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A Literature Review of Information Dissemination Techniques in the 21st Century Era

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Abstract

Owing to advances in Information Communication Technologies (ICTs), information repositories have radically changed their information dissemination platforms and employed new techniques. Information repositories such as libraries are striving to remain relevant in the 21st century. It has become essential for libraries to meet 21st century user needs and demands. Today libraries have acquired new roles and are making use of various technologies such as mobile technology and social networks to disseminate information to library users. ICTs have been employed in information services due to their ability to provide high speed and effective access. Usage of information communication technologies present information seekers with a variety of advantages such as; 24/7 connectivity, self-service platforms, limitless access and it is time saving. The purpose of this paper is to discuss various techniques used to disseminate information in the 21st century era. The paper aims to inform and raise awareness to 21st century information professionals about the use of technology in information dissemination. This paper is based on literature review, it is an in depth desk-top research.

Keywords: Information dissemination, Digital libraries, Mobile technology, Self-service, Mobile library services, Digital content, Information repositories, Library, Information seekers, ICTs.

Introduction

Communications and information spread has been revolutionized by technological breakthroughs and rapid advances. Technological development has greatly changed the way in which information is stored and transmitted. Chapman & Slaymaker (2002) avers that industrial society has progressed into an era of advance technological innovations, thereby affecting the way people live their lives and how organizations run their daily business activities. Technology is permeating people's lives like never before. It is being used in all pheres of life such as health care, education, agriculture, banking sector, information seeking and retrieval, energy, manufacturing and transportation (Boutin, 2013). At the center of all technological developments is the growing use of the internet and mobile technologies (Dickey, 2013; Reference.com, 2017; Okiy, 2010). ICTs have been embedded in our everyday lifestyles to such an exetnt that there is an emerging concept called 'internet of things' (IoT). The 'internet of things' is refered to as a network of interconnected devices, objects or things that are able to communicate and exchange data using embedded sensors and the internet (Meola, 2016; Morgan, 2014). According to Rouse (2016, para. 2) "A thing, in the Internet of Things, can be a person with a heart monitor implant, a farm animal with a biochip transponder, an automobile that has built-in sensors to alert the driver when tire pressure is low --or any other natural or man-made object that can be assigned an IP address and provided with the ability to transfer data over a network". This is how fast technology is changing our daily activities, the way we interact with one another and our interaction with nature.

In today's world, information societies are no longer separated. As stated by Nwagwu (2006), Okiy (2010) and West & Heath (2011); mobile phones, fax machines, the internet and other ICT facilities has accelerated the concept of globalization. With the use of technology individuals, organizations and government agencies are able to share ideas and work on projects from across continents. It is unfortunate that developing countries are at an ever increasing disadvantage in a globalizing world, as they fail to harness the benefits of the ongoing technological developments (Chapman & Slaymaker, 2002; Rodríguez & Wilson, n.d.). Nwagwu (2006; 179) also concurs that "the impact of ICTs in developing countries generally can be considered inegalitarian because their benefits accrue more to the rich than the poor developing countries, thus defining a new form of digital divide". Therefore it is of paramount importance that developing countries know how to bridge the digital divide and be able to use ICTs to benefit all levels of society (Greenberg, 2006).

Though the rate of technological development and adoption in developing countries cannot be compared to the rate of technological developments in developed countries; literature shows that developing countries are also facing an information explosion and relatively high numbers of information seekers who are using technology on an everyday basis. Bruijn (2009) gives an account of how ICTs revolutionized African countries such as Cameroon, Chad and Mali since the 1980s. Other studies also reveal that developing countries have implemented ICT policies, e-government initiatives and they are making significant investments in various technological innovations e.g. in health and educational ICT (Bhuasiri, Xaymoungkhoun, Zo, Rho, & Ciganek (2012); Kozma & Vota, 2014). ICTs can possibly help developing countries tackle numerous issues such as health, social and economic problems. This can be possible if both government and the public have instant access to information that can influence decision making. It is there vital for information providers to adopt information communication technologies that will enable them to disseminate information in an effective and timely manner. Efficiency and effectiveness of information distribution by information repositories and access by information users, will potentially help developing countries to eliminate extreme poverty and combart serious diseases (Andrianaivo & Kpodar (2011); Delponte, et al., 2015).

