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Digital Libraries and Accessibility of Information by Users: A Conceptual Framework

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Abstract

The objective of this paper is to explore the factors that enhance the performance of digital libraries in promoting access to information. The method adopted was an exploration of literature to find out the relationship between digital libraries and access to information. First, a review of the concept of digital libraries and access to information was carried out in order to unravel their meaning. Secondly, a conceptual framework was presented to show the digital libraries variables that influence the user in having effective access to information. Lastly was the examination of the factors that promote access to information through digital libraries. It was revealed that technology usability and usefulness; adequate support services from library professionals and acquisition of digital literacy by users are the basic critical factors that promote access to digital information. Among other things, it was recommended that government / parent institutions, which are the major donors of digital resources, ensure that digital technologies, through which access is provided, are designed in an easy-to-use manner to enable library patrons to make optimal use of the resources for effective access to information.

Keyword: *Access to information, Digital libraries, Digital Technology, Digital Information, Electronic Resources.*

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Introduction

Provision of access to information is the sole reason why libraries are established in every institution of higher learning. The library is meant to provide information resources for improvement of teaching, learning and research as a way of supporting the parent institution in actualizing the goals of scholarship. The introduction of digital libraries is a way of enhancing the traditional library's roles in providing access to more adequate, timely and current electronic information resources to users. The conventional library system is limited by poor funding as a result of decreasing budget leading to dearth of core print collections in various fields and inability to meet up with the cost of preserving decaying materials; proliferation of electronic resources and the libraries' inability to acquire and keep up-to-date with the astronomical increase in the volumes of information resources being produced as well as the need to access remotely stored information and effective collaboration (Igun, 2010, Mutula and Ojedokun, 2008). Digital libraries have therefore been described as a child of necessity resulting from the need to use technologies to increase the availability and accessibility of information from various electronic resources (Ogunshola 2005). With this development, Computers and electronic networked tools (e-resources) are an important part of libraries and references are now made to 'information commons' which refers to a specific environment in a library where a designated number of computer workstations, networked to databases and other e-resources, are made available to readers (Igun, 2010) for the purposes of providing access to timely information.

The introduction of the digital libraries and the related electronic resources in today's library service delivery is based on the obvious advantages in facilitating access to information. Indeed, it has become a way of ensuring consistent availability and quick access to relevant and correct information through wed-based OPACs, databases, institutional repositories, e-books, e-journals, e-archives and images of various types. Despite the fact that huge financial investments have been made in building digital resources in some academic institutions, personal observation across some libraries has shown that many users find it difficult to appropriate the resources for information search and access. Considering the complementary roles of the digital libraries to the traditional print resources, the questions that come to mind are: Are the digital

libraries effective in ensuring access to information beyond what the traditional library system offers? What are the factors that enhance access to information through the digital libraries?

Connecting to Digital library information requires the application of technologies, involving the use of computers, networked technology and file storage systems to ensure the availability and retrieval of information (Ming, 2000). With the availability of the rich online resources the challenge before the user is how to access the required information. Overcoming this challenge depends on the availability of the appropriate equipment, resources and the ability of the user to find, search, download and navigate as well as the role of the libraries in raising awareness, promoting access and encouraging the use of digital information (Ming, 2000). Some crucial factors in the digital libraries were found to be essential for successful access to information. In the view of Ming (2000), Thong, Hong & Tam (2002, Ramayah (2006) and Millawithanachchi (2012) those factors include the application of technology, provision of effective support by library professionals and acquisition of digital literacy by the users. Explicitly, the above identified factors entail the availability and usability of the required hardware (digital technology), types of data organization and the user's ability to find, search, download and navigate, and the role of staff or library in raising awareness, promoting access and encouraging the use of digital information (Ming, 2000).

