALISE, 2020). It should however be noted that the number may even be higher because the author is aware of the existence of two (2) LIS schools in the Northern part of the country that have not been reported by the directory, i.e. Kano State University of Science and Technology, Wudil and Bauchi State University, Gadau. Additionally, according to Salubi (2017), National Diploma (ND) and Higher National Diploma (HND) in Library and Information Science are being awarded by many polytechnics in Nigeria. In fact, according to NALISE (2020) there are 10 polytechnics in Nigeria offering LIS courses. Likewise, some colleges are now offering LIS programmes at different levels.

Ways of Ensuring Sustainable Development of LIS Education in Nigeria

The sustainable development goals were developed by the United Nations in 2015 as a result of growing global concern regarding human society's impact on the natural environment. According to Obenga and Dadzie (2020), the 17 Sustainable Development Goals (SDGs) replaced the previous 8 Millennium Development Goals (MDGs), with 169 targets. Similarly, according to UNDP (2020), the Sustainable Development Goals (SDGs) also recognized as Global Goals, were developed by all United Nations Member States in 2015 as a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity by 2030. As a result, most countries of the world nowadays are making frantic efforts to embrace education for sustainable development. LIS education which is critical in this 21st Century and now largely technology-based is no exception. Sustainable development not only meets the need of present generation but also those of the future generation. In other words, it is the development that guarantees a better quality of life for everyone, now and for the generations yet to come (Iroka & Ndulaka, 2018).

According to Aboluwodi and Owolewa (2018), UNESCO has identified seventeen goals which countries can follow in order to ensure sustainable future for human beings. The goals are: No poverty, zero hunger, good health and well-being, quality education, gender equality, clean water and sanitation, affordable and clean energy, decent work and economic growth, industry, innovation and infrastructure, reduced inequalities, sustainable cities and communities, responsible consumption and production, climate action, life below water, life on land, peace, justice and strong institutions, partnership for the goals. It is vital to note that some of these goals are critical for the provision of quality education.

For this reason, LIS education requires a number of these goals for its sustainable development. Hence, transformational change in LIS education is a key element in ensuring its continuous sustainable development in Nigeria. However, this demands total commitment from the LIS schools on one hand and their sponsoring authorities on the other hand. Sustainable development of LIS education entails a balance between the prevailing local conditions in LIS education and the changing realities of the present day, as well as the need to maintain sustainability in all segments of the LIS profession. Additionally, sustainable development of LIS education should be seen as the process of improving the quality of the education provided within the limited resources available. It involves proper funding of LIS education, provision of critical infrastructure, public private collaboration, mounting of quality, vibrant and dynamic curriculum, provision of the right faculty, partnership among LIS schools both within and outside the country and marketing of LIS programmes. These are discussed in detail in the following manner:

1. **Proper Funding:** The success of any education, LIS education in particular, depends to a large extent on proper funding. This is because no educational system will succeed without proper funding. Additionally, LIS education is supposed to be dynamic rather than static. For this reason, its sustainable development rest upon proper funding and improvement in funding is very critical. To this end, funding to LIS education should be adequate and should meet the basic requirements as set out by the various professional bodies and quality assurance agencies both within and outside e.g. the National Universities Commission (NUC) Benchmark for Minimum Academic Standards (BMAS), International Federation of Library Associations and Institutions (IFLA), American Library Association (ALA), and Chartered Institute of Library and Information Professionals (CILIP) etc. Therefore, attaching importance to funding of LIS education is critical to its sustainable development in Nigeria.

2. **Provision of Critical Infrastructure:** The proper provision of modern infrastructural facilities and their continuous upgrading is critical to the sustainability of LIS programmes in Nigeria. Consequently, there is no denying the fact that sustainable development of LIS education can only be attained when modern facilities that are in line with global best practices are provided by LIS schools. This, however, requires the efforts of both the LIS schools and their sponsoring authorities in ensuring that the corresponding infrastructural facilities and actual LIS environment meet the basic requirements as enshrined in the various standards and guidelines for LIS programmes both locally and internationally. Therefore, in terms of teaching facilities and resources, LIS schools should make appreciable provision of such resources to ensure the delivery of quality LIS education. Additionally, there is a pressing need to upgrade the existing infrastructural facilities as well as the provision of those facilities that are not available in the LIS schools since the discipline is dramatically changing into an ICT driven profession. Consequently, computer laboratories, classrooms that are technologically compliant and spacious staff offices are needed for sustainable development of LIS education. This is in addition to the provision of standard libraries in the LIS schools. Such libraries should be loaded with current resources such as monographs and current journals to fully support the teaching and research activities of the LIS schools which is significant for sustainable development.
3. **Public-Private Collaboration:** The significance of public-private collaboration to the sustainability of LIS education cannot be overemphasized. This is in a bid to stem the current situation of over-reliance on only public support to LIS education. According to Uhegbu (2011), public-private sector collaboration is a situation where the public sector, represented by the government, partners with the private sector, represented by wealthy private individuals, organized groups, associations or corporate bodies. It is all about inclusion and working together to achieve a common purpose perhaps improvement in LIS education. Public-private collaboration will not only help to improve the quality and quantity of facilities for library and information science education, but also improve the quality of training, restore confidence in the student librarians, attract more applicants into the profession and above all, elevate the image of both the profession and the librarians and information scientists themselves (Uhegbu, 2011). Thus, such collaboration would improve the quality of LIS education in the country and ensure its sustainable development.
4. **Quality and Dynamic LIS Curriculum:** In order to achieve sustainable development of LIS education in Nigeria, priority should be given to the curriculum which is serving as a barometer for any educational programme. Such curriculum should be robust, vibrant and dynamic and must be regularly reviewed to be in line with current realities of the present day. According to Nwosu (2016), the curriculum for LIS schools should be robust; to include relevant skills and knowledge for outstanding performance in the work place by the LIS graduates and also for sustainable development of LIS education. The curriculum is a key factor shaping the educational outcomes of a programme, and how it is developed and delivered affects the experience of students in the programme, and the faculty involved (Lester, 2011). Equally, LIS schools in Nigerian universities have to engage in meaningful dialogue with various stakeholders to ensure conformity with the current global trends and the stipulations of available standards. However, the local condition and situations should not be relegated. Besides, LIS schools should give priority to the injection of ICT courses and the new emerging areas such as introduction to ICT,

management of ICT, multimedia, ICT hardware and software, data base management, information system and system development, media and publishing library automation, knowledge management, information literacy, advocacy, marketing and public relations information architecture and content management etc. into their curricular since today's world is ICT driven. In addition, the curricular of LIS schools should incorporate aspects of entrepreneurial skills which are critical to the sustainable development of LIS education. According to Issa, M'bashir and Saka (2011), improved and sustainable global economic advancement depends on a strong entrepreneurship education. Nwosu (2016) also stated that the interest in sustainable development would open up opportunities for information businesses to enable LIS graduates to make good use of such opportunities. In response to such trends, many library schools today have been giving necessary face-lifts to their curriculum contents so as to reflect needed changes; even though the present situations are still far from being easy (Issa, M'bashir and Saka 2011).

5. **The LIS Faculty:** The sustainable development of any educational programme is contingent upon the quality of the faculty, LIS education inclusive. Educators are the backbone of the LIS programmes, and therefore critical to its sustainable development. In this case, one of the strategies to be adopted in this regard is to ensure the recruitment of vibrant and ICT skilled faculty for the university-based LIS schools in Nigeria and even beyond to guarantee sustainable development of LIS education. Additionally, re-training of the existing faculty members is also essential. Stueart (1998) stated that the quality of a programme is mirrored on its faculty. Hence, according to the author, the faculty expertise, as well as professional activities and interest must reflect the cutting-edge of research through the development and exploration of new knowledge and skills which are all critical to the sustainable development of LIS education. This justifies the emphasis on the faculty.
6. **Partnership among LIS Schools:** The importance of partnership among LIS schools to the sustainable development of LIS education cannot be overexaggerated. This is because partnership is accorded priority in all disciplines in these changing times as it provides bountiful and unprecedented opportunities. In this case, LIS schools in Nigerian universities and even beyond are expected to work in partnership with one another in a number of ways, particularly in the areas of research, curriculum development, conferences, seminars, and faculty and student interactions. The experience of one another in relations to curriculum development and review, researches, conferences and teaching methods are of primary importance and essential to sustainable development. According to Virkus (2015), partnership affects the quality of teaching, research, organization and management. Consequently, partnership enhances the quality of LIS education and makes certain its sustainable development.
7. **Marketing of LIS Programmes:** LIS schools in Nigeria should factor in marketing as one of their strategies for attaining sustainable development of LIS education. Despite the negative perception accorded the profession, LIS schools should employ aggressive marketing strategies aimed at boosting the image of LIS education at local, national and international levels so as to make people appreciate the importance of the profession and thereby attracting more prospective applicants to the LIS schools. Thus, attaching importance to marketing of LIS education is essential to its sustainable development in Nigeria.

Challenges of Sustainable Development of LIS Education in Nigeria

Generally, due to the current development in technologies and paradigm shift in LIS education, coupled with the changing pattern of educational systems, contemporary LIS education globally is affected by many challenges. However, in Nigeria, the challenges are even bigger and manifest in so many ways which serve as stumbling block to the sustainable development of LIS education. Such challenges as discussed by various writers (Salawu&Igwe 2018; Abubakar, 2019; Saka, Garba&Zarmai, 2018; Abubakar&Harande, 2016) are as follows:

1. Persistent difficulty in attracting students that are interested in studying LIS as a course of study. This has been a lingering issue over the years that affect LIS education in Nigeria since its commencement which hampers its sustainable development.
2. Inadequate funding of education and LIS programmes in particular. It is imperative to state that adequate funding is needed if sustainable development is to be achieved. However, in the Nigerian context the reverse is always the case. LIS schools are grossly underfunded which hinders their activities.
3. Inadequate infrastructure/teaching and quality learning resources which originates as a result of chronic underfunding of LIS education also serve as stumbling block to sustainable development of LIS education.
4. Establishment of LIS schools without compliance to standards. The pace at which LIS schools multiply without compliance to standards in the areas of curriculum development and resources is harmful to sustainable development of LIS education in Nigeria.
5. Improper development, implementation and review of LIS curricula as well as lack of involvement of professional bodies in accreditation of LIS programmes in Nigeria are equally affecting the sustainable development of LIS education in the country.
6. Lack of involvement of critical stakeholders in LIS education issues is equally affecting the sustainable development of LIS education in Nigeria.
7. Inadequate collaboration among LIS schools, exchange and linkages programmes both locally and internationally is also serving as obstruction to sustainable development of LIS education.
8. Discrepancy in nomenclature and organizational placement for LIS departments in the country. Some LIS schools in Nigerian universities are housed under faculties of education, some in social sciences, while a few are under faculties of information and communication etc.; (Abubakar, 2019). This trend negatively hampers sustainable development of LIS education.
9. Apathetic attitude of the professional associations to LIS education in Nigeria is as well negatively affecting its sustainable development.
10. Insufficient LIS faculty particularly those with PhD degrees. The majority of newly established LIS schools are always relying on their institution's librarians and in some cases the use of visiting and part-time lectures has become a common practice which is harmful to sustainable development of LIS education.

The Way Forward

In the increasingly and rapidly changing LIS environment, it is crucial to state that sustainable development of LIS education in Nigeria has become necessary if LIS education is to continue with its main mandate of educating information professionals in the country and even beyond. Hence, the above identified challenges need not to be handled with levity. Some of the impediments that need to be addressed squarely and comprehensively include:

1. The need to develop proactive approach by the LIS schools with the basic aim of attracting students into the LIS programmes. This implies that aggressive marketing of LIS programmes should be the focal point.
2. Improvement in funding and Infrastructural facilities. This demands a change of attitude from the government and sponsoring agencies of LIS schools. Besides, LIS schools should develop new strategies of generating more funds to complement their financial allocation so as to acquire critical infrastructure in order to ensure sustainable development of LIS education.
3. The need for proper curriculum development and involvement of critical stake-holders in LIS education matters: This demands that LIS curriculum should be jointly developed by the respective faculties, and all other critical stakeholders, particularly the employers of the LIS graduates. Equally, involvement of LIS professional associations in accreditation of LIS programmes should be emphasized. This is necessary if sustainable development of LIS education is to be achieved.
4. There is also the need to control the proliferation of LIS schools and the entrenchment of standards: This requires that the establishment of LIS schools should be based on established standards. The success and sustainable development of LIS education rest upon a solid foundation.
5. There is also the urgent need to address the crises in the nomenclature of LIS programmes, and organizational placement for LIS departments. This is indispensable if sustainable development of LIS education is to be attained. Moreover, it would ensure compliance with the demands of the continually changing and diverse LIS setting.
6. Improvement in Faculty: The success of any LIS educational programme as well as its sustainable development depends to a large extent on the quality of the faculty, and so there is the need for careful recruitment of lecturers to ensure that only those with the requisite academic and professional qualifications, are allowed to teach in the LIS schools. Additionally, those lecturers that are lacking in ICTs and other emerging areas should be sent for further training in order to attain sustainable development of LIS education.
7. Integration of more ICT and entrepreneurship based courses in the curricular of LIS schools: The introduction of ICT and entrepreneurship based courses in the curriculum is critical to the sustainable development of LIS education as well the backbone for success in the changing market for LIS professionals. LIS schools in Nigeria should therefore constantly improve their curricular to incorporate such areas.
8. Finally, the Nigerian Library Association (NLA), NALISE and all other LIS professional associations need to be aggressive in stimulating the profile of the profession in Nigeria. This is essential in achieving sustainable development of LIS education. However, a proactive strategy is crucial in this situation.

Conclusion

This paper examines sustainable development of LIS education in Nigeria in the 21st century. It traces the historical development of LIS education in Nigeria. The paper also discusses the salient strategies for sustainable development of LIS education and stresses that coordinated efforts by LIS schools and their sponsoring bodies are crucial to the attainment of sustainable development of LIS education in Nigeria. Additionally, sustainable development is presently generating global attention and interest and some of the sustainable development goals are critical to the sustainability and survival of LIS education in Nigeria. Therefore, if sustainable development of LIS education is to be guaranteed, emphasis should be given by the LIS schools and their sponsoring authorities for the establishment of viable environment for LIS education through overcoming the identified challenges inherent in LIS education so as to realize its sustainable development. Hence, action and transformation need to be constant and dynamic in order to achieve sustainable development of education for librarianship. This paper concludes by emphasizing that refurbishing and repositioning of LIS education in Nigeria has become inevitable if significant progress is to be made in ensuring sustainability of LIS education in this age of global competitiveness.

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TACKLING THE CHALLENGES OF PLAGIARISM IN THE AGE OF INFORMATION OVERLOAD BY LIS PROFESSIONALS IN NIGERIAN ACADEMIC INSTITUTIONS

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Abstract

The advancement in information and communication technologies (ICTs) has enabled a global surge in the generation and dissemination of information. This has created remarkable shift from the previous promulgation of information explosion to the concept of information overload in this age, which seems to be characterised by ease of intellectual theft in various forms. Studies have shown that the sophistication of ICTs and the overwhelming availability of information have subjected many research outputs to the affliction of 'copy-and-paste' syndrome and copyright abuse; and there appears to be dearth of literature on efforts being made by LIS professionals to tackle the challenges in Nigerian academic institutions. This study, therefore, sought to draw attention to how the challenges of plagiarism are tackled by LIS professionals in the age of information overload in Nigerian academic institutions. The study adopted phenomenological research design of qualitative methodology, using interview survey which was developed and conducted electronically; and analysed using thematic analysis. Findings from the study revealed high level of plagiarism and moderate level of engagement of curbing the menace by LIS professionals. The study recommends that information literacy and academic writing be incorporated as core courses in LIS schools and for non-LIS members, in order to equip researchers with requisite skills for producing academic works that are of high quality and free from plagiarism, especially in this age of information overload.

Keywords: Copyright; Information Overload, LIS Professionals, Plagiarism; Nigeria

Introduction

Library and information science (LIS) professionals have over the ages been vanguards in providing people-oriented services. These services have facilitated preservation and transmission of human knowledge between people of diverse communities and from one generation to another. Yet, there have been emerging challenges that accompany the operational processes of these services; which have been increased by the continuous advancement in information and communication technologies (ICTs).

Carroll (2012) argues that ICTs have been disruptive such that the means by which information functions are carried out have changed radically. While LIS professionals have been making frantic efforts to enhance clientele's accessibility and use of information in various formats at the right time, the soaring amount of information being generated globally has become a

challenge. Extant human activities in various sectors have been affected by data deluge which has been more than before. Alexander et al. (2016) state that societal knowledge in scholarly and non-scholarly forms has long surpassed the cognitive limits of the individual human's mind. This has invariably given birth to the *information overload* phenomenon – not a new phenomenon, but with a new degree and form.

The information overload phenomenon means greater creation, generation and production of information than the human community can absorb. Due to the overabundance of information, there have been easy ways to lay claim to other people's intellectual property without adequate acknowledgement; and this is a challenge to LIS professionals. Hoq (2014) notes that information overload is a major cause of concern for LIS professionals and information users. Hoq claims people are suffering from an 'information glut', which makes it difficult for them to find the required information quickly and conveniently from various print, electronic and online sources. However, this claim can be furthered by the challenge posed by the 'copy and paste' syndrome; whereby online users especially, would take credit for other people's intellectual works.

The foregoing depicts LIS professionals need to always add new skill sets, especially technology driven skills, in order to stay up on the disruptive changes brought by ICTs and the accompanying challenges. This age of information overload has indeed facilitated plagiarism; and LIS professionals as custodians of human knowledge in enhancing human progress, have significant roles to play in tackling plagiarism. Importantly, the new dimensions that characterise this age call for new perspectives and approaches to tackle the challenges of plagiarism. This study, therefore, examines how LIS professionals tackle the challenge of plagiarism in the age of information overload in Nigeria.

Statement of the Problem

Plagiarism is a challenge that robs intellectual property owners of socioeconomic benefits and scholarly recognition. The menace has gained momentum with the overabundance of information on the internet and in various digital formats; which according to Hoq (2012) creates unique problems such that the global community is challenged by rational and ethical use of information. Amidst campaigns for open access to information and globalisation of knowledge which come with peculiar changes, especially in the online community, there have been frightening cases of plagiarism which make these researchers wonder that, perhaps, information users in the age of information overload may have different perception about intellectual property. Notably, the 'copy and paste' syndrome spreads like wildfire in harmattan such that no scholarly publication might have, directly or indirectly, been spared of the menace of plagiarism. Nelms (2012), for instance, stated that McCabe and Trevino disclosed in their report that 84% of students admitted to having plagiarized at least once. In Nigeria, despite efforts being made to tackle this menace by management of tertiary institutions, the results have not been commensurate as there are still alarming cases of plagiarism reported on a regular basis (Omonijo et al., 2017; Maina, Maina, & Jauro 2014). Likewise, online literature search revealed that most publications on plagiarism have focused largely on students while LIS professionals who are key stakeholders in accessing information resources in academic settings have not been duly studied. Particularly, with the pervasive concerns caused by information overload, there is need to highlight what efforts, mechanisms and tools are being used by LIS professionals in tackling the challenge of plagiarism in Nigeria. This is what the study seeks to examine.

Research Questions

This study will be guided by following research questions:

1. What is the level of encounters of LIS professionals with plagiarism in Nigerian academic institutions?
2. What is the level of engagement of LIS professionals in tackling plagiarism in Nigerian academic institutions?
3. What are the factors of information overload that facilitate plagiarism in Nigerian academic institutions?
4. What are the mechanisms to tackle plagiarism by LIS professionals in Nigerian academic institutions?
5. What are the tools to tackle plagiarism by LIS professionals in Nigerian academic institutions?
6. What challenges are faced by LIS professionals in tackling plagiarism in Nigerian academic institutions?

Literature Review

Plagiarism has been a global challenge which undermines academic integrity and robs academics and scholars of due recognition and benefits from their intellectual ideas and property. Academic institutions exist to generate knowledge which can stimulate human progress and enhance socioeconomic development. These institutions facilitate human development, through creation/generation, preservation and dissemination of knowledge for societal survival (Olutola, 2016; Jason and Dietz, 2011). In a bid to achieve societal development, academics, researchers and students in the academia engage in research; taking and harmonising ideas from others to make impacting findings. However, many of these research activities have over the ages been characterised by intellectual fraud and dishonesty as some members of the academia have been enmeshed in the web of plagiarism (Olutola, 2016).

There has been no universal definition of plagiarism; yet, it has been recognised globally as a notable intellectual menace. Maina, Maina and Jauro (2014) note that plagiarism, the act of stealing, passing off and using others' ideas, words or works as one's without acknowledging and crediting the source, is a pervasive dishonesty which seriously undermines academic integrity globally. Plagiarism means the adoption and usage of ideas, thoughts, writings/texts, computer programs, inventions, data, analyses, argumentations, pictures, techniques, tables and figures not generated from primary data but derived from other sources, as one's without making proper acknowledgment of the sources of the work (Onuoha and Ikonne, 2013; Abioye, 2016). Although there are other scholarly fraud issues in the academia, but the unceasing upsurge of plagiarism among students, academics and researchers in many tertiary institutions across the globe, makes it the most common and troubling problem in the academic world (Awasthi, 2019; Singh and Guram, 2014; Bretag, 2013; Shahabuddin, 2009 cited in Olutola, 2016). Plagiarism is an academic crime (Oyewole and Abioye, 2018); while according to Khan (2016), plagiarism depicts breach of academic integrity which is believed to lessen or sometimes eliminate the real value of scholarly publications.

Plagiarism, summarily, can be regarded as the intentional or unintentional, total or partial lifting, paraphrasing, modification, and usage of other people's intellectual property (in any format) without giving due credit, acknowledgement or recognition to the original owners or sources. Plagiarism could be intention or unintentional; although there have been divergent scholarly views about this assertion. Orim (2014) while citing Coventry University notes that intentional plagiarism stems from the deliberate reproduction or use of another person's work without acknowledgement; while unintentional could be as a result of poor academic practice. The latter, however, has

consequent effects on the quality of intellectual output of the plagiarists, particularly students. This is the argument of Gullifer and Tyson (2010), that plagiarism does not only bypass learning but produces incompetent graduates whose lack of skills may pose potential threats to societal development through the provision of inaccurate knowledge at different levels.

The challenge of plagiarism in Nigerian academic institutions continues to soar, despite efforts being made by various stakeholders in the education system to curb the menace. Olutola (2016) states that the upsurge in cases of plagiarism in Nigerian academic institutions is one of the factors that necessitated the partnership between the Committee of Vice-Chancellors of Nigerian Universities (CVC) and Turnitin Incorporation – an organisation that specialises in the production of plagiarism detection software, to establish an institutional plagiarism mitigation system in the nation. Nonetheless, several studies have shown that scholarly debates on an enduring panacea to plagiarism have not ceased due to the challenge it poses, especially with the global shift from information explosion to information overload (Onuoha and Ikonne, 2013; Orim, Davies, Borg, & Glendinning, 2013; Onwubiko, 2012; Babalola, 2012; Adebayo, 2011).

Different factors have been identified in several studies as the causes of plagiarism in academic institutions. The causes found and highlighted in some of these studies include: lack of academic writing skills; improper time management; and the proliferation of ICTs which has led to information overload and become influential to the easy accessibility of information resources on the internet, for copy-and-paste syndrome (Harji et al., 2017; Polona et al., 2017). The proliferation of ICTs has indeed facilitated access to abundant information, especially in digital and electronic formats. This means there is overwhelming, available information for the human minds to absorb; hence, the academia – a subset of the global community, has become subject to the phenomenon of information overload. Oyewole and Abioye (2018) argue that the propensity of plagiarism has really become high due to the ease with which hundreds of electronic documents can be downloaded on the Internet through search engines. Likewise, these factors which cause information overload, directly or indirectly, have effects researchers' the inclination towards plagiarism. These factors as identified by Eppler and Menjies in Hoq (2014) are: too much information; difficulty in managing information; multiplicity of sources of information; lack of time to understand information; and irrelevance or unimportance of information.

Occasionally, these factors seem to create beautiful deceit in the minds of some researchers who engage in plagiarism, thinking that since the internet is overwhelmed with information, they could easily lay claim to others' intellectual property without being caught. Alternatively, some researchers have become guilty of plagiarism not just because they lack time to find and grasp the right information; but also due to lack of requisite information literacy skills, i.e. accessing, retrieving and managing relevant information from multiple sources. This is aside the dearth of formal courses in LIS schools which emphasise information ethics as a mechanism to forestall copyright abuse, amidst other realms.

Specifically, these researchers note that while most Nigerian higher institutions offer courses in Research Method(ology) at various levels, there have not been courses dedicated to academic writing; whereas it remains one of the ways through which students are evaluated in academic institutions before graduation. This lack of requisite academic writing skills has been an influential factor for the high cases of plagiarism and why a significant number of academics, researchers and students have been predisposed to the menace (Obinna, 2012; Orim et al., 2013; Olutola, 2016). The situation is worsened in this age of information overload because being overwhelmed by information stimulates indolence especially by those lacking information searching skills; as many result to plagiarism. More so, some researchers in the academia are unmindful of copyright abuse. The problem of plagiarism, according to Wahid (2011), could potentially result from uncertainties or lack of copyright awareness of users.

However, LIS professionals have invaluable roles to play in tackling the challenges of plagiarism. While there has been reliance on detective software to curb plagiarism in academic institutions, there are limitations to these software; hence, Olutola (2016) argues that there should be a shift from total reliance on plagiarism software to assertive and sustained training on scholarly writings nested within related curricula of various academic institutions. To achieve this in Nigerian academic institutions would be impossible without valuable inputs from LIS professionals. Importantly, the roles of LIS professionals should manifest in this age in many ways such as training other academics, scholars, researchers and students on information literacy skills, the rudiments of citation and bibliographic techniques, and information ethics. For instance, ethics was incorporated into a core business class where students were surveyed with a pre- and posttest to determine whether students completing the course would demonstrate more ethical judgments than those who did not complete the course. Findings from the study revealed that ethics can change an individual's ability to reason ethically; suggesting that incorporating ethics instruction into a discipline can lead to ethical judgment against plagiarism (Cloninger and Selvarajan, 2010).

Furthermore, to increase awareness about what constitutes plagiarism in this age of information overload, LIS professionals with requisite ICT skills have been noted to create physical instructions or tutorials on web-pages, thereby tactically incorporating plagiarism information into library instruction sessions (Maxymuk, Lampert, cited in Strittmatter & Bratton, 2014). Highlighting the roles of LIS professionals in tackling plagiarism, Gibson and Chester-Fangman (2011) in a survey found that 46 percent indicated that they had worked with at least one instructor to design an effective assignment during the course of an academic year; and that approximately 75 percent incorporated plagiarism information into library instruction sessions. Likewise, Madray (2007) cited in Strittmatter & Bratton (2014) states that LIS professionals at Long Island University, United States, incorporated plagiarism instruction into library instruction programmes, and evaluated the effectiveness of the instruction on students through a pre- and posttest survey. Findings from the posttest survey showed that students were better able to identify when plagiarism occurred, increasing from 73 to 97 percent); were better informed about what plagiarism is, from 49 to 89 percent; were better able to cite Internet sources, from 31 to 44 percent; and had a better understanding of the significant effects and penalties associated with plagiarism, from 26 to 88 percent.

Methodology

This study adopts phenomenological research design of qualitative methods. The design has been chosen to enable the researchers get the respondents' experiences and opinions about the challenges of plagiarism vis-à-vis the age of information overload. The respondents for this study comprised LIS professionals (i.e. librarians, information scientists and academics in library schools) from the six geopolitical zones in Nigeria. Semi-structured interview, which was developed and conducted electronically, was the main instrument of data collection; and findings from data collected were complemented with review of relevant literature on the phenomena being examined. The data collected were presented and discussed based on thematic analysis.

Discussion of Findings

Research findings from this study were analysed using steps identified in the thematic analysis approach of Braun and Clarke (2012). The researchers engaged in thorough familiarisation to coding, generating, reviewing and naming themes that were identified from the qualitative data elicited from respondents. The themes identified from the findings were: *High Level of Plagiarism; Moderate Level of Engagement by LIS Professionals; Academic Pressure, Internet and Lack of Knowledge; Advocacy, Sensitization, Information Literacy and User Education; Institutionalization*

of Plagiarism Detection Software and Penalties; Publish or Perish Syndrome, Copyright Infringement and Low Ratings of Academic Institutions; and Information Management, Consultancy and Review of LIS Curriculum.

The interview which was conducted online had 45 participants. Most of those interviewed were mainly academics/lecturers in LIS, majority of whom had obtained doctorate degree and had averagely been in professional practice for 10 years, across the six geopolitical zones in Nigeria. This shows that majority of the interviewees had sufficient experience about issues relating to plagiarism and how it can be tackled in the age of information overload.

High Level of Plagiarism

Majority of the LIS professionals revealed that they had high level of encounter with plagiarism in Nigerian academic institutions. This was evident in LIS professionals' views that plagiarism was 'very high', 'quite high', 'a lot', 'rampant', 'almost always', 'often' and 'prevalent'. The interviews confirmed that plagiarism pervades academic institution. Specifically, one LIS professional stated that "it is indeed a great challenge that has eaten deep into the system"; while another claimed that "plagiarism is found in about 70% of published works, could appear in any form, whether not properly cited, referenced or slightly paraphrased and claimed".

Moderate Level of Engagement by LIS Professionals

Although encounters with plagiarism were high, findings, however, revealed that the level of engagement in curbing the menace by LIS professionals was moderate. While a few LIS professionals had high level of engagement in fighting plagiarism, majority of them stated that their engagement with plagiarism was 'low', 'moderate', 'medium', 'some extent' or 'fair'.

Academic Pressure, Internet and Lack of Knowledge

The factors that facilitate plagiarism, according LIS professionals, were many. Meanwhile, responses showed that academic pressure, internet and lack of knowledge, were notable factors. Students work under pressure from supervisors to meet deadlines at different levels in academic institutions; thereby usually goaded to engage in 'copy-and-paste' in order to graduate. On the other hand, some academics and researchers work under pressure to combine academic works like teaching; but are handicapped by inadequate time to carry out original research. But the ubiquitous '*publish or perish syndrome*' makes some to engage in plagiarism.

Likewise, the internet has become so overloaded with information that users have become lazier to read or take time to analyse, digest and or develop others' ideas based on what had been read. This is worsened by easy access to search engines on the internet and availability of social media networks through which information is disseminated in unquantifiable amount.

This is compounded by the lack of knowledge in many areas which could help to prevent plagiarism, such as lack of information management skills; information literacy and retrieval skills; ignorance of laws against plagiarism; inability to identify prevalent predatory journals with little or no review policy and process; and lack of academic writings skills.

Advocacy, Sensitization, Information Literacy and User Education

The mechanisms that have been adopted by LIS professionals to curb plagiarism varied. Some of these mechanisms were advocacy for proper citation and referencing among researchers to help acknowledge intellectual property owners. Sensitization during lectures/seminars/workshops, library and or institutional orientations had also been used by some LIS professionals to raise awareness about the negative effects of plagiarism.

LIS professionals, however, emphasised that information literacy has been key to equipping researchers, especially in this age of information overload, to avoid plagiarism. Likewise,

user education in academic libraries, has been identified as viable mechanism to acquaint researchers with the right attitudes toward using information resources in their various formats for academic and research purposes. Furthermore, some LIS professionals engaged in teaching *Research Methodology* also emphasised information ethics as preventive mechanism against plagiarism.

Institutionalization of Plagiarism Detection Software and Penalties

LIS professionals identified ICTs, closed circuit television (CCTV) in libraries, and plagiarism detection software such as turn-it-in, grammarly, dupplichecker, etc. as viable tools to spot and prevent plagiarism in Nigerian academic institutions. Nonetheless, some LIS professionals argued that penalties such as rejection of plagiarized academic works or publications and demotion of defaulters should be encouraged.

Publish or Perish Syndrome, Copyright Infringement and Low Ratings of Academic Institutions

The major challenges highlighted by LIS professionals were the ‘publish or perish’ syndrome, copyright infringement and low ratings of Nigerian academic institutions. The ‘*publish or perish*’ syndrome has become pervasive in the academia and led many academics who desire promotion without adequate, original research, to embrace plagiarizing other people’s publications. This syndrome has equally made copyright infringement very easy. Likewise, the dearth of publications with high quality and originality, which are free from plagiarism, has been a challenge to the invisibility or low rankings of many Nigerian academic institutions in the global community. Furthermore, poor knowledge of literature search, the copy-and-paste tendency, unavailability of research works on institutional repositories, and difficulty of detecting plagiarism amidst vast publications on the internet, were also stated as challenges.

Information Management, Consultancy and Review of LIS Curriculum

Despite the challenges, LIS professionals were noted to have high prospects in tackling plagiarism in this age of information overload, playing active roles as ‘information managers’ who are critical and analytical thinkers; ‘anti-plagiarism consultants’ with expertise in stemming the tides of plagiarism; teaching systematic reviews of information resources in diverse formats; guiding researchers as ‘reliable information disseminators’ whose ICT proficiencies and information literacy skills can stimulate ethical adherence to proper citations and acknowledgement of intellectual property rights owners.

Importantly, LIS professionals were identified to have prospects to review LIS curriculum in Nigerian academic institutions to usher accommodate emerging trends about intellectual property, copyrights in digital communities and age of information overload, information literacy and information ethics.

Conclusion and Recommendations

This study has further established that plagiarism is high in Nigerian academic institutions; although LIS professionals’ engagement in tackling the challenge in this age of information overload has not been adequate enough. The high level of plagiarism in this age has been characterised by the overwhelming abundance of information resources on the internet; common copy-and-paste tendency; academic pressure; publish or perish syndrome; lack of information literacy and academic writing skills; ubiquitous dearth of ethical compliance to copyright regulations; etc.

However, the rise in plagiarism underscores the prospects of LIS professionals whose potentials as information managers can be harnessed to curb the menace. Specifically, LIS professionals have been noted to be critical and analytical thinkers who can serve as anti-plagiarism

checkers and consultants. More so, the continuous acquisition of ICT skills by LIS professionals brings to fore their expertise to spot, curtail and deter other members in the academia from plagiarism.

Consequently, based on research findings of this study, the following recommendations are made:

- The use of plagiarism detection software should be fully adopted in all academic institutions in Nigeria; and staff should be trained on the peculiarities of each type and how it can be used to curtail the upsurge in plagiarism.
- Information literacy should be a core course across all levels in library schools and be incorporated into general studies programmes (GES/GSP/GNS) for non-LIS students. This will equip students with relevant skills to access, retrieve, manage and use information in all formats, rightly, whether online or offline.
- The LIS curriculum should be reviewed to integrate Information Ethics and Academic Writing as core courses. Particularly, these researchers note that Creative Writing has been a real course taken by those in the Arts and Humanities; therefore, a case is being made for Academic Writing as a core course for students at all levels in the academia. Alternatively, Research Method(ology) could be reviewed to incorporate Academic Writing into it. This will expose members in the academia to the nitty-gritty of producing academic works of high quality which are free from plagiarism.
- The National Association of Library and Information Science Educators (NALISE) as a strategic interest group under the Nigerian Library Association (NLA) should initiate, stimulate and facilitate the creation of a postgraduate programme in Intellectual Property Rights. This has hitherto been exclusive to Master's of Law (LLM) in most universities; whereas LIS professionals as custodians of information and human knowledge need to be grounded in this realm. As a specialisation in graduate schools, the programme will broaden the understanding of LIS professionals on copyrights, plagiarism and related issues; thereby equipping them theoretical underpinnings that can be demonstrated during professional practice. Meanwhile, LIS students undertaking the programme can take the legal aspects at the respective institution's Faculty of Law.
- LIS professionals should continuously acquire and enhance their ICT skills in order to be more engaged in detecting, preventing and raising awareness about plagiarism in Nigerian academic institutions. More so, these ICT skills will make them more relevant in this age of information overload.

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INFONOMICS IN 21st CENTURY ACADEMIC LIBRARY SERVICES: MYTH OR REALITY?

Celina Jummai Nongo

Abstract

This paper focuses on theoretical review based on previous research on how information dissemination in academic library is accentuated due to manual tools usage amidst a trending 21st Century technological evolution giving rise to mythologies and realities of inadequacies. The era of millennials requires the application of infonomics, together with competent staff to provide effective service delivery in disseminating information. This in turn holds great worth and value for users in the academic environment in the satisfaction of their information needs. Recommendation made include the need for the inclusion of infonomics in academic library services, in order to capture that worth of effective and efficient value in information dissemination to the millennials.

Keywords: *Academic Library, Services, infonomics, Mythologies*

Introduction

An academic library is a library that is attached to a tertiary education institution and serves two complementary purposes: to support the curriculum, and to support the research of the faculty and students. Today's students belong to the generation known as the millennials. It is worrisome when an academic library in the 21st century would have inadequate policies and staff capacity in disseminating intellectual information services to millennials. Academic Librarians are saddled with the responsibility of providing efficient services to the teeming students in this era of technology. Therefore, they have to contend with the issue of their own competencies and the policies guiding their operations.

The millennials are no doubt digitally compliant in using and operating digital phones, interacting online social platforms, in fact, they have embraced technological innovation which broadens their knowledge on easy accessibility of information (Aghadiuno 2019). This is as a result of the 21st century dimension of the evolutionary digital library services. Academic libraries in Benue State need to be vast in use of these innovative technologies, such that infonomics value is domesticated unequivocally while, transacting information services within the academic library interface with clientele (Nongo, Ubagu & Adejo 2020).

Arguments on the place of infonomics in academic libraries bring to the fore what infonomics is all about. According to (Regazzi, 2013) the term infonomics meant an underlying value of information regarding its production, market, demand and economic impact. Infonomics simply coined is the economics of information. It is assumed that generated data is valid when it is used in decision-making; infonomics says that, information should be considered as an asset (Laney, 2012). Another definition of infonomics states that:

“Infonomics” is everything one always wanted to know about how to treat and benefit from information as an actual corporate asset, but did not even know how or what to ask. Infonomics an emerging discipline of using quality and managing information as a valuable business asset has revolutionised the way information is looked at in contemporary times. (Nwosu & Obinyan 2019).

The 21st century experienced influx of information such that infodemic, misinformation and disinformation trends. The term “21st century” is said to be evasive as it is difficult to designate or explain because many writers have described its variegation. Dike, Odiwe and Ehujor (2015) opined that the profound social and economic changes and the new realities occurring today is that of transformations and changes which has witnessed one of the most dramatic technological revolutions in human history. However, 21st century infonomics mythologies is a period of lump some of information service challenges and an increase in effective productivity by the library staff is paramount. The purpose of this paper therefore is to contribute to the basic understanding of the concepts of value for information dissemination in academic libraries as well as value for the library holdings. It will add new insights into the diverse and dynamic fields of librarianship and management practices in the academic libraries.

Concept and Principles of Infonomics

Infonomics is an emerging concept in the field of Library and Information Science. Gartner (2020), provided a model of infonomics as shown below:

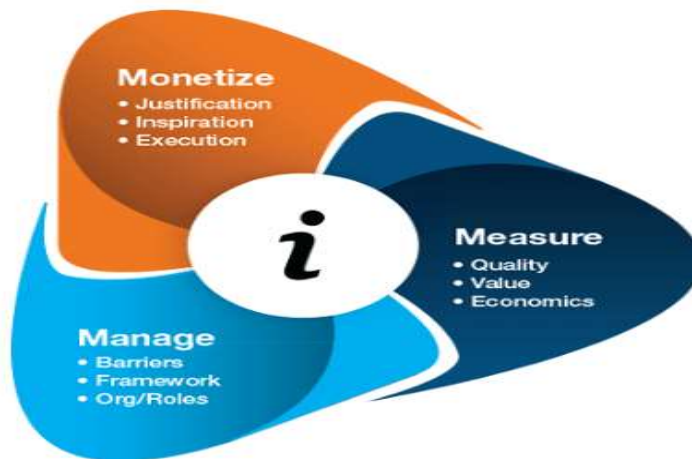


Fig 1. Infonomics Model Gartner (2020)

The diagram above shows major 3 M's in the Infonomics Model which are simply; Monetize, Measure, and Manage information. Librarians should take steps in applying the following action into their library management policies which would enable value on informational material as an asset in academic libraries;

a) **Monetize**: This model is the hub of an established library management with an inspiration to satisfying literary needs of the university community. Its justification of utilization and availability is regulated by the National University Commission at scheduled accreditation visits. Their quality assurance checks proffer accurate budgeting and benchmarking of necessary tools and materials required in an academic library. Information therefore has potential and realized value, its definitive value even not in use, has probable future economic value.

b) **Measure**: This model refers to building library inventories, consumables inclusive from all sources, both vertical and horizontal flow of communication to span through all faculties in the university. Information generated from these sources build data literacy for future planning and coordination of necessary information requirements. Infonomics deems that, organizations acknowledge the fact that information is more than merely a resource and it is regarded as a quantifiable asset.

c) **Manage**: This last aspect of the model requires organisational roles and policies to manage procedures and practices of utilization of informational assets. There are library rules and regulations guiding all the framework in information dissemination. Library management at this level has established goals and objectives in line with the institutional mission. This rules covers revenue drive achieved from dues and charges though meager levies as stipulated in the library policies. Library automation in the 21st century is related to infonomics valuation exercise typically disclosed the need to repackage and deploy information through automation such as library integrated system to garner baseline benefits through improving library collection, management and usage.

There are two primary perspectives to valuating information as an asset. They are; fundamental information valuation and financial information valuation approach which were enumerated by Laney (2015) as shown in figure 2 below.

- * The leading indicators of information value are; Intrinsic value of information [IVI] and Cost value of information [CVI].
- * Improving information management: Requires Business value of information [BVI].
- * Improving information into economic benefits: These are Marketing value of information [MVI].
- * The trailing indicators for information value are; Performance value of information [PVI] and Economic value of information [EVI].

Selecting an Information Valuation Method



From *Why and How to Measure the Value of Your Information Assets* (G0027792), Douglas Laney, August 2015

Gartner

Figure 2 Information valuation method.

What then is the objective of valuating information in an academic library:

- i. The purpose is to determine what and where information materials need to be acquired for in order to achieve library vision and mission objectively.
- ii. It also avoids irrational decision of performance among users assessing acquired materials for the purpose of their academic excellence.
- iii. The purpose of valuating information in an academic library enables benchmarking using measurement of policies of acquisition which could be streamlined by ratio policies, collection development, information dissemination programme and strategies in comparison with standardized guidelines by the NUC which is the regulatory system and
- iv. Reverentially of note is the fact that, Gross Domestic Product (GDP) is calculated to account for data, there has been no progress made in information valuation up to date.

Academic Library Services in the 21st Century

Academic libraries are designed to serve literally curriculum based information resources acquisition for the entire higher education system. The 21st century university system has witnessed milestone developments and this has been phenomenal. The existence of the universities helped a nation in giving its economic vitality, scientific prowess, a broad outline of social change and global competitiveness, through innovation and research. In the Nigerian context, expectations are high on university graduates of this era in perspective to serve as catalysts for social-economic and technological transformation for further advancement in our various states in the country (Saliu 2014).

Academic libraries use web based services to inform their users of library news and developments in such a way that resembles the "news service" that many libraries still have and offer today, often in collaboration with the RSS service: notices for instance, changes to the library's schedule, new acquisitions, library renovations, exhibitions, etc Xu, Fenfei, and Heting (2009) surveyed the web sites of 81 academic libraries in New York State and concluded that instant messaging (IM) is the most popular choice with an adoption rate of 42% and podcast is the least popular with 2% uptake. Radford and Kern (2006) survey reported that, instant messaging can be a useful tool for academic libraries, especially in relation to reference services. There are arguments that this service can be inefficient or inappropriate for some libraries because of limited funds, low volume of use, technical inefficiencies and staffing problems; issues that lead, in some cases, to the decision to discontinue its use. However, infonomics as an emerging discipline is applied to the disciplines of measuring the value of assets; it also includes the process of commercializing data to create value. Invariably, the value of information is in the eye of the consumer (students/lecturers/users/clientele) who finds the information useful. In other words, it is how information is used, that ultimately determines its value. Therefore, by this perception of the Librarian, the equation of this informational value is subjective.

Furthermore, the discipline (infonomics) takes data generated in libraries as a competitive edge to drive growth in acquisition of materials, distribution and evaluation of those information which were distributed into the various respective shelves in an academic library, by that act, it intensifies valuating and treating information as an asset. Ifidon and Ifidon (2007) equally observed that supervisors in the library are the key communicators due to the departmentalization practised in academic libraries.

Infonomics in Academic Library Services: Myth or Reality?

The term myth is widely used and it implies that a story is not objectively true, its' identification of a narrative as a myth can be highly political. Mythology, may either refer to the study of myths in general, or a body of myths regarding a particular subject. The comparative mythology are the comparisons of bodies of myth (VonFranz, 2017). However, the 21st century has witnessed a continuous trend of mining traditional mythology to frame modern plots. Most authors usually use mythology as a basis for their books (Mead, 2014).

Mythology of information services in academic libraries and the description of these mythologies experienced in this era are, activities such as selection, acquisition, collection, organization and dissemination of programmes and facilities by which information is made available for use. In perspective, public relations skills by librarians attending to millennials information needs, should apply emotional intelligence to avoid arrant misgivings in communication and body language during and about disseminating information delivery in an academic library which may affect the librarian or library officer to a state of doldrums. Communication skills is an assuage to such unwarranted encounter especially with an in-experience staffer who lacks a good communication skill as well as technical skill in a trending technological evolution in library services in the 21st era.

Infonomics is based on the idea that information is an enterprise asset and shall be accounted and managed as such. According to Nwosu and Obinyan (2019) innovations by researchers are based on the information which was used and has always been the valuable assets for those who possess it. This assertion relates to economics. Inadvertently, the emergence of the millennial era defines how technology is used and evolving in academic libraries. How do we serve these millennials without hitches in this era of globalized digitally literate environment in academic library while approaching our services with an infonomics value. Knowledge gained in library utilization have become the most important currency for productivity. Data generation increases wealth and prosperity (Akomolafe 2012). Those are the indicators of infonomics within an academic library.

What then is the impact assessment of infonomics to librarianship functions? It is obvious that, infonomics is trending, it enforces an intrinsic value for information as an asset which is duly handled during the act of charging and discharging, disseminating information services such as Selective Dissemination of Information (SDI) and Computerized Dissemination of Information (CDI) in academic libraries as well as reference services. This function is basically domiciled at the librarians' officers' desk who provides services or interfaces with users at circulation, information literacy, serials and respective faculty libraries in the university libraries. He or she is expected to be well rounded in library education and materially equipage to guarantee sufficient self confidence. Impact assessment of infonomics therefore, requires a competent librarian with cognitive skills in public relations for qualitative information service delivery to clients in academic libraries. In summary, it is clearly a difficult matter for the librarian to survive in this age of contemporary technologies, if he or she cannot operate some of the hand held devices to offer online library services. A deficiency on technological and digital competence becomes a challenge for the librarian accessing electronic databases.

Conclusion

This paper has illustrated a model of infonomics its different approach in valuating information regarding fundamental and financial approaches. These have provided an evaluation of the services that have been gradually increasing in academic libraries using the library integrated systems. Very critical is the need to accord value to all library materials more importantly and consistently engaged with trending library activities online such as e-conferences and e- workshops so as to be abreast with the new normal in library service delivery in academic libraries.

Recommendation

The trend in use of technology to disseminate effective and efficient information in an academic library is indeed evolving. Although a challenge has emerged in how to accurately measure productivity of librarians in the digital space to the millennial Nevertheless, this area, is also inculcated in some of the integrated library system module to check excesses of staffers by a supervisory librarian digitally. Therefore this paper recommends;

- i. On the Job training and retraining of library integrated systems to every section of the library, this will enable librarians acquire skills and competences to serve information demands of the millenarian.
- ii. Infonomics as an asset trending value for information should be imbibed in academic libraries. It enhances generation of data which in turn improves benchmarking activities or programmes. Particularly, emphasis information as an economic asset which can be owned and controlled as well as being exchanged for cash at times of loss or mutilation and
- iii. Objective vision actualization of scholarship is recognized globally and it accords standard ratings to such tertiary institution.

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RETHINKING ICT-BASED LIBRARY EXTENSION SERVICES FOR INFORMATION ACCESS IN COVID19 PANDEMIC AND POST PANDEMIC ERA IN NIGERIA

Auwalu Dansale Yahaya
Bappah Magaji Abubakar
Yahaya Ibrahim Harande

Abstract

The importance of Information and Communication Technologies in information dissemination cannot be over emphasized, especially now that educational institutions including libraries around the globe have been mandated to switch to online methods to satisfy users while staying at home. To this effect, this paper discusses the importance of enhancing ICT-Based Library extension services as a necessity in bridging the gap of information access especially in this era of corona virus pandemic, to allow user services halted by the emergence of the pandemic. The paper also highlights some of the negative impacts of COVID-19 on library services and proffers solutions to be applied in the current pandemic era as well as after the period, to enable our libraries maintain a permanent position with or without emergencies.

Keywords: *ICTs-Based, Library Extension services, Pandemic Era, COVID-19*

Introduction

Information and Communications Technologies (ICTs) encompass a range of rapidly evolving technologies and they include telecommunication technologies (telephony, cable, satellite, TV and radio, computer-mediated conferencing, video conferencing) as well as digital technologies (computers, information networks (internet, World Wide Web, intranets and extranets) and software applications (Chisenga, 2006). Nworgu (2006) attributes ICT as a broad technology that gives support to the creation, storage, manipulation, retrieval, and communication of information using computers and telecommunication. Hussain & Lavanya (2014), added that ICT has a great importance in each and every sphere of life; now libraries are not left apart.

The emergence of novel Corona Virus Disease (COVID-19) necessitated the immediate closure of our academic institutions including libraries located in our campuses and also sending billions of students into lockdown. As described by Folorunso-Gasper, (2020) all the government of the world had cogent reasons to shut down their country's national institutions and organizations because of this unforeseen malady. The Libraries and educational institutions were not left out of this closure. Therefore, it is imperative for library professionals to rethink library extension services

with the aid of modern technological media. As emphasized by Aibinu (2020) the COVID-19 pandemic has revealed vulnerabilities which can be corrected with the use of IT tools.

The world has been addressing the unprecedented challenges brought on by Covid19 pandemic. Therefore, librarians as information professional, should be responsive to all users regardless of the channel they choose because they need to feel valued and continue patronizing your library even after the pandemic (Folorunso-Gasper, 2020).

The extension service could be seen as an outreach programme which aims at providing the information needs of people outside any library establishment. Integration of ICTs for such library services motivated Folorunso-Gasper (2020) to state that libraries should consider this an opportunity to deliver relevant, timely information that solves users' immediate and long-term challenges.

Concept of Information and Communication Technologies (ICTs)

Information and Communication Technology according to Haruna (2020) encompasses process of transferring knowledge and ideas across different fields of study using electronic devices. The term "Information and communication technologies "(ICTs) is defined as a diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information (Blurton 1999). Information and Communication Technology according to Nigeria's National Policy for Information Technology (FRN 2001), is any equipment or interconnected system or subsystem of equipment that is used in the automatic acquisition, storage, manipulation, management, control, display, switching, interchange, transmission or reception of data or information.

Ali (2004) described ICT as the scientific tool and techniques for developing, documenting and communicating information when needed, especially as they concern solving problems, providing needed services in the various areas of human endeavours. The concept of ICT is viewed as the term used to describe the tools and processes used to access, retrieve, store, organize, manipulate, produce, present and exchange information by electronic and other automated means. These include hardware, software and telecommunications in the forms of personal computers, scanners, digital cameras, handhelds/PDAs, phones, faxes, modems, CD and DVD players and recorders, digitalized video, radio and TV and programmes like database systems and multimedia applications.

The Need for the Promotion of ICT-Based Library Extension Services

Libraries in Nigeria have always been plagued with lots of challenges before the advent of COVID-19 pandemic. These challenges range from space problem, opening and closing hour services that start and stop at the end of the allotted time, unavailability of adequate number of information facilities/equipment, unreasonably high number of students, far above the capacity of the library buildings among others. These challenges have led to many issues affecting the overall quality of information services provision

Libraries in Nigeria majorly feature physical interactions and the minimal use of technology as a service aid. However, the global pandemic caused by the novel corona virus (COVID-19) has led to the general lockdown of all institutions of learning thereby affecting the operations of academic libraries. Thus making it a bit challenging for information services to take place from the main library building with a physical meeting between the library staff and users. In response to this, Folorunso-Gasper, (2020) opined that the lockdown brought to the fore the need for digitized formats of learning and information dissemination.

It has been an experience that, library users' sitting arrangement like in the pre-COVID-19 era is completely unacceptable, despite that large carrels can be unbundled to create smaller

streams. This calls for more helping hands and still more spaces to cope with the large number of streams. This might prove to be an insurmountable task considering the amount of investment and time required for implementation. Therefore, one practical solution is to take advantage of available possibilities associated with ICT learning tools, such as online or e-learning and Virtual learning which may come handy in this aspect (Aibinu, 2020). In corroboration to this, Folorunso-Gasper, (2020) stated that the responsibility to ensure public access to information, provision of authentic, safe, inclusive and effective learning environments during this pandemic and after the Covid-19 pandemic has made it obvious that librarians need to engage users through information communication technology

The various service provided in the libraries are complimented by available facilities, some of which are technology driven. The integration of emerging technologies in libraries worldwide has proved beyond reasonable doubt (Yahaya & Abdullahi, 2017). Folorunso-Gasper, (2020) remarks that libraries should take full advantage of the virtual platforms to translate traditional services into virtual platforms.

The Concept of COVID-19

COVID-19 according to Hussaini (2020) is an infectious disease which was first reported in Wuhan, China in early December, 2019. The World Health Organization (WHO) declared the outbreak as a public concern on the 30th January, 2020 and a pandemic on the 11th March, 2020.

On 27th February, the Federal Ministry of Health confirmed a first coronavirus disease (COVID-19) case in Lagos State, Nigeria (Ihekweazu, 2020). On 23rd March Nigeria Centre for Disease Control (NCDC) announces first recorded Nigerian death from COVID-19 (Ihekweazu, 2020). As pointed out by owoseni (2020) COVID-19 is a catalyst, it accelerates digitization. He further advised an independent learner to:

- a. despite challenges, take responsibilities for your learning
- b. not to lose sight of his signpost and use global learning platforms
- c. use global learning platforms to his advantage
- d. make commitment to learn daily; do something daily about your study

According to Aibinu, (2020), the complete eradication of COVID-19 is not guaranteed in the nearest future although the post COVID-19 era is envisaged as the period in time when life would have assumed a semblance of normalcy.

Strategies for Implementation of ICT-Based Library Extension Services

Most libraries around the world have been providing services remotely to their users. Many of these libraries already had a strong digital presence; many others have now moved to create one in order to continue serving members (Folorunso-Gasper, 2020).

Library tour is a major component of reference services. However, it cannot be conducted using the conventional procedure whereby users are placed in large groups while the coordinator demonstrates to them. The current trend now is moving in the direction of adopting virtual services to demonstrate to users at a distance. Folorunso-Gasper, (2020) advised librarians to their users channel of preference if they are reaching out through social media, respond to them using social media, if their channel preference is email, respect and use that channel.

Folorunso-Gasper, (2020) further highlighted that while we cannot control the societal crisis at hand, we can control our response to it. This is because there are many efforts that can be employed to integrate ICT-based library extension services for the satisfaction of their users.

Moreover, Folorunso-Gasper (2020) identified virtual resources (Free video conferencing tools) for engaging library and information users to include but not limited to the following:

Zoom: These are free video conferencing tools. Offorma (2000) describes video conferencing tool as a means of linking up two or more remote computers, all of which have a small camera attached which enables the participants to see each other, to speak to each other and in some systems, to be able to start, send documents through the linked computer. Zoom technology is compatible with iPhone, BlackBerry, Android, Nokia, and other Windows smartphones.. With the aid of this technology, library users and staff at different locations in the world could be allowed to hold meetings. Some users can post questions/doubts in the zoom, and library extension staff can give an answer to those questions, or correct/revise the existing answers.

Ring Central: Free video conferencing for educators, health-care provider, or non-profit organizations. Such technology overcomes the barriers of space and time and commands a universal audience by geographic spread, income, education, age, sex (Yahaya and Abdullahi, 2017). It makes it possible for thousands of dissimilar physical networks that are not connected to one another and that use diverse hardware technologies to connect and operate as a single communication system. Ring Central can be applied to motivate library users with customized services for book lovers and readers, and inviting them to share experiences through reviews and recommendations.

Vidyard: Free secure video messaging to enhance internal communications. Librarians can use this platform to give users firsthand information on the on-going pandemic crisis and the users can send Instant Messages (IM) on complaints or ask questions on a particular issue and get a feedback on the spot from a large crowd of library expertise.

Loom: Free video recording and sharing service for teachers and students, universities and educational institutions. This technology offers the users, to have equal access to information and share videos, audio, images and written messages. Library staff and users can get connected with subject-matter experts, pressure group associations, and many more.

Discord: Free, enhanced Go Live streaming service so that it can now support 50 simultaneous users rather than 10. It encourages people to contribute so as to have collaborative ideas that will play a pivotal role in satisfying information needs of library users.

BlueJeans: Free access to video conference service to first responders and Non-Governmental Organizations for 90-days. This technology allows library users to participate in online exchanges, contribute user-created content or join online library communities.

Panopto: Free access which enable employees and students to continue learning and working remotely. It also provides access to capture and distribute video content for businesses, universities, colleges and schools.

Dialpad: Free cloud-based phone system which allows video conferences. Through this platform, libraries can organize a conferences inviting users who have successfully enjoyed their services and arouse the interest of other community members on such services.

Jamm: Free audio-visual communication tool used by remote and distributed teams. Through this platform a library user can quickly record videos generated and disseminated by library staff or do a live call with his reference librarians.

ClassTag: Free communication platform available to help districts and schools communicate. messages sent through this are automatically translated into local languages by the web. Library users need to be educated to organize online clubs/societies e.g 'Friends of the library' in their communities to discuss new ideas and techniques (Yahaya & Abba, 2017). Hence, librarians in

various parts of the world must explore better ways in disseminating fast and less strenuous information to local library users.

The main objective of this paper is to highlight on the necessity of enhancing information and communication technology-based library extension services to serve as a catalyst for information access in pandemic and post pandemic era (COVID-19 Perspective) with reference to libraries in Nigeria. The paper therefore, employs the conventional content analysis approach (desk research method). It adopts the analysis of existing documents that contain the information about the phenomenon under study. The choice of this approach becomes necessary with the need to adequately expose the impacts of COVID-19 on library services and proffers solutions to be applied in the current pandemic era as well as after the period, to enable our libraries maintain a permanent position with or without emergencies.

Qualitative library services is no doubt the bedrock for user satisfaction. Information has remained an integral part of human societies in respective of their local situations and circumstances.

Impact of Covid-19

It is extremely significant to observe the impact of novel corona virus that halted physical activities at all levels across the globe which derailed the transition of library services causing the stakeholders in dilemma in actual return of normalcy of the system. Hence, the need to rethink on ICT-based library extension services for information delivery is much needed.

Onwagboke and Ihebeme (2010) as quoted by Haruna (2020) opined that education appears to be the major sector where ICT integration and effective application could extend massively to other areas of life. From the foregoing, this current era of COVID-19 pandemic is suitable for using ICT to impart knowledge as against the delayed effort caused by the pandemic. One of such means of imparting knowledge is the *use of library teaching* through distance learning. Generally, distance education is a form of education is a form of teaching and learning where students/users and teachers/librarians are separated by physical distances, and the communication between teacher and student is facilitated in special ways (special techniques and methods, special organizational and administrative arrangements).

Furthermore, Aibinu, (2020) remarked that

- COVID-19 pandemic has introduced severe constraints on education that are likely to linger on for quite some time.
- It must be borne in mind that true normalcy as was known in the pre-COVID-19 era may only be expected in a very long time to come. Therefore, we can only talk about semblance of normalcy which implies that we would have to adjust and live our lives within the challenges of COVID-19 (Aibinu, 2020).

As stated by Folorunso-Gasper, (2020) the internet technology allows people from all over the world to provide and access a variety of information. Communicate with one another, purchase good and services at relatively low cost.

The closure of schools, colleges and universities by the Nigerian government was an urgent need to curtail the impact of novel corona virus (Haruna, 2020). However, the shutdown of all schools has interrupted library activities because of fear of spread of the virus.

ICT-Based Library Extension Services

The importance of ICT in library extension services cannot be over emphasized especially now that libraries around the globe have been mandated to switch to online methods to serve their users while staying at home. It is therefore necessary for all types of libraries to prepare for virtual services which will serve as emergency and post emergency situations so as to remain relevant in updating their teaming users with their desired information.

There is the need for creation of tasks team by the government to coordinate library response to COVID-19 so as to curtail the negative impact of corona virus on libraries thereby maintaining quality information services. In addition, Folorunso-Gasper, (2020) emphasized that the pandemic comes with an opportunity to reinvent librarianship and library services delivery. This type of opportunity presented by Covid-19 is rare and as librarians, we must rise up to the challenge and turn this opportunity to a golden one. Library effectiveness is largely determined by the quantity of use of its resources and how it encourages usage of such resources (Yahaya & Abdullahi, 2017).

Owoseni (2020) stated that COVID-19 is a catalyst; it is accelerating technology adoption. The integration of ICT facilities are considered as tools that can greatly assist in complementing Library information service delivery to users in general (Yahaya and Abdullahi, 2017).

In response to this pandemic era, some libraries as brought by Folorunso-Gasper (2020) put an inbound users service number in place; set up virtual meetings, an online chatting with users, and develop easy time saving online frequently asked questions for users. The author further emphasized on the urgent need for librarians to upscale services and learn to communicate with information users during times of crisis whether a global issue like Covid-19 or a local emergency, libraries must have a crisis communication plan in place. This plan must extend to library staff, the website, social channels, library users and more.

Library Extension Services

ICT- based extension information services will become the means of adaptation for all libraries, not just to post-COVID-19 response, but as the next step in career development. Umar (2020) considered library extension services as those activities which are undertaken with the objective of reaching the group of people who might otherwise be unaware of the library services and book stocks. Library extension is undertaken to persuade people that by their own efforts, they can do much to improve their living conditions by effective use of information resources available, to encourage individuals to participate in information generation, transforming, repackaging, utilization and organizing, and to develop reading culture, adult literacy.

Library extension services according to ALA Glossary of Library and Information Science 1983 is the provision of a library of materials and services (including advisory services) to individuals and organizations outside its regular service area, especially to an area in which library service is not otherwise available. Arokoyo (2005) and Ogunbameru (2001) stated that extension has as one of its important tasks, the exchange and sharing of information, knowledge and skills.

Library extension services provide user with necessary education and skills and technical “know-how” to enable them to take effective decision on how to enhance their information search processes. Also help users to improve information search strategies to improve their living condition (Yahaya and Abba, 2017). As emphasized by Yahaya and Abba, (2017) The job of Library extension staff is to disseminate knowledge that would help users to satisfy their information need more efficiently and are expected to help users to identify and analyze their

information need, make them become aware of the opportunities for improvement to obtain information for better standard of living.

The roles of library worker involve disseminating information on new innovation through the use of variety of communication methods. It is through these means, librarians are able to bring about changes in user attitude, knowledge and skills which put users in the right frame of mind that is conducive to adopting proven information innovations (Yahaya and Abba, 2017).

Conclusion and the Way forward

Library extension professionals should tap from the experiences of institutions leading in developing the digital capabilities of their libraries around the world. The virtual technologies all over the world allow people to provide and access a variety of information. Communicate with one another, ask and respond to questions and even coordinate complex far flung world-wide activities even at the pandemic era. Extension services of our libraries should take full advantage of the virtual platforms to translate their traditional services into virtual platforms so as to cope with the challenges emerging from both pandemic and post-pandemic era.

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SCRUTINIZING THE PAST AND SPECULATING ON THE INFINITE POSSIBILITIES OF FUTURE LIBRARIANSHIP

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Abstract

This paper scrutinizes the past and speculates on the future of librarianship by examining its infinite possibilities. This is a historical study. Librarianship as a calling is a powerful perspective. It breaks down the past and future of librarianship into six periods that help us to fully appreciate how our noble profession has traversed. Noting that we live in a world of change, the paper observes that librarianship as a profession is subject to the vagaries and vicissitudes of change. While it has been a long time since libraries were exclusively the provenance of monks some of those sacred roots remain. In this digital age, with information increasingly becoming available online, the role of the librarian is undergoing profound transformation. Drawing from history, psychology, sociology and philosophy, this paper examines the various roles librarians have played in the ages and voices the importance of the library profession and libraries as community institutions in a secular time. Hybrid library services which are a fall out of this change as a result of technological impact in the overall library work the paper notes; provide a pragmatic view of the infinite possibilities of future libraries. Libraries have survived and will continue to thrive in the future, because they fulfill eternal needs for people. The paper concludes that in the midst of all these advances, changes and infinite possibilities, librarians remain invaluable and indispensable resource in the increasingly complex and technologically advanced information environment, navigating users through an often overwhelming labyrinth of print and digital resources.

Keywords: Librarianship, Librarians, Change, Nomenclature Change, Infinite Possibilities, Hybrid Library Services, Technology.

Introduction

Libraries have traditionally existed to collect and organise information, make access to knowledge more democratic, and preserve the record of ideas for future generations. From Ebla to Alexandria, from Pylos to Pergamum – libraries litter the landscape of ancient history. Whether they be rightly called libraries, archives, or repository, or proto-libraries, their legacy has lasted throughout the ages to modern times. But to what extent? Have the features of those ancient libraries informed the features we find in libraries today? And how useful is it to study the libraries of the past? Can such study be of any use in our modern information' society? (Price, n. d.). The

history of book culture and libraries dates back far into the past, and the civilizations of the Near East and the Far East played an important role in them. Handwritten scrolls and book collections were a characteristic manifestation of the antique book culture. In earliest times there was no distinction between a record room an archive or repository and a library, and in this sense libraries can be said to have existed for almost as long as records have been kept. Collections of written knowledge dating from the first half of the 3rd millennium BC was found in a Temple in the Babylonian Empire to have a number of rooms filled with clay tablets, suggesting a well-stocked archive, repository or library. Similar collections of Assyrian clay tablets of the 2nd millennium BC were found at Tell el-Amarna in Egypt. Ashurbanipal (reigned 668–c. 627 BC), the last of the great kings of Assyria, maintained an archive of some 25,000 tablets, comprising transcripts and texts systematically collected from temples throughout his kingdom. Many collections of records were destroyed in the course of wars or were purposely purged when rulers were replaced or when governments fell. By some historians, the creation of the first libraries marks the end of pre-history and the start of recorded human history. As ancient civilizations such as the Mesopotamians and Egyptians began to develop the earliest forms of writing—Mesopotamian Cuneiform and later the Egyptian hieroglyphs—scribes began to create archives of clay tablets that listed inventories and records of commercial transactions. In this way, ancient scribes forged the role of librarians—connecting people with knowledge by giving them access to recorded information. The collection and preservation of works of literature and history in the great libraries of ancient times was a great service for later ages, as these works became the basis of our knowledge of vanished cultures.

While the library has been steadily evolving over the last 2,500 years, remarkably, many of the biggest changes have happened within the last two decades. Libraries continue to house collections of printed materials like they did thousands of years ago, today they do even more. The thrust in the world of scholarly communication is leaning seriously towards open access to information generation and use. Today’s libraries have collections encompassing digital learning opportunities (like certain language-learning software!), makerspaces and events open to everyone in the community. However, the convergence of information resources both analogue and digital has presented new challenges to librarians in their service delivery. This emergent complementary role is what we know as the ‘hybrid library service’. However questions have been asked if hybrid library services are stop-gaps in a continuum or if the future of the library in the 21st century is hybrid. Similarly, some questions about the growth of the library include: What is the state of the library as information service industry from its evolution and what types of services did they provide? How did the roles of libraries as information service industry and librarianship as a profession affect the evolution of the physical library to what we have today? What are the trends in growth of the libraries and the reasons underlying their growth? Furthermore, questions have been asked about the future of libraries and the infinite possibilities of future services offered by them. These and other probing questions will be addressed in this paper.

Scrutinizing the Past of Librarianship

Our love of libraries according to Carruthers, (2017) is nothing new and history records famous libraries as far back as those of Ashurbanipal (in 7th-century BCE Assyria) and Ancient Greek Alexandria. As society and culture have progressed, so too have our libraries. Even epochs such as the Middle Ages (known erroneously as the “Dark Ages” for its lack of learning and culture) had their share of renowned book collections. Indeed, the later Renaissance was only possible because of these stores of learning, preserved for centuries. The very concept of the Renaissance predicates access to a library, because if Antiquity were to be reborn, the guidelines for this rebirth had to emerge from research into the culture of Greece and Rome—which had to take

place in a well-stocked library. The long history of librarianship is defined by three major revolutions: the invention of the alphabet, the development of printing, and the current information explosion. Throughout the ages librarians were responsible for preserving and providing access to the records of civilization, only recently reflecting on the intellectual meaning and cultural impact of their services on society. In this study, these are divided into five periods including: (a) the beginning of librarianship, (b) early period before 1500, showing conservative role of librarians, (c) early modern period during 1500 to 1900, examining his struggling role as bridge maker between information and users, (d) twentieth century, identifying his user-focused role for information dissemination, and (e) the contemporary age, exploring an interactive and collaborative role of librarian and users for knowledge organization and management. In this paper, the conceptual interpretation of the library's role in society will provide a canopy for our understanding of historical, psychological, sociological and philosophical evaluation.

Conceptual Interpretation of Libraries Role in the Society

Libraries are clearly associated with 5,000 years of civilization. For all these years, the library has been at the heart of the society, helping to shape our understanding of the past. The libraries partly played a role in people's lives as a source of information, but their more important role seemed to be as a place for knowledge creation (Nwosu, 2017). The conceptual interpretation of a library or an information agency's role in the society can be briefly reviewed in terms of:

(a) Historical Evaluation

History is the art of recording past events, and historical scholarship searches for the laws that govern the sequences of historical happenings. The library historical literature is predominantly about libraries rather than librarianship. It is so partly because the concept of librarianship implies a philosophical underpinning of the field as a unique discipline, a relatively new, and not yet fully developed approach. Hence, although the history of librarianship provides an important insight into the sociological, political, and technical developments of the discipline it will provide insight into its study. Historical review is very important, however, in understanding the reasons for the directions of library development, which is conditioned by the intellectual environment of each period. This book focuses on identifying the basic factors in the growth of the discipline, using arbitrarily selected, historical examples (Niteck, 1993).

(b) Psychological Evaluation

The fundamental purpose of librarianship is to serve individual patrons and, through them, the society. Individuals are distinct and unique members of the library population, each requiring special consideration. This service is accomplished by transmitting society's knowledge to individuals through recorded messages and by understanding the relationships between the individual patron's use of library resources and the nature of these resources.

(c) Sociological Evaluation

The general social function of librarianship is to provide cultural continuity by preserving and expanding the collective social memory. This is done by providing access to cultural, informational, and historical records. The social functions of the library are defined by the relationships between the producer (author), the distributor (library), and the consumer (patron). The library is always an 'expression of its age' in the kind of services provided and in its mediation between conflicting group interests, always in terms of the perceived interest of the society.

(d) Philosophical Evaluation

Philosophical evaluation of the library's role in a society should express the meaning of library services as assistance to people in their interactions in informational marketplace (Nader, 1974). Shaped by society, library services reflect group interest, conflict, and relativism (Kolitsch, 1945). Dana, (1906) argues that the library provides reconciliation for group conflicts, based on tolerance and dedication to intellectual service, and that it expresses social responsibility by objective social advocacy (Berminghausen, 1972). It offers spiritual and religious interpretation of information, promotes an international view-point, contributes to scientific objectivity, and resists prejudices (Burke, 1947). The philosophical interpretation of the discipline is expressed by an ideal model, combining the pragmatic issues of managing and servicing information needs with theoretical explanation of the subject matter of the discipline, The library is a holistic, comprehensive agency, both in substance -- by collecting known records of the totality of the society's experiences and creations and in function by relating to other agencies. Its organization reflects society's technological, sociological, and ideological culture. Its primary objective is to meet social needs by serving as a repository of intellectual records, to provide dissemination of knowledge and reference to its sources, to educate, and to serve as an agency for social advocacy on issues such as local content, made-in-Nigeria-goods, cultural heritage, reading, or outreach services.

The Beginning of Librarianship – From Repository to Library

The collections of written knowledge were originally kept in what was called a repository. According to Krasner-Khait, (2007) it is a practice as old as civilization itself. Written knowledge did not always mean books. Before books, there were clay tablets, and archeologists had discovered that the Mesopotamian people collected about 30,000 of them in a repository more than 5,000 years ago. Archeologists have uncovered papyrus scrolls from 1300-1200BC in the ancient Egyptian cities of Amarna and Thebes and thousands of clay tablets in the palace of King Sennacherib, Assyrian ruler from 704-681bc, at Nineveh, his capital city. More evidence turned up with the discovery of the personal collection of Sennacherib's grandson, King Ashurbanipal. As the number of records increased, the need arose for storage places where they could be preserved and made available for use. Little is however known about the earliest libraries, and few have survived in any form. The repositories did not have shelves like our modern libraries do. The scrolls were kept in little slots, or pigeonholes, with their titles written on wooden tags at the openings. The name for the repository eventually became the library.

The first and largest library of which there are tangible remains was in Nineveh, the capital of Assyria (an empire in what is now northern Iraq and southeastern Turkey), which existed from about 5000 to 612 B.C. The last ruler of Assyria was Ashurbanipal, who was the most powerful man in the world of the seventh century B.C. (Landauer, 2001). Whether private or public, the library has been founded, built, destroyed and rebuilt. The library, often championed, has been a survivor throughout its long history and serves as a testament to the thirst and quest for knowledge. Early collections may have surfaced from the Near East, but the ancient Greeks propelled the idea through their heightened interest in literacy and intellectual life. Public and private libraries flourished through a well-established process: authors wrote on a variety of subjects, scriptoria or copy shops produced the books, and book dealers sold them. Collections in repositories began to grow because the Greeks encouraged authors to write on a variety of subjects, which copy shops then made into books. Copying books was an exacting business and one in high demand, because a book's "trustworthiness" translated into quality. An Athenian decree called for a repository of "trustworthy" copies. Though the public library first appeared by the fourth century BC, the private library was more prevalent. Aristotle, for instance, amassed a large private

collection. Ancient geographer Strabo said Aristotle "was the first to have put together a collection of books and to have taught the kings in Egypt how to arrange a library."

Throughout most of the library's history, the term "book" referred to works written on papyrus and some parchment rolls. Physically, books were not what we think of today, but rather scrolls, mostly made of papyrus, but sometimes of leather. They were kept in pigeonholes with titles written on wooden tags hung from their outer ends. Beginning in the second century, stacked and bound wooden boards recorded literature, science, and technical information. These tablets, called codex, derived from a centuries-old practice of using wooden writing tablets for note-taking. These new, durable codices gradually replaced the fragile rolls. However, rolls continued to be used for archival-type documents. Parchment eventually replaced the wooden boards. The new codex form impacted book storage. Codices were stored flat on the shelf and covers protected their leaves. The libraries had to find ways to house both rolls and codices. New libraries emerging in the Middle Ages in churches, schools, and monasteries concerned themselves only with the codex form.

Librarianship Before 1500

The library profession has existed since ancient times and has undergone many changes. These changes according to Mairaj & EI-Hadi (2012), have been impacted by political, religious, educational, intellectual and cultural history spanning countries and peoples. Throughout its evolution, the profession has found itself both in parallel and at odds with dominant cultural and political forces. Earlier, libraries were established by kings, rulers and dominant people of society. The first-library of clay tablets was established in Nineveh by Ashurbanipal, the Assyrian ruler of that age in 668-624 B.C. and the second was the Alexandrian Library of papyrus rolls developed around 300 B.C. by Ptolemy Soter. That library, of course, was the Great Library of Alexandria, a public library open to those with the proper scholarly and literary qualifications, founded about 300bc. Much of our knowledge of ancient Babylonian myths and early history comes from his effort. The library was part of an institution of learning called the Alexandria Museum, which was established and supported by the rulers of Egypt beginning in the third century B.C. (Landauer, 2001). When Egypt's King Ptolemy I (305-282BC) asked, "How many scrolls do we have?" Aristotle's disciple Demetrius of Phalerum was on hand to answer with the latest count. After all, it was Demetrius who suggested setting up a universal library to hold copies of all the books in the world. Ptolemy and his successors wanted to understand the people under their rule and house Latin, Buddhist, Persian, Hebrew, and Egyptian works - translated into Greek (Krasner-Khait, 2007).

However, these libraries were accessible to certain privileged people and laymen had no authority to use them. There was more emphasis on preservation of knowledge than on dissemination. This trend as (Thomson, 2003) posits, continued even after centuries. In the ancient period, the growth of knowledge was slow; recorded knowledge was rare and considered as precious and sacred. The libraries called store houses were established to preserve knowledge and had large collection. According to Rubin, (2000) "the comprehensiveness of the collection was beyond comparison for its time". A library which had more collection was given more importance and regarded as a treasure house.

The librarian at this age was a **guardian, custodian, or conservator** of knowledge. Librarians were happy to adopt this role and proud to keep the library collection out of the reach of common people. They aimed to protect it from damage caused by men, insects, and other elements. They had comprehensive knowledge about the collection and were scholars themselves. They loved the collection they had, but reluctant to serve users. They always tried to keep themselves away from readers and also the collection out of their way. Librarians did not like to share the library holdings with users thinking that once they shared their knowledge and holdings with them; they would lose their relevance, no longer would be needed and never be respected. They believed that

their respects were based on keeping themselves and their possession away from users. As knowledge was rare and considered sacred, therefore, libraries were rare and their role was passive: These were the archives and only the elite class of society could access the knowledge. There was monopoly of certain privileged people such as nobles, lords, religious persons and kings (Mairaj, & EI-Hadi, (2012).

Renaissance Period of Librarianship (1500-1900)

Renaissance, (French: “Rebirth”) the period in European civilization immediately following the Middle Ages and conventionally held to have been characterized by a surge of interest in classical scholarship and values (The Editors of Encyclopaedia Britannica, 2020). During the Renaissance era (14th-16th centuries) wealthy people in Europe began building their own private libraries. It became a status symbol—if you were rich, you had a library! As Europe emerged from the depths of darkness into the light of learning as (Krasner-Khait, 2007) observes, its people began to look to the Greek and Roman artistic and literary classics for inspiration. Many aristocrats of the period were dedicated to developing their private libraries. Cosimo de Medici of the famous Florentine family established his own collection, which formed the basis of the Laurentian Library. Also in Italy, the Vatican Library opened in the 1400s.

The invention of printing press in Germany by Gutenberg in 1440 brought a revolution which resulted in more books production in Europe. It was Johann Gutenberg’s 1450’s invention of moveable type that changed bookmaking forever, replacing handwritten books with printed ones and making them more readily available. Gutenberg’s movable type innovation in the 1400s revolutionized bookmaking. As the centuries rolled on, according to Mullen,(2016) libraries took on an increasingly prominent role. Books became more easily dispersed throughout the world and literacy rates skyrocketed. The library came to the United States in 1700s, with Benjamin Franklin largely taking the lead on some of the practices of our public library system—like the idea of taking out and returning books—that are still intact today. Printed books replaced handwritten manuscripts and were placed on open shelves. Accompanying the growth of universities was the development of university libraries, which, in some cases, were founded on the basis of a personal donation. For example, Humphrey, Duke of Gloucester, donated his large collection to Oxford University in the early 1400s. Years and years later, the modern library began to truly take shape. Demand for books increased and university libraries started developing large collection. The mass growth of graphic records urged the need of their organization for effective use. The role of libraries began to change during this period and librarian was regarded as a bridge between recorded knowledge and the seeker of knowledge. The librarians left the post of guardian or custodian and became a **bridge maker** or **match maker**. They tried to match the needs of users with recorded knowledge of the library. They technically organized the collection and developed book and card catalogues, general and subject bibliographies, indexes and reading lists; and made efforts to encourage and facilitate readers. They began to interpret the library collection to those who came to their doors (Mairaj, & EI-Hadi, 2012). However, the majority of people remained ignorant about the bridge. It was perhaps the long history of conservative role of librarians that affected people’s behavior and they were reluctant to use their services. They did not realize that a librarian can be useful to guide and provide them the desired information.

The Golden Age Librarianship

The advent of printing spurred the growth of libraries and the seventeenth and eighteenth centuries were what has been called the “**Golden Age of Libraries**” with many being established all over Europe, including the famous Bodleian Library of Oxford University established in 1602 on the basis of much older collections and open to scholars world-wide (Gilchrist, 2015). While historians consider the 17th century to be “the golden age of libraries,” these contemporary projects

suggest a **biblio-renaissance** is well underway. Throughout the 1600s and 1700s, libraries surged in popularity. They grew as universities developed and as national, state-supported collections began to appear. Many of these became national libraries. In the 17th century, during the 'golden age of libraries', publishers and sellers seeking to take advantage of the burgeoning book trade developed descriptive catalogs of their wares for distribution – a practice was adopted and further extrapolated by many libraries of the time to cover areas like philosophy, sciences, linguistics, medicine, etc. In this way, a business concern of publishers – keeping track of and advertising inventory – was developed into a system for organizing and preserving information by the library. The growth of printed literature resulted in the development of more libraries in the United States (US) and Europe. Library of Congress in 1800 in the US and British Museum Library in 1837 in the United Kingdom (UK) were established to preserve knowledge. Users got attention, public libraries began to establish and for better knowledge organization, the need of formal library education was felt. Librarianship was regarded as an apprenticeship for centuries in past rather than a profession and it was assumed that a librarian required some training within the library. The need of formal education in librarianship was not realized in a true sense. The growth of literature urged librarians to equip themselves with certain skills and organize library collection in a better way. Therefore, the need of advanced library education was felt. University of Gottingen in 1886 started formal library education in Germany. Columbia College currently renowned Columbia University in the next year started library education in America. The library professionals like Melvil Dewey, Charles Ammie Cutter and William Frederick Poole developed schemes to organize collection for better use. (Ameen, 2005; Rubin, 2000; Thomson, 2003; Mairaj & Ameen, 2010; Qarshi, 2006.).

Twentieth Century Librarianship

Libraries observed substantial development during 20th century and librarianship became a renowned profession due to revolutionary development in education, science and technology. Only in the twentieth century did libraries become something other than storehouses for books, and librarians more than book collectors, cataloguers, and custodians. The oldest library in America Krasner-Khait (2007) opines began with a 400-book donation by a Massachusetts clergyman, John Harvard, to a new university that eventually honored him by adopting his name. Beginning with John Harvard's 1638 donation of 260 volumes, the Harvard Library has grown to become the largest university library in the US, with more than 10,000,000 volumes. Another clergyman, Thomas Bray from England, established the first free lending libraries in the American Colonies in the late 1600s. Subscription libraries - where member dues paid for book purchases and borrowing privileges were free - debuted in the 1700s. In 1731, Ben Franklin and others founded the first such library, the Library Company of Philadelphia. The initial collection of the Library of Congress was in ashes after the British burned it during the War of 1812. The library bought Thomas Jefferson's vast collection in 1815 and used that as a foundation to rebuild. It wasn't until waves of immigration and the philosophy of free public education for children that public libraries spread in the US. The first public library in the country opened in Peterborough, New Hampshire, in 1833. Philanthropist Andrew Carnegie helped build more than 1,700 public libraries in the US between 1881 and 1919. Libraries may have changed over the years - no longer do pages carry scrolls in wooden buckets - but the need for a repository of knowledge remains.

After the Second World War, the US and Europe diverted their attention towards socio-economic development and made meaningful progress in every domain of life. Compulsory education resulted in the growth of literacy rate, more readers were produced and use of libraries increased. The librarianship "boom" occurred from 1948 to 1970 and in its heyday libraries were lavishly funded and schools opened to meet the needs of vacant positions (Ostler, Dahlin, & Willardson, 1995). The philosophy of librarianship began to divert towards user-centered services. UNESCO supported education for all, prepared Public Library Manifesto in 1949 and encouraged

for free access to information. Library users got attention and researchers conducted users' studies of various disciplines for information needs and information seeking (Sharify, 1979; UNESCO Public Library Manifesto, 1972).

The concept of reference service emerged in 20th century and librarians started giving personal attention to users. Earlier, there was a trend of collecting, organizing and preserving knowledge but its use was not in the priorities of librarians. Later, increase in literacy, improvement in printing technologies and organized book trade in developed world brought an information revolution. The layman got access to knowledge; libraries opened the doors for users and librarians attended personally to readers. Later on in 1931, Ranganathan framed his famous five Laws of Librarianship. The users were the main focus of these laws that strengthened the emerging philosophy of librarianship. Laws of Ranganathan described a **new user-focused** role of librarians and information professionals. The basic tenet of these laws is to unite users with their desired information. The laws bridge the past and future by underlining the enduring need for “books” - “books,” of course, representing the quest for knowledge, understanding, and wisdom. This stress on ‘use’ and the ‘utility’ of the book as a form which enables and facilitates communication gains a particular emphasis in librarianship of (relatively) ‘modern’ times, highlighted by librarian scholar, and “father of library science” S. R. Ranganathan, in his seminal work *The Five Laws of Library Science* (Jeevan 2005; Ranganathan 1957).

Advent of Computer and Librarianship

The advent of computer in the mid-twentieth century and related technological developments in 1980s-90s, especially the Internet and WWW have revolutionized the concept of librarianship. Internet now has become an integral part of a library and digitization of libraries is being carried out in greater pace. The librarians of today have accepted the challenge of modern technologies. Using these technologies, they started sharing library resources conveniently with other libraries, and building and organizing collection considering user's demand and satisfaction. Following information literacy principles, they started developing close relationships with their users. They started facilitating and training them in identification, selection and usage of the library resources while understanding and identifying their needs. They started teaching and guiding users how to access reliable and authenticated information and resources from a variety of media. Inter-library Loan (ILL), Cooperative Collection Development (CCD), Document Delivery Service (DDS), Current Awareness Service (CAS), Selective Dissemination of Information (SDI), etc. are few examples of services introduced by librarians to meet users' information needs.

Social Media Communications and Librarianship

Social media communications present a wonderful opportunity to find new users for the library while also keeping existing users engaged by providing them with content which informs, educates and entertains. While content is important, context is even more so. The way information is delivered and the variety of social media platforms utilized for that purpose is also very important. For libraries whose client-base is social media savvy, it is necessary to vary your platforms. If the library is using/ writing a blog, it may not take much to turn that into a tweet and to reformat the same information for the Facebook page or a media release. There is a plethora of social networking tools available. An understanding of the leading social networks is desirable for public relations professionals. Even though a lot of them are emerging an understanding of the basics is highly valuable. The importance of these social networking tools and an interest in their use is essential. Encoding schema such as Hypertext Markup Language [HTML], Extensible Markup Language [XML], Standard Generalised Markup Language [SGML], PHP, VBScript and so on are not critical skills, but are useful codes which the library public relations professionals on a daily basis.

Web 2.0 and Librarianship

Modern technology has a substantial impact on libraries in the production, organization and dissemination of knowledge. The first generation of Web technology known as WWW also called Web 1.0 or simply the Web was introduced in the early 1990s by Tim Berners-Lee and since then it has become a dominant source of getting fast and low-cost information. The Web offers organized information in large quantity and people can browse, search and read it easily. The information is accessible round the clock, within no time and number of users can access the same information at the same time. Many organizations use the Web for disseminating information or marketing their products and services. The library community has recognized the importance of embracing Web technologies to remain crucial for users in the digital age. Libraries are using the Web to introduce their resources and services via websites. Users can access these resources and services online at their desktop without physically visiting the libraries. The Web technology has attracted those users who have been reluctant to use the library services by visiting the library in person. The advent of second generation of the Web called Web 2.0 in the first decade of 21st century has revolutionized every sphere of human society. The technology has offered people an opportunity to contribute and share their information and experiences via Internet. According to Chua & Goh, (2010) “Web 2.0 represents an emerging suite of applications that hold immense potential in enriching communication, enabling collaboration and fostering innovation”. It enables online interaction, conversations or verbal communication with others. Instant Messaging (IM) through text, audio and video, and more interactive streaming media like Flickr, You-Tube, blogs, twitters, wikis, RSS feeds, tagging, podcasts and social networks like Face-book, Knowtex, Linkedin, DoYouBuz, MySpace, Mashups, Frapper, Netlog, etc. are the gift of Web 2.0 technology. The table below shows Web 2.0 tools, the category of their use and the 21st century social networking skills required.

Table 1 Web 2.0 Tools

Web 2.0 Tool	Category	21 st Century Social Networking Skills
Blogs	Post & Comment	Creativity & Innovation, Critical Thinking & Problem Solving, Communication, Information Literacy, ICT Literacy, Initiative & Self-direction, Leadership & Responsibility
Wiki	Collaborative Productivity	Creativity & Innovation, Collaboration, Information Literacy, ICT Literacy, Flexibility & Adaptability, Productivity & Accountability
Twitter	Knowledge Sharing	Communication, ICT Literacy, Social & Cross-cultural skills
Google Docs	Collaborative Productivity	Collaboration, ICT Literacy, Flexibility & Adaptability, Productivity & Accountability
Podcasts	Post & Comment	Creativity & Innovation, Critical Thinking & Problem Solving, Communication, Media Literacy, ICT Literacy, Initiative & Self-direction, Leadership & Responsibility

Video / Vcasts (e.g. YouTube)	Post & Comment	Creativity & Innovation, Communication, Media Literacy, ICT Literacy
3D Worlds (e.g. Second Life)	Live Interactive	ICT Literacy, Communication
Gaming, MMORPG's	Live Interactive	ICT Literacy, Collaboration
Skype	Live Interactive	Critical Thinking & Problem Solving, ICT Literacy
Cellphone/Texting	Live Interactive	ICT Literacy, Communication
Sploder	Game Creation	Creativity & Innovation, ICT Literacy
MindMeister	Organizers	Initiative & Self direction, ICT Literacy
Gradefix	Organizers	Initiative & Self direction, Leadership & Responsibility
iPod/iTunes	Knowledge Sharing	Communication, ICT Literacy, Initiative & Self direction

Source: <http://www.solutionwatch.com/512/back-to-school-with-the-class-of-web-20-part-1/>.

Embracing Library 2.0

The emergent technology of Web 2.0 also called Social Web has made it possible for libraries to perform more social and interactive role and equally enabled users to share their knowledge and experiences. It has diverted conservative and centralized approach of knowledge organization towards collaborative and social approach enabling more interactive role of librarians and users in sharing information. The interactive nature of Web 2.0 has made it possible, for libraries to integrate its features into websites. Using Web 2.0 technology, librarianship has emerged in a new way with more dynamic role of librarians and users. A library which uses interactive Web 2.0 technologies is known as ‘Library 2.0. Maness, (2006) defines Library 2.0 as: “the application of interactive, collaborative, and multimedia web-based technologies to web-based library services and collections”. Library 2.0 ‘is a vital tool of librarians for users’ information literacy and innovation and they have become Librarians 2.0. It also enables users as Users 2.0 to participate and share their knowledge and experiences, use the collective intelligence and give feedback about the resources and service offered. Maness, (2006) is of the opinion that Library 2.0 has four essential elements such as: (a) it is user-centered (effective users’ participation in content creation (b) Socially rich (both synchronous e.g. Chatroom, IM, etc. and synchronous communication e.g. e-mail, between the librarian and users); (c) communally innovative library (readily change with new developments) that provides (d) multimedia experience (contain audio, video, text components).