Theoretically, the arguments of this work are based on the tenets of Ranganathan's (1946) Law of Librarianship and the Technology Acceptance Model of Davis (1989). Ranganathan's laws which have a web version as given by Norizu (2004) provided general principles on information service delivery with guidance to information professionals on ways of promoting easy access to information to avoid user frustration. This law is regarded as the basic foundation of librarianship. The application of the principles help libraries not only in adaptation to changes/innovations but also in the process of organization of knowledge through cataloguing, classification and storage of information resources to ensure that access points are created and presented in a manner that helps the user to access the resources with ease and devoid of frustration. This invariably is the hallmark of the aim of digital libraries. The

Technology Acceptance Model, on the other hand, portrays the fact that usability and usefulness criteria are the determinants of the user's intention and ability to use digital technology to access information. According to the theory, the intention to adopt an information system (for information access) is determined by two beliefs namely, perceived ease of use and perceived usefulness. These beliefs have been found to be influenced by eternal variables such as design characteristics, training, computer self-efficacy and the nature of the implementation process. Hence, it could be deduced that performance of digital libraries in enhancing access to information depends on human and technological factors which are backed up by these theories.

Objectives of the Study

The study's goal is to explore conceptually the interactive factors that are vital to the promotion of access to digital information. Subsequent priority areas will be considered as follows:

Digital libraries: meaning, development and the advantages.

1. The concept of access to information.
2. The critical factors for promoting access to information through digital libraries.
3. Challenges in digital libraries regarding access to information.
4. Strategies to improve access to information via digital libraries.

Digital Libraries: Meaning

The term digital libraries may be understood in different ways using different names. Analysis of various definitions of digital libraries pointed out that digital library is used interchangeably with electronic library, virtual library, hybrid library, gateway library, library of the future, library without walls (Bawden and Rowland, 1999). Other terms include repositories of information product, computerized network library system and database accessible through the Internet (Ramayah, 2006). All these terms point out seamless characteristics of digital libraries. Another description sees the concept as libraries with the same purposes, functions and goals as traditional libraries-collection development and management, subject analysis, index creation, provision of access,

reference work and preservation (Cleveland, 1998). The weakness of above description lies in the fact that it failed to highlight the characteristic that distinguishes digital libraries from conventional libraries, which has to do with the possibility of new/improved mode of information access through the application of technology as highlighted in the definitions of Li (2002) and the Digital Library Federation (2004). A synthesis of the definitions given by the above different authors indicates that digital libraries are platforms that result to interaction between the human and computer technology in the process of locating, access and use of information that exist in the universal network.

Researchers in the different fields have differing views about digital libraries. From an information retrieval point of view, it is a large database; for people who work in hypertext technology, it is one particular application of hypertext methods. For those working in wild-area information delivery, it is an application of the web; and for the librarianship profession it is another step in the continuing automation of libraries (Nurnberg et al, 1995). From the point of view of librarians, digital libraries are the electronic extension of a service-based institution that has existed for millennia. Computer scientists see them as one of many distributed multi-media information systems, while to end users they are walled gardens in the wilds of the World Wide Web (Xie, 2006). One common feature of the above differing views is that digital libraries provide access to information through networked systems. They serve particular communities or constituencies, though those communities may be widely dispersed throughout the networks and they require the skills of librarians as well as those of computer scientists to be viable. Hence digital library is not all about technology alone but includes the services, expertise and skills of humans.

The collections of digital libraries are not generated in one place; rather they are originally produced in diverse locations, most often as print materials and can be converted digitally for easy and seamless access as a single entity using technology (Cleveland1998). This implies that digital library resources can be classified into two major forms: born-digital and non-born digital resources. Born-digital resources are regarded as those resources that originated digitally, while the non-born digital resources are resources that have been created by the digitization process from current print materials(Mutula and Ojedokun 2008). Certain basic characteristics are inherent in the description of digital

libraries: no individual digital library can function alone; and it takes technology to connect the resources of many libraries so as to provide users with universal access to information and more effectively conserve resources (Lynch & Garcia-Molina, 1995 and Cleveland, 1998**).** The working concept of digital libraries by the researcher defines digital libraries as a collection of universal computer-mediated information resources that are created, obtained, processed, stored and accessed primarily by the use of digital technologies. A clearer perspective of the concept requires an understanding of the historical antecedents that led to its development