The New Age of Librarianship

There is a lot of talk these days about the “new age” of libraries and the role they play in a changing information landscape. Taking the lessons learned over that nearly 3,000 year history to forge an approach based not on books and artifacts, but on knowledge and community; a new age librarianship is emerging. This librarianship is based upon how people learn, not how they browse. This new approach to librarianship will require a change in the skills and preparation of librarians,

new types of services, and ultimately a new relationship with communities. The problems faced by our communities are too important to wait for people to come into our buildings (Lankes, 2011). In the past ten years or so libraries have witnessed dramatic changes in technology: TVs connected to the Internet, Cloud technologies, online classrooms, mobile devices with fast computing power. Libraries and librarians need to think about how these technologies will be utilised and integrated into their service delivery models. In this digital age, with information increasingly becoming available online, the role of the librarian is also undergoing profound transformation.

A major change in the new age of librarianship is the shift in focus from building collections to improving access. With a vast amount of digital information available on national and global networks; collaborating and partnering with other library systems to improve access to information is an essential service for today's libraries. In addition, providing remote access to digital archives is another worthy goal of the modern library. Research libraries in particular are called upon to provide access to materials for patrons who cannot physically come into the library. While it is true that the Internet has put vast amounts of information at people's fingertips at the time and place of their choosing, the Internet does not take the place of a campus or community library. Whereas some people are predicting the demise of the profession altogether or there is a propensity to say that libraries and librarians may become redundant as publications go digital and information goes online. Their thinking like Abram, (2013) suggests is, "*Who needs a librarian when you have Google?*" This is not the case. In fact, libraries and librarians are needed now more than hitherto. In fact, now more than ever, skilled librarians are needed to help people understand the changing ways information is accessed and to help them filter out good information from bad in the "white noise" of the Internet. Information available online is often of dubious origin and there is still a wealth of information behind pay walls that can only be accessed by those who have paid. Even in Vaidhyathan's, (2011) world of *Googlisation of Everything*, "Google", according to Gaiman, (2015) "*can bring you back 100,000 answers. A librarian can bring you back the right one.*" We have helped many library users who have only been using search engines for their research and come to the library perplexed because they cannot find the information they want. If anything, the Internet has added to the range of services libraries provide – hybrid library services- and in turn this has also increased the variety of roles available to librarians. For the librarian, according to Naidu (n. d.), these roles include: Librarian as Knowledge Manager, Librarian as an Information Expert, Librarian as an End – User trainer, Librarian as Consultant, Librarians as Teachers, Librarians as Technology Specialist, Librarians as Advertisers, Librarians as Event Planners, Librarian as an Evaluator, Librarian as a Search Intermediary, Librarian as a Facilitator, Librarian as a Navigator, Librarian as a Website Builder, Librarian as Hybrid Librarian, Librarian as Researcher, Librarian as Sifter of Information, Librarian as a Content Manager and Librarian as an Information Ninja (Nwosu & Babatope, 2016) among others.

The profession may be in the throes of change, but to paraphrase the famous quote; those death reports are greatly exaggerated! The need for library science skills is greater than ever. The library and information management profession offers an extraordinary variety of work environments. Librarians are breaking into a wide range of fields outside the traditional roles because their skills are extremely valuable across the board to many organizations and agencies. People with library and information science degrees are putting their skills to work in all kinds of interesting places. But the places may not be libraries, and the job titles may not say "librarian." (Putnam, 2014). Librarians are by their training information experts. They gather, synthesize and organise information for use. Intelligence information gathering is a major part of librarians training and they perform this task excellently. While many graduates will find career homes in traditional libraries, many others will take their skills into other settings where

information experts are also valued. Their business cards may never say “librarian.” Librarians also have opportunities to serve as embedded, or forward deployed information experts in CIA offices and select Intelligence Community agencies. The aftermath of 9/11 bomb attack on the World Trade Centre led the Obama led administration to direct the recruitment drive of information professionals as analysts in many of the 16 intelligence community agencies in the United States (e.g., Federal Bureau of Intelligence, Central Intelligence Agency, Directorate of Intelligence Agency, National Security Agency) particularly in newly established departments and agencies (Shrader, 2004; Losey, 2007).

Speculating On the Future of Librarianship

"The future belongs to neither the conduit or content players but those who control the filtering, searching, and sense-making tools we will rely on to navigate through the expanses of cyberspace."

Paul Saffo, (1994;3) "It's the Context, Stupid" in WIRED

Most futurists will tell us that it is important to look at the trends and to develop various scenarios to assist in determining our future directions. Librarians all over the world have spent the last decade scrutinizing the past and speculating on the future. The traditional library of the past century was a physical entity with a specific geographic location and a defined local user group. The next evolutionary step taken by libraries has been called the “automated library.” In retrospect, the automated library was identical to the traditional library with the minor distinction of computer-based catalogues and indexes, and access to online library utilities such as OCLC and RLIN. This was a distinction in format alone. More recently, discussions in the literature have centered on the “hybrid library.” The hybrid library further advances the idea of the automated library and most librarians today describe their institutions in terms that define this concept. In a hybrid library, materials in electronic formats are used as readily as paper and micro formats. The online catalogue and electronic indexes are standard. By embracing the new technologies, librarians have discovered that thoughtfully composed web pages can provide gateways to information required by their patrons; web forms present a new means by which users can ask questions, and lists of frequently asked questions are common timesavers for librarians and patrons alike. The library is no longer limited geographically, but opportunities for expansion of services continue to be severely curtailed by limitations on membership to the community of users.

Librarianship is unmistakably a career of public service and as a result it is an ever changing field. As information providers, it is necessary to adapt and to quickly assimilate new ideas and information. What about the future? The future like Lewis,(2016;6) quoted in Levinson,(1967) says it is “*something everyone reaches at the rate of sixty minutes an hour, whatever he does, whoever he is*”. What does the future hold for librarians and of course the library? Eleanor Roosevelt (1884-1962), wife of Franklin D. Roosevelt (1882-1945), the U.S. president from 1933 to 1945 [was the “First Lady of the World,” according to President Harry S. Truman], once said that, “the future belongs to those who believe in the beauty of their dreams” (Branch, 2015). There are a lot of beautiful dreams taking place that will help form tomorrow’s libraries. In the future, as Shank & Bell,(2011) opine the library as place and the containers its collections come in should not define the librarian as it has too often done in the past. Instead, the services (e.g., course related instruction) and products (i.e. information) provided by the librarians should. For us as librarians in the library community can we look back to some years past and come up with a smile, or a chilling thought of where we are coming from and where we are going? In the past, our role was as ‘custodians of books’...In the present library environment, our role stand as ‘guardians of collections and pathways to information...In the future, our role will be as ‘architects of information sources’...(Wilkins, 1996). As librarians we do not advocate forgetting the past [where we are coming from]. On the contrary, librarians believe the past is important to understand

the future [where we are going] and believing that some things never go out of style. But as librarians we cannot take for granted our abilities and desires in embracing change. This statement resonates with the words of Wallace (1876:199):

... a good librarian has ever been a valuable minister to letters. He has always stood between the world of authors and the world of readers, introducing the habitants of one sphere to the habitants of the other . But in this day and for the future he is called to new offices and to higher distinctions. His profession belongs to the SCIENCES. He requires some fine faculties of mind. He takes his rank with philosophers.

If as information service providers we take this for granted all that we acquired in library school will become obsolete and rapidly replaced. We must bring back the library. Just as the image of the culture and knowledge temple of the past won through because of its almost religious rituals and regular rhythms, the new library will have to find its story, so that it becomes neither a revitalisation of previous core services nor dissolution into everything – and therefore nothing. The hybrid library might be a bid – but is it enough? There is more to it. It provides us with the ways in which we can use those insights to do practical things that will improve libraries and library services. In essence, we would be saying like Gorman, (1998) soliloquy:

*here is where we are and where we have been;
here is the likely direction in which we are going;
here is the impact of the likely future on libraries, library service, and library users;
and, here is how we should organize ourselves and run our libraries
to respond to the challenges of change.*

As a result, a pragmatic view of the infinite possibilities of future libraries would suggest, like that it is likely that most libraries will for the foreseeable future – which after all is here or would say not all that long–base their services on a mix of physical objects [books, printed materials, paper-based journals, video-tapes and the like] and electronic stuff [web pages, remote data services, CD-ROMS etc.]. For this reason, approaches that stress the management and delivery of hybrid library services would appear to be the most useful. The future of librarianship thus hinges on what happens to the perpetually changing work of the profession in its three contexts: the context of larger social and cultural forces, the context of other competing occupations, and the context of competing organizations and commodities (Abbott, 1998).

Some Discussion

In the midst of all these advances, changes and infinite possibilities, librarians of today and the future remain invaluable and indispensable resource in the increasingly complex and technologically advanced information environment, navigating users through an often overwhelming labyrinth of print and digital resources. Lankes, (2011) in his book *The Atlas of New Librarianship* states that ‘future libraries will be valued more for services than for book collections’.⁵ He asserts that our services will move from our traditional role of book storage and lending into a dynamic community space. We need to embrace both our physical environment and our virtual environment, allowing our customers to interact with us wherever they are located via any means they choose. Sorman-Nilsson, (2013) expresses this as ***“Digilogue; how to win the digital minds and analogue hearts of tomorrow’s customers”***. Libraries and the role of librarians will survive as digital tools take over printed material, the same way they have survived across millennia—by adapting to the modes of documentation and the needs of information seekers at the time. As online databases continue to develop, librarians will still serve an active role in connecting

people with the information they need. While a library might not need to house as many books and print archives for scholars and readers to sift through, it will still serve as a space for people to come to seek out knowledge. People will still turn to libraries and librarians to connect them to the correct online tools they need to conduct their research.

Conclusion

The future of the profession of librarianship thus seems clear if very complex and contingent. The profession will no doubt continue its generalist strategy and federated structure. Individuals will continue to flow in and out of the profession at many levels and career stages. To the profession as a whole, the central challenges lie in embracing the various information technologies of the future and the groups that service them. This embrace will end up redefining the profession. But that is necessary to survival. In conclusion, it is hereby stated that the future is not fixed and librarians are in a position to write it themselves rather than having it written for them. They need to be the architects of their own destiny, anticipating change and adapting their library and information services to be part of the flow. Change and flexibility are the watchwords of the future, but have always been a part of our past.

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A SURVEY OF DIGITAL SKILLS AND TECHNOLOGIES FOR DIGITAL PRESERVATION IN ACADEMIC LIBRARIES IN NIGERIA

Eneh Anthonia C.

Abstract

The study surveyed digital skills and technologies for digital preservation in academic libraries in Nigeria. Descriptive research survey was used. The population comprised librarians in academic libraries in Nigeria. Simple random sampling technique was used to select the librarians. Online questionnaire was used to gather the respondents. 235 responses were valid for analysis. The study was analysed using mean scores and simple percentages. The result shows that librarians in Nigeria lack skills for digital preservation, libraries in Nigeria rarely digitize its collections; academic libraries acquire digital materials through born digital collection and consortium/resources sharing. The technologies and techniques used for digital preservation are integrated library management system, institutional repositories, CD/disks and data migration. The challenges affecting digital preservation includes lack of fund, lack of facilities, inadequate skills, copy right issues and lack of policy. It was recommended that libraries should be automated and undergo digitization of library collection, librarians should be trained on digital preservation skills and preservation policies.

Keywords: digital skills, digital preservation, technologies, academic libraries.

Introduction

The continuous deterioration, damage, theft of library materials caused by various factors which include light, humidity, heat, climate change, pollutants, termites, cockroaches, silverfish, firebrats, humans mal-handling and natural hazards like floods, fire or earthquakes, is increasingly becoming a serious threat in the quest to keep up library's role as a repository of adequate and vast available information resources. As a way of curbing this menace libraries have applied several preservation measures the most common being fumigation, application of insecticides, mass deacidification, lamination, cold storage, temperature and humidity control. These measures of preservation merely reduced damages and deterioration of library materials. To some extent, the aim was achieved going by what preservation implies as defined by IFLA Principles for the Care and Handling of Library Materials (as cited in Sambo, Urhefe & Ejitagha (2017). They referred to it as practices applied to reduce deterioration, and prolong the life span of a material either by direct intervening in its physical or chemical make-up. However, library materials like books and journals are mainly made of paper and papers easily deteriorates due to the application of chemicals and other contents used in its production, for example papers are usually made up of cellulose fiber which lacks its natural state. The quality of paper is dependent on the quality of cellulose fiber and the

professionalism of the bonding of the printing press. This presents just a natural threat to effective preservation of library materials. However, in the modern times various methods have been adopted to minimize damage, deterioration and mal-handling of library materials as well as provide efficient and effective services delivery in the 21st century. Due to its backdrop, academic libraries have adopted a more aggressive and saver approach by the acquisition of Electronic Information Resources (EIRs) and or digitization of library materials. The United Nations Educational, Scientific and Cultural Organisation (UNESCO) (as cited in 2019:1), defined digital materials as

“resources of human knowledge or expression, whether cultural, educational, scientific and administrative or embracing technical, legal, medical and other kinds of information that are increasingly created digitally, or converted into digital form from existing analogue resources. These digital materials include texts, databases, still and moving images, audio, graphics, software and web pages among a wide and growing range of formats”

Digital preservation requires the conversion of library materials into EIRs or acquiring born digital contents. The conversion could be created by scanning for example books, journals, newspapers, projects, theses and dissertations while born digital contents such as ebook and ejournals could be acquired or bought. Kavishe and Dulle (2016) recommended the “need to perform digital preservation strategies and have skilled librarians in terms of managing EIRs in libraries and other collection centers that preserve EIRs”. Regrettably, despite the proliferation of information technologies in many libraries and information centers, preserving Electronic Information Resources (EIRs) for continuous access by users is a main issue for many libraries all over the world (Usman and Gopakumar, 2018). Preservation of EIRs according to Karvishe and Dulle (2016) is a challenging exercise that needs appropriate digital preservation strategies. As a result, librarians involved in preserving EIRs should be Information Technology (IT) literate and there should be IT trainings whenever a change in technology occurs. Altobellis (2012) identified the use of interfaces, storage devices, metadata basics, collaboration, reformatting strategies and equipment as well as workflow management software packages as the training required for digital preservation and web archiving. It is therefore, expected that academic libraries regularly organize trainings to equip librarians with digital skills such as scanning, creation of digital contents, how to born digital contents and burning files to disks, uploading documents to the cloud, retrieving documents from the cloud, data security, data management, the use of digital preservation technologies such as institutional repositories, Integrated Library Management Systems (ILMS), Databases, cloud technology. This is important for academic libraries to maintain its claim as the heart of its parent institution.

Academic library is a library established in institution of higher learning to manage the information, knowledge and ensure the academic performance of the academic community by providing vast information resources and attractive atmosphere that will further enhance and encourage its utilization. The evolution of ICT academic libraries as ascertained by Spante et al (as cited in Adebayo et al (2019) are seeking for innovative ways to perform their functions. The use of digital preservation and web archiving are the key innovations in embraced by academic libraries. The exploitation of these skills require ICT skill. ICT skills according to Igwela and Nsirim (2018) are those “technology and or computer skills and knowledge required by librarians to be able to fully exploit information services in the wake of new technology”. ICT skills for preservation as identified above seem to be inadequate among librarians despite its role in the preservation of digital information resources. Note (2018) confirmed that “the archival field lacks people with the expertise needed to extend the digital preservation agenda. Formal training opportunities for digital preservation are still rare and new archivists may be uncertain as to where to acquire specific skills, seasoned archivists need to broaden their knowledge or expand their roles professionally”. It therefore culminated the need to survey digital skills and preservation in academic libraries in Nigeria.

Objectives

1. determine the extent of digital skills possessed by librarians for digital preservation in academic libraries in Nigeria
2. ascertain the frequency libraries digitize library collections in academic Libraries in Nigeria
3. unravel digital acquisition method by academic libraries in Nigeria
4. ascertain the technologies used by librarians for digital preservation and web archiving in academic libraries in Nigeria
5. Identify the challenges facing the preservation of digital collections in academic libraries in Nigeria.

Research questions

1. To what extent do librarians possess skills for digital preservation in academic libraries in Nigeria?
2. How frequently do academic libraries in Nigeria digitize library collections?
3. How does your library acquire digital contents?
4. What are the technologies used by librarians in the preservation of library collections?
5. What are the challenges affecting the digital preservation in academic libraries in Nigeria

Review of Related Literature

Acceptance and use of technology is the readiness of an individual, group, organization or institution to adopt, implement and use technology. TAM was developed by Davis in 1986 based on the theory of reasoned Action. It suggests that the acceptability of an information system is determined by two main factors which are: Perceived usefulness and perceived ease of use. Perceived usefulness is found to be 50% more influential than perceived ease of use. This is because perceived usefulness is an indicator for the extent of job performance improvement perceived by a person who applies the new system. Instead, perceived ease of use measures the degree to which a person assumes that using the new information system will be free of effort (Al-Mamary, Shamsuddin&Hamid, 2015). Library and information science profession has had a drastic change due to the development of ICT. ICT has been a useful tool in the preservation of library materials. But adopting EIR and the use of ICT to preserve library materials seems to be on the low side. This could be due to the factors identified by the TAM model; perceived usefulness and perceived ease of use. Several studies have shown the reason responsible for the low usage of technology. Adeoye and Olarenwaju (2019) stated that there are many factors responsible for undergraduates use of electronic information some of them include, the flexible nature of electronic resources in-term of multiple access points, search ease and retrieving information from various mobile electronic devices as compare to print resources. Ammarukleart (2017) applied the theory in his study on the factors affecting faculty acceptance and use of institutional repositories in Thailand and confirms that performance expectancy, social influence, and resistance to change were direct determinants of faculty members' intention to use institutional repositories. Scherer, Siddiq and Tondeur (2019) showed that TAM models remain a good choice for explaining teachers' adoption of digital technology in education. Given the above prove TAM has been found as a determinant of the use of technologies. The study which surveyed ICT skills of librarians and digital preservation adopted the TAM model due to its link with the use of technology.

Altobellis (2012) in his study "essential skills for digital preservation addressing the training needs of staff in small heritage institutions" found that user interfaces and access tools (58%), workflows and management (55%), metadata basics (54%), reformatting strategies and equipment (51%) were the skills possessed by staff for digital preservation. Kavishe and Dulle

(2016) investigated the preservation skills and strategies being used by the University of KwaZulu-Natal libraries in preserving electronic information resources (EIRs) to for long term availability and access. The study adopted a survey research design. A census sampling technique to select the respondent .Questionnaire comprising closed and open questions were the instrument used. The data was analyzed using Statistical package for the Social Sciences version 20. The results showed that the respondents had intermediated level of ICT knowledge and skills regarding preservation of EIRs. It also showed that the respondents needed trainings in migration, metadata and emulation techniques. In addition, skills such as data migration, data curation and recovery, metadata entry, scanning and uploading are necessary for digital preservation.

The processes intended to acquire, index, give access and preserve digital resources covers two distinct kinds of digital material; documents digitized from physical media (books, engravings, maps, etc.) and born-digital material bought or collected under its legal deposit mandate(Derrot, Jean-Philippe, Oury & Reecht, 2014). Strategically, Sambo, Urhefe and Ejitagha (2017) asserted that to preserve digital documents from being lost, regular migration of the bits onto new media to guard against technological obsolescence was necessary. It was suggested that data on magnetic tape needed to be copied once a year to guarantee that none of the information was lost. The term ‘data migration’ according to them is now preferred to ‘data refreshing’. Empirically, Kari and Baro (2016) investigated the digital preservation practices in institutional repositories (IRs) in Nigeria. The population comprised 141 approved universities in Nigeria. Interviews, questionnaire and investigation from websites were used to gather data. It was found that only 15 university libraries were found to have developed institutional repositories in Nigeria out of which 12 responses were recorded. Furthermore, half of the IRs engaged in information migration. Different libraries may adopt different practices in preserving digital material depending on the available fund of policy put in place. Libraries may consider to convert its print format to digital format or acquire born digital materials.

Technologies and digital preservation

Several digital technologies can be used as tools for digital preservation. Pal (2012) in his study on “digital preservation methods and technology in digital era” established that:

“The uses of digital technology include analog- to- digital conversion for sound and video recordings, images-to digital conversion for documents, books photos etc. and text – to digital conversion for documents and books using OCR/ICR optical. The wide range of technology and tools are available to create digital information for text and multimedia staff such as web publishing using HTML, XML, JAVA, PERL etc. Floppies and CDS are the examples of new digitization technology. It has become possible to store electronic new images of the documents on magnetic tape, floppy or CD which can be read on computer screen whenever wanted. Email and Internet have proved to be beneficial for libraries since they have given a new dimension to their reprographic services no doubt but seen from a different angle these developments are beneficial for preservation programmers also. While digitizing documents certain things need to be kept in mind like the basic materials needed for digitizing, the software requirements, and standards to be followed”.

Similarly, Adamou and Ntoka (2017) opined that for an effective scanning of library materials, apart from hardware equipment, an appropriate software package must be accompanied. They identified Greenstone, OpenDLib, Fedora and DSpace software packages used for preservation. Furthermore, after scanning, the material become digital and can be stored in formats such as JPEG and PDF on the hard disk of the computer. It was also discovered as recommended by Pantei on University Librarians that “a server is a safer means of preservation whereas CDs are more sensitive means of preserving material as there is a danger of physical destruction and lack of compatibility.”

Library Materials Digitized

The National Diet Library (NDL) has been converting the content of materials into other media to achieve compatibility of use and preservation. A microfilming program was originally used as a method for preserving valuable materials. The library as at March 2020 has the current situation of library materials online are: 350, 000 books, 10, 000 periodicals, 70, 000 rare books and old materials, 10, 000 doctoral dissertations, 20, 000 official Gazettes and 60, 000 others

Research Methods

The study adopted a descriptive survey design. The population comprised all the librarians in academic libraries in Nigeria. The study intended to sample all librarians in academic libraries therefore, simple random sampling technique was used to gather the respondents. Due to the online survey used which only gave opportunity to those with IT complaints, only 232 responses were received. The online questionnaire was a Google form distributed to the Nigerian Library and Association yahoo groups online forum and several other association forums of librarians across the country. The questionnaire was a four point likert scale of Strongly Agree (SA=4), Agree (A=3), Disagree (D=2) and Strongly Disagree (SD=1). The data collected was analysed using mean scores and simple percentages. The decision on the analysis of the mean scores was that items with 2.5 above was accepted and below rejected while items with 50% above were accepted and below rejected.

Findings of the Study

Research question one:

To what extent do librarians possess skills for digital preservation in academic libraries in Nigeria?

Table 1: skills possessed by librarians for digital preservation?(n=232)

Please indicate the extent to which you can perform the following?	Mean	Decision
Digital Scanning	1.9	Reject
Uploading	2.8	Accept
Digital curation and recovery	2.1	Reject
Data backup	2.0	Reject
Migration	1.6	Reject
Microfilming	1.5	Reject
metadata entry	2.7	Accept
Programming	1.6	Reject
Grand Mean	2.0	Reject

Table one shows the mean scores of skills possessed by librarians for digital preservation. It shows that apart from uploading (2.8) and metadata entry (2.7) with mean scores above the reference mean of 2.5 indicating the possession of digital preservation skills, other items like digital curation and discovery (2.1), data backup (2.0), migration (1.6), microfilming (1.5) were possessed below average. The grand mean of 2.0 shows overall lack of digital preservation skills by librarians

Research question two: How frequent do academic libraries digitize library printed materials?

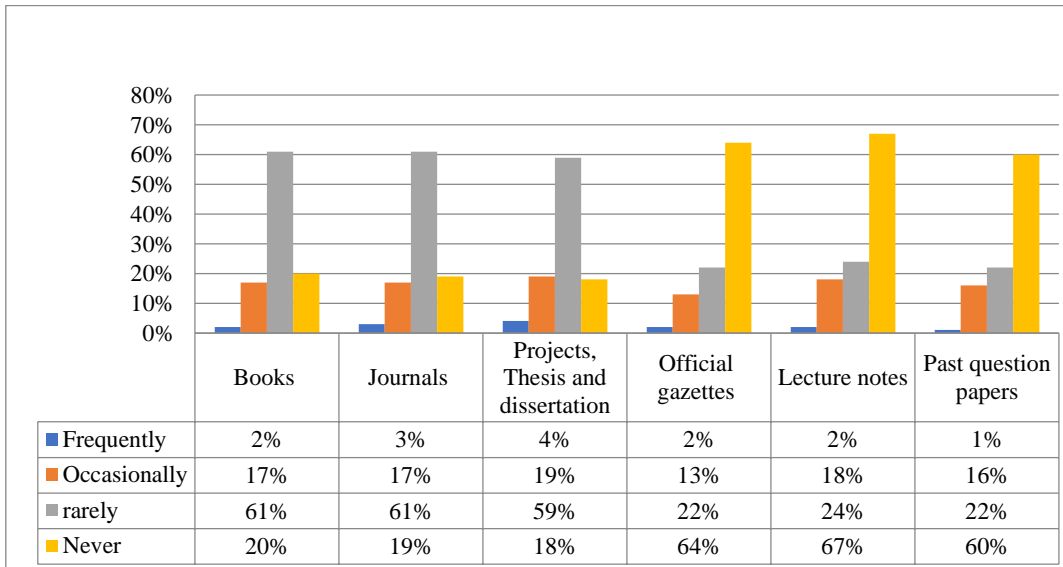


Fig. 2: The extent academic libraries digitize library materials.

Fig. 2 shows that books (61%), journals (61%), projects, thesis & dissertation (59%) were rarely digitized. On the other hand, lecture note (67%), official gazette (64%) and past question papers were never digitized.

Research question three: How does your library acquire digital material?

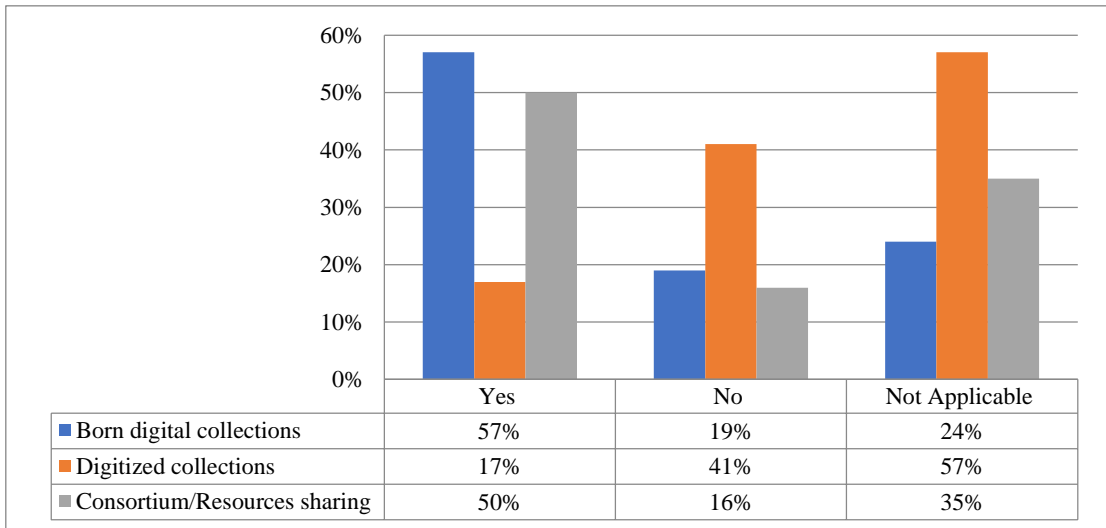


Fig. 3: acquisition of digital material in academic libraries in Nigeria

Fig. 3 shows that most of library digital collections were acquired through born digital (57%) and consortium/resources sharing (50%). On the other hand, 57% said it was not applicable to digitize library collections.

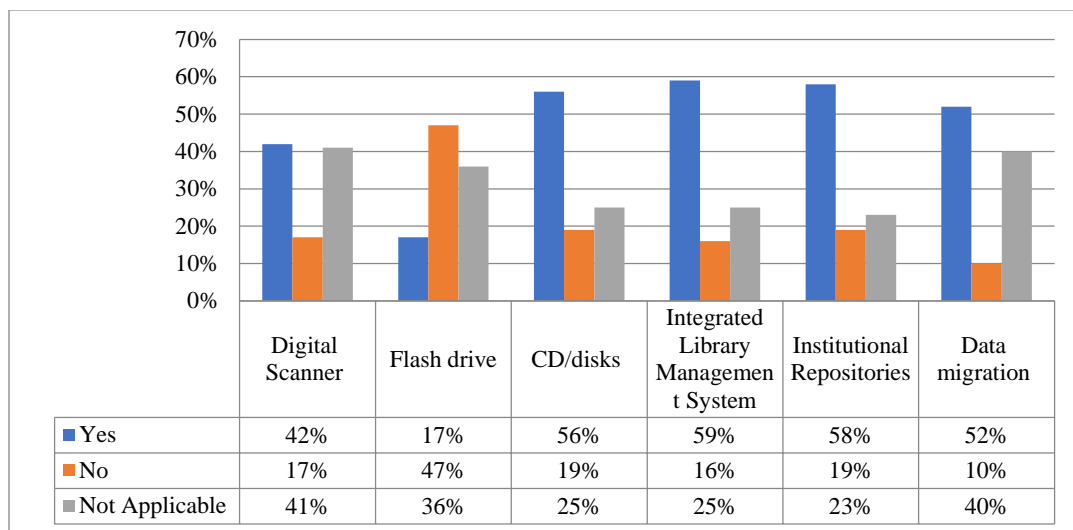


Fig 4: Technologies/techniques in Use in Academic libraries for digital preservation

The study shows that the technologies and techniques used for digital preservation are integrated library management system (59%), institutional repositories (58%), CD/disks (56%) and data migration (52%)

Research question what are the challenges affecting the digital preservation in academic libraries in Nigeria.

Table 5: Challenges affecting digital preservation in academic libraries in Nigeria

What are the challenges facing your library in practicing digital preservation	SA	A	D	SD	Mean
Lack of policy	81	91	41	19	3.0
Lack of funds	93	95	30	14	3.2
Inadequate skills	88	94	30	20	3.1
Copy right issues	89	91	35	17	3.1
Lack of facilities	96	92	29	15	3.2
Grand Mean					3.1

Table 5 shows that lack of fund (3.2), lack of facilities (3.2), inadequate skills (3.1), copy right issues (3.1) and lack of policy (3.0) are above the reference mean of 2.5 indicating the challenges facing digital preservation in academic libraries in Nigeria.

Summary of the Findings

The study summarizes viz:

1. Librarians in Nigeria lack skills for digital preservation
2. Libraries in Nigeria rarely digitize its collections
3. Academic libraries acquire digital materials through born digital collection and consortium/resources sharing.
4. The technologies and techniques used for digital preservation are integrated library management system, institutional repositories, CD/disks and data migration.
5. The challenges affecting digital preservation includes lack of fund, lack of facilities, inadequate skills, copy right issues and lack of policy

Discussion of the Findings

Research question one surveyed the possession of digital skills of librarians and shows that apart from uploading and metadata entry with mean scores above the reference mean of 2.5 indicating the possession of digital preservation skills, other items like digital curation and discovery data backup migration, microfilming, were possessed below average. The grand mean of 2.0 shows overall lack of digital preservation skills by librarians. This should not be neglected by library management as digitization process requires skilled librarians. This is in agreement with Zhang and Gourley (2009) who recommended that when selecting materials for digitization, the library should consider whether it has the staff and skill sets to support the digitization, metadata entry, user interface design, programming and search engine configuration that is required for the project to implement the desired functionality.

On research question two the respondents were asked shows that books, journals, projects, thesis & dissertation were rarely digitized. On the other hand, lecture note, official gazette and past question papers were never digitized. This could be because some of the academic libraries were not automated and or lack the resources to digitize their collection. The study is not in agreement with Derrot, Jean-Philippe, Oury & Reecht, (2014) that library collections including pictorial material, maps, printed music, manuscripts, books and serials were digitized.

Research question three shows that most of library digital collections were mostly acquired through born digital consortium/resources sharing as against converting collections into digital contents. It is not in agreement with National Diet Library (NDL) that has been converting the content of materials into digital contents to achieve compatibility of use and preservation.

In research question four, respondents were asked to identify the technologies and techniques used for digital preservation. The study shows that the technologies and techniques used for digital preservation are integrated library management system, institutional repositories, CD/disks and data migration. The study corroborates with that of Adamou and Ntoka (2017) that Greenstone, OpenDLib, Fedora and DSpace as software packages used for preservation. Furthermore, after scanning, the material become digital and can be stored in different digital formats such as JPEG and PDF on the hard disk of the computer

Research question five shows that lack of fund, lack of facilities, inadequate skills, copy right issues and lack of policy are above the reference mean of 2.5 indicating the challenges facing digital preservation in academic libraries in Nigeria. The study is in line with that of Sambo, Urhefe & Ejitaga (2017) on a survey of digital preservation challenges in Nigerian libraries: librarians' perspectives and found that hardware and software obsolesces, lack of training, lack of backup and standards, lack of strategy policy, lack of funds, lukewarm attitude among the librarians and lack of legal right to preservation of content as the challenges facing the digital preservation.

Conclusion

Digital preservation and web archiving in libraries have come to stay. It therefore requires that libraries, librarians, especially in academic libraries where there is high rate of dynamism, equip themselves to be able to blend with the modern set up of archiving and preservative technique and practices of information resources. How be it, this study investigated the skills and technology for digital preservation and web archiving in academic libraries in Nigeria. The result shows that librarians in Nigeria lack skills for digital preservation and so, rarely digitize its collections. The technologies and techniques used for digital preservation are integrated library management system, institutional repositories, CD/disks and data migration. The challenges affecting digital preservation includes lack of fund, lack of facilities, inadequate skills, copy right issues and lack of policy.

Furthermore, this study is able to conclude that digital skills, digital preservation and web archiving are very important for sustainable procurement of information resources and for improved library service delivery in this age of ICT.

Recommendations

The study recommended that:

1. Academic libraries should be automated to ensure easy upload or transfer of digital resources from one device to another.
2. Academic libraries should digitize their library collection for easy web archiving.
3. Librarians should be trained on digital preservation skills and preservation policies.
4. Libraries management should provide the equipments and atmosphere required to promote digital preservation and web archiving practices.

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PRESERVING EVIDENTIALITY IN DIGITAL RECORDS: NIGERIAN PUBLIC RECORDS AND CONCEPTS OF DIGITAL EVIDENCE

**Justice Chinonso Ujournna
Lowry James**

Abstract

The challenges of digital preservation are compounded by considerations of the essential aspects of digital records: not only do digital records need to be preserved over time; their evidential qualities need to be preserved if those records are to be useful as evidence. The difficulty of preserving the evidential qualities of records when the evidential qualities may not be present at the creation of records seems to be the most challenging aspect of this. Digital records are records that are created, collected, processed, organized, stored and retrieved with digital devices in digital formats. These types of records come in different formats, sizes and media such as word processed documents, PDF, video clips, spreadsheets, digital voice recordings etc. They are created through computers, and computer related devices like the scanner, camera, voice recorder, SMS, email documents, CCTV, cell phones, among other devices. Digital records if properly created, conserved and preserved should have evidential qualities that make such records admissible in courts. These qualities are based on the conservation and preservation approaches adopted in the management and storage practices. This paper offers views of various literature on conservation and preservation approaches to digital records in the 21st Century records management practices before contemplating the state of record-making in Nigeria today, asking: are our public records that are created digitally fit for legal purpose?

Keywords: *Information Management Storage, Conservation and Preservation, Digital Records and Evidence*

Digital records

For the fact that Digital records are records that are created, collected, processed, organized, stored and retrieved with digital devices in digital formats does not give a comprehensive definition of what digital records are. One therefore needs to understand other major ingredients or contents of what makes a digital record. These types of records come in different formats, sizes and media such as word processed documents, PDF, video clips, spreadsheets, digital voice recordings etc. footage outputs (video or voice). They are created through computers, and computer related devices like the scanner, camera, voice recorder, SMS, email documents among other devices, including security footages. Digital records were before now seen as computer records and from computer records to computer-generated records in the mid 18th century as if that was not enough, between the late 19th century to 20th century the world

electronic records had become the choice of description for librarians, information professionals and records keepers. Today, the world electronic seems to be obsolete while describing records of hydride formats. On this premise, this review uses the 21st century word of Digital records in this discussion. For the benefit of doubt, records considered here as digital records cut cross any record other than paper that is created and stored in binary digits where the only means of creation, storage and retrieval is by a computer devices. We have chosen computer device other than computer system as such other devices may be peripheral in nature compared to a computer system.

The world has gone digital. It seems a general speculation that almost all countries now have presently been described as an Electronic Economy. This is obvious as every aspect of the world's economy such as education, commerce and industry, health, governance, agriculture, security, and other social institution like religious bodies have either automated or basically at the processes of automating their daily activities. This in no doubt has led the road in the amount of generated digital records. Most offices except for documentary record-keeping have upgraded to a paperless system where memos are now shared in form of emails, SMS, phone call recording; applications sent in and received in organizations via online, staff directory and customers' records stored in the databases. All these include digital records considered in this review. However, the focus of this paper remains how are these records created and managed in Nigeria and then contemplating if they satisfy the legal requirement to be admissible in court as digital evidence.

Digital evidence

Briefly handled, digital evidences are all documents that satisfy the requirement of law to be admitted in court of law as a testimony. Remember, testimonies are forms of evidence presented by someone in support of a claim especially in courts of law.

Conservation

This includes all processes taking by records-keepers in making records last longer as it may be needed. They may go as much as changing their formats to make them last longer. Such changes may also include duplicating the records into several copies, whichever way the managers take to make such records preserved is conservation.

Preservation

For records purpose and in the content of this paper, preservation may be an act or process through which record manager keeps records as it is for a long time. It could be the process of maintaining and protecting the values of records as they exist. Lastly, the definitions of preservation here is not limited to protecting digital records from loss, alteration, destruction, decay, danger, or efforts toward making digital retain its evidential weight. But also, all methods usually adopted by records managers to keep records alive without changing their contents or form.

Introduction

Crevan (2008) argues that "archivists by and large look backward: despite pressures of the modern world- search rooms to be staffed, educational programmes to be arranged, funding bids to be written, targets to be met- the stuff of their approach to life is, in many cases, both reflective and harmonious with this view". While Atsango (2011) adds that "the digital era has brought to life a new perspective of looking at archives and archivists; a critical look from the external environment and from the future (rather from the inside and the past) that not only touches on the management, but also the preservation and conservation of books, records and archives". However, we must add that if we must confirm in us the perspective of the external environment

and the future, we must as a matter of professional importance consider the preservation and conservation of digital evidence to retain evidential qualities of digital records to satisfy the legal purpose of such records anytime. This paper though conceptually approached looks into various views of conversing and preserving digital records to retain their evidential values with the contemplation if digital record keeping in Nigeria is up to the challenges.

Nigerian Public Records: Conceptual clarification

A record is a specific piece of information produced or received in the initiation, conduct or completion of an institutional or individual activity from time to time. It comprises sufficient content, context and structure to provide evidence of that activity in a progressive manner. It is not ephemera: that is to say, it contains information that is worthy of preservation in the short, medium or long term (McLeod & Hare, 2006). From the above definition, one can identify concepts which are essential to the definition of records such as content, context, medium and structure. This could be used as carrier of information and proof of one's business activities.

Yorke (2006) maintains that for an organization to remain a functioning business entity, it has to create, keep, and manage a wide range of records. He went further to state that "recordkeeping practices within an organization are (in broad terms) a reflection of its particular responses to the environment in which it operates. Expressing his view on the concept of what period of time, is governed by a host of factors and many of these may be outside of the organization".

Ujounna and Ezenwuzor (2019) sees records as "specific type of documents that can serve as legal evidence, as such, records are often necessary in order to prove compliance, regulation and law. A record is a collection of fields, possibly of different data types, typically in fixed number and sequence". Also, Association of Records Managers and Administrators (ARMA) International (1992) defines record as "stored information regardless of media or characteristics, created or received by an individual or group which is evidence of its operations and has value requiring its retention for a specific meaningful period of time. In this case, from the definition above, it is important to state in the content of this research that records reviewing under this study are not just any kind of document, rather, for records to be accepted and admissible, it must have sufficient value to qualify as a record and to be retained as a future evidence of an action or operation".

Nigeria is a federated state located in West African Region with thirty-six States and FCT. It operates a democratic federal system constitution that separates powers with the three arms of government, the executive, legislature and the judiciary. Some other institutions or public bodies are recognized by the constitution of Nigeria such as the Central Bank, the Nigerian Police Force and the Independent National Electoral Commission among other public Bodies.

Public Records are records collected, created, managed, processed, stored and retrieved by any of these public bodies as recognized by the constitution of the federal republic of Nigeria in their day to day legal activities as required by law. The emergence of Electronic environment has prompted many nations to move into digital creation and storage of records to meet the nature and standard of modern society. These public records are seen in different formats, sizes and media such as all computer and computer-related generated records usually in digital formats. See my definition of digital records below.

Concept of Digital Records

Digital records are records that are created, collected, processed, organized, stored and retrieved with digital devices in digital formats. These types of records come in different formats, sizes and media such as word processed documents, PDF, video clips, spreadsheets, digital voice

recordings etc. They are created through computers, and computer related devices like the scanner, camera, voice recorder, SMS, email documents among other devices. Digital records if properly created, conserved and preserved should have evidential qualities that make such records admissible in courts.

“Digital records are records stored in digital format. There are two main types: Records “born” or created digitally, for example, word processed documents, PDFs, emails, spreadsheets or database records; Paper records copied to digital media, for example, documents scanned into a digital filing system”.

These records were called electronic or computer-generated records but are increasingly called digital record; the more recent term is ‘digital records’. In this research, electronic records and digital records mean the same thing. Different jurisdictions have handled digital surrogates differently. In the UK today, for example, it is acceptable to the National Archives if a public body scans a paper record and destroys the original – the digital copy becomes ‘the record’. But this is not acceptable practice in some other countries like Nigeria, unless there proof of evidence that the scanned copy was satisfied to be original and in many cases accompanied with court affidavit.

In defining digital records, the Records Management Services State of Michigan maintains that an electronic record is information recorded by a computer that is produced or received in the initiation, conduct or completion of an agency or individual activity. Examples pointed by them as digital records include, word-processed document, electronic spreadsheets, digital images, and databases. The said body went further to add that many digital records are maintained as part of an electronic recordkeeping systems, such as geographic information systems (GIS), digital storage system, computer aided design (CAD) systems, etc. In their attempt, they tried to clear up the frequently asked question in digital records, “if electronic records are public records” by stating that electronic records are public records if they are created or received as part of performing official duties. And then, defines public records as “a writing prepared, owned, used, in the possession of, or retained by a public body in the performance of an official function from the time it is created. From the above, it simply means that some digital records are public, while some are private. Therefore, for a digital record to be public, it must be created, managed, and owned by a public body in the cause of regular and daily official working duty function.

Moreover, according to the said State Services on records Management, reviewed different responsibilities of government or public body employees such as namely; government employees’ responsibility for managing digital records is the same as those for other records; Government employees are responsible for organizing their electronic records so they can be created and used; Government employees are responsible for using an approved Retention and Disposal Schedule to identify how long digital records must be kept; Government employees are responsible for keeping digital records for their entire retention period, and for deleting digital records in accordance with an approved Retention and Disposal Schedule.

Moving further, a review of literature published by University College Cork, on “Records Management Best Guideline Part 8”ⁱ has given an array of ingredients to the definition, benefits and a major challenge of digital records in that, they defined digital records as those which require a machine to be read. According to them, “this refers to computer-generated records, and also those stored on visual and aural media such as voicemail systems, DVDs, videotapes, cinematographic film, cassette tapes, compact discs, mini-discs and microforms such as microfiche and microfilm etc”.ⁱⁱ In the same piece, they out listed some benefits of digital records namely; “Technologies such as e-mail, facsimile and conference calling facilitate rapid transmission of documents and information and enable quicker transaction of business; Electronic records are easily amended and

updated; Electronic record formats such as geographic information systems, film and sound recordings, add vivid and interesting visual dimensions to written records; Electronic records use space much more efficiently than paper records. For example, a huge database may be stored on a single compact disc but if its contents were printed off or created in a paper format, it would be much more costly in terms of required storage; Paper formats cannot adequately capture some records, for example, a written description will not have the same impact as a film recording; Electronically stored records, specifically those stored on computer, are more easily accessible than those stored on paper; Electronic devices are modern, efficient, streamlined and attractive to users; Computer-generated records, for example, those stored in a database format may generally be retrieved very rapidly. Then they identified obsolescence as a major challenge by saying is a concern with both electronic hardware and software (see also Cohen 2012). For instance, the prevalence of videotapes is currently being threatened by the emergence of DVDs; floppy disks have changed radically in terms of physical size and capacity in the past decade and have now been outstripped by zip disks and the various types of compact discs that are on the market; the functionality of computer software changes rapidly as new versions come on-stream”ⁱⁱⁱ.

Finally, Amagno (2017) identifies digital records as records stored in digital format and went on to say there are two main types, namely; Records “born” or created digitally, for example, word processor documents, PDFs, emails, spreadsheets or database records; and Paper records copied to digital media, for example, documents scanned into a digital filing system.^{iv}

Digital Information Management Storage

Digital records management may be seen as the process of collecting, arranging, classifying and cataloguing, processing and storing as well as disseminating digital records for easy use and retrievals. Managing digital records are also a complex task because it comprises of the entire life-cycle of the record from the creation, collection, classification and analysis, organization and interpretation, storage and retrievals and providing ongoing access to the said records. However, it is at this point of management that the preservation and conservation approaches to digital records comes into practice, and we ask, to what extent do we preserve and conserve the evidential values of digital records. In managing digital records, it important to bear in mind that these records vary in nature; their timely disposal, must be arranged for the fixed life, and long-term preservation for those records of historical value. It has become a global view that digital records should be managed even though some countries are yet having challenges from the early stage as technology evolves from time to time. Are there best practices to digital records management, at least, knowing full well that some digital records do not show up with their evidential qualities at creation. How best do records managers preserve these values as long as the digital records are conserved? All these are the concerns of this review.

Records management, perhaps, digital records concerns multiple roles in that; it covers the organizational, technical and legal issues, and which must be considered in managing records from time to time. McDonald (2005) states that in terms of recordkeeping laws and policies, for instance, some progress have been made over the past ten years in establishing accountability frameworks for the management of information including information in records. Just like in paper records containing information, digital records contain evidence which ought to be preserved and conserved over time. He went on to state that the effective management of electronic records is not just a technology issue but requires an infrastructure of laws and policies, standards and practices, systems and technologies, and leadership capable of continually aligning the infrastructure in support of the business of an organization. It is these lacks of laws, policies and organized systems that many countries like Nigeria are facing in the legal system as a challenge of admissible records in digital format.

Digital records management is very systematic and goes in a strict consistent control of all records throughout their lifecycle. This means that records need to be managed in a well-planned and methodical design instead of accidental management or request on use approach. In managing digital records, technology ought to be considered in that records become effective, efficient and consistent part of business activities by evaluating the types of software systems for managing digital records, procedures for the management of digital records over time and analysis of approaches to integrating digital records management in our day to day life since we now live in an electronic environment, should be established with benchmarks for admissibility in court when the need arises.

Digital records are stored in two major different digital storage formats which are internal and external storage media(s). Internal Storage Media include all in-built memory storage media like hard disk, computer memory (CPU), while the External Storage Media include the CD, USB flash drive, external memory cards. Recently Digital Information System Storage has evolved to include Cloud Computing and cloud storage formats, Google Storage such as the Google Drive, and other Online Host Storage like the G-Suits among others. This paper having reviewed these two methods of storing digital records is of the opinion that for digital records to retain its evidential qualities should be stored in these two forms while the external storage media be registered and submitted in a central database from time to time as maybe required by law with the same value of content in the internal storage media within the public body. This would serve as a check should the digital submitted for admission as evidence in court.

Conservation and Preservation Practices for Digital Records

The challenges of digital preservation are compounded by considerations of the essential aspects of digital records: not only do digital records need to be preserved over time; their evidential qualities need to be preserved if those records are to be useful as evidence or meet the requirement of any legal purpose. The difficulty of preserving the evidential qualities of records when the evidential qualities may not be present at the creation of records seems to be the most challenging aspect of this.

However, conservation and preservation practices of digital records can be seen in different ways. The most ignorable practices in Nigeria is the International Data Protection Laws which handles in a very magnificent approaches the sharing of data or records in Data formats. The most essential aspect of the law that covers preservation and conservation of digital records include among other provisions; who has the right to creates, where or how is it stored, who has access to records, and for how long should the record be preserved and conserved? This practice should be carefully considered in the handling of digital records by public bodies.

Preserving Evidential Weight in Digital Records

Bouvier (1856) in a legal dictionary definition has defined weight of evidence as '*Measure of credible proof on one side of a dispute as compared with the credible proof on the other, particularly the Probative evidence considered by a judge or jury during a trial.*' The Trier of fact in a civil or criminal trial, whether a judge or a jury, must review the evidence presented, evaluate it, and determine if it meets the standard of proof. If it meets this standard, the Trier of fact must return a verdict in favour of the plaintiff in a civil suit and must convict a defendant in a criminal trial. If the evidence does not meet the standard of proof, the Trier of fact must find for the defendant in a civil or criminal case. "These decisions are based on the concept of the "weight of evidence".

The evidential weight of any record is based on the choice of the assessors to believe the fluency of evidence. The probative value (tending to convince a person of the truth of some proposition) of evidence tendered does not necessarily turn on the number of witnesses called before the court to witness, but rather the expressiveness of their testimonies on the said record in question. For example, someone testifying in court may give non supportive report, even though it may appear apparently honest and seems to be sincere evidence that commands belief, even though several witnesses of apparent respectability may contradict the evidence. The question for the jury is not which side has more witnesses, but what evidence they believe to be true and acceptable to both parties.

In any legal system, it is believed that particular evidence presented either in digital, documentary paper or oral evidence has different weight in inducing belief with respect to the facts and circumstances to be proved before the trial judge. This means that in legal practice, “Evidence that is indefinite, vague, or improbable will be given less evidential weight than evidence that is direct and un-refuted fact. For example, a criminal defendant's testimony that he had never been at the scene of a crime would be given little weight if his fingerprints were found at the crime scene and witnesses testify they saw him at the scene. Similarly, evidence given by a witness who testifies from personal observation is of greater weight than evidence offered by a witness who is testifying from general knowledge alone”.

“In a civil trial, the plaintiff's Burden of Proof is the preponderance of the evidence standard, which means that the plaintiff must convince the Trier of fact that the evidence in support of his case outweighs the evidence offered by the defendant to oppose it.^v In contrast, criminal trials require that the weight of evidence proving a defendant's guilt must be beyond a reasonable doubt. All jurisdictions prohibit the judge from instructing the jury on what weight is to be given to the testimony of any witness or class of witnesses. The judge may not state that any particular piece of admissible evidence is or is not entitled to receive weight or consideration from the jury. The judge is also forbidden either to aid a jury or to infringe upon its role in weighing the evidence or in deciding upon the facts. In addition, the judge, in giving her instructions to the jury, has no right to prescribe the order and manner in which the evidence should be examined and weighed by the jury, or to tell the jurors how they shall consider any evidence that has been received by the court”.^{vi}

In many legal systems like United States, United Kingdom and Spain, evidential weight can be as ‘adequate evidence, adequate proof legally presented at trial, burden of going forward, legal responsibility, obligation of going forward, sufficient corroboration, sufficient evidence in a case, sufficient evidence to establish a case, sufficient proof, sufficient proof of facts, validation of proof of a case, verification of proof of a case. Associated concepts: cause of action or claim, evidence, evidential burden, failure to sustain, prevalence of the evidence, prima facie case, rebuttal. Other foreign phrases that can describe weight of evidence are ‘Onus Probandi’ and ‘Burden of proof’.

Having reviewed evidential weight of digital records and the treatment by some legal systems, the paper raises concern on how to preserve and conserve these evidential qualities especially in a like country like Nigeria, since observations have shown that there actually exist such public digital records in Nigeria. The truth be told, preservation and conservation practices in Nigerian public bodies are matters of individual bodies’ methods. There is no unified practice in the public bodies or any law specifically enacted to provide benchmark on creation, preservation and conservation to retrieval either for evidence or any other legal purpose, hence the question does the preservation and conservation practices fit for legal purpose? The confirmation of this observational approach is a situation where individual public bodies and staff handle digital records as private documents to the extent of working and saving in private computers. Enquires from some staff have proven that some public officers hands over public records in digital records

upon retirement or request. We are therefore worried if these records to this extent as practiced in Nigeria fit for legal purpose. Records in public bodies should be mandated to go through auditing from time to time, submitted and registered from time to time for protection, accountability and admissibility as digital evidence. No wonder why some courts have in several occasions referred some of those public records as not admissible records. The question therefore remains, how should digital records in public bodies be preserved and conserved to be fit for legal purpose is an answer to empirical research. Even at that, we are contemplating if Nigeria can adopt any method to make digital records fit for legal purpose.

The Concept of Digital Evidence

Digital Evidence as digital files is seen as valid piece of evidence in case of a dispute. Even though records can be admissible (i.e. accepted as evidence) the opposing 'party and their legal counsel may call the evidential weight into question if there are any doubts as to the record's veracity or integrity (Ajileye, 2018). Digital evidence must be accurate, i.e. unaltered representations of the information; Digital evidence must be authentic, i.e. what it purports to be; Digital evidence must not have been tampered with; Digital evidence must be stored in a system that has been secure throughout the file's lifetime. If you can't demonstrate the above, then the file's evidential weight can be severely called into question in case of a dispute.

Contemplation on the State of Digital Record-making in Nigeria Today

The contemplations on the state of records-making in Nigeria today is to generate a reasonable answer to the fact of establishing whether our public records that are created digitally are fit for legal purpose? "There are no hard and fast rules to determine whether a digital file is 100% legally admissible, and it remains to say that there are many ways that paper files are commonly manipulated, forged, and called into question as well etc. but it is of course questionable". Therefore, the state of digital records creation in Nigeria today leads someone into contemplations on how best digital records preservation and conservation can satisfy the requirements of law in its totality from creation, processing, preservation approaches and conservation practices in the public bodies for such digital records to meet the purpose of legal evidence.

However, there are different facts to contemplate upon, these include the emergence of different application software that can alter, manipulate and miss manage digital records especially in public bodies where different staff has access to one computer system or database storage systems which makes it more worrisome. We believe that Photoshop Application Software can make someone present in a place where he was not and vice versa. Auto-voice applications can also create additional voice note to a digital record, creation of fictional audio-visual motion and non-motional pictures adds to the worry in preservation and conservation practices in digital records of public bodies.

In all these, the emergence of Modern Digital Information Storage Systems has tried to develop into sophisticated devices that hinder alteration and manipulation of digital records. The question now is to establish whether these modern digital devices can solve the problems of such circumstances in preserving the evidential qualities of digital evidence of public records in Nigeria as admissible records for the purpose of legality. This is yet to be generally accepted. But what can we do to provide enough reasons to accept the solution is question to Digital Legal Archivists and related researchers in digital archives and records management practices.

Should there be authenticating approaches to the preservation and conservation practices of digital records for preserving the evidential qualities of digital records created by public bodies in Nigeria, the benchmark for the admissibility in a legal system when legal purpose of such records

are needed could be noticed upon retrieval. However, looking into the various authenticating approaches for the preservation and conservation practices of digital records in public bodies may bring such reasonable solutions of benchmark for the satisfaction of preserving the evidential qualities of digital evidence created by public bodies. Having said all these, it is no longer a worry the fact that digital records are created by public bodies or the fact that they are preserved, but the fact to which means, approach or practices should they be preserved to satisfy the requirement of legal purpose in Nigerian Legal System is worrisome.

Conclusion

This paper on preserving evidentiality in digital records: Nigerian public records and concepts of digital evidence has in a literature review style, perhaps in opinion approach, offer views of various literature on conservation and preservation approaches to digital records in the 21st Century records management practices before contemplating the state of record-making in Nigeria today, asking: are our public records that are created digitally fit for legal purpose? The literature review was done on the following sub-headings; Nigerian Public Records: conceptual clarification; Concept of Digital Records; Digital Information Management Storage; Conservation and Preservation Practices for Digital Records; Preserving Evidential Weight in Digital Records; The Concept of Digital Evidence; before Contemplating on the State of Digital Records-making in Nigeria Today and then Conclusion and Recommendations. It was found out Digital records and the protection of its evidential value through preservation and conservation remains a challenge in Nigeria. To this effect, the paper contemplates on certain questions, if answered, should lead a way in the required standard of preserving and conserving digital records in public bodies in Nigeria.

Recommendations

This paper on preserving evidentiality in digital records: Nigerian public records and concepts of digital evidence having reviewed important aspects of the literature recommend the following;

- i. There should be a central database that should serve as a legal deposit for organizations to register digital records accruable to their organization from time to time as may be specified by law. This would authenticate any record that its evidential value is under question and declares any document not registered as inadmissible notwithstanding the value. This will also make organizations especially public bodies to sit up in their responsibility and become accountable to their duties as public officers and the like.
- ii. There should be international best practices on data protection on issues of Digital records in the world and in Nigeria in particular. Should there be such, Nigerian courts should not be seen practicing less of the standard especially when the legal system in practice in the English Common law of England.
- iii. Digital Evidence and Digital Records Management should be a mandatory course or field of study in universities since it occupies major part of day to day activities as both individuals and institutions. This is to have professional digital forensic experts to interpret digital records since many speculate that digital records can easily be manipulated with.
- iv. There should be an empirical study to find out if Nigeria can adopt any approach in preserving and conserving digital records for such records to be fit for legal purpose.

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FOOTNOTE/ FURTHER READING

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AVAILABILITY OF THE LITERATURE OF AFRICAN STUDIES AS A TOOL FOR PROMOTING PAN-AFRICANISM

Mohammed Bappah Adamu
Comfort Onwayi Umoru

Abstract

This paper discusses how availability of the literature of African studies can serve as a tool for promoting pan Africanism. The concepts of literature, African studies and pan-Africanism were discussed extensively. For Africanists, (those that specialize in African studies) problems within Africa are thought to be caused because the real flesh and blood communities that comprises Africa are marginalized from public life to many tribes and there is need to defend culture and put Africa's age-old communities at the center of African politics. The paper therefore seeks to examine how literature [written by Africans or on Africa] on in-depth African studies can establish the historical root of African people, determine the culture and social identity of Africans, establish a basis for a better relationship between African nations and the rest of the world. The paper also points out some of the factors responsible for inadequate availability of literature on African studies. Finally, the paper recommended among others, the crying need for a strong and functioning organization of African Librarians, the study of Africa should be a responsibility which Africa and her children must recognize lie's completely on their shoulders; in addition, Africanists should maintain contact and communication amongst themselves.

Key words: African studies, pan Africanism, literature, availability, Africanists.

Introduction

Africa is a resource-rich continent with thousands of languages and cultures, unparalleled eco-diversity and over a billion vibrant and innovative Africans. The relevance of African issues are apparent in our everyday lives; we use African products, exports, or mineral resources sometimes unknowingly, studying African history and current events gives us a deeper understanding of the world history and current events. For instance, the relationship between the United State and Africa predates American independence. The profit from the transatlantic slave trade helped jump-start our industrial revolution, while the labor of enslaved Africans and their descendants laid the economic foundation of this continent.

Right now African immigrants are establishing more and more communities in America , thus enriching our own African culture, which puts the study of African issues and culture at our front door step. [Mamdani 1996]. African studies are important to students and individuals who want to understand their neighbors and themselves. One becomes a better informed global citizen when one studies Africa.

According to Ekere [2010] African studies captured the interest of the world after the end of the second world war prior to that most territories of tropical Africa were more or less regarded as special preserves of different colonial powers this function among others contributed to limiting the scope of independent research in African studies. With a few exceptions, the studies undertaken at this time in the field of African anthropology, sociology, government etcetera were carried out either at the instance of or in conjunction with the colonial administrators. These writings or studies brought the light of understanding about a continent of which little was known outside. It also laid the basis for the organization of African studies on a larger and more systematic scale after the world wars.

Concepts of African Studies and Pan -Africanism

African studies is the study of Africa, especially the continent culture and societies [as opposed to its geology geography, zoology etc]. The field includes the study of African history [pre colonial, colonial, post colonial] demography (ethnic groups), culture, politics, economy, languages and religion (Christianity, Islam, traditional religions). A key focus of the discipline is to interrogate epistemological approaches, theories and methods in traditional disciplines using a critical lens that inserts African-centered ways of knowing and references.

According to Ekere (2010) African studies is both a disciplinary branch of university education and an area of study. It is a fringe of academic activities carried on for the most part in centers which exist outside universities and faculties (especially in Europe and Africa) and also attached to mid run by the university or college (especially in Africa). African studies also called africanistics is an inter-disciplinary area of study or studied in relation to other fields of study around which the study of Africa, her people, geography, traditions, history, customs and in fact everything and anything about Africa is carried out These studies are carried out by experts in African studies also known as Africanists who have devoted their time to the study of Africa and African affairs. Ekere (2010) went further to state that literature of African studies, is a study of African i.e. information resources on Africa by Africans and non Africans alike. It includes studies about Africa in its entire ramification

Pan-Africanism is a worldwide movement that aims to encourage and strengthen bonds of solidarity between all people of African descent. Based on a common fate going back to Atlantic slave trade the movement extends beyond continental Africans, with a substantial support base among the African Diaspora in the Caribbean, Latin America and the United States (Omotayo 2012).

The expression 'pan-Africanism' did not come into use until the beginning of the 20th century when Henry Sylvester Williams of Trinidad and Tobago and William Edward Burghardt Du Bois of the United States of America both of African descent used it at several Pan-African congresses (Nkrumah, 1963). Pan-Africanism as a philosophy advocates the way of liberating the black people from any form of colonization and establishing the unity for Africans and the need to have the government for Africa as United States of Africa.

Pan-Africanism is a philosophy and movement to unify all native Africans and people of African heritage. It sets aside cultural differences in the struggle against slavery, racism, and colonialism. Pan-Africanism contains a diverse range of political movements but these movements share a common goal of promoting equal right, self government and recognition of shared experiences.

Characteristics of the Literature of African Studies

One of the characteristics of literature of African studies is uneven quality of recently published books. This feature is common in both children and adult literatures. Secondly, there is a strong bias towards publishing books about English speaking Africa, which of course reflects the bias in the data collected and readily available to English speakers.

Collection of African folklore emphasizes animal tales with universally appealing features and take great liberties with translations in order to make the tales readable. Books on Africa also bear the biases of the persons who write them just as the theoretical basis of African scholarship. Visitors to Africa write books which reflect both the length of their visits and their private perceptions of what they have experienced. Many visitors stay in Africa for only a short time and their books disclose their incomplete grasp of Africa as a whole.

Availability of the Literature of African Studies as a Tool for Promoting Pan-Africanism

Literature is a common word in use among library and information professionals, yet its specialized meaning is obscure to many. When used in the domain of librarianship and information service, it refers to the total corpus of information resources whether recorded or oral, print, non-print or electronic, published or unpublished available on any subject (Ekere, 2010)

Joseph (1996) notes that African literature arguably is a journey to self rediscovery; the mannerism, diction and sometimes proverb - filled nuances are a spectacle to behold. This relays how exhilarating African literature is and how sometimes it leaves one with no option but to read the story again.

Literature is a vital component of a community's culture. It plays a huge and formidable role in the way of life of a particular group of people and that is exactly what African literature does. It holds the fabric of society together. The themes of the word the true Africa, they may differ from country to country or from sub-region to sub-region but the stories 'africanness' is always noticeable. African literature brings into light, the daily life experiences of the average African from various angles and through different nuances which can be blunt as it can be.

These stories can be either real or fictitious and each of the fore mentioned brings to the whole its distinctive 'sparks'. African literature therefore portrays through the eyes of a native to the outside world what the real Africa is all about, our dreams and innovations, our successes and challenges.

Moreover, literature on African studies serves as a means of education and entertainment. Every potential idea on Africa if properly documented and made available can educate us on various aspects of our heritage and the state of affairs of our continent pointing out categorically to the everyday issues. The imaginations and nostalgia birthed after reading these stories are simply priceless and our creative impetus are being further enhanced.

According to Campbell (2018) the intersection between education, linguistics diversity, transformation and reparations is crucial for the leap necessary to break with the limits of Euro-Centric educational ideas and structures. At a public lecture delivered at the University of Cape Coast main auditorium on 20th of March 2018, he stressed the need for the learning and promotion of the use of indigenous languages in our schools as a way of socializing the African child. An African education is one which is sure to ensure survival of our languages, indigenous cultural systems and history which have been affected by euro-centrism.

Literature across ages and continents have functioned as the embodiment and interpreter of people's culture, a conveyor of people's language as well as their philosophy, politics, psychology and national character. Nwachukwu (2005) notes that literature whether cast in the form of agitation, negotiation or based on historical reconstruction have a touch of identity.

In Africa, the fact is constituted that there is the emergence of literature as part of cultural identity and revolutionary struggle against domination, marginalization and political cruelty in African states like Kenya, Nigeria, Zimbabwe, South Africa, Guinea Bissau etc. (Ojaide 1992).

Apart from poverty, poor education, ill health, violence, hunger, sustainable agriculture, access to finance and low economic growth rate another challenge facing Africa in this 21st century is xenophobia; the fear and distrust of that which is perceived to be foreign or strange. The best we

can do as Africans is to continue to patronize literature written on Africa. Literature has the deliberate power to recreate the human society via the exposition of human experiences, religious belief and social-cultural motifs of that society within the imaginative framework of art, literature is also a liberating force that frees us from the intent ideas placed on us by the society.

Factors Affecting the Availability of the Literature on African Studies

Despite the huge impact of African studies literature on pan-Africanism, it is saddled with the following challenges;

- (1) **Fund:** The root of the crisis in African studies as it was perceived by the British Africanists was by and large financial, brought about by a severe cut back in funds available for education.
- (2) **Inadequate number of publishers:** There was severe reduction in the number of publishers willing to take on monographs relating to Africa consequently, there were just few books and monographs on African studies.
- (3) **Communication gap:** Africanists teaching in Britain have not been to the continent of their study for several years, consequently they lack good knowledge and experience of African socio-political life and customs upon which African studies should be based.
- (4) **Inadequate resource persons:** Additionally, there were inadequate trained personnel versed in African affairs. This lack of trained manpower has affected African studies and its literature.
- (5) **Compartmentalization:** there was also the problem of the existence of two separate and compartmentalized worlds of Africanists: Africans and non-Africans. The compartmentalization of Africanists into two worlds of the rich Europeans and American on one hand and poor African scholars on the other hand is a general phenomenon.

Conclusion

African studies have represented a new change, a testing ground to the academic world as a whole. The search to know and reconstruct Africa's past has reinforced the historian's determination to emancipate human knowledge from its euro-centric chains. In recent times more emphasis has been tied on compiling the oral traditions of African's field in which historians of Africa are making their most important contributions to historiography generally.

As culture is integral to the existence of a particular group of people so is African literature essential to the pride and dignity of Africans and to also strengthens our bonds of unity thereby promoting pan-Africanism.

Recommendations

In order to make available the literature of African studies as a tool for promoting pan-Africanism the following recommendations were made:

1. Africanists should maintain contact and communication amongst themselves through conferences, seminars and symposia which offered them the opportunity to build up and publicize their case for African studies.
2. Adequate fund should be made available for education and research.
3. There should be a strong and functioning organization of African librarians, first on country basis and then on regional and continental basis. Furthermore, active co-operation among Africana librarians in Africa will help to make known what records exist and what studies are going on in a local area, in a country or region.
4. Finally, the study of Africa is thus, a responsibility which Africa and her children must recognize as completely on their shoulders. In carrying out that assignment they may receive help from Europe, America, Asia and elsewhere.

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A STUDY ON POST GRADUATE STUDENTS' PERCEPTION OF LIBRARIANSHIP AS A PROFESSION IN RIVERS AND BAYELSA STATES

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Mercy E. Echem

Abstract

A profession is a specialised occupation or vocation characterised by intensive education and training in a specific field of knowledge with an intension to apply and serve humanity. Librarianship is a distinct and distinguished profession in modern society. Library and Information Science (LIS) as a profession is almost drowning in the sea of change and has been in a transformation for quite a long time. These transformations have attracted a significant increase in the number of post graduate students pursuing LIS as a profession. Hence, the purpose of this paper is to understand the perceptions of post graduate students towards LIS profession, factors that influences their choice and challenges they are facing in LIS post graduate programme. The study adopted a descriptive survey research design. The questionnaire was used as data collection instrument. The targeted population of the study are LIS post graduate students in Rivers and Bayelsa States. Questionnaires were sent online via Google form to the NLA Rivers and Bayelsa platforms respectively in order to get responses from post graduate students in the States. Based on this, 63 number of post graduate students responded which was used as the population of the study. The major finding shows that the general perception of librarianship as a profession is that it is an interesting and versatile career. What influences the students most in choosing Librarianship as a profession in their PG programme is because they want to continue from their first-degree course and employment opportunity. The major challenges faced by LIS PG student in Rivers and Bayelsa state is that most Library School do not run PG programme and LIS PG programme do not have area of specialization. The researchers therefore recommend that Library Schools in Rivers and Bayelsa State should upgrade to post graduate programme.

Key Words: Librarianship, LIS Profession, Post Graduate Students, Perception, Rivers and Bayelsa States.

Introduction

A profession is an activity or set of activities constituting a calling. A calling is an activity for which the performer has a legal and moral right to be paid reasonably whether he works in an organisation or is self-employed. All professions are callings but all callings are not professions Professions are social facts, social/economic categories highly valued for their services and

commitment to the community and the society at large. Historically, the word “profession” meant an acknowledgement or declaration and it referred to the vow or pledge taken by a cleric or monk. Later it came to be associated with the hippocratic oath taken by a physician and a similar one by a barrister. And the term thereafter came to be associated with all the activities of a religious monk or that of a physician, or a lawyer. These classical professions followed by the coming up of Dentistry, Civil Engineering, Logistics, Architecture and Accounting. With the rise of technology and occupational specialisation in the 19th century, other bodies began to claim professional status e.g. Pharmacy, Logistics, Veterinary Medicine, Nursing, Teaching, Librarianship, Optometry and Social Work. All of these could claim the status of a profession by 1900. Thus, new disciplines including librarianship rose in status and power as a profession (Butler, 1951 in Varalakshmi, 2017).

Every profession strives to persuade the community to sanction its authority to the profession within certain spheres by conferring upon it a series of powers and privileges. The society accords to it recognition in the form of social acceptance. The recognition is accorded to the profession due to the expertise possessed by it that is beneficial to the society. The term profession denotes occupations which demand a highly specialized knowledge and skill acquired at least in part by courses of a more or less theoretical nature and not by practice alone, tested by some form of examination either at a university or some other authorized institution, and conveying to the persons who possess them considerable authority in relation to clients. The definition differentiates a profession from an occupation by mentioning that a professional possesses theoretical knowledge acquired during a specialised programme conducted at a higher level. Sound theoretical knowledge forms the basis of the practice. It helps the individual to practice with confidence, update and evolve with changing time (Calhoun, 2002).

Over the years, librarianship developed from a vocation to a profession having a body of knowledge, laws, principles, techniques for processing information and serving the users. The application of scientific method to librarianship gave it the status of a profession Librarianship is a profession that is dedicated to serving the general public, providing timely and accurate information, thus contributing to the development of the society. Traditionally, librarianship is a profession associated with acquiring, organizing of books and other documents and disseminating information to the users according to their information need. The rapid technological developments like Internet and World Wide Web (WWW) have affected the role of a librarian. Now librarianship has become a very challenging profession collaborating with other profession. Of late librarians’ role has been changed to information officer, innovator/website designer, educator, database manager, so on and so forth. However, the profession of librarianship hardly shares the glamour and respect of other professions such as medicine, engineering, law etc. that are recognized worldwide (Maharana, Sahu and Majhi, 2017).

The pathway to a career in the Library and Information Science (LIS) field is rarely straightforward and unidirectional, but is often multi-faceted, with interesting detours and circuitous and even scenic routes along the way. Even in our popular media and culture, for example, one seldom sees or hears a young person remark that he/she would one day aspire to become a professional librarian. With that said, where do our LIS professionals come from and at what point in their lives did they choose their intended profession in LIS? No wonder, Igbinsa (2007) maintained that people, particularly students in their early stage in school, do not like to pursue a career in librarianship. They do not realize that librarians are unsung heroes behind the successful stories of students, researchers, medical doctors, etc. According to Lo, Chiu, Dukic, Cho and Liu (2016), it is clear that librarianship represents a second or even a third career for a significant number of professional librarians. As pointed out by Zemon (2002), “initial career choice is usually driven by youth dreams, personal interest, personal talents, market availability, geographic preferences, and likelihood that the career will support one’s lifestyle.... Lateral and

interim career choices are usually made for personal reasons (having to move, for instance) or because the current position has an unpleasant atmosphere, declining prospects, an incompatible boss... These are generally future-oriented choices tempered and driven by accumulated experience.” Meanwhile, career changes might be influenced by various factors such as the desire for personal development, economic downturn and computerization (Smart and Peterson, 1997).

In the past, it was customary for people to have a single career throughout their entire working lives. In comparison, an increasing number of people are now opting for second and even third careers by the time they retire (Lambert and Newman, 2012), especially with the existence of so many job opportunities nowadays, career changes and transitioning have become very common amongst many established professions of which librarianship is not left out. This is simply the trend as people seek to adapt to their social and economic circumstances in an age that is driven by globalization, information and technology.

There has been an increasing number of students pursuing LIS as a second career from many other non-LIS-related professions over the years (Lo *et al.*, 2015; Noh, 2010). Although, many of these newcomers have made significant contributions to the LIS profession, as they transfer their years of professional experiences, expertise, knowledge and skills from their former careers into the field (Lambert and Newman, 2012). Undoubtedly, prior work experiences affect their approach and choices towards their post graduate studies.

Meanwhile, Fisher, Hallam and Partridge (2006) noted that in the context of a rapidly changing profession, student motivations for entering the LIS profession as a second career, have not been investigated widely or in depth. It is against this background that the researchers consider it important to conduct an empirical study on post graduate students' perception of librarianship as a profession in Rivers and Bayelsa States. Therefore, this study seeks to investigate the reasons while post graduate students in Rivers and Bayelsa States consider Librarianship as a profession.

Objectives of the Study

The main purpose of the study is to understand the post graduate students' perception of librarianship as a profession. The specific main of the study are:

1. To ascertain the perception of post graduate students on librarianship as a profession.
2. To find out what factors influences post graduate students to consider LIS as a profession.
3. To determine their level of satisfaction towards the profession.
4. To examine the challenges faced by Rivers and Bayelsa States post graduate students in chosen librarianship as a profession.

Librarianship as a Profession

Librarianship as a profession was formally launched at the first national library conference on October 6, 1876, in Philadelphia. In that year, the American Library Association was organized, the Library Bureau of ALA was established, and the first official survey of public libraries was included in the United States Bureau of Education Special Report. Today, librarianship is seen as a professional organization that processes and facilitates access to and use of information, provides means of communication between knowledge and people and mediates between different needs (Nwosu, 2017). Librarianship is developed both as a science (body of knowledge) and an art (the skills). The motto of the LIS profession is to meet the needs and demands of users. Librarianship as a profession have more critical role to play in building up awareness among the members of the society and help them to adjust to changes in the information environment (Varalakshmi, 2017).

Librarianship is a missionary profession and many people feel those who are blessed would become librarian. A librarian is a highly privileged human being as he live in the temple of knowledge and has access to world's best knowledge resources. Many academicians have

perceived librarianship as highly intellectual profession who support the academic endeavours to take shape. Dr. A.P.J. Abdul Kalam, the former president of India, a great academician, scientist par excellence, visionary and a philosopher has said, “Librarian is the best academician in any university system”. A librarian understands, identifies, validates and channelizes treasures knowledge to the students and teachers in the university (Maharana, Sahu and Majhi, 2017).

At the on-set, librarianship started as a practice or apprenticeship trade. Librarianship which began as a career aligned with the clerical trades has in the last century developed into a bona-fide profession. The reason for this is largely due to the creation of post graduate programme. The primary purpose of LIS profession is to provide access to information pertinent to user request with great speed and thus, achieve user satisfaction. Hence it is service based. Keeping this basic purpose in view many LIS scientists define the LIS profession (librarianship) in different ways. In essence it is the science and art of managing libraries. Librarianship is that branch of learning which has to do with recognition, collection, organization, preservation and utilization of graphic and printed material. It is that branch of human knowledge which is concerned with the production, care and use of recorded human knowledge. From the above, we can infer that:

- Librarianship is a branch of human knowledge
- It is a profession
- It is tool for information or knowledge
- It involves social service
- It is department of scholars, not a mere craft.

Knowledge of the aims of librarianship is needed along with the skills on applying them effectively in individual situations. Librarianship implies the development of individual in the profession so that he can fill successfully high position for which his abilities fit him (Dakhole, 2005).

According to Varalakshmi (2017), the concept of librarianship has been changing according to the demands of the society and the bewildering growth of the communication media. The whole history of librarianship indicates some broad landmarks, with different phases. The first phase of librarianship comprised of the “custodianship of the resources of knowledge”. From that stage it traversed to the contemporary roles of “knowledge manager” and “digital librarian”. Social institutions are affected by movements and changes in the society around them and the library is no exception. The media revolution, the computer and communication technology, the changing behaviour of user community and the increasing social responsibility of libraries have had a great impact on the LIS profession. The present librarian is vested with new responsibilities like managing information networks, and conducting online searches, managing digital preservation and development of digital libraries. The profession is more active and meaningful in the present day information world. Librarian acts as an advisor, interpreter and mediator for user’s information needs. Thus, the work performed by today’s information professional, seems quite different and challenging in both forms and formats than in the past. Thus, LIS profession is gaining a new identity. The profession has evolved from being a custodian, librarian, documentation officer to webmasters, network administrators/managers, information literacy providers, information facilitators etc.

Lis Profession in Nigeria

According to Nwosu (2017), the Nigeria Library Association (NLA) established in 1962 served as the mouth piece of the profession until 1995 when the Library Registration Council of Nigeria (LRCN) was established to provide legal status for the profession. However, the strength of these two bodies lies in their promotional roles. Both have been very successful in promoting

continuing education (conferences, seminars, workshops, courses, talks and training) publications as well as registration of professional librarians. The professional associations exist to advance the standing of the members of the occupation or profession by setting educational and other standards governing the profession, advocating for public and private policies, aiding members in their professional development, and advancing professional practice through research and information dissemination. Within the profession, required skills and competencies are evolving, as the knowledge content of production processes and services are rising. For instance, the Nigerian Professional Cataloguers must be equipped with a wide range of personal and transferable skills which include interpersonal communication, knowledge of cataloguing standards, and knowledge of bibliographic utilities in order to manage the changing environment in which they work and to fit in the 21st century librarians.

Review of Related Literature

Simon and Taylor (2011) use focus groups to investigate students' perceptions towards the LIS profession and their motivations for choosing or arriving at a career in this field. Their findings indicate that motivations for attaining a qualification are a complex mix of both personal and professional aspirations. Personal aspirations were identified as finding balance between work and life/family after major life changes, as well as love of books and sense of self-worth. Meanwhile, previous library-related work experience, the value of a MLIS degree and its professional status, and career progress were identified as the professional aspirations amongst the student respondents. At the same time, many participants described their route into LIS work as 'accidental', and so the "decision made at this point may indicate that the 'accident' has transformed into a viable career path" (Simon and Taylor, 2011, p. 813). According to another study conducted by Alansari (2011) on academic, public and special librarianship, it was found almost half of the respondents reported that they just 'drifted into the profession', while other respondents chose the LIS profession because of their interest in books and reading and generally considered LIS work to be interesting and attractive.

Ard, Clemmons, Morgan, Sessions, Spencer, Tidwell and West (2006) conducted a survey of MLIS students at the University of Alabama to explore their motivations in choosing a career in LIS. They focused on students' views of the job market, and their preferred areas of LIS work after graduation. The study concluded that, for these students, the opportunity to get a job that they considered interesting was far more important than financial compensations or professional and social prestige. Other reasons for choosing LIS career included poor job market in their originally-preferred professions, need for a change, previous working experience in a library, personal interests and providing services to others. About five years later, Taylor, Perry and Hayes (2010) conducted a follow-up study on MLIS students at the same university (University of Alabama) using the same questionnaire. In addition to confirming the findings from the Ard *et al.* (2006) study, the Taylor, Perry and Hayes (2010) results indicated a further diversity amongst the MLIS students' educational and career backgrounds, and highlighted that the 'love' for library work was also the major motivating factor amongst the students in choosing LIS. In fact, a large number of the respondents had previously worked in libraries before starting their MLIS degrees.

Noh (2010) examined the career movement patterns amongst librarians, with a questionnaire survey on different public, academic, special and school libraries to explore various factors that influenced their career movements. Out of the total 2,179 copies of the questionnaires distributed, 614 were collected. The findings revealed that the career with the highest retention rate was public libraries, followed by university libraries, agencies, special libraries, and school libraries. On the other hand, library automation system developers demonstrated the highest rates of

career movement. Meanwhile, public libraries had the highest rate of returning to the career, and also had the highest rate of being chosen as the final career, when they were also the initial one. This was followed by university libraries, agencies, special libraries, and school libraries, and so on.

Furthermore, academic librarians with some reference responsibilities made up 90% of the second-career librarians. Deeming and Chelin (2001) investigated why people change career to become second-career librarians. They found that while some career changers “drifted” into LIS, others made an active choice influenced by a number of factors including previous career, the influence of others, for example, the nature of LIS work, different stages of life and other family circumstances. Findings of this study pointed to tensions in the LIS field, as participants who entered the LIS from other professions were mostly happy with their change and generally enjoyed the LIS profession; but at the same time, they were aware of the low social status and poor image that came with being a professional librarian. de la Pena McCook (2009) also reported that school teachers often felt entering the LIS profession would enable them not only to work in traditional library environments, but also to find jobs in other non-traditional library settings such as systems librarianship, information technology (IT) specialists, webmasters, and so on.

A study undertaken by Adanu and Amekuedee (2010) investigated the reasons why people have changed career in order to become members of the library profession. Some of the factors they cite as having influenced career change to librarianship are, issues with previous career, context of life as a whole, the nature of library work, etc. Other factors according to the study are prior experience in library work and a liking for books, amongst others. In line with above study, the research carried out by Salaam and Owolabi (2010) to find out the reason for choosing Librarianship as a career choice in Ogun State, Nigeria, on responding to a question on reasons to choose librarianship as a profession, 33 (37%) indicated that they made the choice because of their previous work experience in libraries, this was followed by intellectual development with the score of 23(26%) by respondents as a major reason for choosing librarianship as a profession. The finding however, revealed that the respondents strongly affirmed that they were satisfied with their choice of librarianship as a career.

Agyemang (2019) in his empirical study on titled “So what made you choose librarianship? Reasons teachers give for their career switch” identified the nature of library work providing flexible working hours as an influencer to enter librarianship. Other reasons for a decision for one to change their career as found by Masdonati, Fournier and Lahrizi (2017) in their study are; avoiding job insecurity and poor work conditions, etc. coping with a particular life event or personal circumstance; reducing dissatisfaction and work frustration; looking for a work-life balance. Thus, the need for a life change and for a job that fits personal values and interests, employment conditions, etc., initiated a change into librarianship. Furthermore, it is on the ground of job insecurity, that Lambert and Newman (2012) also revealed in their study that teachers pursue Masters in Library and Information Science because they perceive the Library and Information Science field as an area to obtain stable employment in many academic, special, public or even school libraries. This new change or switch is not unconnected with dissatisfaction with one’s previous occupation, low job market for ones’ former filed and limited opportunities for advancement or change (Awad, Khawla, Zoabi and Abu-Rokon, 2014).

Alemna (1991) conducted a study on the characteristics of past postgraduates diploma students of the departments of library and archival studies, University of Ghana, Legon, 1981/82-1987/1988 and found that opportunity for intellectual development and further education were a major reason for choosing the profession as a career. This corroborated the findings of Nzotta (1982) on the reasons to choose librarianship among the post graduate students at the University of Ibadan. In his findings, the majority of the respondents (58%) indicated that they choose the profession because it gives them room for intellectual development.

Research Methodology

The study adopted a descriptive survey research design. The questionnaire was used as data collection instrument. The targeted population of the study are LIS post graduate students in Rivers and Bayelsa States. Questionnaires were sent online via Google form to the NLA Rivers and Bayelsa platforms respectively in order to get responses from post graduate students in the States. Based on this, 63 number of post graduate students responded which was used as the population of the study.

Data Analysis and Presentation

Table 1: Response Rate

State	Frequency	Percentage %
Rivers	41	65.1
Bayelsa	22	34.9
Total	63	100

A total of sixty-six post graduate students responded to the online questionnaire. 41(66.1%) students are from Rivers State while 22(34%) are from Bayelsa State.

Table 2: Demographic characteristics of the respondents

Sex	Frequency	Percentage %
Male	24	38.1
Female	39	61.9
Total	63	100
Age		
25-34	24	38.1
35-44	24	38.1
45-54	15	23.8
55 and above	-	-
Total	63	100
Current PG Programme		
PGD	13	20.6
MLS	31	49.2
Ph.D	19	30.2
Total	63	100
Employment Status		
Lecturers	22	34.9
Librarian	27	42.9
Others	14	22.2
Total	63	100
First Degree Course		
LIS	47	74.6
Others	16	25.4
Total	63	100

Table 2 show demographic characteristics of the respondents, the distribution of the respondents by gender revealed that 24(38.1%) are males and 39(61.9%) are females. Out of the 63 respondents, 24(38.1%) are in the age bracket of 25 – 34, 24 (38.1%) are in the bracket age of 35 – 44 while 15 (23.8%) are between 45-54 years. Also, the current Post Graduate Programme of the respondents

shows that 13 (20.6%) running Post Graduate Diploma programme, 31(49.2%) are presently running a Master Degree in LIS while 19(30.2%) are running Ph.D programme in LIS. The employment status of the respondents indicates that Lecturers in LIS are 22(34.9%), Librarians 27(42.9%) while others are 14(22.2%) respectively. Finally, the distribution of the respondents' first degree qualification shows that 47(74.6) had LIS while others are 16(25.4%).

Table 3: As a post graduate student, what is your perception on librarianship as a profession?

Perception	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
Interesting	57(90.5%)	6(9.5%)	-	-	63(100%)
Challenging	7(11.1%)	13(20.6%)	43(68.3%)	-	63(100%)
Monotonous	4(6.3%)	8(12.7%)	49(77.8%)	2(3.2%)	63(100%)
Versatile	41(65.1%)	22(34.9%)	-	-	63(100%)

From Table 3, the respondents Strongly Agreed that Librarianship as a profession is Interesting with 90.5%, next to Versatile with 65.1% while the respondents Strongly Disagreed that Librarianship as a profession is Monotonous with 3.2%.

Table 4: What influences you to consider LIS as a profession in your post graduate programme?

Influences	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
Employment opportunity	40(63.5%)	14(22.2%)	7(11.1%)	2(3.2%)	63(100%)
Currently working in the library	26(41.3%)	19(30.2%)	13(20.6%)	5(7.9%)	63(100%)
Continuation from my first degree	50(79.4%)	9(14.3%)	3(4.8%)	1(1.6%)	63(100%)
Intellectual development	34(53.9%)	29(46.0%)	-	-	63(100%)
Prospect for good salary	18(28.6%)	20(31.7%)	12(19.0%)	13(20.6%)	63(100%)
Promotion in work place	26(41.3%)	22(34.9%)	13(20.6%)	2(3.2%)	63(100%)
Attractive work environment	16(25.4%)	19(30.2%)	21(33.3%)	7(11.1%)	63(100%)
By accident	-	5(7.9%)	30(47.6%)	28(44.4%)	63(100%)

Table 4 above indicate that Continuation from the first degree of the respondents is what influences them most to consider LIS as a profession in their Post Graduate Programme with 50(79.4%) responses. Next is Employment opportunity with response of 40(63.5%). While 28(44.4%) and 13(20.6%) strongly disagreed that it is by accident and prospect for good salary.

Table 5: What is your level of satisfaction with the profession at the post graduate level?

Level of Satisfaction	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
Highly Satisfied	19(30.2%)	40(63.5%)	2(3.2%)	2(3.2%)	63(100%)
Satisfied	23(36.5%)	37(58.7%)	3(4.8%)	3(4.8%)	63(100%)
Slightly Satisfied	4(6.3%)	13(20.6%)	33(52.4%)	33(52.4%)	63(100%)
Not Satisfied	-	8(12.7%)	13(20.6%)	13(20.6%)	63(100%)

In table 5, respondents were asked about their level of satisfaction with the profession at the post graduate level. 40(63.5%) agreed that they are Highly Satisfied with the profession while 33(52.4%) indicated slightly satisfied.

Table 6: What are the challenges faced in the course of choosing librarianship as a profession at the post graduate level?

Challenges	Strongly Agree	Agree	Disagree	Strongly Disagree	Total
Not all library schools in Rivers and Bayelsa runs PG programme	55(87.3%)	5(7.9%)	3(4.8%)	-	63(100%)
Difficult to gain admission into LIS PG programme	-	3(4.8%)	53(84.1%)	7(11.1%)	63(100%)
LIS PG programme do not have area of specialization	34(53.9%)	27(42.9%)	2(3.2%)	-	63(100%)
Difficulty to understand the LIS course at the post graduate level	2(3.2%)	6(9.5%)	29(46.0%)	26(41.3%)	63(100%)
Few lecturers at post graduate level	9(14.3%)	25(39.7%)	24(38.1%)	5(7.9%)	63(100%)

Table 6 above shows the challenges faced by the respondents in choosing the profession. Out of 63 respondents, 55(87.3%) indicated that not all library school in Rivers and Bayelsa runs PG programme. Next is LIS PG programme do not have area of specialization with 34(53.9%) responses. 53(84.1%) of the respondents disagreed of the fact that it is difficult to gain admission into LIS PG programme and 26(41.3%) of the respondents also strongly disagreed of the fact that LIS as a course is difficult to understand.

Summary of Findings

The research surveyed post graduate students' perception of librarianship as a profession in Rivers and Bayelsa States From the data analysis, the following significant findings are drawn:

1. There is high enrolment of female students in LIS PG programme
2. The respondents are predominantly between the age brackets of 25-44
3. MLS students in Rivers and Bayelsa are more running PG programme
4. The employment status of the respondents shows that Lecturers and Librarians are most of the people running the LIS PG programme which is actually appropriate.
5. The analysis also shows that those that had LIS in their first degree are more in the programme.
6. Librarianship as a profession was found to be very interesting and versatile
7. Continuation from my first degree and employment opportunity are what influences the respondents to consider LIS at the PG programme
8. There is high level of satisfaction in the LIS PG programme
9. Most Library School in Rivers and Bayelsa do not run Post Graduate Programme.
10. Gaining admission into PG programme is not difficult
11. LIS Post Graduate programme is not difficult to understand.