Digital Libraries Creation

The history of digital libraries is dated to the 1990s, as recorded by Cleveland (1998), Ballard (2000), and Mutula and Ojedokun (2008). The evolution of the concept began with Vannenar Bush and Douglas Engelbert in 1945 and 1950 respectively. Bush devised an automated method for processing information, including books, personal records and articles; this led to the development of the Memex machine that allowed users to display the stored information from various access points simultaneously and look at several items (Mutula and Oyedokun, 2008). The memex machine advanced to the use of computers and focuses on broad bibliographic databases, electronic search systems and public access systems that are part of every existing library (Cleveland 1998). The machines were connected to large networks which evolved into the internet, and efforts were channeled towards creation of digital information libraries that anybody from anywhere in the world can access. This process is referred to as the concept of interoperability, that is, the ability of multiple digital libraries to interact with each other independently (Lynch and Garcia-Malina 1995). The above authors further asserted that digital libraries are able to do so because they use common tools, interfaces and standards that allow users to still access digital objects using federated software of some kind. Related to the process of interoperability of digital libraries are the open source applications readily available which has made digital libraries very acceptable and appealing. Open source software are computer programs (Greenstone, DSpace) for running digital libraries that are available free of charge, thereby saving the cost of acquisition and updating (Francis, 2008). The quality of this program, along with

the interoperability requirements (Z39.50 protocol, XML and Dublin Core) are central to the digital exchange of knowledge on a global level (Francis, 2008).

Stages of Evolution of Digital Libraries

Since the introduction of digital libraries, the information system has evolved through four various stages (Mutula and Ojedokun 2008). These include polymedia, electronic library, digital library, and virtual library. Polymedia also referred to as conventional or traditional library, occupies physical space, with the collection largely in print and audio-visual (microfilm, video, microfiche and audio resources) formats. Access to information services is through direct personal visits, and the core library functions (acquisition, cataloguing, circulation, reference services), are essentially done manually. The polymedia library metamorphosed into electronic library, where the core processes are computerized but the resources are in print format; the library occupies space but users have minimized interaction with the librarians. Digital libraries present a computerized collection of electronic information resources. Here library processes are conducted using digital technologies including computers and networks. No conventional printed information is available and access to resources is mainly through electronic means. The library may or may not occupy a physical space. Similarly, the virtual library is an information service whose collection is entirely in virtual or digital form and information is accessed over the network. No physical space is provided where users visit to access information. Access is distributed and virtual. The authors added that this type is equally regarded as paperless library, library without walls, networked library, seamless library and library of the future.

However, one may add that emphasis on digital/virtual libraries and the associated electronic resources should not underscore the place of the print resources of the traditional library. Digital libraries are meant to complement the roles of the traditional library. Hence the introduction of the concept of hybridization of libraries (hybrid library) which involves the integration of printed and digital resources and combining the traditional library space with the virtual space to accommodate the changing information environment (Ahlota 2004).

Advantages of Digital libraries to the Traditional library system

Digital libraries have several advantages as earlier indicated. Below are further additions to the potentials of digital libraries.

Digital libraries make knowledge available seamlessly. Online libraries have the capacity to reach globally through international networks such as the Internet, which makes it possible for search of OPACs of global libraries and utilization of their online resources (Ojedokun, 2000 and Mutula and Ojedokun, 2008). Anybody can use the digital resources through online access via networks at any time and ensure improved information search and manipulation as well as enhanced information sharing facilities.

Digital librariesensure user's freedom in the use of resources. They ensure the reduction of digital divide (Anasi 2010) thereby improving the use of information. They give room for collaboration and for reformatting electronic information to the specifications of the user; offering low preservation, storage and maintenance costs by enabling the production of multiple copies and expanding the range of materials being provided to users for access (Mutula and Ojedokun, 2008).

Also Digital libraries are highly economical. Digital libraries are found to be less expensive and more helpful for easy and timely access to and preservation of information resources, as well as for enhancing user satisfaction (Ojedokun, 2000).

The foregoing shows that the digital/electronic environment provides far reaching opportunities for scholars and researchers in their search for information more than the conventional library system.

The Concept of Access to Information

Access to information has been described as the user satisfaction indicator and the raison d'être of any digital library(Chowdhury and Foo, 2012). Conventionally, access to information is regarded as the process by which users acquire adequate information resources, which are bibliographically organized through effective assistance given to them by the library professionals (Aguolu and Aguolu, 2002).

The advent of digital technology has brought out an expanded understanding of the concept to include the use of digital tools to seek, locate, organize and understand information (Hearst 1999). Hence, for information to be accessible it has to be available in a computer-related system, whether traditional or digital, in such a way that it can be identifiable and useable. This further entails that identifiability and usability criteria are the basic yardsticks for determining access to information.