Conclusion and Recommendations

This paper is based on the post graduate students' perception of librarianship as a profession in Rivers and Bayelsa States. The major finding shows that the general perception of librarianship as a profession is an interesting and versatile career. This is in agreement with the work of Maharana, Sahu and Majhi (2017) who stated that Librarianship is a noble and knowledge-based profession, a profession that is dedicated to serving the general public, providing timely and accurate information, thus contributing to the development of the society.

Based on the findings, there should be more Library Schools in Rivers and Bayelsa, those institutions that have Library School for Undergraduate alone should upgrade to PG programme to enable more enrollment and limit students from leaving their state to other state to run the programme. Also, there should be areas of specialization in LIS PG programme like other professions. This can be achieved by the assistance of NUC and NALISE. More Lecturers should be employed in the PG programme of LIS to reduce workload from the present ones.

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STRATEGIES FOR INTEGRATING HEALTH INFORMATICS FOR KNOWLEDGE DIFFUSION AND CONTROL OF EPIDEMICS AND COMMUNICABLE DISEASES IN NIGERIAN HEALTH SYSTEM.

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Abstract

The paper adopted systematic literature review to examine the strategies for integrating health informatics in Nigerian health system: since information technology are being used at all stages of epidemics, such as prediction of epidemic trends, tracking of close contacts and infections, and remote diagnosis. Technologies employed include: mobile and web-based services such as Internet hospitals and Wechat, big data analyses (including digital contact tracing through QR codes or epidemic prediction), cloud computing, Internet of things, Artificial Intelligence (including the use of drones, robots, and intelligent diagnoses), 5G telemedicine, and clinical information systems to facilitate clinical management. The study also analyzes the measures for controlling communicable diseases and epidemics, information and knowledge for control of epidemics and communicable diseases, health information and knowledge diffusion infrastructure, health informatics as tools for surveillance, detection and control of epidemics, as well as technical and policy issues bedeviling Nigeria's health sector. The study concludes that for the Nigeria's health sector to adopt the new technologies there is need to establish a coordinated programme for the development of a National Information Infrastructure (NII), State Information Infrastructure (SII) and Local Information Infrastructure (LII), as well as training and retraining of personnel on the use of the new technologies.

Keywords: Health informatics, Knowledge management, Knowledge diffusion, Epidemics, Communicable disease, Nigeria.

Introduction

The control of communicable diseases depends on a healthy environment (clean water, adequate sanitation, vector control, and shelter), immunization, and health workers trained in early diagnosis and treatment. Thanks to effective environmental health measures, epidemics following disasters are no longer common. Exceptions are the epidemics occurring in chronic emergencies triggered by drought and civil strife, such as those that occurred in Africa in the 1980s and 1990s, and the epidemics of communicable diseases that have swept refugee camps in Africa and other parts of the world. Functioning disease surveillance systems and intact environmental health services are crucial in protecting public health and in responding to these outbreaks when they occur in times of disaster.

The conditions leading to an epidemic are caused mostly by secondary effects and not by the primary hazard, except in the case of flooding, which can cause an increase in waterborne and vector-borne diseases. Other hazards may leave standing water or pollute, or interrupt drinking-

water supplies. High winds, coastal storms, mud slides and even earthquakes can all result in standing water, especially where a “cascade” of physical effects occurs. For instance, in the Andes it is not uncommon for a volcanic eruption to melt ice and snow, creating floods, mud flows and rock falls. Earthquakes can trigger landslides that block rivers, causing flooding. In all these cases, excess standing water can promote the breeding of insect disease vectors, or contaminate water supplies with waste or sewage. Both natural disasters and armed conflict may result in the breakage of water mains or the interruption of electricity supplies required to pump water. Sewer pipes and sewage treatment works may also be broken or rendered inoperable. Besides waterborne and vector-borne disease, there may also be major epidemics of highly contagious diseases-those spread by personal contact. These are most commonly the result of crowding survivors living in crowded temporary accommodation without adequate ventilation or adequate facilities for personal hygiene and laundry. Hence, the need for integrating health informatics in order to ameliorate the Nigerian health system to cater for the large and ever growing population in the country.

Health informatics (HI) is defined as the systematic application of information, computer science and technology in areas of public health, including surveillance, prevention, preparedness, and health promotion. The main applications of PHI are: 1. promoting the health of the whole population, which will ultimately promote the health of individuals and 2. Preventing diseases and injuries by changing the conditions that increases the risk of the population basically, PHI is using informatics in public health data collection, analysis and actions. Emphasis on disease prevention in the population, realizing its objectives using a large variety of interventions, and work within governmental settings are aspects that make PHI different than other fields of informatics. The scope of PHI includes: the conceptualization, design, development, deployment, refinement, maintenance, and evaluation of communication, surveillance, and information systems relevant to public health. PHI could be considered one of the most useful systems in addressing disease surveillance, epidemics, natural disasters and bioterrorism. The use of computerized global surveillance and data collection systems, such as health information exchange (HIE) and health information organization (HIO), could assist in population-level monitoring. This could help to avert the negative impact of a widespread global epidemic.

Information systems play a central role in developing an effective comprehensive approach to prevent, detect, respond to, and manage infectious disease outbreaks of plants, animals, and humans (Damianos, Ponte, Wohlever, Reeder, Day, Wilson and Hirschman, 2002; Buehler, Hopkins, Overhage, Sosin and Tong, 2004). Currently, a large amount of infectious disease data is (are) being collected by various laboratories, health care providers, and government agencies at local, state, national, and international levels (Pinner, Rebmann, Schuchat and Hughes, 2003). Furthermore, many agencies have developed information access, analysis, and reporting systems of varying degrees of sophistication. For example, in its role as the key agency responsible for human reportable diseases in the U.S., the Centers for Disease Control and Prevention (CDC) has developed computerized reporting systems for local and state health departments. Similarly, the U.S. Department of Agriculture (USDA) is enhancing data systems for certain animal diseases (e.g., mad cow disease and foot-and-mouth disease), and the U.S. Geological Survey (USGS), through its National Wildlife Health Center (NWHC) and numerous partners, manages databases for wildlife diseases. Databases may also be available at other federal and state or local health, agriculture, and environment/wildlife agencies and laboratories.

Information and Communication Technology (ICT) represents an important structural part of modern society; this is why countries strive for constant progress in ICT and why it draws such significant attention. The digital divide is a phenomenon linked not only to the topic of access to the Internet, but also to the one of usage and how this can stimulate the sustainable development of nation-states since ICT has accelerated the growth of the global economy and improved the quality

life of the world's inhabitants. ICT has brought new ways of creating livelihoods for people: the diffusion of ICT has made it possible to reduce poverty; created opportunities that eventually reduced the "distance" between countries in many other ways. In this regard, in countries registering higher levels of ICT adoption, the digitalization pattern is explained by Digital Opportunity Index (DOI), GDP, service sector, education, and governmental effectiveness. In contrast, in developing countries, population age and urban population are positively associated with the ICT adoption, while Internet costs impact negatively.

There are those who do not see access to and use of ICTs as a luxury, but instead see them as determinants of the sustainable development of individuals, communities and nations, hence, a necessity (McNamara 2000). ICTs are viewed as crucial in the development agenda because they can be used in public administration, business, education, health, and environment, among others (WSIS 2003). This is what gave rise to the concepts and practices of e-parliament, e-governance, e-democracy, e-commerce, e-learning, e-education, e-medicine, e-treatment, e-healthcare, e-aviation, e-banking, e-publishing, e-records, e-library, e-journal, e-magazine, e-voting, e-resources etc.

The most optimistic among people see ICTs as providing developing countries with an opportunity to 'leapfrog' stages of development and be at par with the level of development in the West (Nulens 2000). One evidence is a recent study that found a relationship between access to mobile phones and economic growth, with its impact more significant in developing than developed countries (Waverman, Mesch and Foss as cited in *The Economist* 2005b). Hence, in Nigerian local government administration and public service in general, ICT can be an effective tool to ensure increased access to government services, improved value for money as well as increased productivity, transparency and better service delivery (Achimugu, 2011).

Measures for controlling communicable diseases and epidemics

Communicable diseases (infectious diseases) are illnesses caused by bacteria, viruses, fungi or parasites. Organisms that are communicable may be transmitted from one infected person to another or from an animal to a human, directly or by modes such as airborne, waterborne, foodborne, or vector-borne transmission, or by contact with an inanimate object, such as a contaminated doorknob. The following are the measures to control communicable diseases and epidemics;

Preparedness and prevention

Preparedness measures taken before a disaster can greatly increase the ability to control communicable diseases and prevent epidemics. Such measures include: training health and outreach staff in the identification and management of specific diseases considered to be a threat; creating local stocks of supplies and equipment for diagnosis, treatment and environmental health measures in case of disease outbreaks; strengthening health surveillance systems and practicing protocols for managing information on certain diseases; raising awareness among the population likely to be affected by a disaster on communicable diseases and the need for early referral to a health facility. Acute respiratory infections and diarrhoea are most often the major killers in emergency situations. To prevent them, hygiene promotion, the provision of adequate quantities of safe water, sanitation facilities and appropriate shelter are absolutely necessary. Measles outbreaks are a common hazard in emergencies, often with a high case fatality rate. Early vaccination campaigns should be considered before any cases appear.

Public-health surveillance

Public-health surveillance is the collection, analysis and dissemination of health information to enable appropriate action to be taken. This is particularly important in disasters and emergencies because of the particular vulnerability of the affected population, the sudden changes

that can occur in health due to the unstable nature of the situation, and the need to share quantitative data rapidly with a range of partners to enable rapid and effective action to be taken (Médecins Sans Frontières, 1997a). It is important to designate specific health staff for public-health surveillance. Neighborhood and community health workers, as well as the personnel of temporary relief centres and hospitals, should be alert to patients presenting with any of a list of diseases, including typhoid or paratyphoid fever, cholera, typhus, plague, encephalitis or meningitis, as well as to excessive numbers of poisonings (including food poisoning) or cases of malaria. Histories should be taken from these patients, contacts identified, and the source of the disease isolated. Surveillance of public-health problems may be possible to some extent even under the worst conditions of large-scale population movement. Existing reporting systems can be extended to create an area-wide surveillance system that covers priority diseases, including serious water- and sanitation-related epidemic diseases.

Outbreak control

Suspected disease outbreaks, indicated by information from a health surveillance system, should be rapidly investigated using standard protocols for assessment (Médecins Sans Frontières, 1997a; World Health Organization, 1999b). The assessment should enable decisions to be taken on how to control the outbreak. The two main strategies for controlling outbreaks of communicable disease are to reduce the number of cases through preventive activities and to reduce mortality due to the disease through early case detection and effective treatment. These measures should be put into place rapidly, and should not be delayed while waiting for laboratory confirmation of the disease in question. The key to effective outbreak control is a rapid response, before the outbreak develops into a major epidemic. Mass immunization is a priority in emergency situations, where people are displaced, there is disruption of normal services, there are crowded or insanitary conditions and/or where there is widespread malnutrition, regardless of whether a single case of measles has been reported or not. One confirmed case of cholera should prompt all diarrhea cases to be treated as cholera.

Preventive and curative measures work together to reduce the sources of infection by rapidly isolating and treating patients and controlling animal reservoirs; to protect susceptible groups through immunization, nutritional support and possibly chemoprophylaxis (e.g. to protect vulnerable individuals in the case of a malaria outbreak); and to reduce transmission through improvements in hygiene conditions and hygiene behaviour. The role of outreach workers in these three activities is important. They can inform people about the disease and encourage early referral of patients to a treatment/ isolation centre; identify vulnerable families and individuals requiring particular support or protection; and encourage improvements in hygiene conditions and hygiene behaviour by identifying areas where facilities need to be improved and protective hygiene behaviors need to be promoted.

Information and Knowledge Diffusion: a Panacea for the Control of Epidemics and Communicable Diseases in Nigeria

Information and knowledge diffusion is the process by which an innovation is communicated through certain channels over time, among members of a social system (Rogers, 2003). This is important because health sector is heterogeneous and, in order for it to be effective, communication needs to be targeted (DEFRA, 2008; Roling, 1998). The important role of knowledge diffusion stems from Lundvall's (1988) notion of interactive learning, as the *raison-d'être* of any innovation system which stresses that innovation happens only where actors of different backgrounds interact. An effective information and knowledge diffusion in the health sector will deliver increased data management, increased medical supply, services and assets, derive more efficient communication network, reduced costs, improved people welfare and patient care and, finally, more efficient use of resources, knowledge and assets (Manning, 2013).

Public health relies on data reported by health care partners to conduct nearly every aspect of its core functions. Information technology offers the opportunity to replace manual reporting processes with automated ones, and innovators are increasingly developing such approaches. The electronic transfer of data for public health reporting requires each health care partner to translate data from its proprietary structures-its vocabulary or format for storing data, and its protocols for sending the data as messages- into standards defined specifically by and for various public health authorities so the data are represented consistently and can be analyzed in a uniform fashion. However, the cost of developing these interfaces and associated translation services is high, partly because each specific use of clinical data to support public health (e.g., notifiable disease surveillance, birth and death registration, hospital adverse event reporting, occupational health, injury prevention, and chronic disease improvement) currently requires a separate, dedicated technical solution and the requisite management and organizational activities on each side to support the initiative. Consequently, electronic data gathering has not been widely adopted for public health purposes, even where the benefits of electronic public health reporting have been well described.

Recently, health information organizations (HIOs) across the country have been developing networks to enable health information exchange (HIE) among diverse stakeholders within a given region. These stakeholders may include clinicians, provider organizations, pharmacies, laboratories, radiology facilities, payers, emergency management and first responder groups, and health departments. Although there is some public health agency involvement in many HIOs, the primary use case of most HIOs- that is, the way that a system would be used by end users- is centered around direct patient care with the primary goals of improving providers' access to information, thereby improving the safety and quality of care, and reducing costs. As part of this work, HIOs provide the organizational infrastructure, legal underpinnings, and technical expertise to enable HIE. This includes building physical data interfaces between the stakeholders and the HIO, and mapping proprietary database codes from each stakeholder to widely accepted standard vocabularies.

Health Information and Knowledge Diffusion Infrastructure

The following technical decisions are central to an infectious disease information sharing infrastructure: data standards, system architecture and messaging standards, and data inject and access control. In this section, we discuss them in turn.

Data Standards

Data standards represent the cornerstone of interoperability between information systems involved in disease reporting and surveillance. Likewise, data standards are critical to provide unambiguous meaning to data and form the foundation that enables data aggregation as well as data discrimination in data mining applications. The often repeated quote .the nice thing about standards is that there are so many to choose from. Certainly rings true when data standards in health care and public health informatics are discussed. Fortunately, the swarm of data standards applicable to infectious disease informatics is beginning to narrow to a manageable group by the combined efforts of the National Center for Vital Health Statistics (NCVHS) and the Consolidated Health Informatics (CHI) E-Government initiative (Goldsmith, Blumenthal and Rishel, 2003). While these standards are currently required only for federal government information systems, in all likelihood, data standards adopted by the federal government need to be replicated at the local government levels for effective healthcare delivery.

System Architecture and Messaging

Messaging standards have been fewer in number with significantly deeper penetrance in the health care marketplace. From the perspective of IDI, Health Level 7 (HL7) is the dominant

messaging standard for transfer of clinical information. Almost all hospital information systems exchange HL7 messages and the majority of large private clinical labs have adopted the HL7 standard as well.

Data Ingest and Access Control

An important function of an infectious disease information sharing infrastructure is data ingest and access control. Data ingest control is responsible for checking the integrity and authenticity of data feeds from the underlying information sources. Access control is responsible for granting and restricting user access to potentially sensitive data. Data ingest and access control is particularly important in IDI applications because of obvious data confidentiality concerns and data sharing requirements imposed by data contributors. Although ingest and access control issues are common in many application domains, IDI poses some unique considerations and requirements. In most other applications, a user is either granted or denied access to a particular information item. In IDI applications, however, user access privilege is often not binary. For instance, a local public health official has full access to data collected from his or her jurisdiction but typically does not have the same access level to data from neighboring jurisdictions. However, it does not necessarily mean that this official has no access at all to such data from neighboring jurisdictions. Often he or she can be granted access to such data in some aggregated form (e.g., monthly or county-level statistics). Such granularity-based data access requirements warrant special treatment when designing an infectious disease information system.

Health Informatics as Tools for Surveillance, Detection and Control of Epidemics

Surveillance in public health is the collection, analysis and interpretation of data that are important for the prevention of injury and diseases. Through available data, possible early detection of outbreaks can be achieved through timely and complete receipt, review, and investigation of disease case reports. An inclusive surveillance effort supports timely investigation and identifies data needs for managing public health response to an outbreak or terrorist event. Worldwide, governments are strengthening their public health disease surveillance systems, taking advantage of modern information technology to build an integrated, effective, and reliable disease reporting system.

A surveillance system such as syndromic surveillance systems, could collect symptoms and clinical features of an undiagnosed disease or health event in near real time that might indicate the early stages of an outbreak or bioterrorism attack. For instance, local or regional public health departments could alert all the clinicians within an HIO about unique cases of a highly resistant infectious organism or a widespread of communicable diseases. Consequently, HIO can play an important role as part of PHI in providing available patient data in conditions of natural disaster when paper-based records might be destroyed or unavailable. The latest development of public health informatics, such as geographic information system (GIS), which uses digitized maps from satellites or aerial photography, can be used to provide a large volume of data. This enables the combination of various information such as geographic location, trends, conditions and spatial patterns. GIS along with the incorporation of mobile technology has proved to be useful in tracking infectious disease, public health disasters and bioterrorism.

Many of these areas of potential breakdown in communication could be overcome with an automated process of data collection provided by a computerized infectious disease information system. Having historical data collected on outbreaks that are readily available for predictive modeling would also lead to improved surveillance activities, fewer data entry errors, and better public health data. Data in an information system would facilitate the required reporting of infectious diseases from local public health jurisdictions to state organizations and from state

organizations to national surveillance entities such as the CDC. Additionally, information systems would streamline the reporting requirements for bioterrorism agents to the Department of Justice. Such systems also simplify dramatically the required chain of custody analysis for samples being tested for biological or chemical hazards. Infectious disease information systems also provide the ability for application of the ever expanding collection of statistical algorithms to data in real time that would not be possible without such systems. Increasingly, infectious disease data are being collected in an electronic form by various laboratories, health care providers, and government agencies at local, state, national, and international levels (Pinner et al., 2003). There has been a steady trend for public health agencies to develop in-house infectious disease information systems tailored for their access, analysis, and reporting needs. However, the development and deployment of such systems do not automatically guarantee the effective collection and use of infectious data in broader contexts (Kay, Timperi, Morse, Forslund, McGowan and O'Brien, 1998).

Furthermore, health informatics can be used to provide insights and opportunities to improve public health surveillance system the following ways:

Planning and system design – Identifying information and sources that best address a surveillance goal; identifying who will access information, by what methods and under what conditions; and improving analysis or action by improving the surveillance system interaction with other information systems.

Data collection – Identifying potential bias associated with different collection methods (e.g., telephone use or cultural attitudes toward technology); identifying appropriate use of structured data compared with free text, most useful vocabulary, and data standards; and recommending technologies (e.g., global positioning systems and radio-frequency identification) to support easier, faster, and higher-quality data entry in the field.

Data management and collation – Identifying ways to share data across different computing/technology platforms; linking new data with data from legacy systems; and identifying and remedying data-quality problems while ensuring data privacy and security.

Analysis – Identifying appropriate statistical and visualization applications; generating algorithms to alert users to aberrations in health events; and leveraging high-performance computational resources for large data sets or complex analyses.

Interpretation – Determining usefulness of comparing information from one surveillance program with other data sets (related by time, place, person, or condition) for new perspectives and combining data of other sources and quality to provide a context for interpretation.

Dissemination – Recommending appropriate displays of information for users and the best methods to reach the intended audience; facilitating information finding; and identifying benefits for data providers.

Application to public health programs – Assessing the utility of having surveillance data directly flow into information systems that support public health interventions and information elements or standards that facilitate this linkage of surveillance to action and improving access to and use of information produced by a surveillance system for workers in the field and health-care providers.

Categories of ICT

The ICT can be broadly categorized in to the following;

- Computing technology: such as mainframe computers, mini computers, microcomputers, microchip technology, Artificial Intelligence, Software technology etc.

- Telecommunication technology: audio technology, teletext, videotext, telephone, fax (facsimile transmission), voice mail, motion picture, E-mail, teleconference etc.
- Broadcasting technology: Broadband and Satellite technologies etc.
- Microelectronic/micrographic technology: CD-ROM, Hard Disk, USB/Flash technologies etc.
- Reprographic technology: printers, scanners, photocopiers etc.

Based on the above, the following specific ICT tools and services are used in the health sector to control and improve healthcare administration and delivery practices;

- Phone (both landline and mobile)
- Email
- Video conferencing
- VOIP e.g. Skype, Viber, Google talk
- Social networking sites e.g. Facebook, Twitter, WhatsApp, Instagram, Google+
- Fax
- LinkedIn
- Web forum/blogs/wikis
- Communication and correspondence systems such as TV screen and e-voting, Instant messaging services/chat
- Event calendars

Adoption of ICT for Management and Control of Corona Virus (COVID-19)

The novel coronavirus COVID-19 was initially identified in December 2019 as a case of pneumonia in Wuhan, China and has since become a global pandemic, affecting more than 150 countries around the world. The World Health Organization declared the outbreak a pandemic on March 11, 2020 and called for coordinated mechanisms to support preparedness and response to the infection across health sectors. On March 13, the Executive Office of the President of the United States proclaimed the pandemic a national emergency. While the incidence of COVID-19 continues to rise, healthcare systems are rapidly preparing and adapting to increasing clinical demands. Inherent to the operational management of a pandemic in the era of modern medicine is leveraging the capabilities of the electronic health record (EHR), which can be useful for developing tools to support standard management of patients.

The coronavirus disease (COVID-19) epidemic poses an enormous challenge to the global health system, and governments have taken active preventive and control measures. The health informatics community in China has actively taken action to leverage health information technologies for epidemic monitoring, detection, early warning, prevention and control, and other tasks.

Information technology has played a key role in China's response to the COVID-19 outbreak. Information technology was used at all stages of the epidemic, such as prediction of epidemic trends, tracking of close contacts, and remote diagnosis. Technologies employed include mobile and web-based services such as Internet hospitals and Wechat, big data analyses (including digital contact tracing through QR codes or epidemic prediction), cloud computing, Internet of things, Artificial Intelligence (including the use of drones, robots, and intelligent diagnoses), 5G telemedicine, and clinical information systems to facilitate clinical management for COVID-19. Variety of health informatics are being used for the management and control of communicable diseases in the world, as encapsulated in Table 1 below;

Table 1: Health informatics used for management and control of communicable diseases

Technology	Scenarios	Application
Mobile internet	Internet hospital, web-based services; Web-based information dissemination platforms	Provide a variety of web-based services for the public during the outbreak, including screening and consultation services for mental health disorders or other diseases; Release official statistics about the COVID-19 epidemic and keep the public correctly informed about the current situation in a timely fashion
Big data	Contact tracing; Epidemic prediction; Spread track	Record health status and activity trajectory, monitor crowd movement, or locate close contacts; Apply predictive modeling and turning point projection, monitor crowd activity; Assist the development of epidemic prevention and control strategies
Cloud computing	Supercomputing	Provide computing power
IoT	Real time data collection	Intelligently manage information
AI	Drones; Intelligent diagnosis; Temperature detection; Robots	Deploy for fever detection and crowd activity monitoring; Assist doctors in contact tracing diagnosis, reduce work pressure, and improve diagnostic accuracy; Rapidly measure body temperature; Use intelligent robots to perform simple operations such as disinfection and delivering medications and food during the epidemic
5G	5G+ telemedicine; Comprehensive clinical information system	Provide support for remote video consultations and diagnostics; Facilitate clinical management related to COVID-19
Social Media e.g. Social networking sites e.g. Facebook, Twitter, WhatsApp, Instagram, Google+	Constant information dissemination	Enlightenment on management and control of the disease

Technical and Policy Issues bedeviling Nigeria's Health Sector

The Nigeria's health sector is bedeviled by a number of technical and policy related issues that hinder massive deployment of health informatics for data collection, analysis, dissemination and reporting. These include;

Existing communicable disease information systems do not fully interoperate

Most existing systems have been developed in isolation. As such, when disease-control agencies need to share information across systems, they may resort to using non-automated approaches such as email attachments and manual data (re)entry. In addition, much of the search and data analysis function is only accessible to internal users. Real-time data sharing, especially of databases across species, could enhance expert scientific review and rapid response using input and action triggers provided by multiple government and university partners.

The information management environment used to analyze infectious disease data and develop predictive models

The amount of information necessary to collect and analyze for any public health outbreak has exceeded the capacity of epidemiologists to work without the assistance of a computerized system. Even with the assistance of statistical packages and geographical information systems, the lack of integration of current data collection, analysis, and visualization activities still leaves a significant gap in the ability to timely process the information acquired by field investigators. Current infectious disease information systems provide very limited support to professionals analyzing data and developing predictive models. An integrated environment that offers functionalities such as geocoding, advanced spatio-temporal data analysis and predictive modeling, and visualization is critically needed. Having an information system where data are integrated from the point of collection to the level of modeling and visualization-facilitated analysis would lead to higher quality of data input, more timely analysis, better predictive analysis of outbreaks, and potentially improved disaster incident management.

An efficient reporting and alerting mechanism across organizational boundaries is lacking

Certain infectious disease information needs to be quickly propagated through the chain of public health agencies and shared with law enforcement and national security agencies in a timely manner.

Data ownership, confidentiality, security, and other legal and policy-related issues need to be closely examined

When infectious disease datasets are shared across jurisdictions, important access control and data security issues need to be resolved between the involved data providers and users. Subsets of such data are also governed by relevant health care and patient-related laws and regulations.

Requirements for ICT Adoption and Use for Effective Healthcare Delivery

- Improving ICT skills/literacy
- Stable electricity
- Provision of ICT infrastructure
- Improving accessibility and affordability to ICT facilities
- Government commitment and responsibility
- Create public awareness on the importance of ICT for information and knowledge diffusion.

Conclusion and recommendations

Since its early operation, health informatics have played an unparalleled role in discovering and containing the spread of diseases in a timely fashion while protecting lives and improving the health of entire populations by reducing the financial and human impact of diseases on the society as a whole. Several applications and initiatives are currently available to meet the growing needs for faster and accurate data collection methods. For example, the Global Outbreak Alert and Response Network of WHO relies on web-based sources for the purpose of daily surveillance. Web applications are being developed regularly to visualize and aggregate news. Mashupscan serve as a tool for disease surveillance. Hence, the revolution of information technology and the urge to incorporate it into different aspects of healthcare has become a required task for public health leaders. Patients, healthcare professionals, and public health officials can all help in reshaping public health through the adoption of new information systems, the use of electronic methods for disease surveillance, and the reformation of outmoded processes. The study recommends as follows;

- There is need to establish a coordinated programme for the development of a National Information Infrastructure (NII), State Information Infrastructure (SII) and Local Information Infrastructure (LII), by using emerging technologies, such as satellites, including VSAT, fibre optic networks, high-speed gateways and broad-band/multimedia technologies to facilitate information and knowledge diffusion for effective healthcare delivery services in the state.
- Training and retraining of personnel on the use of the new technologies for enhanced collaboration through information and knowledge sharing.

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THE ROLE OF INNOVATIVE TECHNOLOGIES IN ENHANCING ACADEMIC LIBRARY SERVICES IN CONTEMPORARY NIGERIA

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Abstract

This paper examines the role of innovative technologies in enhancing academic library services in contemporary Nigeria. The major objective of every academic library is to provide quality information resources and effective means of access to such information resources to its users, particularly in this rapidly changing digital environment. The paper discusses the concept of innovative technologies. It also explores the various emerging technologies such as social media, mobile phones and cloud computing etc. that can be employed in enhancing academic library services for effective service delivery. The paper analyzes the major predicaments that could hinder effective use of innovative technologies for service delivery in academic libraries in Nigeria that include among others: lack of information technology skills among academic librarians, inadequate Internet connectivity and unstable power supply etc. The paper equally provides tips on how to overcome the identified predicaments. The paper concludes by stressing that academic librarians in Nigeria should make efforts to acquire innovative skills so as to be relevant in this 21st Century, and that all hands must be on deck to ensure compliance with global best practices by our academic libraries.

Keywords

Innovative technologies, Roles, Academic libraries, Academic library services, Contemporary Nigeria

Introduction

It is a known fact that libraries have witnessed significant changes in recent years. Such changes which are brought about by the advancements in Information and Communication Technologies (ICTS), have impacted positively on the modalities of information services provision. The traditional methods of information dissemination have given way to electronic means of communication. While the developments and application of ICT in library operations which have improved and facilitated the dissemination of information and access, libraries are witnessing unprecedented growth. Additionally, ICTS have equally provided new roles in information provision, dissemination and transfer. The librarian no longer plays a passive role rather he assumes an active role. He is no longer a custodian of books but the gate way to a myriad of information sources. Haber (2011) posits that while providing books was a standalone function for libraries throughout the last few centuries, their offerings have evolved with the digital age to meet the changing needs of their patrons in the 21st century.

The basic aim of an academic library is to meet the teaching, learning, scholarly-research and other information needs of its faculty, students and research scholars effectively and with efficiency. Academic libraries in Nigeria are not divorced from technology revolution. As information providers, they are constantly under pressure to provide relevant sources of information to their immediate communities. Technology enables change and technology enforces change. According to Ogar and Tangkat (2018), librarians and patrons must make a number of adjustments as a result of any library automation project, whether it is an original implementation or a migration. One key area is the relationship between people and technology is that people have to change the way they behave and think to work effectively in a technology driven environment. This means that academic libraries are compelled to incorporate digital sources in order to remain at the fore of information provision and dissemination.

Today, students and faculty have developed greater preference for electronic information than manually driven systems. The increased availability of digital information has caused students to find alternative means of study and research with the aid of laptops and cell phones. Ocholla (2009) asserts that the acquisition of information online using PC's such as laptops and palmtops and even phones is proving to be detrimental to academic libraries in terms of patronage. Patrons no longer depend on the academic library as an essential part of their learning and research rather they are beginning to see the library as one of those facilities a university or college should have. Libraries must strive to retain their patrons and be at the peak of providing information sources that suit the demands of the present day information seekers. There is need therefore to ensure that the academic library continues to soar high in information generation, provision and dissemination. The library cannot function effectively without the librarians who are the human resources that determine effectiveness in service delivery. It is against this background, that this article aims to examine the roles of innovative technologies in enhancing academic library services in contemporary Nigeria.

The Concept of Innovative Technology

Innovative technology is an extended concept of innovation. While innovation is a rather well-defined concept, it has a broad meaning to many people, and especially numerous understanding in the academic and business world. Innovation according to Andrew (2020) refers to adding extra steps of developing new services and products in the marketplace, or in the public that fulfil unaddressed needs or solve problems that were not solved in the past. Innovative technological however focuses on the technological aspects of a product or service rather than covering the entire organization business model. It is important to clarify that Innovation is not only driven by technology.

Innovative technology is the process where by an organization or a group of people working outside a structured organization embarks in a journey where the importance of technology as a source of innovation has been identified as a critical success factor for increased market competitiveness. Innovative technology in the library is the combination, the integration and interaction of different technologies that makes the library product and services successful. According to Kiran (2016) service innovation may be defined as the use and improvement of various latest technologies to provide better and timely services to the users within a reasonable cost for the development of the users as well as the society as a whole.

Library started to apply new innovative technologies features in providing information and knowledge to their users. For example, few years back, the library website might not be so interesting enough for users. But, now, the rapid growth of information based engine could be attached to websites, it's give a great look and feels. Users feel it is more user's friendly and easy to

navigate. Other technologies such as the RFID, automated checkout systems and online databases are among the good innovations that helps academic library to cater for their users.

Furthermore, the new technology of cloud computing is giving huge benefits to libraries and information centres. Cloud computing is the system that uses a network of remote servers placed on the Internet. In this case, information of the website is stored in the remote location. Library easily can store their website contents in the cloud system and the administration of the website can be done remotely anywhere at any time. Examples of some of the innovative technologies for academic library services are elucidated below:

Social Media

The growth of social media has given an added-value to many organizations including the library and has created closer relationship between libraries and their users. Social media is a platform for communicating information. According to Bradley (2012), the term social media refers to the use of web-based and mobile technologies to turn communication into an interactive dialogue. Kaplan and Haenlein (2010) described Social Media as a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0, and allow the creation and exchange of User Generated Content. It is the shift from a broadcast mechanism, one-to-many, to a many-to-many model, rooted in conversations between authors, people, and peers. According to Dahl (2009), social media are defined as forms of electronic communication through which users creates online communities to share information, ideas, personal messages, and other content (such as videos). While there are different ways to categorize social media, its typology is often based on the main function and purpose of use, such as for blogging, microblogging (like Twitter), social networking (for instance, Facebook), collaborative knowledge production and sharing (like Wikipedia), multimedia sharing (YouTube), and sharing reviews and opinions.

Social media can be described as the communication tools that enable other users to response immediately to the issue or topic. Applications such as Facebook, Blog, Twitter, Flickr and Instagram are most popular among users nowadays. This application could be the communication tools by academic libraries to deliver information to their users. For instance, it can be viewed using smartphone or tablet. When the library is using social media, it is more considering on numbers. The more numbers library get, it means that more users are aware of library announcement and library users are able to communicate directly to the library staff on issues posted.

Furthermore, some academic libraries are using WhatsApp application for their communication tool. Some libraries are using Facebook application to invite users by creating event calendar. The Youtube application enables libraries to record video in educating users on how to use library collections. As new platform has emerged, academic libraries need to choose their platform on how to disseminate information and updates. For promoting purpose, social media plays an important role in outreach programmes. Librarian is the best person in the library to use this powerful tool to create links between users and the library. A social media in the library focuses on building online communities of users who share interests and activities, or who are interested in exploring the interests and activities of others. Most social media services are web based and provide a variety of ways for users to interact, such as e-mail and instant messaging services. Academic libraries, particularly in Nigeria and their parent institutions can work together to integrate positive uses of social media services delivery for obvious reasons.

Mobile Phone

Mobile phones have collapsed all barriers and they have promoted fast communication across boundaries. According to Ahmed (2011) before the advent of ICT, communication in the library was possible through notices, circulars etc. in libraries, users have to visit the notice board to get update about the library activities. As scientific knowledge increased, electronic communication systems began to develop. The library can inform its users through a single SMS about any new activity and this has gone a long way in supporting library-to-user, user-to-library, and user-to-user online interactions. Global System for Mobile Communication (GSM) has revolutionized the daily operations of most academic libraries. The application of telecommunications to an automated library can bring more efficiency of library services on mobile phones. Academic libraries are putting efforts to develop new innovative ways to deliver their services to mobile phones so that their users can access them any time anywhere.

Similarly, mobile phones can be used by the library for sending text message alerts to the users about their reservations becoming available or overdue books. Moreover, some vendors are having mobile version of catalogue for their customers or announced plans to produce an iPhone-optimized version of their catalogue. The benefits of mobile phone services in academic libraries according to Iwhiwhu and Ruteyan (2010) include short message services (SMS) facilities available on all mobile phones, which could be used to create awareness amongst the academic library users about upcoming events and new arrivals. In addition, with the help of GPS, users can find the location of multiple branches of the central library. Academic libraries can provide access of their digital information materials on users' mobile phones. Web OPAC on mobile phones also help users in searching for information from anywhere, when the library updates any information, the users will be able to receive the new information. Using mobile phones, academic libraries can configure automatically to send text message alerts for hold, overdue materials and reserved resources available.

Armstrong (2009) in an article titled "Should Academics Use media in their Professional Lives?" posited that there are many opportunities for the academic scholars offered by social media technology. Most of these could be viewed as an extension of face-to-face networking. Social media offers another type of forum for researchers to forge connections with scholars around the world. The author gave this example to further buttress the point "a conference that you attend in person might also have a web page on Facebook or a similar site. Materials such as paper proposals and posters can be posted on that site in advance and people can meet each other ahead of time in a secured online environment.

Cloud Computing

Cloud Computing is a web based technology, which is a new form of computing. It is a service provided on the Internet or network. It is a server based service which is very helpful in these modern times. Cloud computing requires remote server and Internet so as to maintain and organize data and applications. In cloud computing, so many computers are connected with a server. The applications are installed in a remote server and all the computers connected to that server location can use all these applications. There is no need to install every application in a single computer (Patil and Nalawade, 2018). It is one of the most important innovative technologies in the 21st Century that offers infrastructure, platform and software as a service and is receiving a great deal of attention among individuals, corporations and Governments.

Additionally, cloud computing is a conjunction of technologies and tendencies that are making infrastructures and applications more dynamic, more flexible and replaceable. Applications such as e-mail, web conferencing, customer relationship management (CRM) are all tracked in

one cloud. Cloud computing is a combination of technology with trends that makes infrastructures and applications more dynamic, flexible and usable. Cloud computing can transform the way systems are built and services delivered, providing libraries with an opportunity to extend their impact. According to Suman and Singh (2016), Cloud computing helps libraries to maintain the record data, private and delicate data. It also enable libraries show their presence on the web. Academic libraries are adopting this technology for electronic journal access, hosting digital libraries, tracking of statistical data and also integrating library hosting too. The library community can apply the concept of cloud computing to amplify the power of cooperation and to build a significant, unified presence on the Web. This approach to cloud computing can help academic libraries save time and money while simplifying workflows.

Impact of Innovative Technologies on Libraries

Libraries now use various types of innovative technologies to aid the services they render. Everyday new technological advances affect the way information is handled in libraries and information centers. The impacts of new technologies are felt by libraries in every aspect. According to Har and Preeti (2010) computing technology, communication technology and mass storage technology are some of the areas of continuous development that reshape the way that libraries access, retrieve, store, manipulate and disseminate information to users. The academic library has been from its inception an integral part of institutions of higher learning, rather than an appendix or adjunct.

The introduction of various Information and Communication Technologies (ICTs) trends have led to reorganization, change in work patterns, and demand for new skills, job retraining and reclassification positions. Technological advancements of the past twenty five years, such as the electronic database, online services, CD-ROMs and introduction of the Internet have radically transformed access to information. Innovative technology has impacted on every sphere of academic library activity especially in the form of library collection development strategies, library building and consortia. Innovative technologies present an opportunity to provide value-added information services and access to a wide variety of digital based information resources to academic library clients.

Furthermore, academic libraries are also using modern ICTs to automate their core functions, implement efficient and effective library cooperation and resource sharing networks, implement management information systems, develop institutional repositories of digital local contents, and digital libraries and initiate ICT based capacity building programmes for library users. Innovative technology has brought unprecedented changes and transformation to academic library and information services, conventional LIS such as OPAC, users services, reference services, bibliographic services, current awareness services, Additionally, document delivery, inter library loan, audio visual services and customer relations can be provided more efficiently and effectively using ICTs, as they offer convenient time, place, cost effectiveness, faster and most-up-to-date dissemination and end users involvement in the library and information services process (Onaade, 2012). The impact of ICTs characterized on information services by changes in format, contents and method of production delivery of information products. The emergence of the Internet as the largest repository of information and knowledge has changed the role of library and information science professionals from intermediary to facilitator. New tools for dissemination of information and shift from physical to virtual services environment and extinction of some conventional information services and emergence of new and innovation web based services are also prominent.

Challenges Affecting the Use of Innovative Technologies for Service Delivery in Academic Libraries in Nigeria

In Nigeria, just like other developing countries, the application of innovative technologies is affected by certain challenges, some of which are as follows:

1. Lack of Information technology skills that include inadequacy of networking skills by some academic librarians, library automation and digitisation, web based services, reprography, micrographs, facsimile, video text, Teledex, database creation, library management software including CDS ISIS, LIBSYS, content development, desktop publishing, intranet, presentation etc.
2. Insufficiency of hardware/software and relational databases in the academic libraries. This also includes the inability of the academic libraries to create data structures which facilitates the indexing and retrieval of information and thesaurus development which will support innovative technology. Farkas (2006) emphasizes on some specific technical skills like HMTL, Network administration, PHP and MYSQL, efficient use of search engines, use of blogs to provide services, web cast and search skills as factors that will go a long way in enhancing academic library services in Nigeria.
3. Lack of Information literacy skills: These have to do with the inability of some of the academic librarians to locate information efficiently and effectively, evaluate information critically and competently, and use information accurately and creatively. Also, included here is the economics and marketing of information product and services, information resource management, information processing and organising, e-mail, multi-media and video conferencing.
4. Inadequate Internet connectivity and facilities is another major challenge that could hinder the use of innovative technologies for enhanced academic library service. Many academic libraries in Nigeria are grossly affected by this challenge. Hence, a full and reliable Internet services should be provided to the institutions to improve the application of innovative technologies in academic libraries.
5. Unstable power supply. Provision of adequate, steady, constant, uninterrupted and reliable power supply is a key to the use of innovative technologies for enhance academic library service. However, in Nigeria, the general epileptic power supply has been a stumbling block to the use of technologies in almost all sectors including the academic libraries.

Conclusion and Recommendations

The importance of innovative technologies in academic libraries for information service delivery cannot be overemphasized. Various types of social media platforms are used in information communication and dissemination in information related organizations and libraries, particularly in advanced countries. Therefore, in as much as libraries in Nigeria irrespective of their types wish to stay visible and relevant to their community of users, they must move with contemporary trends and embrace developments brought upon by Information and Communication Technologies. The social media technologies have evolved to add value to library services and improve innovations in such a way that enables the library to retain its clientele and attract more.

Considering the increasing application of innovative technologies in library services in today's information environment especially in the advanced world, the paper recommends that:

1. Academic libraries in Nigeria should fully adopt the use of the innovative technologies to provide dynamic information services to their users.

2. There is equally the need for librarians to acquire the necessary technological skills through training programs and be provided with the required infrastructure that include reliable bandwidth, consistent Internet connectivity, for proper use of these technologies for service delivery in order to compete with their counterparts in other parts of the world.
3. Improvement in power supply is also essential for meaningful use of innovative technologies to deliver dynamic services to clients.

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LIBRARY AND INFORMATION PRACTICE IN THE FOURTH INDUSTRIAL REVOLUTION

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Abstract

History has it that every industrial revolution has its toll or impact on organizations including libraries. Some of these impacts have been very friendly to some organizations why it is very catastrophic in others. The fourth industrial revolution otherwise known as industrial 4.0 presents a clear way of describing the boundaries existing between the physical, digital and biological world. It guarantees a combination, fusion or application of artificial intelligence or other technological devices in the performance of functions and services in organizations including libraries and information centres. Industrial 4.0 creates a world or avenue for the application or adoption of virtual and physical systems in official operations and services at the global level. This paper examines library and information practice in Nigeria in the fourth industrial revolution. The paper highlights the synopsis of earlier industrial revolutions, the impact of the fourth industrial revolution on library, functions and services, types of technological devices needed to work in libraries and information centres in this industrial revolution, what library and information professionals need to do to fit in properly in industrial 4.0 era as well as the challenges of librarians in fitting in properly in industrial 4.0 revolution. The paper recommends that every librarian or information practitioner should engage him/herself in ICT training to acquire the needed skills and knowledge needed to function effectively in industrial 4.0 era

Key Words: Industrial 4.0, Industrial revolution, Library, Library and information practice, Librarians

Introduction

Industrial revolution is a period when one can rightly say that remarkable development started in the manufacturing industries in Europe and America. It is a period in history which marked the process of positive change from agrarian and handicraft economy to one dominated by industry and manufacturing. It marked the period when there was a paradigm shift from manual to the use of machines in agricultural practice and the manufacturing industries in developed parts of the world particularly, Europe and America.

Industrial revolution started in Europe in the 18th century-(1760-1840). According to Chen (2020), the industrial revolution was a period of major industrialization and innovation that took place during the late 1700s and early 1800s. Chappine (2020) states that industrial revolution was a period when new sources of energy such as coal and steam were used to power new machines designed to reduce human labour and increase production.

The industrial revolution began in Britain and later though very quickly, spread to other parts of the world. So far, three industrial revolutions have taken place and the fourth Industrial Revolution (4thIR) which began in Germany in 2011 is fast changing how we live, work and communicate. The 4th IR focuses on artificial intelligence and empowers people on how to value the things they use now and into the future (Hussain, 2019). The 4th IR brought about a lot of innovations in many organizations including libraries. It is also affecting library practice in different types of libraries, and librarians have no choice than to queue in to the industrial 4.0 innovations in library operations. This has enhanced library services to library users in various libraries.

The History of Industrial Revolutions

Industrial Revolutions (IR) clearly showcased a period in history that is characterized by an overhaul in global economy from agrarian and manual economy to mechanical methods of production. It is a period that is characterized by enormous socio-economic changes in England and America.

The first industrial revolution began in 1760 to 1840. This was a transition period from human and animal labour technology to machinery, new chemical manufacturing and iron production process, improved efficiency of water power, increased use of steam power and development of machine tools (Mohajan, 2019). The author further stated that the first industrial revolution brought a complete turnaround in textile manufacturing, mines, steam powered railroads, powered ocean freighters, steel productions and other areas of economic activities.