Effort in accessing information is to help the user find documents that satisfy his needs. However, the challenge is how to sieve out desired information from the large amount of information existing in the information systems. To have access to information then means to be able to retrieve the desired information from the multiple information sources available. This covers all traditional information retrieval processes and activities ranging from collection, processing and indexing of content and data by a digital library for search and retrieval by a specified user group (Chowdhury and Foo, 2012).

Some basic tasks are required to achieve the expected result of effective access to information. These include, information retrieval, question answering, text summarization and text clustering (Hidalgo 2009), which were summarized into two components as search/retrieval and information analysis/synthesis of result (Manjunatha and Shivalingaiah, 2003).

Promoting Access to Information through Digital Libraries

The general mantra has been that access to information is the main reason why libraries, whether conventional or digital are established. This is because access to information is a vital driver of effective decision making, problem solving and development of scholarship all of which culminate to both individual and societal well being. A number of issues have been found to be critical in the understanding of the relationships between access to information and digital libraries.

The conceptual model below is applied in the explanation of the relationship between digital libraries and access to information.

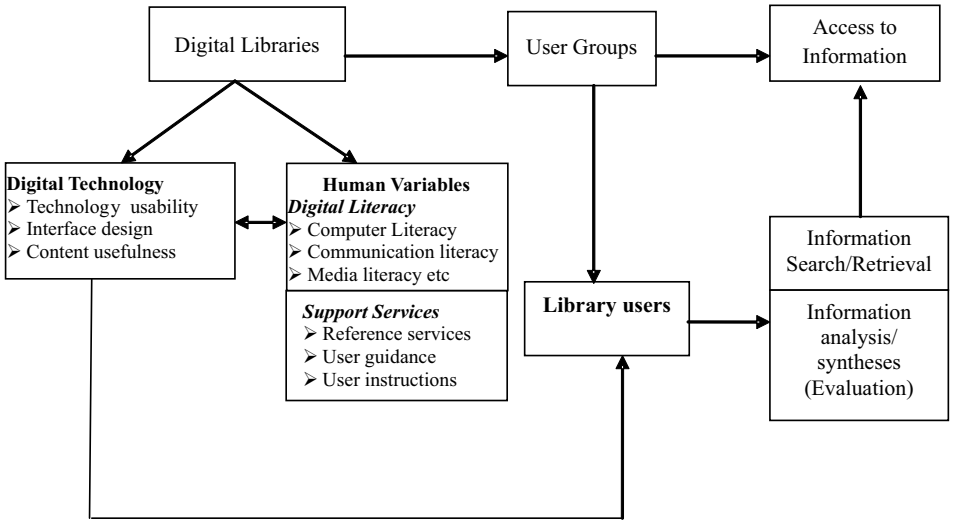

Fig 1: Diagrammatic representat ions of the study's conceptual model.

The above model illustrates the relationship in between the digital libraries and information access. It is evident that the interaction of the user with the digital libraries influences access to information. The potentials of the technology variables - technology (usability/ease of use, interface design and content usefulness), digital competency(computer literacy, communication literacy, media literacy, etc) and effective support services (reference services, user guidance, user instruction) are maximized by the user to gain effective access to information which involves information search/retrieval and information analysis/synthesis(information evaluation).

Digital Technology and Access to Information

Technology integration in library services and the use of knowledge has been described as the center of digital libraries(Faruqi and Alam, 2005). According to the above authors, for digital libraries to be effective in functionality, the underlying technology framework is critical to delivering the required performance and reliability. They further added that digital library patrons demand a high quality of service, requiring scalable enterprise-level technology with built-in reliability, flexibility and serviceability. The above assertions imply that assessing the influence of digital libraries on information access should

involve quality evaluation of digital libraries in terms of usability and usefulness. Based on this, Fuhr et al (2007) have presented a generic conceptual model of digital library evaluation which is made up of three components – the user, content and technology supporting the digital library content(system-centric approach) . In relation to the above model, Tsakonas, Kapidakis and Papatheodorou (2004) advanced a model (user-centered) that focused on relations among the user, the content and the system, which were grouped into three: content-system, user-system and user-content. Expatiating further, the content-system pair relates to Strength in accuracy, recall, reaction time, etc. The user-system pair relates to the criterion for usability which defines the quality of the user-system interaction. Usability here, according to the author, refers to whether the program is easy to understand, versatile and tailored to user needs and abilities. Lastly, deduction from the above model shows that the influence of digital libraries on information access hinges on the usability of the system and the usefulness of the content.