Prior to the first IR, Wilde (2019) recorded that agriculture which was the major occupation of the British people was done manually and it was labour intensive which made it difficult to produce at commercial level. Many authors and scholars have also written a lot on the causes of the first industrial revolution notably, Wright (2020); Wilde (2019) and Chappine, (2020). They all agreed that the first IR sparked off in Britain because of political and economic competitions in Europe, scientific revolution in Europe, agriculture, government policies, political influence over India and other colonies, innovations in technology of the time, growth of the population, availability of coal and iron, financial innovations (capitalism and entrepreneurship) and transport all contributed to enhanced the first IR.

The Second Industrial Revolution (2IR) also called Technological Revolution (TR) or US revolution started in the middle of the 19th to the first quarter of the 20th century (1860-1914). It is a period or phase of rapid industrialization which triggered rapid advancements in the manufacturing and production industries. It is characterized by a number of technological inventions like electricity, alloys, petroleum and other chemicals, electrical communications technologies (telegraph, telephones and radio) and running water with indoor plumbing (Atkeson & Kehoe, 2001). Again, Atkeson and Kohoe in Mohajan (2019) stated that during the 2IR, the inventions and innovations were science-based that were centered on iron and steel, rail road, electricity and chemicals. This period was described as the age of synergy (Smil, 2005). On the effects of the 2IR globally, Niiler (2019) states that technology has changed the world in many ways, and that perhaps, no period introduced more changes than the 2IR. The author further stated that from the late 19th to early 20th century, cities grew, factories sprawled and peoples' lives became regulated by the clock rather than the sun.

The Third Industrial Revolution (3IR) began in the 1950s and it ushered in semi-conductors, main frame computers and the internet. The 3IR brought in full blown technological development which affect either positive or negatively our socio-economic lives. The 3IR brings with it the cloud, internet, the Smart phones of all sizes and shapes, Facebook, telegram,

WhatsApp, etc. It is called the digital revolution. According to Roberts (2015) the third IR is not driven by a physical engine, but by technologies of the digital engine of internet, renewable energy and Three Dimensional (3D) printing. The author further stated that the revolution will almost change everything we do, make use of and plan in the future. Markillie (2012) and Rivkin (2011) discussing about the TIR state that as manufacturing goes digital, a third great change is now gathering pace. It will allow things to be made economically in much smaller number, more flexible and with a much lower input of labour. The TIR is highly dependent on collaboration to drive changes, innovations and technological advancements (Roberts, 2015). The TIR is making cities and communities to become smarter and more creative with the advent of digital technologies. The negative effect of TIR is that economically, most industries could not compete favourable because of the advances in technology. The TIR has profound impact on the ICT, knowledge, defense, health, education, advanced manufacturing, financial and administrative sectors (Roberts, 2015). This means that TIR touched virtually every facet of human life.

The fourth industrial revolution (industrial 4.0) which is what we are implementing now has a remarkable improvement over the TIR. It is characterized by fusion of technologies that is blurring the lines between the physical, digital and biological spheres. It is defined by Hussain (2019) as a new level of organization and control over the entire value chain of products. It builds on the development of the TIR. Industrial 4.0 is an advanced manufacturing model that includes within itself an extensive set of technologies not necessarily unpublished but integrated with each other and with the whole industry which is characterized by its high virtual, digital and technological performance (Carvalho and Cazarini, 2020). According to Schwab (2016), industrial 4.0 is evolving at an exponential rather than a linear pace, and it is disrupting every industry in every country. It has already produced artificial intelligence, from self-driving cars and drones to virtual assistants and software that translate or invest, the industrial 4.0 involves a systematic change across many sectors and aspects of human life. It also has the potential to raise global income levels and improve the quality of life for populations around the world. Industrial 4.0 has made it possible for consumers to afford and access the digital world; and technology has also made it possible for new products and services that increase the efficiency and pleasure of our personal lives such as ordering a cab, booking of flight, buying a product, making payment, listening to music, watching film or playing a game to be available (Schwab, 2016). Industrial 4.0 has lots of opportunities such as increase in productivity, increasing trends in artificial intelligence, innovative technologies which will integrate different scientific and technical disciplines, increase in the use of robotics and the internet working of physical devices (Xu, David and Kim, 2018). The most serious shortcoming of industrial 4.0 is that it is feared that it may lay off people from their jobs and this will certainly increase the poverty rate (Zervoudi, 2020).

The Impact of Industrial Revolution on Library and Information Practice

The various industrial revolutions have had tremendous impacts on library practice. They have helped to reshape the library and its operations in many positive ways. In the first industrial revolution, Francis in Hussain (2019) notes that libraries had increased in size but because of the haphazard growth, libraries' administration had become weak and funds for the acquisition were to be inadequate. As a result of these shortcomings, library services were not in existence, whereas the position of librarian where considered as part-time job and cataloguing lacked proper method.

During the second industrial revolution, Public Library Act of 1850 was allowed by the Borough in England and Wales to establish public libraries. Towards the end of the second industrial revolution, book stocks were increased and opened up to readers (Hussain, 2019). This means that people were allowed to make use of libraries at the close of the second republic. The

author further stated that in the third industrial revolution, the use of computers was introduced in libraries. This made it easy to store large amount of data in the computer and this solved libraries' data storage problem. During this period, machine readable cataloguing was introduced. Various libraries advanced from a localized off-line batching era of automation into an era of on-line through the On-line Cataloguing of Library of Congress (OCLC) in computing networking. Automation became easier for the professional users. This sparked off inter-library loan and on-line database searching. Libraries became decentralized because of the introduction of library automation. Again, resource sharing was introduced as a means of building library collection while reference services became a serious topic more sophisticated because of highly specialized information (Featherstone, 1990). Ellen (2016) notes that industrial 4.0 revolution will be more interesting for library communities and advised libraries and librarians to embrace the revolution for a number of reasons such as Books to Desk (B2D), mobile work list alert and push information for academic, etc. There will be innovative library services away from the traditional library services such as the delivery of digital knowledge that are being supplied with low cost to consumers; functionally rich products and system that attract customers to use them continuously; and highly multi-task skills of staff that are capable to support customers' demands (Chad, 2009). Libraries have changed and are now sanctuaries intended to be accessible to anyone.

Types of Technological Devices needed to Work in Libraries in the Fourth Industrial Revolution

The fourth industrial revolution is a period in history in which ICT application is overwhelmingly used in virtually all facets of human life. ICT is freely used in business, health, teaching and learning, organize and hold meetings, etc. The use of ICT in libraries particularly in academic and research libraries according to Sivakurmaren, Geetha and Jeyaprakash (2011) became widespread in the 1960s. The authors further stated that libraries employed IT/ICT to speed up their daily activities and reduce their operating cost. Ebijuwa and Anyakoha as cited by Edom (2013) defined ICT as tools and as well means used for collection, capture, process, storage, transmission and dissemination of information. The computers are used to process and store data, while telecommunication technology provides information communication tools which make it possible for users to access databases and link them to other computer networks at different locations.

In their study Mishra and Mishra (2014) listed ICT facilities needed to work with in libraries to include:

1. Bar-coding technology (A barcode scanner for reading printed barcodes for circulation and stock verification).
2. Bulletin Boards Services (BBS) (A computer system running software that allows users to connect and log into the system using a terminal. Once logged in, a user can perform functions such as uploading and downloading of software data, reading news and bulletins, and exchanging messages with other users).
3. Computer technology (All types of computer systems, like desktop, laptops, etc and its peripherals).
4. Fax machines (used to convert images to electronic signals that can be transmitted over a communication link and convert back to images at the receiving end).
5. Library management software packages. (Software packages consist of step by step instruction that tell the computer what to do. Such library software include KOHA, Eergreen, Biblioteg, Openbiblio, Invenw, PMB, Opals, Newgenlib and LIBsys, etc.).
6. Micrographic and Reprographic technology (various types of reprographic machines).

7. Printing technology (These are different types of printing machines used to print documents).
8. Radio Frequency Identification (RFID) (Modern technology device used to prevent theft in libraries).
9. Smart Card Readers (used to read smart cards) such as users identification cards).
10. Storage technology (Optical disc storage technology used to store information externally like CD-ROM, Digital Video Disk (DVD), etc.
11. WEB technology (The World Wide Web (www) is a client server based used to distribute hypertext and multimedia information system on the net).

These facilities are used for different purposes to ensure that the functions and services expected of librarians are adequately provided. The bar-coding technology is used to track the movement of information resources in libraries. Bar-coding information resources help to protect them from theft and mutilation by deviant users. The Bulletin Board Services (BBS) help library users and even staff to upload or download software data, read news and also exchange messages with other library users elsewhere in the global village. The computer systems are used to perform various functions and even provide services to library users. Different types of computers including desktops, laptops and its peripherals are used to perform various tasks in libraries for the benefits of library users.

Fax machines are also used to send and receive messages. Fax machines were useful as a means of transmitting and receiving messages in libraries before computer and internet systems were introduced. The library management software like KOHA, Evergreen, PMB, OPACs, etc is used in total library management. The software if properly installed can be used for various library management purposes like ordering and acquisition of information resources, processing, loan etc. The reprographic facilities like photocopiers, scanners and cyclostyling equipment as well as printers are used to print and mass produce documents in libraries and information centres. The Radio Frequency Identification (RFID) is used to track the movement of information resources in the library. With the bar-code system pasted on information resources, it will be difficult for deviant users to steal or mutilate the materials. The bar-code system helps to protect information resources from theft and mutilation.

What Librarians should do to function effectively in the fourth industrial Revolution

Industrial 4.0 came with its attendant descriptive changes and challenges which library and information practitioners need to contend with. Such descriptive change elements according to Ahmat and Hanipah (2018) include sophisticated technology that simplified solutions to customers in ways that make them affordable and conveniently accessible; low cost, innovative business models; and economically coherent value network. Again, Chad (2009) asserts that libraries would be disrupted by innovative services from outside the traditional library domain. These services the author further stated have substantially grown the total library market but have taken market share away from conventional libraries. Consumers like the new library services and often prefer them to the services offered by new conventional libraries. In order to function effectively in this industrial revolution, Ahmat and Hanipah (2018) suggest that librarians need to:

1. **Reshape the Organizational Behaviour:** When a new era of disruptive changes come(s) up, there should be a study on interaction of organization behaviour in the system which should be scrutinized to enable staff adjust to the new system. The interaction of all the staff in the library at all levels need to be examined in terms of mutual understanding, perception, expectations and barriers so that the positive work environment remains

sustainable (Ereze and Gati, 2004). The libraries need to examine the changes in trend within organizational behaviour comprehensively based on the people, organization structure, environment and technology (Ahmat and Hanipah, 2018). As a result of the disruptive changes occasioned by the 4IR, people's information need and expectations of the library will change and there should also be changes in the organization's structure to accommodate these changes, improvement in the environment and technology are needed to function effectively in the 4IR.

2. **Redesigning New Business Models:** Librarians should re-strategize their business framework and activities to be accommodated in 4IR era. Ahmat and Hanipah (2018) citing Osterwalder suggested that the Business Model Canvas (BMC) which consists of visualizing, mapping, discussing, and inventing new business strategies should be adopted by librarians. This business strategy if adopted by librarians will help them in effective management of their libraries in terms of users, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships and cost structure. With all these key areas covered, provision of library services in 4IR will be very easy.
3. **Restructure Businesses Process Flow:** This means writing out instructions to guide library staff and users in their services and interactions to ensure that users information needs are properly met. Such instructions will take care of the management process, operational and supportive processes respectively. Library practitioners are advised to examine the suitability and the necessity to restructure the library system which will substitute the manual system to modern electronic methods that will guarantee free flow of functions and services in the library.
4. **Remake the Job Description and Roles:** According to Ahmat and Hanipah (2018) libraries are encouraged to study and remake the new context of job descriptions and roles at every rank of staff. This will involve replacing some of the manual operations with ICT enhanced operations. As a result of this, all library personnel both professionals and others should try to acquire the necessary ICT skills and knowledge needed to float with these technological changes. There is also need to develop new enlightenment perspectives about handling library related issues within the 4th IR.

Types of Services to be provided to Library Users in Industrial 4.0 Era

The industrial 4.0 presents libraries and librarians with lots of opportunities to improve libraries services, and to exploit ICT potentials in its functions and services. Information retrieval, sharing and access are being modified as a result of the adoption of industrial 4.0 provisions. Industrial 4.0 presents a situation where information, people, things and technology are interconnected by the internet (Ranjan and Singh, 2018). Revolutions in the information services and information and Communication Technologies (ICTs) have moved the cyberspaces towards being intelligent to capacitate machine-to-business connectivity, giving rise to machine-as-a-service (Grenechar, 2018). This simply means that the use of machine or technology is gradually adopted to perform the functions of human beings. Librarians are expected to provide services using ICT. Services like reference services, Current Awareness Services (CAS) Selective Dissemination of Information (SDI) services, internet search services, web cataloguing skills, accessing databases; e-books, e-journals, etc. However, in order to provide such services, Agadi, Choukimath and Shokeen (2017) suggest that librarians should possess additional skills which will help them to perform effectively in industrial 4.0 era. Among these skills is on-line/web cataloguing skill.

On-line/web cataloguing skill

On-line/web cataloguing skill is one the most important skills that every librarian or library manager should possess in other to perform effectively in industrial 4.0 era. On-line/web cataloguing are used inter changeably and they mean the same thing. It is an electronic bibliographic database that describes the book, video tapes, periodicals, etc. carried by a particular library. In industrial 4.0 era, librarians in various libraries are expected to possess the requisite skill needed to create on-line database. As a result of this, librarians should prepare themselves by undertaking the necessary training privately or officially to be able to carry out this important library function. Examples of on-line catalogue include; COPAC, SUNCAT, NLA Trove, WORLDCAT, etc. these on-line catalogues reflect the collection of libraries worldwide which can be accessed anywhere around the globe.

The Challenges Faced by Library Practitioners in Industrial 4.0 Era

There are myriads of problems for library practitioners to cope with the industrial 4.0 in Nigeria and other developing nations of the world. It will be misleading to assume that the introduction of ICT in library services will provide a perfect and trouble-free information management possibilities particularly in industrial 4.0 age (Agbo, 2015). Some of the challenges to be faced by library practitioners in industrial 4.0 era include:

- 1. Insufficient Funding:** ICT is capital intensive and as such, not many libraries will be willing to expend their meager allocation from the parent institutions on ICT facilities and installations. It is no longer news that libraries are usually neglected in the scheme of things by the host institutions and agencies. Therefore, any little amount released for library development will be properly spread out to touch every area of need in the library.
- 2. Lack/Epileptic Power Supply:** Unless the power sector improves on its services, library and information practice in industrial 4.0 era will not be expected to perform effectively. This is because this era is purely technological based, and technology can only work effectively as expected with steady power supply. Where power supply is epileptic technological facilities cannot be put to proper use.
- 3. None Possession of Technical Skills:** Library practitioners are expected to improve themselves by acquiring requisite skills and knowledge to operate effectively during the industrial 4.0 era. Most library practitioners today do not possess the technical skills needed to function effectively in this era.
- 4. Technophobia:** Technophobia is the extreme fear to use or make use of technology related facilities. According to Runguta (2016), technophobia is the extreme and irrational fear of technology. The author further stated that technophobia relates to irrational fear of computers, robots, artificial intelligence, weapons and other such things which seems advanced in scientific thought. Similarly, Olesen (2019) opines that technophobia is the constant and persistent fear of technology and the feeling of severe anxiety associated with using anything technologically advanced. It is very unfortunate that most library practitioners are highly technophobia even in this age and time where ICT is used in practically all facets of human lives. Most library professionals and practitioners are still afraid to use computer related facilities for both private and official functions. Unless most library practitioner overcome the technophobia in them, library practice by such professionals in industrial 4.0 era will be difficult.

5. **Inadequate infrastructural Facilities:** Poor infrastructural facilities will also contribute to the problems of library and information practice during the industrial 4.0 era. Inadequate bandwidth and non-availability of appropriate antivirus and other necessary software can hinder both library practitioners and users optimum utilization of ICT facilities (Agbo, 2015). Such infrastructure facilities according to Kalbande and Chavan (2017) include; computers, tablets, servers, printers, scanners, barcode readers, e-book readers, photocopying machines, Close Circuit Television (CCTV), telephones, fax machines, etc. These infrastructure facilities should be readily available to enable library and information practitioners function effectively in industrial 4.0 era.
6. **No Strong Management Support:** The parent institution or establishment which the library is serving must give very strong support to library and information practitioners to enable them embrace and grapple with the demands of industrial 4.0 on library and information practice. Such supports could come in form of sponsorship to conferences, workshops and seminars and in-service-training and re-training programmes. Where necessary supports are not provided, it will be difficult for library professionals to adapt to global best practice librarianship in this era

Conclusion

Industrial 4.0 has created an easy avenue for library professionals to practice and equally provided services to users using ICT. Industrial 4.0 has made the job of professionals very simple. Librarians are therefore required to improve on their technological skills and knowledge to enable them to benefit from the provisions of industrial 4.0 revolution It is only when library professionals have acquired these skills and knowledge that they would be able to benefit maximally from the innovations introduced by industrial 4.0.

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AWARENESS AND PERCEPTION OF PLAGIARISM AMONG LIBRARY AND INFORMATION SCIENCE (LIS) PROFESSIONALS IN SELECTED LIBRARY SCHOOLS IN RIVERS STATE.

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Abstract

Plagiarism is a high profile issue for library and information science professionals. Undoubtedly, it is an ongoing issue that has for long bed stridden the academic world like a colossus. Consequently, the fight of plagiarism among library and information professionals in various library schools in Nigeria requires proper awareness and understanding, which in turn will have effects on their involvement in the role the play against plagiarism. Hence the role of LIS professionals towards plagiarism is enormous given the task ahead. Therefore, the study investigated awareness and perception of plagiarism among library and information professionals in selected library schools in rivers state. The study adopts survey research. The population of the study consists of professionals and paraprofessionals in Ignatius Ajuru University (IAUE), Rivers state university of science and technology (RSUST), and university of Port Harcourt (UNIPORT) which has a population of 82, will be used to analyze the data collected, which were purposively selected. Three research questions would guide the study. The data for the study were collected through the administration of a questionnaire. The data collected were analyzed using descriptive statistics (frequency percentages and mean). it was found that the trends in LIS profession towards plagiarism are: referencing an unread (unavailable) primary source without mentioning the secondary source where the information is gotten from; ignoring of prescribed disciplinary plagiarism procedures. Again, promotion, mismanagement of time, academic pressure and to achieve higher grades was among the factors contributing to plagiarism. While using awareness and managing expectation about plagiarism; ensuring sources used are cited correctly; use of detection plagiarism software are viable strategies to curb the menace. The study recommends among other things: emphasis should be made on training of LIS professional in order to acquire knowledge about plagiarism.

Keywords: Plagiarism, Plagiarism awareness, Plagiarism perception, LIS Professionals, Information

Introduction:

Plagiarism in the academic world is a problem observed in today's scholarly works. Plagiarism has rapidly grow among scholars(Professionals), where various works are claimed and submission made without the knowledge of the original author of the works to be acknowledge. Acknowledging the original author and to ensure that sources are cited or linked is the core

lingering difficulty among professionals. Hence, Ashiya and Sharad (2015) reinstate that the foundation of academic and scholarly world revolves around ethics and integrity, where ideas and theories are created, confirmed and re-confirmed, experiment and research work is carried and published for the benefit of humanity with genuine desire of acknowledgement. However, qualities of a research work determine competence in a given profession and its lack deters viable works and create problem for the LIS professionals. In this regard, the understanding of plagiarism will uniquely position the LIS professionals to assist researchers from falling victims to the menace.

Plagiarism is irregularities which consist of copying (entirely or partially) other peoples work (ideas, texts, structures, images, amongst others) literally or in a slightly modified manner without adequately citing the source (Education and Examination Regulations, 2015). The modern concept of the term plagiarism as immoral and originality of one's work as an ideal, emerged in Europe in the 18th century. Etymologically, plagiarism word is derived from a Latin word "Plagiarius" which, literally, means "kidnapper" which denotes the one who steals someone else's work and publish that as his/her own. The word, in literature, was pioneered by Roman poet Martial who complained that his verses were kidnapped by other poets (2018). Similarly, plagiarism is destructive and an unwelcomed development with the implication of creating a setback to the academic advancement of any higher education system created for capacity building, irrespective of staff category or professionalism (Omonijo, Anyaegbunam, Onyekwere, Obiorah and Ogunma, 2017).

Contemporary, plagiarism is more than house hold misconduct. The exponential growth in scholarly publication makes it harder for professionals and instructor to detect the plagiarized sources. Hence, Maurer, Kappe, and Zaka (2006) list the following activities that result in plagiarism as follows:

- Turning in someone else's work as your won.
- Copying words or ideas from someone else without giving credit.
- Failing to put a quotation in quotation marks.
- Giving incorrect information about the source of a quotation.
- Changing words but copying the sentence structure of a source without giving credit.
- Copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not.

Although, it is obvious that plagiarism can be prevented but with sincere efforts and continuous awareness. Reinhardt, Mletzko, Sloep and Drachsle (2015) assert that awareness is the knowledge about an object or event, the competence or skills as well as the method of operation; it has to do with background knowledge about the object, event or other phenomenon in bid to interpret it. However, with enhanced access to a vast amount of knowledge and resources, academic dishonesty and plagiarism is increasing among professionals in various institution of higher learning around the globe (Brimble and Stevenson-Clarke, 2005). Thus, it is important to know that there must be a strong awareness of the generality of academic fraud (plagiarism) before LIS professionals devise strategies to minimize plagiarism.

Awareness is knowledge about something that exist or understanding of a situation or subject at the present time based on information or experience (Ani and Ahiauzu, 2008). Moreso, awareness raise consciousness, knowledge of a situation, familiarity and create an informed interest over event. Consequently, plagiarisms understanding among LIS professionals depend on its awareness. Although librarians have been the hub of knowledge since the ancient time but still the easy availability of electronic resources has ignited plagiarism. As a result, the strategies or mechanism of facilitating cognitive knowledge plays great role towards effective curbing of the menace. However, the gap intended by library and information professionals is fundamentally

linked to the provision and support of education and literacy development. To buttress this point, Orim, Borg and Awala-Ale (2013) stressed that most plagiarism cases occurred as a result of lack of awareness and proper skills. Similarly, it promote change in actions, behavioral change (either negative or positive) and general understanding of the criteria and effect of an issue. Hence, Merikle (1984) as cited in Idiegbeyan-ose, Nkiko and Osinulu (2016) assert that awareness is the ability of a person to discriminate among several possible stimuli: it enables the person to make right judgment and decision as well as attain high level of performance and perception

Hence, awareness and perception are two core decisive factors towards rating of a subject. Thus, perception triggers the process of recognizing , organizing and interpreting sensory information, as it deals with the human senses and generate signals from the environment through the five sense organs: sight, hearing, touch, smell and taste(Human Perception and Information processing, 2015). As such , the understanding of plagiarism is best valued , determined when LIS professionals has adequate knowledge on the way plagiarism is structured and its productive nature in mankind through research. Notably, lack of awareness on the part of LIS professionals has led to wrong perception of the subject and unfiltered research works in our libraries. Libraries irrespective of types have the sole mandate of providing services to her numerous clientele, hence serving as a bridge between knowledge generator and knowledge seeker. These institutions (library) conserve the cultural and intellectual heritage of mankind. Therefore, they ensure information transfer chain. However, the LIS professional ought to act as an agent of communication from information generation to the point of use. The primary purpose of LIS professionals is to provide access to information pertinent to user request with great speed and thus achieve user satisfaction. More so, it is service based which propel her to ensure quality of research / scholarly works.

Chopra (2012) while writing about the characteristics of the profession rightly says: Librarianship calls for a unique combination and personal qualities. A librarian is an administrator without being any less a theoretician. He is a lover of books and he is equally interested in people. He is a scholar, practioner and a person with an eye on the technology, because all technological advances affect the libraries and their social relevance. These complex qualities calls for a comprehensive training as to understanding the procedures and rudiment involves in print and non-print information resources.

However, there is no doubt that academic dishonesty is a moral and ethical issue, which librarians frown at, but lack of knowledge and awareness increases the rate at which it is been practice. Additionally, its perceptive nature among professionals (LIS) must be triggered towards curbing the menace. More so, librarians should be prepared to spend greater hours sensitizing other scholars outside the library profession in order to understand the dangers attached therein.

Statement of the Problem

Plagiarism typically gives reflection to the performance of a particular researcher, all of which is collusion for the purpose of deceiving and receiving credit or reward for work which is not yours. Lack of adequate and stringent laws of copyright and unfair means and lazy mentality of researchers and scholars have become a major problem among professionals and the diverse perception among LIS professionals has become an undermining connection in the detection of plagiarism among scholars.

Therefore, plagiarisms have negative effect on the LIS professionals. It is obvious that such practice is intellectually retrospective; decline in mastery and ability to convey discipline

specific expressions; affects the development of core ethical values such as honesty, integrity, personal effort and respect for the works of others. All these are indication to lack of awareness and positive perception

Also, it is likely that lack of regulation, the failure to detect the menace or lack of knowledge about the existence of tools that allow its detection means it goes unpunished, which in turn may lead to scholarly research been plagiarized by professionals.

The situation among LIS Professionals is no different. The researcher(s) therefore sought to investigate plagiarism awareness and perception among library and information science professionals in selected library schools in Rivers State.

Purpose of the Study

This research work intends to examine plagiarism awareness and perception among LIS professionals in selected library schools in Rivers State. The specific objectives of the study are to:

- Ascertain the most pressing plagiarism trends among LIS Professionals.
- Ascertain if awareness provides the knowledge on which plagiarism are avoided and appropriate understanding perceived.
- Examine the factors contributing to plagiarism and perception among LIS Professionals.
- Proffer solution on awareness of plagiarism and perception among LIS Professionals

Research Questions

This study will address the following research questions:

- What are the most pressing plagiarism trends among LIS Professionals
- What are the factors contributing to plagiarism among LIS Professionals
- What strategies are effective against these menaces among LIS Professionals

Literature Review

The foundation of academic and scholarly world revolves around ethics and integrity, where new ideas, theories are created, confirmed and published for the benefits of humanity with a desire of acknowledgement (Ramzan, Munir, Siddique and Asif, 2012). Hence, the efficient and effective functioning of LIS Professionals in the academic world call for the knowledge of plagiarism as it has fast become part of our educational culture. Arguably, more and more educational professionals are not deeply rooted in constructive and background check work but are turning up for ready-made sources (i.e. on the internet) owing to diverse reasons, among which are: weak argumentative skills; lack of citation skills; time constraint; fear of consequences of failure on fatuity; unfamiliarity with the topics, amongst others. The easy availability of electronic information through internet creates a challenge for librarians, whom must be well informed not only to detect and deter plagiarism, but also to educate their uses about its ill effect (Ashiya and Sharad, 2015). However, Deubel (2018) affirms that clues for detecting possible plagiarism included paragraphs without citations, lack of sources for numeric data, strings of citations from older publications that had no further content elaborates, content that did not appear to match the nature of the citation attributed to it, and quotes without exact locations from the sources.

The emergence of information and knowledge society is a significant intervention with the potential to ensure that knowledge and information are very important for achieving meaningful development. Similarly, the exponential growth in scholarly publications makes it harder for

professionals and instructor to detect the plagiarized sources. More so, taking of somebody's intellectual thoughts and putting them in your own work where you have not acknowledged them at all as coming from somewhere else and passing them off as yours (Breen and Maassen, 2005). Furthermore, plagiarism is not only unethical but also creates a problem for the original authors once he/she locate his/her work in another article (Shahabuddin, 2009). These call for urgency among LIS Professionals, in view of upholding the core value of information access and authority. The enhanced access to a vast amount of knowledge and resources, academic dishonesty and plagiarism is increasing in the institution of higher learning around the globe (Brimble and Stevenson-Clarke, 2005). Hence, to others the internet been free for all and serve as a public domain has made many to copy with citation or acknowledgement (Oliphant 2002;Baruchso-Arbia and Yaari, 2004). This usher in reasons why the need for information on plagiarism and the ability to generate its knowledge is not exclusive to any culture, society or even profession.

Undoubtedly, there are certain factors that trigger plagiarism. According to Dordoy (2002) who concludes that the most important factors influencing plagiarism range from promotion, laziness or mismanagement of time, easy access to information materials on the internet, unawareness of rules and regulations and unwitting plagiarizing. Similarly, Kenny (2007), which found out that pressure to publish as quickly as possible but with little time, submitting the same article to a number of journals to increase the likelihood of acceptance or indeed simple carelessness are among the factors leading to taking the risk of plagiarism. Jereb, etal (2018) noted that higher institutions attitude towards plagiarism, that is whether they have clear policies regarding plagiarism and its consequences or not. Ultimately, the simplified motive for plagiarism according to Park (2003) includes but not limited to the following:

1. Lack of understanding of the subject.
2. Efficiency gain.
3. Time management.
4. Personal values/attitudes.
5. Defiance.
6. Denial; or neutralization.
7. Temptation and opportunity.'
8. Lack of deference

On the other hand, it is fascinating that even though information seekers have both online and offline sources to access information, the usage of it is not always done in the proper way by the end-user, in this way facilitating the occurrence of plagiarism. Another complicating motive that triggers this view is the somewhat indifferent role that may be played by LIS professional not generally educating fellow professionals about avoiding plagiarism or creating policing towards curbing the menace. Notably, in academic society the idea behind plagiarism is that of ownership (Evering and Moorman, 2012). Hence, academic integrity relates to the values been enshrined in scholarly works, such as avoidance of cheating, maintenance of academic standards, honesty in research and academic publishing.

These plagiarist activities are common among professionals. Schminkes (2009) commentary illustrates both the range and variability of plagiaristic activities, of which he distinguishes between experienced scholars, who knowingly violate convention and new scholars, who either lack the knowledge regarding appropriate processes or take shortcut to secure tenure.

Thus, plagiarism among professionals is an old and over-growing problem. Similarly, Fishman (2009) affirm that this plagiarist activities also occur; when the plagiarist uses words, ideas or works of a product without due acceptance of usage; when works of another are attributable to another identifiable person or service; without distributing the work to the source from which it is obtained; in a situation in which there is a legitimate expectations of original authorship; and to obtain some benefits, credit, or gain which need not be monetary. As such, the plagiarist not only steals the fruit of such effort but also register all that painstaking work to his or her own name. Breen and Maasen, (2005) who affirm that professionals/teachers need to teach her subject how to reference their work properly because , as has been previously noted, many incident of plagiarism result from ignorance rather than intentional cheating.

Specifically, from various studies such as Sridhar, Selvan and Prabhu (2014) have come to agreed that to eradicate plagiarism librarian should work with their parent institution to curb plagiarism by incorporating instructions about it into library orientation programs. Hence, they ought to be knowledgeable about reference sources as well as familiarize themselves with standard citation and pass on this knowledge to the academics as well as the students who come to the library to do their research. LIS professionals are expected to give scholarly writing to the attention it requires and must ensure that robust curricula which include detailed compulsory programs or courses on scholarly writing for students, academia are developed and sustained. In the same vein, Carroll and Appleton (2001) maintain that in order to achieve relevant awareness, professionals and institutions have to define and implement plagiarism prevention measures. The author subdivided these measures as strategies into the following main groups:

- Removing possibilities to plagiarize.
- Informing students, researchers and professionals about the institution policy and procedures concerning plagiarism.
- Teaching what plagiarism is all about to avoid it.
- Legal and proper use of computer tools for plagiarism cases search.
- Clear distinction between assessment and disciplinary processes.
- Clear, true and consistent disciplinary procedures.
- Common responsibility of all persons, implementing plagiarism prevention policy and performing procedures.

However, various anti-plagiarism software are available to detect plagiarism. Some are commercial (EVE2, Turnitin, etc) while some are free (Viper, Plagia, Grammarly, Plagtracker, Small Sean tool, and Plagiarism Checker (Ashiya and Sharad, 2015). Also, others include: Turnitin, Copy Find, EVE, Safe Assign, Word check, PlagiServe and so on. On the other hand, establishment of academic policies for reducing cheating behaviors as academic integrity policies and honor codes can be catalysts in preventing plagiarism (McCabe et al., 2001). Moreso, personal knowledge of what plagiarism encompasses is considered a major determinant of one's involvement in (Mandray, 2007).

Methods

Research Design

This study adopted survey and descriptive designs, which involved gathering, tabulating, describing, analyzing and interpretations of data on awareness and perception of plagiarism among library and information science professionals in Rivers State.

Population of the Study

The target population for this study comprised 3 tertiary institutions in Rivers State which is made up of 82 library and information science professionals. The institutions are:

- * Ignatius Ajuru University (IAUE).
- * Rivers state university of science and technology (RSUST), and
- * University of Port Harcourt (UNIPORT)

Instrument for Data Collection

The instrument for this study is self-designed and titled “Awareness and perception of plagiarism among Library and information science professional questionnaire (APPLISPQ). The instrument is a 36-items Likert scale questionnaire of 4-point rating: Strongly Agree=4 points; Agree=3 points; Disagree=2 points; strongly disagree=1 point for items 1-36. This is used to answer the research questions

Method of Data Collection

Copies of Awareness and Perception of Plagiarism among library and information science professionals were administered directly by the researcher(s). The researcher(s) were present as the respondent completed the questionnaire in order to entertain questions from the respondents and for collection as soon as they finish. This is to ensure that the number of questionnaire distributed is well completed and collected.

Method of Data Analysis

The data collected from the respondents were properly organized in tables and analyzed. The data were analyzed using descriptive statistics (frequencies, percentages and mean). The acceptance or rejection of research questions were based on the rating of Strongly Agree+4 points; Agree=3 points; Disagree=2 points; strongly disagree=1 point for items 1-37. This is used to answer the research questions. Thus, $4+3+2+1=10 \div 4=2.5$

Presentation of Results/Discussion of Findings

Research Question 1: What are the most pressing plagiarism trends among LIS Professionals?

Table 1: Descriptive statistics of respondents answer to the most pressing plagiarism trends and mechanism among LIS Professionals.

S/n	Variables(Items)	SA	A	SD	D	MEAN	Decision
1	Enhanced access to a vast amount of knowledge and resources on the internet.	39	22	11	10	3.09	Agreed
2	Copying from colleagues and known authors because of their relationship without acknowledgement..	41	19	17	5	3.17	Agreed
3	Copying sources form the internet without citation and references.	30	27	9	16	2.86	Agreed
4	Laziness of ideas through claiming of other peoples works and ideas.	25	31	18	8	2.89	Agreed
5	Ghost writing among professionals.	30	27	17	8	2.93	Agreed
6	Recycling (collecting and changing research paper, so it can out rightly be yours.)	32	29	20	1	3.12	Agreed
7	Purloning (Out rightly stealing of other scholars work).	31	22	17	12	2.87	Agreed
8	Referencing an unread (unavailable) primary source without mentioning the secondary source where the information is gotten from.	30	28	19	5	3.01	Agreed
9	Erroneously referencing secondary sources as if they were the primary source.	33	29	11	9	3.04	Agreed
10	Ignoring of prescribed disciplinary plagiarism procedures	27	34	14	7	2.98	Agreed
11	Aggregator (proper citation to sources but the paper contains almost no original work)	29	31	18	4	3.03	Agreed
12	Confusion about what constitutes plagiarism.	26	24	22	20	2.92	Agreed

Grand Mean: 3.17 Agreed

Source: Researcher's Field Survey, 2020

Criterion Mean=2.50

The data presented in Table 1 showed that the Grand mean rating of the responses of the most pressing plagiarism trends and mechanism among LIS Professionals on the 12 items in the table ranged from 2.87 to 3.17 which are all greater than the criterion reference (cut-off) point value of 2.50. This indicates that all the 12 identified items in the table were regarded by the LIS professionals as the most pressing plagiarism trends. However, with Grand mean of 3.17, the result of this observation is in line with the earlier study of Fishman (2009) affirm that this plagiarist activities also occur; when the plagiarist uses words, ideas or works of a product without due acceptance of usage; when works of another are attributable to another identifiable person or service; without distributing the work to the source from which it is obtained; in a situation in which there is a legitimate expectations of original authorship; and to obtain some benefits, credit, or gain which need not be monetary.

Research 2: What are the factors contributing to plagiarism among LIS Professionals

Table 2: Descriptive statistics of respondents answer to the factors contributing to plagiarism among LIS Professionals.

S/n	Variables(Items)	SA	A	SD	D	MEAN	Decision
1	Academic Pressure	51	27	1	3	3.54	Agreed
2	Need to achieve higher grades.	31	34	11	6	3.09	Agreed
3	Poor writing skills.	27	25	21	9	2.85	Agreed
4	Pressure from published mantra.	39	20	15	8	3.09	Agreed
5	Unawareness of research ethics.	37	24	12	9	3.08	Agreed
6	Lack of consistent styles among, and within various disciplines.	50	10	12	10	3.21	Agreed
7	Mismanagement of time.	39	30	13	0	3.31	Agreed
8	Promotion.	50	27	3	2	3.52	Agreed
9	Personal attitudes.	41	32	4	5	3.32	Agreed
10	Lack of competence/understanding	20	37	18	7	2.85	Agreed
11	Copy-pasting of tool and loads of pre-fabricated paper.	29	28	20	5	2.98	Agreed
12	Incorrect and inconsistent knowledge about plagiarism.	28	27	5	4	3.50	Agreed

Grand Mean: 3.54 Agreed

Source: Researcher’s Field Survey, 2020

Criterion Mean=2.50

The data presented in Table 2 showed that the Grand mean rating of the responses of the factors contributing to plagiarism among LIS Professionals on the 12 items in the table ranged from 2.85 to 3.54 which are all greater than the criterion reference (cut-off) point value of 2.50. This indicates that all the 12 identified items in the table were regarded by the LIS professionals as the most pressing plagiarism trends. However, with a Grand mean of 3.54, the result of this observation is in line with the earlier study of Kenny (2007), which found out that pressure to publish as quickly as possible but with little time, submitting the same article to a number of journals to increase the likelihood of acceptance or indeed simple carelessness are among the factors leading to taking the risk of plagiarism. Jereb, etal (2018) noted that higher institutions attitude towards plagiarism, that is whether they have clear policies regarding plagiarism and its consequences or not. It also compliments the study of Dordoy (2002) who concludes that the most important factors influencing plagiarism range from promotion, laziness or mismanagement of time, easy access to information materials on the internet, unawareness of rules and regulations and unwitting plagiarizing.

Research Question 3: What strategies are effective against these menaces among LIS Professionals

Table 3: Descriptive statistics of respondent answer to the strategies are effective against plagiarism among LIS Professionals?

S/no	Variables(Items)	SA	A	SD	D	MEAN	Decision
1	Use of online technologies to avoid plagiarism from online sources.	27	26	20	9	2.86	Agreed
2	Raising awareness and managing expectations about plagiarism.	31	35	14	2	3.15	Agreed
3	Systematic detection and vigilant enforcement.	29	22	27	4	2.92	Agreed
4	Having a peculiar definition of what plagiarism is all about.	30	19	26	7	2.87	Agreed
5	Teaching (students & professionals) about plagiarism.	27	25	24	6	2.89	Agreed
6	Ensuring that sources used are cited and referenced correctly.	32	29	19	2	3.10	Agreed
7	Facilitating great need to avoid credibility gap.	35	27	16	4	3.13	Agreed
8	Use of plagiarism detection software.	30	28	19	5	3.01	Agreed
9	Enforcement of law against plagiarism.	28	30	6	18	2.82	Agreed
10	Anti-plagiarism should be established in library schools	33	21	13	15	2.87	Agreed
11	Use of verbatim/text/materials must be enclosed in quotation marks.	27	31	4	20	2.79	Agreed
12	Increasing reliance on intelligent digital technologies.	34	31	10	7	3.12	Agreed

Grand Mean:

3.15 Agreed

Source: Researcher’s Field Survey, 2020

Criterion Mean=2.50

The data presented in Table 3 showed that the Grand mean rating of the responses of the factors contributing to plagiarism among LIS Professionals on the 12 items in the table ranged from 2.79 to 3.15 which are all greater than the criterion reference (cut-off) point value of 2.50. This indicates that all the 12 identified items in the table were regarded by the LIS professionals as the most pressing plagiarism trends. With a Grand mean score of 3.15, the result is in line with the study of Breen and Maasen, (2005) who affirm that professionals/teachers need to teach her subjects how to reference their work properly because, as has been previously noted, many incidents of plagiarism result from ignorance rather than intentional cheating. Similarly, Carroll and Appleton (2001) maintain that in order to achieve relevant awareness, professionals and institutions have to define and implement plagiarism prevention measures against plagiarism among LIS Professionals?

Conclusion

Plagiarism has been found to be an unending cankerworm in the present era, especially in academic environment. This present development has continued to hamper originality; and create questionable and intellectually arrogant within the system. For LIS professionals to co-exist and arrest the situation, it has becomes pertinent to gear up and sensitize her colleagues to brace up with the task ahead.

The study has attempted to investigate awareness and perception of plagiarism among library and information science (LIS) professionals in selected library schools in Rivers State. Findings from the data collected and analyzed, showed that the study identified 12 rationales for most pressing plagiarism trends, 12 factors that contribute to plagiarism among LIS Professionals and 12 strategies that are effective against the menace among LIS professionals. These results suggest that to reduce these different acts of academic dishonesty, library professionals, educators and administrators need to directly address the rationalization that professionals and co-teachers are using for their behavior (i.e. copying of sources from the internet without citation and references, and confusion of what constitute plagiarism). More so, the need to do away with surmounting pressure resulting to mismanagement of time and pressure. Also, to increase reliance on technologies and see to the enforcement of laws against academic dishonesty among those professionals who feel very likely that these rationalizations for engaging in unethical behavior yield more to them.

Recommendations

Based on the findings and the conclusion of this study, it is therefore recommended that:

1. Emphasis should be made on training of LIS professionals in order to acquire knowledge about plagiarism. There should be provision of on the job training for writing skill development on plagiarism.
2. LIS management should ensure that LIS professionals in all institutions are aware of the policies and concept of plagiarism; its impediment and essence of originality of a work.
3. Whatever the mode of any publication, it should be delivered with a framework of professionalism that gives clear message that plagiarism is frowned at.
4. Library and information professionals should see the need to curb plagiarism as an engine for academic excellence.

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THE RELEVANCE AND SIGNIFICANCE OF KNOWLEDGE ECONOMY IN INFORMATION RESOURCE DEVELOPMENT FOR LIBRARIES IN NIGERIA

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Abstract

Every change in human life comes with one effect or the other. Knowledge economy is, an epoch in human life, which establishes knowledge as one of its characteristics. Other characteristics of knowledge economy include emphasis on organization and human capitals, installation of modern enabling infrastructure such as computer, its accessories and other telecommunication devices and knowledge sharing. This paper discusses these characteristics of knowledge economy in relation to its relevance and significance to effective information resources development. Specifically, the paper focuses on the actions that need to be put in place in this epoch, to ensure a functional information resources development. The paper concludes that this change has come and the characteristics it comes with should be understood, so that they are properly managed for an improved information resources development in Nigerian libraries. It recommends among others, that on no account should this professional responsibilities be left in the hands of the untrained.

Keywords: Knowledge Economy, Knowledge, Information Resource Development

- **Professional Responsibilities?**
- **Human Capitals?**
- **Knowledge Sharing?**

Introduction

Time is very important in human life. Time consciousness is a characteristic of the wise. A wise person studies the time and tries as much as possible to move either ahead of it or simultaneously with it. Knowledge economy is a phrase used to describe an epoch; an important time in human history. Some scholars, such as Drucker (1969), view knowledge economy as the latest development in human history. According to Drucker (1969), knowledge economy actually and simply indicates the pivotal role of knowledge in modern economic activities. Knowledge is information acquired through experience, practical ability or skill (Molete, Dehinbo and Dehinbo, 2015). In a similar vein, Nnadozie (2015) described knowledge as information that is relevant, timely and contextual having evolved from experience gained over a period of time. Knowledge, in

the context of the two definitions is information that has been processed by the brain; information blended with experience, which is presented at the right time as dictated by a given circumstance.

The importance of knowledge in an organization has been succinctly stated by Asrar-ul-Haq and Anwar (2016) in the following words, that knowledge is the blood that runs through the organization's veins and is an important element for the survival of the organization in today's dynamic and competitive environment. It is absolutely impossible for any organization to survive today without a coherent knowledge base.

Professional Responsibilities. Libraries are no exception of such a coherent knowledge-base. As social services, institutions, librarians serving in libraries require as much knowledge as profit-making organizations. First, they require proper knowledge of their respective users. Second, the librarians must be familiar with or must have adequate knowledge of their resources and the increasing number and variety of information resources in print; on CD-ROM, online and on the internet, so that they can accurately guide their users to the requisite and relevant information resources. Third, the librarians must be able to select and evaluate information in all formats and to determine both the quality of the resources and their usefulness in a particular library setting. Fourth, they should be able to identify and organize the information resources available on the internet that are appropriate for the library users. Fifth, the librarian must be knowledgeable about the new information and communication technology required to handle effectively, information resources development activities in a knowledge economy. Sixth, the librarian must understand the importance of knowledge sharing as the only way knowledge can realistically be put to work or applied in knowledge economy. Seventh, the librarian must know the danger of relinquishing their professional responsibilities, such as information resources development, to a non-professional however, highly placed, is the person in the parent organization, especially in an era in which efficiency and effectiveness or productive performance is the vogue.