This aligns with the view of Borgman (2003) who identified three components of information access in digital libraries. These include content usefulness and usability of the information system and the documents they provide in relation to ease of use, ease of access and information literacy. Borgman further stresses that much attention is given to usability, adding that any comprehensive analysis of the role of digital libraries in providing access in the current information environment must pay considerable attention to usability of system design as well as the usefulness of the content.

Writing on usability framework, Evans, O'Dwyer and Schneider (2002) have identified conditions under which digital libraries can be used to access information. These include the visibility of the system and appropriate feedback to users; the language of the system to match the user's real life experience and user control and freedom to choose system functions.

The foregoing draws attention to the issue of establishing effective human-computer interaction for efficient use of digital technology in accessing information. This is enshrined in the concept of human interface design as advanced by Dumas (1988). In the view of Dumas, interface is regarded as a vital factor in the success and satisfaction of library patrons. Defining this concept,

the author asserts that it entails the software is easy to understand, flexible and customized to the needs and skills of the user. Shires and Olszak (1992) identified other issues involved in computer interface as the menus that patrons see on the visual display terminal, the commands and selection they make, the displays of bibliographic information they receive and the guidance they receive in the form of messages from the computer. Horton (1990) observed that well articulated messages have been found to improve the performance of both novices and experts, and the ease with which a user can select options affects the perceived friendliness and efficiency of the system. The foregoing shows that technology usability is a vital factor in the ensuring effective access to information in digital libraries.

Human Variables and Access to Information in Digital Libraries

Human activities are central to the role of digital libraries in providing access to information. Technology on its own cannot produce the desired result without the manipulation of humans. This requires a great level of technology competence and skills on the part of both the professionals and the users.

Library Professionals and Access to Information

The Library professionals are described as the guardian of digital information (Sreenivasalu, 2001), who play a vital role in the integration of digital libraries in information service delivery. They are expected to provide users with universal access to information through the application of technology in consultancy services, providing digital services, navigating, searching and retrieval digital information from web documents of the global digital library, as well as, document delivery and selective dissemination of information, user education/instruction and guidance (Bung and Bopp, 2000, Roopa and Krishnamurthy, 2014). This also involves computer-based librarian's interaction with user through the media such as e-mail, web forms, customer call centers and other electronic channels to assist users in gaining access to information in a digital information service platform. The foregoing reveals that the professional is serving as a mediator between the user and the digital information resources (Chigbu, Ekwelem and Ezema, 2015).To be able to carry out the above functions, emphasis is placed on the professionals' expertise and ability to manage user

expectations. They require such basic competencies like knowledge of the electronic resources available, skills in performance of online searches and online communication through e-mail, web forms, chat, web contact, video conferencing, etc.

User's Digital Literacy and Access to Information

Digital literacy entails the user's ability to locate, identify, retrieve and use information in the digital library system. The existence of usable technology and effective support services form professionals cannot guarantee access to information if the users do not possess the necessary skills with which to manipulate the system. These skills are embedded in digital literacy which has been described as central for effective access to digital information by the undergraduates.

The American Library Association (2013) defines it as the ability to identify, understand, analyze, construct and communicate digital content, using information and communication technologies**.** The above definition reveals three dimensions of digital literacy to include, cognitive, technical and sociological skills (Eshet-Alkali, 2004). In another dimension, digital literacy is the application of digital tools in harnessing, the use and sharing of information in diverse formats, while being aware of the ethical issues involved (Sharpe, 2010). Inherent in the above definition is the ability to utilize technology to access and share information with peers and engage in lifelong learning bearing in mind the legal implications involved. In relation to this, Leeds Metropolitan University (2011) identifies a convergence of several types of digital literacy. This includes computer literacy, information literacy, media literacy, technological literacy, information technology literacy, communication and collaboration, digital scholarship and academic practice. However, the above abilities are not enough if the users cannot engage in critical thinking and practical application of digital tools to generate and communicate information (Kaeophanuek, Siriwatchana and Na- Songkhla, 2018).

Information Search/Retrieval

In 1952, the term information retrieval was coined on the assumption that documents or records containing information were arranged in an order

suitable for easy access (Onwuchekwa and Jegede, 2011). Information search/retrieval serves the purpose of informing the user about the existence or non-existence of and location of the related document of his search Hence the system serves as a bridge between the world of creator or generation of information and the users of that information (Chowdhury 1999). Furthermore, Jato and Oresiri (2013), describe it as the method of finding unstructured material (usually documents or texts) that meets the need for information from large collections (usually stored on computers). This implies that information retrieval is all about locating exactly the information one needs when it is needed from the vast information resources available and this is made possible through the ability to give search queries. Categories of information retrieval exist. Two broad categories have been identified by Onwuchekwa and Jegede (2011): in-house information retrieval and online information retrieval. According to the authors, in-house retrieval system is set up by a particular library system to serve users within an organization as in Online Public Access catalogue (OPAC). Online information retrieval on the other hand refers to those systems designed to provide access to remote databases and electronic information resources to a variety of users (as in the virtual/digital libraries).

Methods of Issuing Search Queries for Information Retrieval

Knowledge of how to issue search query has been identified as a key factor in digital information retrieval. The Spiders Apprentice (2004) enumerates five ways of using search queries to find information to include, keyword search, refining the search, relevance, Meta tags and concept-based searching.

***Keyword search*:** This is referred to as search for documents containing one or more words that are specified by a user (Jato and Oresiri, 2013). Here there user identifies relevant terms of one or more words related to his search for a more organized and well articulated search.

***Refining the search*:** This entails two types of search, basic and refined/advanced search. In basic search, a keyword is simply entered for the search, while advanced search makes use of more than one word to give more weight to one search than the other and exclude words that might likely becloud the results. Advanced search, according to the above authors, is mostly done

through the application of the Boolean operators – "AND", "OR" and "NOT". Further description of the Boolean operators by Jato and Oresiri, indicates that while Boolean "AND" means that all defined words must appear in a document t, Boolean "OR" means that the document must contain at least one of the stated words and Boolean "NOT" means that at least one of the stated words must not appear in the document This process generally applies the principles of inclusion and exclusion of terms to get the needed information.

Relevance ranking: While explaining the methods of using search query to find information, the Spiders Apprentice (2004) describes relevancy ranking as a retrieval method that provides a list of documents in the order of how closely they match the search query.

Meta tags: Invisible codes that provide data about the user's query to search engines, makes search engines easier to determinewhat the query is about and how to display the search result (Litsa, 2018 and Hardwick, 2020).

Concept-based search tries to ascertain what the searcher actually means by displaying lists of documents that are about the subject that is being explored, although the words in the document do not exactly match the search words entered.

Information synthesis/ Analysis (Evaluation)

Evaluating sources of information, the second basic task of access to information, has been described as an important step in any research activity. Existing information is so enormous that obtaining the skills of evaluation is very vital for effective access to information (Driscoll and Brizee 2013). It is the making of judgment about the value of ideas, works, solutions, methods, materials, for some purpose and includes the application of criteria and standards to assess the extent to which the information is accurate, effective, economical or satisfactory (Fitzgerald 1999). This entails that information evaluation makes decision about the credibility, reputability and verifiability of the information source (Driscoll and Brizee, 2013) as well as the reliability, accuracy, authenticity, worth of the knowledge, claims and argument (Isothermal Community College Library 2014). In relation to the above criteria,

Bailey/ Howe Library (nd) presented 5 "Ws" of judging information sources thus:

1. Who is the author?
2. What can be said about the content?
3. When was the information published?
4. Where else can the information provided by the source be found (to establish the authenticity or uniqueness)?
5. Why the information was provided (published for whom, the audience).

Answers to the above questions educate an information user who is a critical thinker about the resource to determine its authenticity, which in turn promotes access to information.

Challenges of Access to Information through Digital libraries

A cursory consideration of the nature of access to information through digital libraries reveals some inherent challenges revolving around technological/ infrastructural facilities, the user and the support services. Despite the numerous advantages of digital libraries, numerous challenges are apparent in the use of the system for access to information, especially in developing countries (Witten et al 2001).