The Concept of Information Resources Development

Information resources development, which hitherto, was known generally as collection development, refers to series of activities carried out, usually in the technical services division of a library, to ensure requisite and relevant information resources are made available in the library whether physical or virtual. According to Hunter and Day (2005), in Daniel, Ifidon and Okegbola (2012), collection development refers to the selection and acquisition of materials for an expanding collection and decisions on the materials to be included in that collection. In addition to defining collection development as "the systematic process of building a library's collection of information materials", Ifidon and Ifidon (2007) in Daniel etc (2012:66) listed the processes of collection development to include: collection development policy, use and user analysis, collection analysis, selection and acquisition of information resources. Authors conceptualization of information resources development is not markedly different from the old name (collection development). Corral (2019) defined information resources development as a systematic process of building library collections to serve study, teaching, research, recreational and other needs of the library users. Information Resources Development (IRD), according to Corral include every activity that goes into acquiring materials for a library which include selection, ordering and payment for whatever resources that have been supplied to the library. She noted also that IRD is the foundation upon which other library activities or services are built. It is necessary to briefly discuss the processes involved in information resources development. It is only by so doing that we can satisfactorily justify the significant of KE on IRD.

The Processes of Information Resources Development

Information Resources Development (IRD) processes are systematic and planned steps or actions taken to bring together different variety of information resources required in a particular library as dictated by the information needs and time requirement of the users of the library, physical or virtual. The generally accepted processes of building a library collection to us are those proposed by Evans as re-echoed by Corral (2019). According to Evans a good or rather a functional IRD process must begin with the objective of building the library collections and should logically end with evaluation and reporting of the state of collection to date. Within these two continua are other processes, community or user analysis, IRD policy, selection, acquisition and records management. It is instructive to give some brief information about each of these IRD processes.

The objectives of building a library collection is not different from the objectives of the library which are derived usually from the objectives of the parent organization. The essence is that library services are provided to supplement, complement and implement the activities carried out in an organization in order to meet its objectives. In order to build up a functional and useful collection, there must be a good knowledge of the organizational objectives as reflected in the library objectives and modified in the information resources development objectives. It is absolutely a misnomer or a fruitless effort to building up a library collection without an adequate knowledge of the objectives that really form the foundation of the associated processes. Objectives are both the immediate and ultimate goals for which an organization is established to attain or achieve. People responsible for building library collection must not only familiarize themselves with the objectives of the organization, they must analyze, understand and use them as guides to building up functional collections.

Very paramount in all human oriented organizations is the satisfaction of one human need or another. A good knowledge, and even records of these needs are significant to the overall success of the organization. Thus, community or user analysis is the scientific study of the people for which an organization is established to serve. The essence is to understand their behavioral manifestations in relation to their various information resources needs. As observed by Ranganathan (1933), library information resources are developed for use. Information resources must be relevant before they can be used and the factor of relevance is dictated by the information needs of the users. The objective of user analysis therefore, is to understand the information needs of the users, real or potential. Knowledge, deep one for that matter, is an important pre-requisite for success in executing this process.

Policies, according to Drucker (1969) are guidelines for making decision. Decision making is a costly action in any organization. To reduce this cost, decisions already taken on a given action are recorded as guidelines for further decisions in an organization. This record becomes a policy document. Thus, information resources development policy constitute series of decisions arrived at, on each planned actions to be taken to build up a library collections. Under normal circumstance, people in charge of information resources development must have a proper knowledge of the contents of the IRD policy. No any new decision must be taken in respect of collection building without a prior consultation of the IRD policy. New decisions must be recorded in the policy document for future reference (which are taken either as a modification or a correction of the existing one), (additional knowledge). Information resources development policy is a crucial guideline for building up a collection for a library.

The actual work of IRD begins with the selection of information resources. Selection is the act of chosen one thing instead of another. Selection presupposes presence of alternatives. Selection is based on proper knowledge of what is needed and what is not needed in respect of information resources. In view of the complexity of human behavior, selection activities cannot be limited to the

library staff; pertinent stakeholders are usually involved to ensure only relevant information resources are made available in a library. Sometimes the activity may necessitate formation of a committee as two or more good heads are better than one. Selection also involve good knowledge of the information resource that are already made available in the library whether processed or not to avoid duplication of information resources. Duplication of information resources is characterized by a number of negative implications for a library, one of which is additional cost, which must be avoided as much as possible. Proper knowledge of resources availability is an antidote against duplication of resources.

Sequel to the selection of information resources is the acquisition process. Acquisition involves the activities of bringing into the library all or some of the information resources that are generally considered to be useful in a library. This is done through a variety of ways which include purchase, gifts, exchanges and legal deposits. Purchase is a process of buying a thing; library information resources can be bought from bookshops or from specific supplier either in cash or in debt through promissory note.

Gift is a voluntary transfer of valuable property from one person to another. Acquisition by gift involves a situation where a library receives donation of information resources or even computers from individuals (philanthropists) or corporate entities. Sometimes, the donation of the resource can come to the library in the form of a will from the deceased (bequest). Thus, gift maybe conditional and it may be unconditional. There must be a clear-cut statement on what gift to correct or not. Acquisition through exchange occurs when two or more libraries agreed to relinquish some or all of their superfluous information resources in exchange with those of other libraries. Exchange presupposes prior knowledge of these superfluous resources from which selection can be made on the basis of information needs of the users. Legal deposit, on the other hand, is the lawful relinquishing of specified copies of one's intellectual, artistic or musical production, irrespective of its formats, to the National Library of Nigeria and by extension to any other body so designated to receive such products and maintain custody of them for a community. In this respect, academic and special libraries can influence formation of a policy that empowers them to collect certain number of copies of their parent organizational staff literary productions and maintain custody of such products for the future use of the library community. Practical, individual, team as well as organizational knowledge are required to bring up such policy to the limelight (Abubakar, 2020).

The basis of knowledge is a proper, an efficient and an effective record management. Records, according to Auyo (2015) are documentary evidences in paper or electronic forms, created or received by an organization in the pursuance of its legal obligations or in connection with its businesses and they are important carriers of information. Information resources development apparently involves huge record generation, which must be properly managed to facilitate subsequent IRD tasks. Records are embedded knowledge, which are very useful, especially in routine tasks. Records management is a methodological control of records from creation, through their processing, distribution, organization, storage and retrieval to their ultimate disposition (Auyo, 2015). Records management ensures the processing and preservation of only useful information.

Collection evaluation and reporting is an important aspect of information resources development process. This is partly because the information resources that are useful and relevant today maybe useless and irrelevant in future. This explains the dynamism of man as well as knowledge, as earlier observed by Ranganathm. It is necessary therefore, to critically assess the collections viz-a-viz the changing objectives of the library in relation to that of the parent organization. Evaluation of collections involves a systematic and critical study of the collection in order (a) to discover irrelevant or obsolete information resources (b) to withdraw irrelevant resources and replace them with relevant ones (c) to discover the level of preparedness of the

library in relation to the established objectives of its parent institutions to discover what it has and what it lacks that are pertinent to the realization of the organizational objectives (d) the currency of the collection (e) in term of electronic resources, to determine their contents, their accuracy of presentation, ease of use, technological requirements, especially, the hard and software (f) to determine the level of achievement in relation to the resources provided (g) to reporting what have been observed and recommending the way forward to improving the collections in relation to the findings from the evaluation.

It is very clear from the discussions of the IRD processes that knowledge (especially appropriate) is inevitable for each process to be satisfactory and successfully carried out. The question is what types of knowledge are required to perform the crucial function of IRD in knowledge economy?

Knowledge, Types and Information Resource Development

As indicated earlier, knowledge economy is a specific time, in the history of man in which knowledge explicit or tacit and any other types of knowledge, is its epicentre, that is, its primary feature. Other characteristics of the knowledge economy as observed by Igwe etc (2015: p. 13), include economic and institutional management. Educated and skillful personnel (human capital), Information and Communication Technologies (ICT) and their infrastructure, globalization, research and knowledge sharing. Each of these characteristics has been discussed relative to information resources development (IRD) so that the relevant and significant of knowledge economy to this very crucial professional activity of Librarians can be seen more clearly.

Knowledge, which is the hub of knowledge economy, is an abstract concept and all abstract concepts are generally difficult to define. However, a few definitions will suffice. Wiig (1997) described knowledge as a set of truths and beliefs, perspectives and concepts, judgments and expectations, methodologies and knowhow. These are all elements of tacit knowledge, the source of which is not indicated in the definition. Boist (1998), accepts this definition as capacity that individuals obtained from regular contact with data or information.

In a similar vein, Chen, Snyman and Sewdass (2005) defined knowledge as a combination of contextual information and the individual awareness and understanding of facts, truths as well as information acquired through reasoning, experience and learning. Molete, Dehinbo and Dehinbo (2015) also agreed that knowledge is an information acquired through experience, practical ability or skill. A cursory glance at these definitions will hardly detect any fault with them, but an analytical look at them will reveal the fact that the utilitarian basis of knowledge is missing from the definition. Hence, none of them can be accepted as a working definition for the remaining part of this paper. The working definition of this paper therefore, is that which is provided by Asrar-ul-Haq and Anwar (2016). They define knowledge as the blood that runs through the organization's veins and is indeed very crucial for the survival of individuals and organizations in knowledge economy. In this definition, the utilization value of knowledge is not only implied, it is also recognized. Knowledge is recognized here as the main functional asset of an organization (Knowledge asset) notwithstanding its type. Knowledge is the one that moves the organization from one state of development to another like human being. Knowledge is the coordinator of all other assets of an organization. According to Nnadozie and Unagha (2015), knowledge assets are the key possessions which an organization needs to secure the desired competitive advantage in the knowledge economy. In the previous section of the paper, the role of knowledge in the successful and satisfactory execution of each information resources development (IRD) process has been accordingly expressed. Without knowledge, especially appropriate one, none of the IRD process can be correctly performed. In other words, knowledge is useful but it is context-dependent. A

piece of knowledge used successfully in one context may not be so useful in another context. Thus, for IRD activities, what type of knowledge is relatively more useful?

Types of Knowledge and IRD Process

In the opinion of Pemberton and Stonehouse (2000), the recognition of the different types of knowledge is necessary in revealing its potential contribution to task performance and in selecting and assigning the right people and equipment to the right task. As observed by AbdulRazak (2020), classification of knowledge varies according to authors and according to time. Only the ones that are relevant to this paper will be discussed. There is the *Explicit* and *Tacit Knowledge* by Nonaka and Takeuchi (1995); Embrained knowledge, that is, conceptual skills and cognitive ability, embodied knowledge, which emphasizes practical thinking and action-oriented and Embedded knowledge which relate to systematic routine ability (Blacker, 1995). Tasks knowledge, which consists of know-how, skills, brainstorming, analysis, best practice etc (Jang and Lee, 1998). Embodied knowledge which is rooted in experience, background and personal skills, and social knowledge, which emphasizes and values exchange of knowledge (Blumentritt and Johnson, 1999). Professional knowledge, like the social knowledge, gives premium to exchange of knowledge, coordination knowledge, that is, the ability to dispense knowledge at an appropriate time and know-how knowledge, that is knowledge of who knows what or who has what, which is of interest to Libraries as well organizations (Christensen, 2007); practical knowledge which is very useful in decision-making and action oriented task (Wallace, 2007); individual team and organizational knowledge (Zhang, Li, Chen, Song, Wang and Shi, 2008) and market or entrepreneurial knowledge, which relate to opportunities recognitions, abilities to get information about the needs of the users, competitors etc and cultural knowledge, which relate to linguistic ability, awareness of norms, laws etc of a community (Merji and Umemoto, 2010).

An analytical look at all the various categories of knowledge quoted in the preceding paragraph will reveal two broad categories, viz: *explicit and tacit knowledge*. The functional or working knowledge may have been written down as guidance for performance of assigned tasks (explicit knowledge or through institutional management, opportunity is available for individual workers to exhibit their talents, skills, experience, know-how, know-what, know-why and other cognitive ability (*tacit knowledge*). The processes involved in IRD require the presence of both knowledge in order to achieve the requisite success. For example, IRD process begins from objectives, which are written down goals for the building of a library collection. This is an explicit knowledge that must be studied and known before any move towards collection. Building community or user analysis is a systematic process of converting tacit knowledge to explicit knowledge, so that the resultant knowledge can be used for the purpose of collection building. Resources Development Policy (RDP) is an explicit knowledge that must be referred to in the course of building library collections. Selection and acquisition procedures are predominantly explicit knowledge. In this process individual (tacit) team/brainstorming knowledge (knowledge conversion process), organizational knowledge (*explicit*), market or entrepreneurial knowledge and cultural knowledge (which are either explicit or tacit knowledge) are all required to carry out these tasks efficiently and effectively. All other processes require both explicit and tacit knowledge to execute them satisfactorily.

Libraries, wherever they are or for whoever purpose they are established, are the heart and life-line of their communities, institutions, or organizations. The success of the libraries determine the success of their parent organizations. It behooves therefore, that libraries, whether physical or virtual must be staffed with highly educated, skilled, creative and modernized/digitized individuals, who will be able to handle tasks which are not the same as hitherto. In knowledge economy

virtually everything has changed and it is still changing. Users are no longer the same. They have moved far away from their usual ways of seeing, viewing and using things. In this epoch, people are no longer depending on print resources alone in order to know places, study new development in the globe whilst in their homes. This new trend in peoples' lives must be taken into cognizance while harnessing information resources for their sake. This task is rather very sophisticated and technical to be released for execution by un-informed individual or group of individuals, however powerful, he or they may be in the organization, institutions or communities.

The success of knowledge economy is the involvement of ICT in the primary activities of an organization. Information and communication technology (ICT) is an umbrella term that includes any communication device or application, encompassing radio, television, cellular phones, computer and network, hardware and software, satellite systems and so on, as well as the various services and applications associated with them such as video conferencing, and distant learning (Ajibero 2012 :p.51). ICT as observed by Abdulrazak (2020) has innumerable benefits in modern organizations. Besides endowing organizations, the ability to perform almost all tasks speedily, efficiently and effectively, ICT allows the organization to effectively document all transactions. For instance, it provides organization the wherewithal to store images, texts, graphics etc. and be able to retrieve them within a little or no time. Thus, ICT has become, within a very short time, one of the basic building blocks of modern organization and society (Aiyebelehin, 2012).

Part of the reasons for introducing ICT in IRD, according to Cornel (2019) in Aiyebelehin (2012) include:

1. Increasing pressure or demand on libraries to provide current and relevant information resources.
2. Failure of traditional IRD system to meet this demand or pressure.
3. To meet the variety of information needs of the user timely and satisfactorily, deployment of ICT is inevitable.

Almost all the findings on the impact and use of ICT in the 21st century have indicated the inevitability of ICT in information resources acquisition and dissemination, Aiyebelehin (2012) Chinma Nwachukwu (2013), Corral Roberts (2019). The significance of ICT in information resource development in the knowledge economy has been stressed in the following words by Aiyebelehin (2012):

The collection development process in academic libraries in the knowledge economy (21st century) can only survive if the changes brought about by ICT are duly integrated. He added, ICTs are not only used in the collection development process but used in managing the collections, especially the online collections...with an increasingly digital environment, abundance is replacing scarcity, digital ubiquity is replacing physical locality. P.69

Another very important features of knowledge economy is the introduction of internet system. Internet is an international computer network connecting other networks and computers from varieties of individuals, organizations, institutions and other setting located in all nooks and crannies of the globe (oxford advanced learners dictionary 8th edition 5th impression, 2015). It is a system that allows computers to communicate with each other wherever they may be (Giginyu, 2019). Ownership of computer or at least, access to computer, is presupposedly, a necessary requirement to take the advantage of internet system. Internet remains a powerful means of communication, dissemination and retrieval of information. It is one of the potent technologies ever produced by man for accessing any information from any part of the world, with a little or no time spent. Usage of internet is not limited to organization or institutions alone, individual, association or groups of individuals can use internet for varieties of communication services. In libraries, internet

provides the ability to reach out easily with little or no cost to publishers (or their agents) of information resources (both offline and online); to access objective reviews of these information resources; to have access to varieties of database all over the world (there are more electronic resources in the market today than the print resources and most of them are available free of charge in open access arrangement). The availability of social networks, which is one of the aftermath of internet, permit libraries to discuss one-on-one, with their users in terms of their information needs, a knowledge which is necessary for functional collections development.

Knowledge Sharing

Information is useful only when it is processed and the resultant effect, which is knowledge, is shared effectively. In the knowledge economy information sharing or exchanges is very much facilitated by the presence of ICT. Unlike before information exchanges or sharing in knowledge environment or economy do not require physical movement or meeting at specific location. The moment you have the enabling communication device, which is connected to internet, sharing information with anybody, whenever he/she may be is no longer an issue. Platforms like websites, social networks such as facebook, twitter, youtube, myspace, blogs, pod casts, photo and video are very useful in sharing information (tangible and intangible) remotely. Libraries in Nigeria have found the usefulness of these outfits and they are employing them effectively in their services performance, including information resources development.

Conclusion

It is clear from the discussion so far that the advent of knowledge economy has tremendous positive impact on information resources development process. Not only has work environment changed from traditional infrastructure to modern infrastructural environment, the knowledge base of the staff working in the information resources development unit has impressively improved. They have been trained and retrained to be able to cope with the new trend in the information resources environment. IRD focus is increasingly shifting from the print information resources to electronic information resources. Libraries, especially academic libraries, subscribe more to electronic databases now than they do to print resources. It is even easier for users to access and share information nowadays than it was in pre-knowledge economy. Thus, people are more sophisticated and more prone to giving useful advice that would assist in functional resources development nowadays than before. There is therefore no contesting fact that knowledge economy is relevant and significant in information resources development for Nigerian libraries.

Recommendations

Libraries of today are not libraries of yesterday or yesteryears. The world of today is a global village. Things happening in any part of the world can be viewed life from any part of the globe. Spill-over effect of any development in human life can easily be felt and copied in any part of the globe. The world is not static; it is rapidly transforming. This fact must be known by all libraries in Nigeria and they should be seen proactive. Whatever is needed to keep the libraries abreast of global transformation should be made available at the right time, right quantity and quality and at the right place. Some of the proactive actions libraries should take include:

1. Provide and install appropriate infrastructure such as computer and its accessories; telecommunication facilities such as band-with and other internet connectivity facilities, video facilities etc. All these are useful in and facilitate information resources development.

2. Training and retraining of staff especially those who are willing to work behind the scene, that is, in the technical section of the library. Not all staff are willing to work in a place where he/she has no access to the users-social needs
3. IRD activities are not only technical, they require special knowledge and experience for their successful execution. Moreover, a library is synonymous with its collections (its information resources). The library is as good as its collections. Once its collections are relevant and good it will be used or patronized. And the success of a library is determined by its level of use. Thus, IRD is a professional and a crucial task which must never be relinquished to the un-informed, non-professional person or group of persons for execution. A wise librarian must be ready to fight against any extant organizational policy that recognizes any other authority other than the organizational librarian for execution of IRD activities.

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INNOVATIVE TECHNOLOGY AS A STRATEGY FOR LIBRARY AND INFORMATION SERVICES TO SURVIVE CHANGE IN NIGERIA.

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Abstract

Innovation is not exclusive to institutions, library and information services as service institutions are also innovative. The paper focus on the important role innovative technology has played in the rise of the service sector in LIS; it defines its contribution to improve productivity, gain sustainable competitive advantage for the institution, improve performance in service innovation and generate more variety in response to the clientele' needs. Changes in services generally trigger changes in library and information services strategies. Moreover, these roles, in the present era are hampered by certain challenges such as the competitiveness of an institution which depends upon its capacity to adapt and exploit technology in order to fulfill and exceed beyond clientele' needs and expectations, while maximizing resource utilization. The increasing growth of services in today's organizations and economy, the importance of understanding innovation technology concepts and practices which has been on the rise. Today, innovative technology has evolved into a vast field encompassing study of intangible processes and dynamic interactions among technological and human systems that lead to managerial and organizational change in services. However, library and information service is at the heart of library operations and transferring their knowledge in the form of knowledge based services, as innovative technology is playing a major role in the delivery of quality service to the users. The work recommends that there is need to start developing a new paradigm that is able, conceptual and practical, to get to grips with the possible effects of these new technologies on both people and organizations.

Keywords: Innovation, Innovative Technology, Information, library services,

Introduction

A widespread perception on innovation in institutions is one that refers to advanced technology solutions offered by using the updated and latest version of knowledge. Innovation is about doing things and introducing new ideas or new types of product and services into a system. Rogers (2003) assert that innovation is an idea, object, or practice that is perceived as new by an individual or organizational unit. More so, the term innovation is a process which emphasizes different stages of approaching and analyzing issues (creativity, marketing, research and development, design, production and distribution) (Katsirikou, 1999). Meanwhile the benefit of innovation will tend to show up in measurable form only gradually. Also, an innovative system will

have the flexibility and the capacity to quickly adapt both to the variations regarding the nature of service and in condition of her delivery, as well as the capacity to produce an excellent range of unrestricted service through innovative technology system.

The application of technology in information and related works, teaching, learning, research and entertainment is almost limitless. On the other hand, technology has also enabled organizations to accommodate customers' variability and offer a wide range of customized services that meet the needs of individual customers. Notably, innovative technology is recognized as one of the five key drivers of a firm (institution) level of productivity/services along with investment, skills, enterprise and competition (Camus, 2007). Hence, Gracia and Calandoe (2002) described innovative technology as an interactive process initiated by the perception of opportunity for a technology-based invention leading to the conception, development, production, commercialization and marketing of invention. Undoubtedly, technology is a critical driver impacting on how academic libraries do research, collaborate, and how libraries create access, archives and living content of her services.

In the same vein, in conceptualizing innovative library services, Drotner (2005) noted that the change of concepts from information society to knowledge society reflected a new set of multimodal competencies that are necessary to advance a knowledge society. In libraries, they can be applied in areas as: Serial management reference/referral services, resources organization, bibliographic services, acquisition or library resources, documentation services, CD-ROM management service; electronic resources management services, selective dissemination of information. Also, library resources and services have moved through three phases of development. The first phase was based on providing information about the library on the web or physical library online since early 1990s while the second focused on digital libraries or virtual libraries. Since late 1990s when the libraries offered online collections and services. The third development of online libraries was based on web 2.0 technologies or also called as Library 2.0 (Blummer, 2007). The advance on technology has turned libraries into a force to reckon with, in her mode of serve delivery.

Innovative technology aid libraries in information transfer and process of connecting individuals to the full portfolio of resources available to library users. For instance, innovative web 2.0 technologies enhance participation, interaction and use reengagement in knowledge construction and delivery of library services. As well as generate more variety in response to the clientele needs. Librarians as information professionals need adequate knowledge, skills and attributes of innovative skills and strategies so as to convince and attract users to library collections and services they offer. A key responsibility of libraries (Public, academic amongst others) is to provide timely access to information resources (print and non-print) that will meet curriculum and programme need of student's, teaching and non-teaching staff of the academic community. With technology, librarians can introduce themselves as visible, valuable and essential partners in achieving common goals. More so, librarians provide information services which include manual, electronic and the web based circulation programs, reference services and electronic access to resources and services. Hence, libraries must also ensure that acquired information resources and services are best utilized by users and innovative mechanism used for such. Therefore, libraries should not push so hard for change that would end up in positions to pull her services function down but increase her values and image. However, the pivotal height of innovative technology is the growth of automation and mechanization of technological processes in libraries.

Innovative processes are critical based on the improvised methods of making innovation become routine. Of course, it is useful for an institution (i.e. library) to have a road map in order to reach the point it wants to arrive; but the fact that it opens to change shouldn't be ignored. Hence,

creating a viable strategy to determining a vision about its future services. Marley (2009) observed that a service that is not used does not need support nor continued implementation. Sustainable innovative technology strategies improve scholarly communication in different ways, as well as serve a support synergy in service delivery mechanism. Also, it will promote use of library holdings and services and consequently the value of the library and image of the library personnel. Thus, innovative technology is essential to overcome these and guarantee the existence and survival of libraries. Library and information science professionals need to investigate innovative technology strategies used and challenges encountered in service delivery so as to survive change in Nigeria.

The Need for Innovative Technology for Library and Information Service by Librarians.

As innovation brings together groups of people who have different ideas, approaches, experiences and areas of expertise in order to create a fertile environment for generating new concepts and methods, the need becomes inevitable. Thus, it propels service institution (i.e. library) to accentuate her knowledge and capabilities in line with the needs of the present. The need for librarians to innovate her services by devising fast and quick ways of improving in users' information queries is attracting attention from scholars in library schools and within all academic domains. The reasons for this are not farfetched as changing needs of users have re-introduced the role of librarians. Also, librarians have always acted as a link between knowledge source and its user; and the speed at which ICTs are expanding is vividly glaring that the more efforts and strategies are necessary as at the present the provisions of library services requires the use and application of ICTs. The advent of ICT is indeed a boost to the library services as librarians utilize the various platforms to meet her users' information needs. More so, in librarianship, the adoption of ICTs can only be satisfactory if the facilitators (library professionals) and users (library clientele) are able to develop first ways of learning how to use or adopt to them (Prayag, 2011).

Innovative holds the key to delivering the kind of public services the library need at the present. Engaging new actors, resources, systems and processes to create a viable and valued system for enhanced LIS. A modern library cannot be imagined without the application of innovative systems (i.e. computers) (Ghante, 2011). Thus, it can be used for performing efficiently all sorts of jobs in the library from the procurement of the reading material to organization and use. It is therefore, crucial that the managers of library and information services innovate her services for efficiency, effectiveness and timeliness. However, there is a shift in focus of operation from library-centered to information-centered; from the library as an institution to the library as an information providers, and to the librarian as a skilled information specialist functioning in all related information environment, which requires the use of new innovative technology method known as automation of library functions and services for the enhancement of information access and delivery not physically contained within the four walls of the library but from library networking for information provision to area networking for all types of information resources provided. This become important and needful because innovative technologies are ensuring that many libraries allow patrons to access a wider range of information resources in their respective or centralized data bases (Raman, 2006; Kogonuranath and Angadi, 2014). Innovations thus respond to a variety of new contributions ranging from new services to more computerized outcomes such as new ideas or combinations of ideas. It becomes needful that the modern librarian should be a professional that possesses standard and values that function effectively and smoothly in a technological environment, and fully understand and knows efficiently the conventional library practices, adapts easily in a permanently altered environment of information in a considerable amount of communication skills (Salter, 2003). Hence, we argue that there is need for innovative technologies for library and information services as they:

- Help library administrators to make sense of the environmental scan and prioritize the allocation of limited resources when crafting strategies for managing innovations.
- Help libraries challenge the status quo and therefore increase their image and value to the reader community.
- Help libraries generate positive socio-economic outcomes and life-long learning for their patrons' communities and other stakeholders (Field and Tran, 2018).
- Help reposition library services for better adaptation to the changing needs and priorities of community of users.
- Make libraries more competitive with benefits including but not limited to attracting and retaining patrons, seeking more funding and enhancing the perceived image of libraries (Knab, 2010).
- Help in the successful exploitation of new idea. The survival of library and information services will be ensured by the adaption and establishment of new service configuration out of the old known existing systems.
- Gain competitive advantage for the institution.

Specific types of innovative technologies applied for library and information services.

Innovative technologies act as a means to help libraries provide access to society in which knowledge keeps on changing. Shanhong (2000) argued that the application of information technologies enlarges the scope of knowledge acquisition and service delivery which is a key process in managing knowledge. It is impossible to accomplish such important tasks by using the human brain alone in a society in which knowledge keeps on changing and service spring higher. In essence, information and communication technology should be seen as a tool to assist the process of the changing needs of users in libraries (Shanhong, 2000). However, libraries need to carefully assess and select technologies that help them achieve goals and vision. The library administrator must view innovation seriously and provide follow through to develop ideas that can be integrated into library operations and systems. Some of the innovative technology applied is suggested below.

Web 2.0 Library Tools

Web 2.0 plays role in dispensation of information, knowledge and communication services in libraries. The web 2.0 contents are easily shared, re-use, re-distributed and edited. (Notess, 2006) opine that the web 2.0 is a set of economic, social, and technology trends that collectively form the basis for the next generation of the internet a more mature, distinctive medium characterized by user participation, openness and networks effect. Thus, library 2.0 simply means making the library space (Virtual and physical) more interactive, collaborative and driven by community needs, development of the library and information services through user participation is the key feature of library 2.0 where constant updates and evaluation of library services are ensured to better serve the needs, demands, desires and wisdom of user communities (Muneja and Abungu, 2012). Library use web 2.0 as a way to share information to encourage feedback from patrons to highlight their services and new materials which include Blogs, Wikis, RSS Syndication, Mashups, Podcast, and vodcasts.

Blogs: Blog has been considered by many as practical model for library 2.0. A blog (Short for web log) is a user generalized website where entries are made in journal style and displayed in a reverse chronological order .A typical blog combines text, images and links to other blogs, web pages and other media related to its topic. Libraries can create their blogs, tell their users about the library and library services, their special collections, new arrivals, understand users problems, quick feedback

to user queries, in house publications, current awareness services, etc. Thus, it is important to note that with the aid of and the creation of her services will not be far-fetched. Examples of some library blogs are:<https://lisnews.org>; noshelfrequired.com; blog.archive.org; teenlibrariantoolbox.com; librarian.net; nypl.org/blog; alsc.ala.org/blog; librarycoocnet.elsevier.com; library.cornell.edu; blogs.library.duke.edu; librariansmatter.com/blog; milibrarydube.wordpress.com; litablog.org- however, in using blogs users need to understand that:

- Blogs are easy to set up.
- Blogs are usually free or low cost.
- Blogs are user friendly.
- Blogs can be password protected.
- Blogs post can be organized by categories.
- Blogs posts can be allowed for user feedbacks and comments.
- Blogs can be read right from the site or syndication(i.e. <http://www.bloglines.com>)
- Blogs can be run by one person or a group.

Wikis: wiki means” Quick” in Hawaiian. Been simple and one would find it very easy and manageable to use. wiki are the simplest online databases, easily editable by any one. However, applying wikis in libraries enables information to be read and edited by people simultaneously, facilitating the library operations and enhancing collaboration within the profession while increasing the involvement of the community (Chawner and Lewis,2006). Hence, Wikis

- Is an easily editable web page-no knowledge of HTML is required.
- Can be as open to editing as one would like.
- Software is usually free or at a low cost.
- Are truly collaborative, allowing several people to create and edit content on one page?

Examples include: library success, a best practices wiki: <http://www.libsuccess.org/>-:Wikipedia:<http://www.library.ohiou.edu/subjects/bizwiki/index.php/mainpage>;Wikipedia.<http://www.wikipedia.org>. However, through wikis, users and libraries share their information at one place in the form of discussion, comments, criticism, photos, graphs etc.

RSS and Syndication: Really simple syndication (earlier it was known as Rich site summary), is a family of web formats which permits users to get the update of the RSS enabled websites. Holveoet (2006) explained that RSS is an XML application that allows users to gather content as it is created and as sites are updated. When such a feed is created, interested users can subscribe to it. Thus, the syndicate pages are viewed with feed readers, aggregators, RSS reader etc. Libraries can create RSS feeds to their users’ communities which shows the update in the library collections, services, databases; among others. Wusteman (2004) affirm in listing and describing them to include announcements, extended services, e-journals and table of content services, reference services, web resource, announcements, search resource, books, and newsgroups search results and RSS based search engines.

Mashups: Mashups is considered a useful innovative tools and medium of communication and dissemination of ideas and knowledge of all kinds and magnitude. By this function, it is a mechanism to integrate visual contents with related available resources in the library. Mashups are typically simple web application (Most of the times consisting of just one single page) that rather than being coded from scratch , are developed by integrating and reusing available data, functionalities or pieces of user interface accessible over the web(Florian, etal 2012). The mashups

processes can be applied effectively for integration of open contents with locally located library resources at the time of serving these resources through OPAC. Hence, it clearly state why the term implies easy, fast integration, frequently using open application programming interface(API) and data sources to produced enriched results that were not necessarily the original reason for producing the raw sources data . In mashups there are mainly three activities, which are:

- Data is extracted from a source web site.
- This data is translated into a form meaningful to the destination websites and
- The repackaged data is sent to the destination site.

In library and information services mashers provide the user with a much more customizable and interactive interface to data as they are not based on the read and update events models of portals which are defined through specific port lets APIs. As such mashups can be integrated and combined with a new type of internet portal capable of providing its users with a richer set of features. Examples of mashups include; Pubwal; k.com, WeatherBonk.com, Parkingcarma.com. Notably, mashups are composed of:

- Presentations of User interaction layer (i.e. HTML, CSS. Asynchronous JavaScript and XML (AJAX &XML).
- Web sites services (i.e. XMLHTTP Request and SOAP).
- Data (XML is used in sending, storing & receiving data).

Therefore, it helps the librarians' effort to easily merge two or more library services to make users convenient, such as traditional services mixed with any current online services with new services.

Social Networking Sites: Social networking sites are online platforms that allow users to create a public profile and internet with other users on the website aiming towards retrieving resources from diverse sources. Also known as social websites or a social networking website. Hornby (2010) sees social networking as a communication with people who share your internet using a website or other services on the internet. The uniqueness of the social networking sites is to share information among users ranging from highly personal to academic interest of the participants. These social sites among others include, LinkedIn, lislinks, Twitter, Facebook, YouTube etc., They can help offer libraries the opportunity to reach out to its clients, also if a library connects to a social network sites then a librarian easily get the users recommendations, interest, information needs, user information and libraries can easily provide quick reference services, current awareness, latest arrivals, rules/regulations of the libraries, OPAC, etc. Therefore, social networking sites in libraries would enable speed up of numerous functions and services: hence,

- Libraries build up various knowledge transmission pages to reach her numerous clients (etc.).
- Social networking re-introduces librarians and her patrons to share and exchange information resources in both print and electronic medium.
- Libraries and information service value are built and an interconnected link created among interested groups with common interest. User content can be added within the library system

Podcasting: A podcast is made by creating an audio file with the help of sound recorder or other similar devices and uploading the file to the host server and making them the globe aware of the

created file by the use of RSS. Thus, been distributed through web feed, to portable media player and personal computer. However, podcasting can be applied in library and information services via:

- The library that works hard to produce audio content such as recording of programs or library tour. Podcasting can be an effective means of making that content more widely available.
- Podcast highlight about new resources.
- Podcast enable librarians to share information with anyone at any time.
- Podcasting can be a publishing tool for users and librarian oral presentation.
- Libraries can subscribe podcast from lead publishers of scholarly communication for interactive learning programme to the users (Raysh, 2017).

Strategic approach to innovative technology in Libraries.

Strategy deals with the essential issues of maintaining the entity's existence; representing the new activities and areas of interest and addresses the unusual affairs for the organization (Drejer, 2006). Strategically, libraries as a service based institution follow competition by constantly changing the traditional competitive mentality expressed as making an effort to exert superior performance towards user quest for information satisfaction. Three main elements in creation of innovation strategy are as follows: strategic analysis- exploring where we could innovate; strategic choice- choosing between different options; strategic implementation- planning to make innovation happen (Tidd and Bessant, 2014)

However, in order to strengthen the visibility and value of the library, it is desirable to create a global service which is a pivotal strategic option to bridge user information gap and the accelerated knowledge development change cycle. Interestingly, when the most successful innovation is analyzed, it is observed that they are the beneficiaries of the change. As a matter of fact, change always provides opportunities for the new and different one. Hence, by coping with this complexity (change) libraries can better shape their services and develop in them a high capacity for adaptation to a constantly changing environment. Stating a goal that is aimed to be achieved in the future and also a method or structures and rules of activities in a given situation.

However, if properly applied, viable innovations offer the organization and its personnel opportunities to improve the value of the institution and to continue the organizations viability. For the innovative strategy to succeed rewards and incentives cannot be solely about previous service delivery performance, rather , there must be a willingness to reward compliance toward a new service acceptance of changes and the process involved. When they are changes in strategy, changes in the entire system are necessary to adjust to the information processing needs; service delivery mechanism and management of new strategy. Thus, the service innovation strategy involves a high degree of interactivity between the service supplier (librarian) and the customers (library users). Standing (2004) affirm that service delivery is a product or activity that meet the needs of the user or that can be applied by a user. Hence, strategic innovative approach takes place in libraries and other service delivery institution when it becomes realizable that there is need to bridge a gap. These gap expresses: 1) newly emerged users or those ignored by the library system, 2) newly emerged clientele needs or the existing clientele needs that aren't well-served by previous administration/management and 3) new methods , services, presentations and dissemination of information for current or new users segment. Hence, in making institutional innovation effective, the approaches could be summed up in a SWOT model.

The SWOT stands for Strengths, Weaknesses, Opportunities and Threats, and can be analyzed as an approach in which library management and or administrative team identifies,

analyze and develop a framework in dealing with the internal and external factors affecting the system. Interestingly, the usefulness of SWOT analysis for the library has been linked to user's information diversity, and service preference, and thus the switch to innovative technologies become timely. More so the current services in libraries seek to plan strategies for her innovative technologies by means of SWOT analysis to establish a unique difference and understanding of her peculiarities which highlight their strengths, weaknesses, opportunities, threats and given the users a reason to choose among numerous services.

Strengths

- Development of Technical competence
- Effective and efficient skilled manpower
- Users satisfaction
- Development of new online resources.
- Up skilling in new technologies and resources.
- Successful experiences in the past with new, dynamic programmes, thus, expertise in dealing with change.
- Investment in high technology programmes.'
- Facilitate service-driven
- Assets(physical, human ,intangibles)
- Easy access to institutional library & her services.

Weaknesses

- Insufficient management
- Time constraint.
- Lack of sufficient space for the required extra equipment.
- Librarians skills
- Insufficient facilities
- Access to affordable financing.
- Incentive mechanisms among staff.
- Poorly linked information resources
- Lack of operational skills.
- Obsolete technologies.

Opportunities

- Updating of information resources
- Collaboration and lobbying.
- Ensuring smart specialization.
- Incorporation of blended learning in future curriculum development.
- Development of new online services and resources.
- Working remotely and easy to use.
- Accessibility to other libraries on real time basis.
- Competitive advantage
- Flexibility in service sharing and delivery, as well as quality of collection.
- Creation of new knowledge products(i.e.subject portals and websites)
- Subscription to reputable online databases as well as quality of collection.

Threats

- Proliferation of new relevant technologies.
- Diversity in user needs
- Reduction in quality of resources.
- Diminished librarian /user relationship
- Ever-changing technology.
- Competitive behavior.
- Discovery of unmet user needs.
- Retooling of traditional services resulting in a better user experience.
- Creative collaboration.

Libraries may accomplish this balance by evaluating new programs and services with the intent of maximizing organizational performance (Harrison, 2010). As a strategic tool, SWOT analysis is a preliminary decision making technique of strategic planning approach that helps institution managers to evaluate both external and internal goals (Hinton, 2012). Hence, a lot of strategies can be adopted to develop knowledge innovation culture of libraries, among which consist of establishing the environment beneficial to knowledge innovation, creating a learning culture, sharing knowledge based team organization , improving trust and cooperation , enhancing human resources development and cultivating knowledge innovation talents. Therefore the strategic approach as stated using SWOT model will guide institutions/organization in making innovation feasible and consistently as it will create an enablement of: 1) Accepting change as indispensable. Leaders recognize the crisis that the organization is facing and help others understand and confront it. 2. The commonly-shared strong goal is to develop strategic intent. The goal should have an emotional attraction and so it should be easily supported by people. Benefits must be open to society, not just for the institution. The goal is the main idea to advance the institution innovative strategies. 3. A person who is motivated by a strong goal makes a new and different innovation without following any well-defined rules or methodology. 4. Some innovations seem to succeed and people copy the first innovation processes, adapt them to new uses and thus create new innovations. 5. Development and operation of strategic innovation routines. (Wood, 2007).

Benefits of Innovative Services in Libraries

Understanding that innovative services plays an important role in growing the libraries and librarians; otherwise the library profession may grey in future. Consequently, librarians must be aware of how these innovative services are connected among her library seekers, because of its huge benefits. These services which are mainly due to high level skills demonstrated by library staff are mostly because of the advances in communication technologies, content generation options, increase in number and diversity of the makeup of the community (Abidina and Isa, 2018). Interestingly, librarians are repositioning to be digital repositories and a wonder of modern information architecture and design. This has led to the revolution of libraries and librarians across the globe, thereby adding amazing services and technology and creating a sustained knowledge economy. There is no doubt that the infusion of ICT into all human activities has completely changed the librarianship at the globe, and making the ideal libraries we know some decades back to be very different from the ideal library today. The same is true with the kind of library professionals we have then and now. Hence, the basic purpose of dissemination of information services remains but the way libraries disseminate her information services have changed drastically.

Basically, innovation enhances the workflow of the library which helps in reducing manual work. With this, it proliferate the library services. The modern technology has carried momentous changed in different aspect of library management. However, the following are some of the summed benefits of innovative services in libraries:

- (i) It facilitates resource sharing among library users and the library system by collaboration, co-operation and co-ordination.
- (ii) It saves the resources at the library disposal(i.e. time, space,energy,information and human resources)
- (iii) It helps to reposition the library as to providing better services, aiming towards meeting up with the new normal.
- (iv) It helps in information assemblage, control & dissemination.
- (v) It create an enabling medium for easily accessibility to information and content, which can be delivered directly to end-users and enhance retrieval remotely.
- (vi) Ability to provide a large number of services to users at a given time.
- (vii) Increasing demand for accountability, with focus on quality clientele services, and continuous improvement.
- (viii) Ability to provide secure access to scattered e-resources and services, anytime, anywhere

Challenges of Innovative services in libraries

The challenges to managing diverse innovative services are inherent problems. There are many challenges which face library services. Though it is obvious that innovation are visible and are being applied in the library and information services. it is undeniable that there are a lot of challenges militating against innovative technology. Invariably, one can say that innovative technology despite its benefits to the institution is being hampered by numerous challenges. These include:

Deteriorating Infrastructure: with continued enrollment and innovation accompanied by steadily declining real resources, users have been of information resources have been over crowded. Examples are infrastructure and infrastructure pedagogical print and non-print resources in libraries.

Internal inefficiency: virtually the decline in resources has been compounded by inefficient use. Even though many library facilities are overburdened by users , they are also often under-used. For instance, many libraries are closed on evenings and weekends in accordance with the civil service regulations. Hence, it poses a great threat to information accessibility and dissemination of library resources and services.

Providing access to content in all formats: as academic library continue to shift from a repository of materials to a platform for learning, research and participation, its ability to provide access to vast amounts of content in all formats is vital. However, in providing such content, libraries face two immediate major challenges:

- (i) Being able to procure and share e-books and other digital content on the same basis as [physical versions.
- (ii) Having affordable universal broadband technologies that deliver and create content/.

Ensuring access to e-books, other e-content and high speed broadband becomes a big concern in academic library owing to its mandate.

Inadequate staffing and skilled manpower: as a result of librarians' salary been declining in real terms and as a result the ability of the system to retain qualified librarians has become a persistent problem in many libraries. Due to increase services and enrolment in schools closely followed by the modern era. More so, there is dearth of skilled manpower to maintain the electronic resources in many academic libraries.

The pace, cost and value of change: the perspectives on the value of technology in library services is contradictory. Hence, the provision of improved effective, efficient and sustainable information services as well as access to a wide array of knowledge and information sources in the face of dwindling funding is not feasible (Enweani, 2018). This no doubt validates the fact that fund is a prerequisite for effective innovative technological services in an era gearing towards change.

Resistance to Change: Maa (2017) assert that change is a phenomenon that is inevitable for progress. Ideally, it is not easily accepted in any society owing to the fear of the unknown. Librarians are not exceptional, as most of them show resistance because of the uncertainty that accompanies the said development. Also whether it will deter their existence in the profession. Unfortunately, such resistance to changes in libraries will limit the services, growth and visibility of the library.

Lack of ICT literacy skills: lack of basic skills needed for innovative library services becomes a pivotal concern as hampers the speedy flow of service access. According to Emezue and Nwaohiri (2013), some professional librarians lack the requisite technological literacy skills needed for a 21st century library services. More so, the competitiveness of an institution which depends upon its capacity to adapt and exploit technology in order to fulfill and exceed beyond clientele needs and the increasing growth of services in today's organizational economy while maximizing resource utilization.

Conclusion

The paper has extensively examined innovative technology as a strategy for library and information services to survive change in Nigeria. There is no doubt that Effective application of innovative technology in library services transmits users' satisfaction and creates library visibility. Gradually, new technologies are developed and change becomes paramount on the information service delivery system. Consequently there is need to develop capacity for modern technologies so as to untapped the inherent innovative and creative skills among librarians aiming towards enhanced library services. The paper reveals that institution competitiveness, provision of access to content in all formats, the pace, cost and value of change, etc. are the major challenges to innovative technology. The study recommends that there is need to start developing a new paradigm that is able, conceptual and practical, to get grips with the possible effects of these new technologies on both people and organization. The paper thus concludes that library services are faced with myriad of challenges in terms of innovation. Therefore, LIS professionals need to identify and use a variety of nontraditional information services. Library and information education programs also need to look beyond the traditional LIS jobs and start preparing professionals for emerging job roles towards quality services. So, it is inevitable for the library professionals to be updated with the technology for the own existence, so as to yield desired result,

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PRACTICAL APPROACH TO INFOPRENEURSHIP IN NIGERIA: A BUSINESS GUIDE TO GRADUATES OF LIBRARY AND INFORMATION SCIENCES

**Shehu O. Bello
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Abstract

Unemployment generally and graduate unemployment in particular, has been on the increase in Nigeria since 1980 as a result of the nation's poor economic policy, politicization of purely socio-economic issues, infrastructural decay, rampant insecurity, many companies, domestic and international, government organizations that were established to satisfy some political interest, which were then, the potential and great employers of labor folded up. Oblivious of this scenario, universities and other higher institutions proliferate without any plan for job replacement of the products of these institutions. Thus, many of the institutional graduates in the country have found themselves stuck at home without employment or any source of livelihood. They see themselves as liabilities, rather than expected assets to their families. Many of them who cannot bear this unexpected negative development end up committing suicide and some get themselves involved in criminal behavior. This explains why there are rampant cases of criminalities such as kidnapping, armed robbery and cybercrimes. This paper proposes an option of entrepreneurship as a way out of this social and economic quagmire. It represents an attempt to create awareness of this opportunity of self-employment. Rather than a theoretical explosion of the concept, the paper dwelled very much on the practical approach to entrepreneurship, more of a step-step guide to the business. The paper also stresses the need for the entrepreneurship curriculum to be domesticated and program based.