Poor technological infrastructure has been identified as a strong factor that hinders access to information in digital libraries. This is in the form of frequent obsoleteness of computers, frequent interruption of electricity, frequent machine breakdown/ lack of technicians for maintenance, low internet connectivity/bandwidth and server instability (Aguolu and Aguolu, 2002, Fezaa, 2013 and Uutoni, 2014).

Lack of skills in the use of technology and other skill related factors have been found to exert negative influence to access to information through digital libraries. These include lack of improved knowledge of ICT and low digital/ information literacy and user friendly technology interface which makes it difficult for easy utilization of the technology for information access by users (Luther 2000 and Fezaa 2013).

Changes and short lifespan of technology and digital File is a major challenge. **P**ermanency ofelectronic information resources is most often not guaranteed. Jackson (nd) concurs with the above observation when it was stated that computing technologies change tremendously at such a rate that information stored in them can be rendered inaccessible within a decade. From the point of view of technology strength and longevity, Luther (2000), Conway (2006) and Li and Banach (2011) aver that digital information is fragile and faces the challenges of technology obsolescence and the deterioration of storage media. Further comment by Conway (2006) on durability of digital information has shown that as our capacity to record information increased exponentially over time; the longevity of the media used to store the information has decreased equivalently.

Inadequate support services from professionals is also a challenge. Absence of human intermediaries who should play a major role in online search services is identified as one of the major problems of information search in a digital environment (Chrowdhury 2001). While emphasizing on this, The American Library Association Office for Information Technology Policy, Digital Literacy Task Force (2013) identified lack of sufficient staff/staff skill, lack of subject area or technical expertise and training as the challenges faced by digital libraries in enhancing access to information.

Strategies for Improving Access to Information in Digital Libraries

A number of factors have been identified as strategies for meeting the challenges of information access in digital libraries. Effectiveness of digital libraries requires that the users should have a friendly user interface and skills to use it (Park et al, 2009). In the opinion of Han and Goulding (2003), improvement in the use of digital libraries for information access is achieved through the following strategies: designing the user interface knowing the users, selecting high quality resources, training/educating the users, providing effective library support services, increasing technology accessibility and usability, improving power supply and professional development of staff for effective functioning. Commenting specifically on strategies related to library support, Sharman (2000), identified user training, cooperation/collaboration

among libraries in providing ready reference and subject specific references as factors that enhance access to digital information. In the same vein, Bung (1999) has suggested the provision of personalized services through the following techniques and technologies: understanding user's personal characteristics and tasks to understand their information needs; engaging in collaboration with other libraries for sharing of resources and application of technologies in information services using internet chats, call centre management and video conferencing.

Suggesting strategies for overcoming the problem of short digital lifespan, Li and Banach (2011) opined that the intervention of digital preservation techniques is required for digital information to be accessible over a long period of time, adding that creators of digital information should be more proactive about archiving their work to ensure a long term preservation of digital scholarship.

Conclusion and Recommendation

The paper has argued that access provision is the basic expectation from libraries by the community of users. The present innovation occasioned by the introduction of the digital libraries can only achieve its objectives when it is ensured that the technology is usable and relevant; when the library professionals are positioned to provide the necessary assistance to users and when there is the enabling environment for patrons to develop digital skills that will empower them to confidently utilize the technology to access information that satisfies their needs. The work has been able to establish the relationship between digital libraries and access to information, with emphasis on the interacting factors that make up the equation. Hence, the study has made contribution to knowledge as it reveals the factors that influence access to information through digital libraries.

It is thus recommended as follows:

1. The government/parent institutions, who are the major funders of the digital resources should ensure that digital technologies, through which access is provided are designed in an easy to use manner to enable library patrons optimally utilize the resources for effective access to information.

2. The library administrations should equally provide the enabling environment for library professionals to offer digital support services to users. This could be done by offering librarians the privilege to engage in training even outside the university through staff exchange / fellowship programs where they could be given the opportunity to visit other libraries that have recorded success stories in digital library service especially in the area of online information services.
3. The library administrations should engage in organizing training for users to equip them with the relevant skills for effective use of digital technology to search for information.
4. Users should equally be encouraged through advocacy and awareness creation by libraries to engage in self training to help themselves acquire the skills of information access which is vital for survival in the present knowledge economy

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