Keywords: Infopreneurship, entrepreneurship, criminal activities, business guide

Introduction

The downfall of a man, according to our people, is not the end of life of the man. There is also a related adage which says that "necessity is the father of invention. These two proverbial statements aptly describe a wise and creative man; certainly not the reverse of this. It takes a wise person or man to recognize that he has fallen and to get back to his feet should be his paramount concern. Similarly, only a wise and creative minded person would envisage the probable closure of a door and quickly works towards the opening of a new door.

The usual expectation of university graduates, notwithstanding his/her areas of specialization, is to engage in white collar jobs. A white collar job gives a worker the opportunity to work in an office and earn an uninterrupted monthly salary, whether the worker works or not and he/she is entitled to grow and develop on the job in addition to other perquisites. Frustrations ensue

to many of the graduates, including even trained engineers and professionals, where this expectation is not met. Most of them interpret this scenario (not getting a white-collar job) as a downfall. Only the wise ones among them would manage this situation efficiently and effectively. Others would fall out of the way; some end up taking their lives while some other would opt for the easiest route to earn a living (stealing, armed robbery, kidnapping etc).

Engagement in lawful or legitimate ways of earning a living presents itself as the alternative to white collar jobs and only the wise and creative graduates know this. These sets of graduates are usually referred to as entrepreneurs. According to Oxford Advanced Learner's Dictionary (8th Edition, 2010), an Entrepreneur is a person who makes money (earn living) by starting or running a business.

In this paper, an entrepreneur is regarded as a wise and creative person who engages him/herself in the sales of products and services that customers (that is, potential buyers) need, at prices they are willing to pay. Indeed, the prices must be high enough for the entrepreneur to be able to cover all costs of providing the products and services, and have money left over as profit. In other words, the product or services prices must be reasonable to both the buyer and the entrepreneur. Entrepreneurs are generally the sole owners of the organizations they run; they are therefore, both owners and employees. They employ rather than being employed. Some of them have developed so much that they are now big employers of labor. Entrepreneurship is a powerful alternative, if not the best alternative to white collar employment.

This explains why entrepreneurship is introduced in our higher institutions as a compulsory credit earning course. It is hoped that at the end of the program of each student, he/she would have sufficiently imbibed entrepreneurship idea and he or she is ready to seek for alternative and acceptable way of earning a living rather than waiting endlessly for a white collar job that is not forthcoming or may never be attainable.

Infopreneurship is a derivative word from the merger of information and entrepreneur. Infopreneur, according to Aregbesola, Vander Watt, Idiogbeyan-Ose, Okocha and Eylororunsh (2019) is a self-employed business person who earns his/her living through identifying collecting, creating, developing, organizing, repackaging, disseminating and selling information product and services in different formats and at an acceptable price to information seekers in different places and at different times. Like the entrepreneur, Infopreneur is a risk taker. He/she goes into the business under the probability to make it or not. Once he/she makes it, he or she remains in the business. One good characteristic of an entrepreneur/Infopreneur is that he or she is never perturbed about failure. Their slogan generally is "forward ever and backward never". Remember, we said earlier that entrepreneurs are wise and creative individuals, they are risk bearers, and they believe they have the capacity and wherewithal to make it in their new endeavors. Among their personal attributes are confidence; high imagination; good vision; perseverance and adventure.

No matter how good, hardworking and dynamic is an entrepreneur/Infopreneur, his or her success depend on the environmental friendliness, that is, the condition that is likely to affect the behavior and development of these forward looking individuals. Is Nigerian environment conducive for Infopreneurship? If not, how can the Infopreneur navigate successfully, in the supposed friendly or unfriendly environment? These are parts of the focus of this paper.

Nigerian Infopreneurship Environment

Environment can be looked at from two perspectives: it could be described as a physical or the natural world in which people, animals and plants lives, like Nigeria as country, it could also be conceptualized as condition that affect the behavior and development of a person, group of persons

or a community, for instance, business environment, political or even social environment. The last description exemplifies specific features that are not only predominant but also tend to dictate events occurring in the place. Both conceptualizations are relevant in the discussion of Infopreneurship environment.

There is no contesting the fact that Infopreneurship (a specific kind of business) cannot thrive in all environments. There are specific conditions in an environment that enable entrepreneurship, most especially Infopreneurship, to flourish. The conditions, according to scholars (Bello, 2019; Abubakar, 2019; Chux-Nyehe and Nwinyokugi, 2020; Ocholla, 2016; Aregbesola, 2019) include:

- a. Availability of information seekers who are prepared to pay for information products and services;
- b. Inability of formal information centers to cope with the demand of information products and services;
- c. Availability of information and communication technologies and other relevant component infrastructure; for instance, rapid growth of the internet;
- d. Constant or regular electricity supply;
- e. Increase in the demand for specialized and repackaged information;
- f. Global economic crisis or meltdown, which unfortunate outcome is unemployment;
- g. Cutback on public spending; associated with this government actions is poor or complete absence of social services, such as public libraries;
- h. Willingness of people to share information;

A research is needed to establish the presence of these conditions in Nigerian Infopreneurship environment. The essence of these is to let prospective Infopreneurship to have knowledge of the conditions that must be seen to be available for Infopreneurship to thrive as expected. Additionally, understanding the available condition in the environment would enable the Infopreneur to know what type or area of information service he/she could embark upon, for the purpose of viability. Thus, it is important to recount in this paper, the various information products and services that are available, from which choice can be made in accordance with the available business condition.

Areas of Infopreneurship

- a. Consultancy services. These includes
 - i. Performing specific professional tasks based on consultants specialist knowledge, establishment of libraries and other information centers; reviewing the services of existing libraries, digitization of library collections and classification of library collections; indexing and abstracting work; developing new skills and knowledge on behalf of clientele etc.
- b. Advisory work on general information products and services
- c. Assisting in staff selection, training and development (Ocholla, 2016).

With the advent of ICTs, additional information products and services have been identified by scholars (David and Dube, in Ocholla, 2016; El-Kalash, Ayob, 2018. These include:

- a. Development of wiki software
- b. New web-based publishing
- c. Automation of libraries
- d. Information repackaging

- e. Proof-reading and editing
- f. E-abstracting and indexing services
- g. Online broadcasting
- h. Freelance writing etc.
- i. Graphic design; paid blogging services
- j. Project publishing consultancy etc.
- k. Book monetization, digital marketing; video monetization; software vending etc. (ChuxNyehe and Nwinyokugi (2020)

In addition to the listed business opportunities for the Infopreneur, Chux-Nyehe and Nwinyokugi (2020), strongly recommend knowledge and value creation as the contemporary business opportunities for the Infopreneur. According to them, knowledge creation is concerned with making information available to the end user or information seekers through extraction or harnessing of tacit knowledge. Knowledge creation is a product of creativity and imagination rather than imitation. Creativity, they argued, is more essential for the survival of any business and being a saleable knowledge, it (creativity) is more likely to attract customers than any other kind of knowledge source. In the business of selling information, it is necessary that whatever knowledge that is created should be desirable, relevant and useful. This is possible only when value is injected in the knowledge creation. Value creation is concerned with adding value to people's organization's life. To create knowledge, an Infopreneur has to go into the environment, explore it for the purpose of capturing essential and useful information (tacit) for the people that need and are ready to pay reasonably for the information.

Having briefly discussed the theoretical perspective of the paper and having identified areas of business opportunities for the prospective Infopreneur, the road is cleared to highlight the practical guides to Infopreneurship in Nigeria.

Practical Guides to Infopreneurship

- a. Ensure a good understanding of the environment and which business potential is available for exploitation. This, however, presupposes market research. It is almost impossible to access this kind of information without a scientific survey or investigation of the environment. From the environment, you would know whether you would want to be a content creator or affiliate marketer, that is, whether you would want an original information creator or a vendor for original information creators.
- b. Having established the nature of information products and services you are prepared to go into. The next step is to have a business name, which must be registered officially with the Corporate Affairs Commission (CAC). Registration is available online. Since Infopreneurship is a professional business, your professional certificate is a crucial pre-requisite for registration.
- c. You would require a contact place, address, and website to facilitate interaction with information seekers. You would also need a bank account to facilitate payment for business transaction. Without official business registration, opening account with any bank may not be possible. Similarly, access to financial facilities may be impossible without a bank account.
- d. Before you accept any contract of business, it is necessary to carry out cost-benefit analysis to evaluate the viability of the business. Accept the contract if the benefit accruable from the business is higher than or equal to the cost of providing the business. Higher benefit is undoubtedly better and more promising, especially the immediate future. However, break-

even point (that is when total benefit is equal to total cost) is a decision point at which you would want to continue or discontinue with the business. It is important to know that breakeven point in any business indicates future prosperity for the business if the Infopreneur can preserve a little further in the business, he/she will eventually make it.

- e. Costing of information products and services. There is no hard and fast rule about this subject. Costing would depend on the nature of the information product and services involved and the ability and financial readiness of the information seekers to pay where specific equipment is needed, where it involves utilization of costly consumables to provide the services, the cost of the equipment or the consumable is a significant factor in price determination. The value of the products and services is yet another cost determination factor.

Naturally the higher the value of the product and service to the information seeker, the higher he/she is ready to pay for the services. It is important for an Infopreneur to study the price charging pattern of other Infopreneur. This will help significantly in the retention of consumers, without which survival in a business will be threatened.

- f. Advertisement: An Infopreneur must create awareness of its existence, where and the nature of his/her information products and services. He/she may not have sufficient money at the inception to involve or utilize the services of Radio, Television, Newspapers or even the Internet in the awareness creation process. These may be costly to come by. He/she can start with attending workshops, conferences etc. where he/she can distribute leaflets containing his/her line of information business or even seek a permission of the organizer to talk about his/her information products and services. Later, advertisement could be done using social media platforms such as Instagram, WhatsApp, Facebook and other social networking platforms.
- g. Extravagant Spending: This should be avoided at the beginning of the business no matter how much you have made at the start of the business; profit plugged back is a very good way of increasing capital and consequently business expansion. Commercial bank loans are dangerous and should, as much as possible, be avoided at the beginning stage of the business or else you will only be working for the bank (servicing loan only).
- h. Record Keeping/Management: Record, according Auyo (2015) is a document or other source of information compiled or recorded or stored either in written form; on film; by electronic process, or in any manner or by any other means. Records and the information they contain are valuable business assets that must be managed and protected. Records provide the essential evidence that a particular action or transaction took place or that at a certain point in time and place, a particular decision was made. Records support all business functions and are very critical to the assessment of business behavior. Records are essential tools for litigation. Thus, records of business transactions, at any point in time and place must be carefully and systematically kept, maintained and jealously protected.

Requirements for Infopreneurship

In order to be an efficient and effective Infopreneur, he/she needs to be equipped with the following:

- a. Information and Communication Technological skills. This will assist him/her in great detail to perform his/her work;
- b. Knowledge of the business environment
- c. Knowledge of the nature of information product and services he/she is proposing to sell;

- d. Management skills e.g. resources management, management of human resources. Material resources must be regularly maintained. Staff must be treated well; they must be given opportunity to grow etc.
- e. Marketing skills, that is, ability to gain and retain customers, especially through provision of valuable services, regular creation of awareness, good interpersonal relation and reliability
- f. Skills in pricing products and services

Challenges facing Infopreneurship in Nigeria

A number of challenges have been identified by scholars such as Ocholla (2015), Aregbesola (2019); these include:

- a. Insufficient training of graduates for Infopreneurship. Not only is the present curriculum too general, it is not field or program based
- b. Lack of funding; minimal access to government controlled loan and grant
- c. Being almost strictly urban in context, the high cost of office space can be scary. Although, quite a number of infopreneurship business can be comfortably handled virtually (without any need for physical space), once the Infopreneur is equipped with a laptop with all the necessary accessories (internet connectivity), business can move
- d. Unpleasant behavior and poor payment attitudes of customers.
- e. Very poor and erratic electricity supply. To compound the problem, this basic infopreneurship infrastructure is being controlled currently by the private sector.
- f. Taxation of small based businesses. This has a tremendous negative effect on the new or just-beginning entrepreneurs.
- g. Another setback to the business of entrepreneurship in Nigeria is the activity of fraudsters that engage the internet to dupe people.

Conclusion

Self-reliance is a reasonable and a legitimate alternative to white-collar jobs and sometimes even more permanent and reliable. The volatile nature of the Nigerian socio-economic and political environment is enough a warning to Nigerian graduates not to rely so much on white-collar jobs and accept entrepreneurship/infopreneurship as a fertile area to exploit business wise. Only wise graduates would know that it is better to put the horse before the cart. There are challenges, however, but with determination no difficulty is insurmountable.

Recommendations

- a. The entrepreneurship curriculum should be domesticated and should be program-based. Only this way can the curriculum be made relevant, useful and sufficient to practice infopreneurship in this country
- b. Now that the Federal Government is advocating self-reliance and has even gone above this stage to empower productive youths/graduates, it should be magnanimous enough to subsidize electricity supply to the young entrepreneurs as well as conceding tax waiver to the entrepreneurs/infopreneurs. This is the only way they can grow and truly be self-reliance
- c. Government should try as much as possible, through promulgation of law, to criminalize the activities of fraudsters, and prohibit the escalation of this dysfunctional attitude. This negative attitude is increasing on a daily basis. A decisive measure should be taken urgently, to forestall its growth.

- d. Infopreneur should look for alternative legitimate ways of getting paid for their services. Legal process is recommendable here. But Infopreneur should try as much as possible to maintain good records of business transactions for the purpose of eventual litigation.

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RESEARCH PRACTICES OF GRADUATE STUDENTS IN STATE AND FEDERAL UNIVERSITY LIBRARIES IN SOUTH EAST NIGERIA

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Abstract

The main purpose of this study was to investigate research practices of graduate students in state and federal universities in South East Nigeria. The study adopted survey research design. Four research objectives, four research questions and one hypothesis were formulated to guide the study. The population of the study comprised 5,465 graduate students who used the libraries of the universities at the time of the study. The sample size of the study is 556 which was derived through a multistage sampling technique. Proportionate sampling technique was employed to select a sample size from each of the institutions, while simple random sampling technique was used to select the actual respondents in each institution. The responses of the respondents were elicited by the use of a researcher-developed questionnaire. Simple percentage, frequency counts and mean values were used for data analysis, while the research questions formed the basis for data analysis. The hypothesis was tested using t-test statistics at 0.05 level of significance. Results from the analysis of data and testing of hypothesis revealed that unhealthy research practices of graduate students were more prevalent in state universities than federal universities. It also revealed some unhealthy research practices of graduate students such as plagiarism, reasons for such practices, and its effects on both the universities and the students. The study suggested ways of preventing unhealthy research practices of graduate students to include institutional funding of graduate research, and more practical instructions on research literacy among others.

Key words: Research, practices, graduate, students, universities

Introduction

Research is the bedrock of scholarship. Researches carried out in the universities are done by faculty members, graduates, and undergraduates. For graduate students- some of who are already practicing or teaching in their field- their research works and reports are communicated through, theses, dissertations seminar and conference papers. New and additional knowledge are produced as a result which in turn are meant to engender development in the field, including the library and information discipline. Research practices are important predictors of the quality of research works produced by them. When good practices are upheld during research investigations and reports, there is the likelihood that the outcome will be of excellent quality. If the process undertaken to reach the research goal is based on sound and standard practices, there

is a chance that the outcome would be reliable. On the other hand, bad research practices are capable of engendering misleading information which may even be contrary to the researcher's intention. Developing good research practices therefore, is of essence in ensuring that such researches solve problems.

Research practices thus are those behaviors, attitudes, skills, processes, and standards which are consistent with good research product and quality. Information gathering is at the heart of every research. Success would depend largely on information behavior of the information user- his choice of information source, ability to communicate, and generally his information seeking behavior. Today, the way students approach the research process, information wise, hardly portrays a deliberate and systematic attempt at achieving quality research. Moreover cases of long years of research, research dropout rate and unhealthy research practices continuously stare institutions, students and faculties on the face, especially at graduate level, hence threatening research asset of universities.

Graduate students use library resources for reading and learning information and research literacies, and for research in general. However, their mastery of these library and information skills for research purposes may differ from one student and institution to the other.

Universities are centers of research per excellence. They take the lead role in promoting research conduct, and practices among their academics and students. In Nigeria, universities are classified based on their ownership/major sponsors. Thus there are private and public universities. Under the public, there are also state and federal universities. Scholars have advanced a significant difference among these university types in such variables as resource availability, governance, students' performance and research output. Chiemeké *et al.* (2009) argue that the foundations for research are good research training and motivation, availability of equipment and good library facilities. Similarly, Yusuf (2012) decried the poor funding of research in the universities generally, but however said that the federal institutions are better off than the state in terms of funding and in autonomy. Thus research practices may actually be a function of extraneous factors other than the graduate student researcher.

Sadly, despite the strides that have been employed in the universities to ensure sound researches, it seems the efforts are yielding little success. Empirically, it is unclear which type of institution between the state-owned and the federal are more hit by this ugly trend that is prevalent in our university system. Consequent upon this condition, the researchers wish to investigate the relative contribution of university ownership to research practices of graduate students, among other variables.

Statement of the Problem

Research, unequivocally extends the frontiers of knowledge. For graduate students, research is a basic requirement for their graduation and quality of their research may speak a lot about the ratings of their libraries and universities. However, preliminary investigations coupled with the researchers' observations in the course of attending graduate students' research presentations show an increasing rate of unhealthy research practices and other problems associated with research among students. This has been consistently muted by scholars (Baker, 2016; Krishna, 2018; Serafoglou, Hoogeveen and Matzke, 2019). At the graduate level, faculties and universities are inundated with many instances of plagiarism, duplication of research reports and copied works. Are these unhealthy research practices more prevalent in states or federal Universities? There is therefore, an unresolved issue of determining any difference between state

and federal institutions in relation to research practices. It is against this background that this study investigates research practices of graduate students in state and federal universities in South East Nigeria.

Objective of the Study

The main aim of the study was to investigate the research practices of graduate students in state and federal universities in South East Nigeria. The specific objectives were to:

1. identify various forms of unhealthy research practices of graduate students in state and federal university libraries in South East Nigeria
2. examine the effects of unhealthy research practices of graduate students on research outputs in state and federal university libraries in South East Nigeria.
3. establish if any difference exists in the research practices of graduate students in state and federal university libraries in the zone.
4. suggest ways/strategies to improve such unhealthy research practices of graduate students in state and federal university libraries in South East Nigeria.

Research Questions

The following research questions derived from the objectives of the study were designed to guide the study as follows:

1. What are the various forms of unhealthy research practices of graduate students in state and federal universities in South East Nigeria?
2. What are the effects of unhealthy research practices on research outputs of graduate students in state and federal universities in South East Nigeria?
3. Does any difference exist in the research practices of graduate students in state and federal universities in the zone?
4. What are the ways/strategies to improve such unhealthy research practices of graduate students in state and federal universities in South East Nigeria

Hypothesis

H₀: There is no significant mean difference of graduate students' research practices in state and federal university libraries in South East Nigeria.

Literature Review

Research practices include many experiences and activities which researchers uphold and undertake to produce research outputs. They are also the information behaviour of the researcher exhibited in the course of the research process such as problem formulation, finding information, using information from sources, citing sources, and evaluating sources, including the researchers' source preferences and choices (The Higher Education Data Sharing (HEDS) Consortium, 2016). Quality research practices also presupposes knowledge and adoption of research skills, strategies and processes which if they are lacking would hamper research. Good research practices according to Taylor (1986) are research behaviours that address a number of value added criteria known as quality values – accuracy, currency, reliability, and validity, in assignments, project writing and use of library and information sources.

Students are involved in research that includes dissertation writing and eventual publications in journals and presentation in conferences. Ebenso (2004), Seehole (2011), and Oyewo and Uwem (2016) agree that PhD dissertation is the ultimate academic product in a doctoral programme that showcases its author's training in terms of the technical, analytical and writing skills he or she imbibed during the programme. University of Uyo Postgraduate School Guidelines (2014) avers that this is accomplished through research orientation which encourages originality of thought, ability to break barriers of mental inhibitions and the extension of the frontiers and horizon of knowledge. There is a consensus among scholars that postgraduate education enhances institutions' prestige as a result of research and knowledge production (Oyewo and Uwem, 2016). Graduate students engage in research that contributes to knowledge, but doctoral education particularly, is the core of university research capacity, source of research productivity and innovation in the global knowledge economy. Doctoral education is expected to produce new, cutting-edge and original ideas and knowledge. Through research and exchange of ideas, knowledge and information are shared between professors, researchers and students (Oyewo and Uwem, 2016). Unfortunately the rate at which unhealthy research practices is prevalent among researchers has not gone unnoticed by the research community

A study by Baker (2016) cited in Sarafoglou, Hoogeveen and Matzke (2019) report that 90% of researchers surveyed believe that there is unhealthy research practices crisis. The researchers along with other researchers call it 'a crisis of confidence' and goes further to identify the undesirable elements of unhealthy research practice to include: doctoring results, unsuitable data collecting instrument, reporting unexpected findings as if they had been part of the study from the onset and large scale replication of studies. He proposes a remedy of teaching research practices by institutions. Peter (2018) refers to it as questionable research practices which are seen in behaviours involving fabrication or falsification of data and result. He argues that the supervisor has a huge role to play in ensuring healthy research practices and quality research works. Therefore, a good research practice is a comprehensive plan as well as a collective responsibility of students and their universities. Yusuf (2012) carried out an analysis of research in Nigeria universities and the finding revealed factors hindering research goals in Nigerian universities. The study did not however relate the factors identified in the study to any university type. Rather, the researcher revealed that the findings of his study applied to both federal and state, and old and new generation universities. Similarly, Ahmed, Umar and Paul (2015) conducted a study that focused on finding out factors that enhance pitfalls in research and teaching in Nigerian universities and found that it is a shift in focus on research for academic promotion and prestige. Ahmed's study did not associate any factor specifically to any university type.

Some other studies' findings reveal a disparity in the operations and activities of different university types. Obadara (2012) carried out a study that analyzed the difference in the administration of public and private universities, and their impact on students' academic performance. Findings revealed a significant difference between the two institution types. In the same vein, Iroaganachi and Izuagbe (2018) did a comparative analysis of the impact of electronic information resources use on research productivity of academics on Nigerian universities. Their findings equally showed different results for the different university types. The public universities were comparatively low on their usage compared to their private counterpart. This study however focused on use of electronic resources (ER) not on research practice. Okafor (2011) carried out a study that explored the research output of federal universities in South East Nigeria and findings show no significant difference among the academics in the federal universities. This study's findings suggest similar result for the same type of institution. Chukwu and Ezenne (2019) in their study did not find any difference between the federal and state universities in their availability and

utilization of e-learning infrastructure for teaching and learning. In another study that x-rayed factors that influence international graduate students' academic performance in a public south eastern university, Hagedorn and Ren (2012) acknowledged that the findings they obtained in their study may be different if they studied another type of university.

Some findings have corroborated their proposition while some did not show any significant difference. Thus, there is an unresolved issue of determining any difference between state and federal institutions in relation to research practices, which is what this study seeks to address. Moreover, these previous studies centered on other academic variables except research practices, and also few centered on graduate students, thus the need to fill these knowledge gaps.

Methodology

The research adopted a survey research design. The area of the study is South East Nigeria. South East comprises five states- Abia, Anambra, Ebonyi, Enugu, and Imo. There are ten public universities in the zone. Each state has two public universities- state and federal. The study covers six universities. The researchers purposely chose these six because they are conventional universities, having a comprehensive graduate programme and by extension, students. The population of the study is 5,565 graduate students who use the libraries of the universities. The universities are Abia State University, Uturu, Anambra State University, Uli, Nnamdi Azikiwe University, Awka, Ebonyi State University, Abakaliki, University of Nigeria, Nsukka, and Imo State University Owerri. The sample size of the study is 556 which was derived through a multistage sampling technique. Proportionate sampling technique was employed to select a sample size from each of the institutions, while simple random sampling technique was used to select the actual respondents in each institution. The responses of the respondents were elicited by the use of a researcher-developed questionnaire. The questionnaire was administered by the researchers personally and with the aid of research assistants. Data collected were analysed using simple percentage, frequency counts and mean values, while t-test was used for testing the hypothesis.

Presentation of Results and Discussion of Findings

Research question one: What are the various forms of unhealthy research practices of graduate students in state and federal universities in South East Nigeria?

Table 1: Forms of Unhealthy Research Practices of Graduate Students in Federal and State Universities in South East Nigeria

S/N	Forms of unhealthy practices	Frequency	Percentage
1	Plagiarism and sources citation	132	24
2	Repetition of studies	106	19
3	Long period of research completion	94	17
4	Manipulation of research data	81	15
5	Problem formulation	74	13
6	Poor attendance to seminar presentations	69	12
	Total	556	100

Table 1 reveals that graduate students in South East Nigeria engaged in various forms of unhealthy research practices as follows: 132 respondents (24%) were engaged in plagiarism and sources citation, 106 (19%) engaged in repetition of studies, 94 (17%) engaged in long period of research completion, 81 or 15% were engaged in manipulation of research data, 74 (13%) in problem formulation, while 69 (15%) of the respondents had poor attendance to seminar presentations. The

finding is in consonant with The Higher Education Data Sharing (HEDS) Consortium (2016), which identified various types of research practices such as problem formulation, finding information, using information from sources, citing sources, and evaluating sources, including the researchers' source preferences and choices.

Research question two: What are the reasons for unhealthy research practices of graduate students in state and federal universities in South East Nigeria?

Table 2: Reasons for Unhealthy Research Practices of Graduate Students in Federal and State Universities in South East Nigeria

S/N	Reasons for Unhealthy Research Practices	SA	A	D	SD	Mean	Decision
1	Unavailability of funds for research	238	175	75	68	3.04	S
2	Unhealthy supervisor-supervisee relationship	80	70	301	105	2.22	NS
3	Lack of basic knowledge of research	229	184	65	78	3.01	S
4	Non-commitment to research	241	172	73	70	3.05	S
5	Lack of interest in research work	230	193	77	56	3.07	S
6	Poor attendance to seminar presentations	81	69	310	96	2.24	NS
	Significant mean = 2.80						

Table 2 indicates the various reasons for unhealthy research practices of graduate students in federal and state universities in South East Nigeria. From the analysis, four out of the six reasons for unhealthy research practices of graduate students were found to be significant because their mean scores were above the significant mean value of 2.80. They are unavailability of funds for research ($\bar{x} = 3.04$), lack of basic knowledge of research ($\bar{x} = 3.01$), non-commitment to research ($\bar{x} = 3.05$), and lack of interest in research work ($\bar{x} = 3.07$). However, reasons such as unhealthy supervisor-supervisee relationship and poor attendance to seminar presentations were found to be insignificant because their individual mean scores were below the significant mean of 2.80. The implication is that respondents did not see unhealthy supervisor-supervisee relationship and poor attendance to seminar presentations as cogent reasons for unhealthy research practices. The finding of the study among other things contradicts the findings of Krishna and Peter (2018) who in their study on questionable research practices in students' final theses found that perceived supervisor attitudes exerted both a direct and indirect effect on students' theses and attitudes.

Research question three: What are the effects of unhealthy research practices of graduate students in federal and state universities in South East Nigeria?

Table 3: Effects of Unhealthy Research Practices of Graduate Students in Federal and State Universities in Nigeria

S/N	Effects Unhealthy Research Practices	SA	A	D	SD	Mean	Decision
1	Poor quality research output	239	178	75	64	3.06	S
2	Poor image of university	230	184	78	64	3.04	S
3	Lack of respect to graduate certificate	240	173	89	63	3.06	S
4	Lack of confidence by graduate students	90	83	325	58	2.40	NS
5	Integrity problems of research reports	235	180	101	40	3.09	S
	Significant mean = 2.92						

Table 3 shows the effects of unhealthy research practices of graduate students in federal and state universities in South East Nigeria. From the analysis, four out of the five effects of unhealthy research practices of graduate students put forward by the researchers were found to be significant because their mean scores were above the significant mean of 2.92. They are poor quality research output ($\bar{x} = 3.06$), poor image of university ($\bar{x} = 3.04$), lack of respect to graduate certificate ($\bar{x} = 3.06$), and integrity problems of research report ($\bar{x} = 3.09$). However, lack of confidence by graduate students as an effect of unhealthy research practices was found to be insignificant because the mean score was far below the significant mean of 2.92. The implication is that unhealthy research practices have a lot of adverse effects on both the student and the institution though respondents did not see lack of confidence by graduate students as one of the effects of unhealthy research practices. The finding corroborates the study by Rabelo et al (2019) which found out that questionable research practices have received serious attention due to its harmful effects on science.

Research question four: What are the ways/strategies for improved research practices of graduate students in federal and state universities in South East Nigeria?

Table 4: Ways/Strategies for Improved Research Practices of Graduate Students in Federal and State Universities in South East Nigeria

S/N	Strategies for Improved Research Practices	SA	A	D	SD	Mean	Decision
1	Institutional funding for graduate research	240	177	75	64	3.07	S
2	More practical instructions on research literacy by institutions	235	182	79	60	3.06	S
3	Imbibing moral/ethical conducts of research	238	179	73	66	3.06	S
4	Improvement on method of evaluation	250	175	66	65	3.10	S
5	Timeline for completion of research	258	173	100	25	3.20	S
	Criterion mean = 2.50						

Table 4 shows that at a criterion mean of 2.50, all the ways/strategies put forward for improved research practices of graduate students in federal and state universities were all significant. This is because all the factors had positive means above the criterion mean of 2.50. They are institutional funding for graduate research ($\bar{x} = 3.07$), more practical instructions on research methodology by universities ($\bar{x} = 3.06$), imbibing moral/ethical conducts of research ($\bar{x} = 3.06$), improvement on methods of evaluation ($\bar{x} = 3.10$), and timeline for research completion ($\bar{x} = 3.20$). The finding is in consonance with the findings of Bareille, Baudouin-Masset, Carreno, Fournier, Lebret, Remy-Jouet and Giesen (2017) who recommended moral and ethical conducts of research and improvement on methods of evaluation by institutions as preventive measures against unhealthy research practices.

Research question five: What is the mean difference of graduate students’ research practices in state and federal universities in South East Nigeria?

Table 5: Mean Difference of Graduate Students’ Research Practices in State and Federal Universities of South East Nigeria

Institutions	N	Mean	Std. Deviation
State	368	130.91	10.24
Federal	188	136.49	11.71

The result in Table 5 indicates that the mean of graduate students’ research practices in states universities in south East Nigeria is 130.91, while that of graduate students in federal universities is 136.49. The mean research practices difference between graduate students in federal and state universities in South East is 5.58 and that is in favour of graduate students in federal universities. This implies that unhealthy research practices of graduate students in South East Nigeria is more prevalent in state universities.

Hypothesis

There is no significant mean difference between graduate students’ research practices in state and federal universities in South East Nigeria.

Table 6: Independent t-test Analysis of Graduate Students’ Research Practice in State and Federal Universities in South East Nigeria

Institutions	N	Mean	Std. Deviation	t-cal	df	t-cri	Decision
State	368	130.91	10.24	5.54	554	1.96	Significant
Federal	188	136.49	11.71				

The result in Table 6 indicates that the calculated t-value of 5.54 is greater than the critical t-value of 1.96 at 0.05 level of significance. Therefore, the null hypothesis which states that there is no significant mean difference of graduate students’ research practices in state and federal universities in South East Nigeria is rejected. Hence, there is significant mean difference of graduate students’ research practices in state and federal universities in South East Nigeria.

Conclusion

The paper investigated research practices of graduate students in state and federal universities in South East Nigeria. The study identified some unhealthy research practices in which graduate students do indulge in such as plagiarism, repetition of studies and long period of research completion among others. The study had revealed reasons for such unhealthy research practices, which include unavailability of funds for research, lack of basic research knowledge and non-

commitment to research etc. It also found effects of unhealthy research practices on both the students and the universities; strategies and ways to ameliorate these unwholesome practices such as adequate funding for graduate research, more practical instructions on research methodology by universities among others were put forward. The study also revealed that such unhealthy research practices were more prevalent in state universities than federal universities in South East Nigeria. This study as it were, can serve as an empirical basis for continuous reflection on the current state of research of graduate students in universities and encourage robust debate on how to improve research practices in the ivory towers.

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A SUSTAINABLE DEVELOPMENT OF GREEN LIBRARIES IN ACADEMIC LIBRARIES IN NIGERIA:A CHALLENGE

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Abstract.

Against the threatening global environmental warnings, organizations world over are taking various measures to prevent its devastating occurrence. Libraries have also played a vital role in this regard by introducing the concept of “greenlibrary”. The green library otherwise called sustainable library is a new concept and is gaining popularity in the field of Library and Information Science profession. Many libraries in various part of the world have been changed from the classical mode into green library. In this regard, academic libraries in Nigeria should not be left out. Against this backdrop, the paper discusses the areas of implementation, characteristics of green libraries, the role of green librarian and the advantages of green libraries. The paper also enumerates the teething challenges to be contending with by academic libraries in Nigeria in their attempt to achieve transformation into Green libraries.

Keywords: Green library, Sustainable Library, Green Building.

Introduction

In the current scenario the word ‘Green’ plays a major role. Due to people’s longing for sophisticated life; our earth is facing global warming. Ecological sustainability which can often be an underrated aspect for the marketing strategy of the library, has more impact on clients and on stakeholders than one might expect. Hence, according to Meher and Proboi (2019) enthusiastic library users are calling on libraries not just to provide popular services but to communicate a clear green identity. Libraries as gateways for knowledge are not particularly responsible only for disseminating the idea of sustainability but also for leading by example and thus serving as examples of ecological sustainability could be part of the marketing strategy of the library as a socially responsible body.

Academic libraries in Nigeria should be in forefront and position themselves to espouse this new trend in order to contribute towards maintaining the natural ecological balance in the environment. These academic libraries are the heart of intellectual development and the bedrock of knowledge provision. Hence Ramatu (2016, 34-44) describes them as the focal point around which serious and intense intellectual development and scholarship is birthed. Academic libraries according to this stand point are critical components, as well as indispensable instruments of intellectual, cultural and socio-economic development. Accordingly, Ode (2019) believes that as the heart of university and vital instruments of intellectual development of any university, academic libraries should be in perfect locality. They should contribute towards maintaining the natural ecological balance in the environment and preserving the planet and its natural system and

resource. Collaborating with this fact, Meher and Proboi (2019), opine that academic libraries have a unique role to play in the green building movement due to its noble mission, public and educational nature, and the fact that new libraries are usually high profile community driven projects. It also improves day to day operations and procedures of the library as well as apprising the community about responsible environmental practices. Bringing environmental awareness to libraries does not necessarily require huge financial effort of a big budget. Hence, it is imperative that academic libraries should first and foremost consider domestication into green libraries as a sole priority in order to be consistent with the overwhelming effort to overcome the global ecological warning.

To control global warming, Rajeswari and Shivarama (2019) advocated that academic libraries have to grow large number of trees and also have to reduce the usage of machinery that discharges greenhouse gases as part of reducing global warming and to decrease the emission of greenhouse gases. Green Library concept should be introduced by academic libraries because it plays a major role in environment. In Oxford English Dictionary (1989) the word 'Green' is defined as "pertaining to, or supporting environmentalism"

Concept of green library

A green library according to Online Dictionary of Library and Information Science is designed to minimize negative impact on the natural environment and maximize indoor environmental quality by means of careful site selection, use of natural construction materials and ecofriendly products, conservation of resources (water, energy, paper), and responsible waste disposal (recycling, etc.). The main theme of green library according to Rahmath and Rajah (2019) is to increase the positive impact of nature by using sustainable energy efficient resources in constructions, maintenance and overall life of the structure. Green libraries are part of the larger green house building movement also known as sustainable library. Green libraries are being built all over the world, with many high-profile projects bringing the concept into the mainstream. Green libraries according to Meher and Proboi (2017) are credited by a rating system which is named LEED (Leadership in Energy and Environment Design). LEED was developed by U.S Green Building Library in the year 2000. They introduced the mechanism to categorize the sustainability with 100 base points wherein a building can be identified as certified. This trend implies that green building is a requisite qualification for a library to be considered a "green library" LEED is a point-based system, which gives credits to the building by looking at the following prospective:

- Site Location
- Water Conservation
- Energy Efficiency
- Materials and
- Indoor Air Quality

LEED credit system aims to allocate points based on the Potential Environment Impact and human benefits of each credit. These are weighed using the tools by United States Environment Protection Agency for the Relocation and Assessment of Chemical and other Environmental Impacts.

Green building

The building of a green library is constructed with environmental products, conservation of resources and with renewable resources. Green library is a part of Green Building Movement. It came into existence in the year 1990 and is gaining popularity in the field of Library and

Information Science Profession. According to Rahmath and Rajah (2019) green libraries are designed in a manner to reduce negative impact on the environment. Some of the construction methods of green library is using green materials like bamboo, cork, linoleum, day light. Instead of using concrete roofs we can use green roofs, natural ventilation for free air circulation and indoor environment quality. Green library plays a vital role in environment and helps in reducing global warming.

Characteristics of a green library

In taking the initiative to implement a green library, there are certain fundamental requirements that every organization/ library should embrace in their plans; Murrugananda and Aravind (2019) identified and categorized those essentials as discussed below

Site Location: Before building can start, a comfortable location must be chosen. According to Murrugananda and Aravind (2019) the selection of the site to a large extent determines how ecologically friendly the library will be. The library should be located in a comfortable densely populated area, near a number of other service related buildings. People should be able to reach the building by public transportation and the parking lots should give priority to those driving energies efficient vehicle. Considering site location is very crucial because for example in Nigeria, the climatic condition varies from one area to another. Therefore, in planning for library building construction, we need to weigh the pros and cons in terms of planning separately for hilly and plain areas.

Water Conservation: water conservation should be given high priority in planning green libraries. There are many different ways for libraries to conserve water. One way is for the library to rely on proper site selection. If a site is selected properly strategies can be used to capture rainwater runoff to be used in irrigating. Another strategy is to use low flow fixtures and waterless urinals.

Energy Efficiency: There should be proper conservation of energy. Energy efficiency is considered by many to be the most important category in becoming sustainable. In the LEED rating system according to Rahmath and Rajah (2019), it is the heaviest weighted of all the categories. Energy efficient design is in many ways a return to passive design principles that evolved over thousand years, until the advent of air conditioning and cheap energy made those strategies appear to be unnecessary. As environmental awareness increases, as well as the cost of fossil fuel needed to operate giant heating, air conditioning, and ventilation system, building designers are beginning to recognize that the outside environment cannot be ignored, and should be taken advantage of. What 21st-century designers are beginning to do is to implement ancient passive design principles, while taking advantage of the most advanced technology available.

Constructional Materials: It is recommended that in planning for a green library, up to 40% of landfill space is filled with construction waste material. The primary responsibility in selecting materials for library is to contribute as little waste as possible. Another responsibility is to choose materials that can be produced without causing too much damage to the natural environment. In order to fulfill the first responsibility, post-industrial and post-consumer recycled materials are being used. Murugananda & Aravind (2019) emphasizes that when purchasing materials, it is important to investigate the claims that the product is made from recycled goods to ascertain what their claims mean. It is a common marketing practice by marketers to exaggerate how green a product is by using misleading statements. According to the above stand point, the materials should be chosen based on their quality assurance that they are capable to be reused or recycled 50-100 years down the road when the library building has reached the end of its useful life. As non-renewable resources decrease, reusing and recycling are going to become increasingly necessary in the future. In addition, the first thing that comes to mind when we think about green library is the library building. In

making green building, the recommended standard is to use recyclable and environmentally sustained materials. The recommendation of LEED as internationally accepted program planning the environmentally high-performance green building for a healthy environment that waste should be minimized at every stage of construction of building should strictly be adhered to.

Indoor Air Quality: Indoor air quality is another important aspect that should be considered in the design of green library building. In most cases the building is temperature controlled which make them to be airtight. Lack of ventilation makes the building not to cool and thereby attracts harmful toxin that are likely to affect the respiratory systems of the staff/ patrons since they spend most of the time in the room/ indoors. Murrugananda and Aravind (2019) strongly believe that, green building should be designed in such a way to give enough room for ventilation and does not allow air gets stagnant. A green building is not just taking care of the environment, it is about taking care of the health and wellbeing of those who work in it and patronize it. The inside of the green libraries should have natural sunlight because many patrons want to read with sunlight.

The role of green library Librarian

The question is whether the Librarian can go-green? If yes, how does he go-green. The under mentioned points according to Rajeswari and Shivarama (2019) would show how he could be.

- Use paper saver: e-journals, e-books and likes
- Practice delivering softcopies
- Weed out worn-out books and manuscripts
- Promote green library books through conferences, seminars and discussion forums
- Encourage patrons to familiarize and embrace green library
- Use wooden furniture and biodegradable materials
- Effective use of LED and solar energy

Green Library Advantages

Advantages of green library to library building environment, staff and the patrons are numerous and Murrugananda and Aravind (2019) categorized them as follows:

- **Reducing Pollution:** Adoption of green library reduces the carbon footprint of our buildings. The term carbon footprint is defined as “the total amount of greenhouse gases produced to directly and indirectly support human activities usually expressed in equivalent tons of carbon dioxide (CO₂)”.
- **Encourages proper usage of Paper:** It discourages paper wastage and digitation of rare books can be done to save papers. Papers are prepared from woods and if a single paper is saved the tree is saved. Papers should not be wasted. Two sides of the paper should be utilized. Papers should be reused or recycled effectively. More e-books and e-journals should be used in order to save paper. Digitization of rare books also can be done to save papers.
- **Effective Reuse of non-biodegradable products is enhanced:** Put a separate container next to your waste basket or printer making it easier to recycle your bottles, can and papers. Plastic should be avoided. Reusable pens can be used instead of ball point pens. Polythene covers should be avoided consciously. This is also kind of saving earth.
 - Use of maximum Natural light and wind can save electricity. Since the green libraries are built with open windows to allow the use of natural light it will reduce frequent use of electricity thereby cutting down the cost of electricity bills
 - Eco friendly pesticides can be used at the time of pest control.

- Eco friendly materials can be used for stacking purpose.
 - Using network printers instead of personal printers.
 - Installing a new serve and running multiple servers on one server box.
 - Re-fill toner cartridges instead of buying new once.
 - Putting computers in sleep mode when is not in use.
- **Limited Budget:** Green Library does not require any high budget allocation. It is now possible for libraries to build green buildings on conventional budgets. Green Libraries make use of finite energy resources which is readily available and also fit into the library's budgets. Here technology does not become a barrier.
 - **Social Responsibility:** As Green Library play a paramount role towards the welfare of mankind, this could be used as a part of the marketing strategy of the library as a socially responsibility body which can have a big impact on the library's image

Challenges

The academic libraries in Nigeria while considering a green library had to contend with the following challenges

1. Most academic libraries in Nigeria were built in the past without the concept of green libraries and green building in mind. It therefore, means the already existing library buildings do not fit into the green library and they may have to be demolished and restructured to meet the standard requirements for green library and this requires financial implications. Certainly, no parent institutions in Nigeria would want to take such huge risk for the sake of transforming into green libraries. Where would the money come from when the budgetary allocations are not regular and even when regular are in- adequate to meet ever increasing library needs?
2. Again, there will be the need to reclaim the entire library environment by planting trees around the library in line with the LEED recommendations. While this is feasible, it will take a very long time to achieve and does not exclude finance which most libraries may find difficult to afford due to their usual lean budgetary allocations.
3. There will be need for total orientation and training for staff and particularly the librarian in line with the new concept of green library in order to make them relevant in the new dispensation. The concept of green libraries is new and was not taught in the universities therefore, adopting it will require total training for the staff to enable them gain knowledge in green libraries.
4. Certainly, the concept of green libraries is new and it will be an uphill task to convince the parent institutions to embrace its introduction more so as is going to involve unwanted demolition of library buildings and expenses for the institutions. A change is always opposed at the initial stage no matter how good or bad it may be
5. Serious consultations are required in order to achieve this goal. The librarian has to consult and lobby several organs of the school in order to secure better support for the introduction of green libraries into the institutions. Every new thing or change usually attracts challenge and opposition therefore, clamoring for the implementation of a green library is likely to receive stiff opposition which can only be calmed down by good diplomacy and consultations.
6. The green library is a modern library where there should be less use of electricity, consumption and maximum utilization of renewable sources like air, sunlight and woods

whereas, in most academic libraries in Nigeria, there is concentration in the usage of electricity, air conditioners and metals in the construction of the libraries. It therefore means that efforts should be made to redesign the libraries to allow maximum use of sunlight against electricity and natural air against air conditioners and vice versa. This is going to be a big challenge the academic libraries in Nigeria have to contend with.

7. Library and its components need special care. The library always faces difficulties like space and budget in such way similar to that of books which are facing problems from fungi, dust and humidity. When designing the library building, the designers have to look far into the future as they are long term reserves of knowledge made to help the community
8. A common strategy in green is to increase the levels in order to increase circulation, but the weight of the piles can be an obstacle to this policy
9. To protect books from getting damaged, they must be kept away from sun light, yet sunlight is the key component in green library designing. The challenge here is to accept and avoid sunlight.

Conclusion

As the whole world is moving towards ‘Green’ concept, it is essential for the academic libraries in Nigeria to adapt to environment friendly, sustainable information system. Though it is not that much easy to adopt this new change, however since the library is the heart of the institution; if anything is modified in the library then everything in the institution will also change. Hence, let the library be the starting point where knowledge grows. The challenges may be there but they are not insurmountable.

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