A study carried out in Nigeria by Okiy (2010) revealed that; students and lecturers in Nigerian tertiary institutions incresingly demaded and prefered access to electronic sources and networked information from their respective libraries. Another pre-liminary study conducted by Shonhe and Jain (2017) revealed that potential library users have positive attitude towards technology, they have competent skills to use mobile technology and they access information daily using mobile technology. McGrath (2016) also revealed that 87% of internet users own a smart phone. These findings show that information seekers are ready to access information through the use of ICTs. It is left to the information providers to take appropriate measures to dissiminate information using 21st century techniques. ICTs offer tremendous advantages that cannot be ignored. If information providers harness the benefits brought by technology, developed countries can raise informed and educated economies at a much faster rate. It is on this premise that this paper sought to explore and establish the 21st century environment of information dissemination.

Motivation of the study

The researcher was challenged by the shortcomings of the Botswana vision 2016 specifically on the pillar that reads “An Educated and Informed Nation”. A vision 2016 report on ‘status at a glance by key results areas’ shows a number of activities that have taken place to achieve different pillars (Botswana Vision 2016 Council, 2010). Unfortunately, on the first pillar of “An Educated and Informed Nation” all the key activities do not show any effort towards making information available to the communities, either through libraries or records centers. The report does not show any tangible evidence that there are efforts in place to re-engineer information repositories to suit the 21st century environment. Going forward, the Botswana Vision 2036 have about four pillars, under which there are key elements to address each pillar. For example; Vision 2036 Pillar 1 is on Sustainable economic development (Area of concern- knowledge based economy and doing business & competitiveness). Pillar 2 is on Human and social development (area of concern to this study is education and skills development). The last pillar important to this study is Pillar number 3- Governance, Peace and Security (Area of concern- Transparency, accountability and implementation) (Vision 2036 Presidential Task Team, 2016). All the aforementioned areas under each pillar, they can be achieved through modernization of public/school/private libraries and other information repositories such as the Botswana National Archives and Records Services (BNARS). A study conducted in Nigeria, affirmed that libraries play an important role in the achievement of developmental goals (Onoyeyan & Adesina, 2014). Hence the efficiency and effectiveness of libraries cannot be ignored.

The current status especially in public libraries it is disheartening just at a glance (Ogunsola & Okusaga, 2006). An example is shown in a study by Pyati (2009), who mentions that Indian public library system is generally in a state of disrepair and does not provide meaningful services to the masses. From the researcher’s personal experience and observation during internship and voluntary programs in Botswana Public libraries, it was observed that most public libraries and BNARS do not have electronic retrieval systems or any library management systems. These libraries are still operating in the traditional environment where operations and services are carried out through manual practices. With this kind of background, some of the vision 2036 pillars may not be achieved if information repositories are not acclimatized to changes taking place. They should be rejuvenated to operate in the 21st century environment where information access is instant and simultaneous. Information repositories such as public libraries should be seen as tools

for capacity building, and mechanisms for poverty alleviation in developing countries (Krolak, 2005; Ogunsola, 2011; Pyati, 2009). Alemayehu (2014) affirms that access to information in Africa is a fundamental obstacle to development. Hence appropriate attention should be awarded to the development of information repositories to accelerate provision of quality information and timely access to information. As stated by Hamilton (2013), development in the 21st century demands access to timely and quality information.

Objectives

The prime objectives of this paper is to establish various kinds of techniques used to disseminate information in the 21st century era. This paper should be viewed as an informative or awareness tool to various information repositories and information providers in developing countries. This shall be achieved through the following research questions.

- a. What are the roles and skills required for the 21st century information provider?
- b. What are the characteristics of the 21st century information seekers?
- c. What are the techniques used for disseminating information in the 21st century era?

21st Century Information Providers

In the context of this study, information providers shall refer to librarians, knowledge managers and records managers. Information providers shall also refer to institutions that create and disseminate information for public consumption (e.g. Libraries, archives and records centers). More reference shall be made to operations in the library environment. These are professionals tasked with the mandate to manage information or documents throughout their lifecycle; thus from the time an information resource is created to the time it is disposed or discarded. These information professionals manage the storage, maintenance and retrieval of information in a wide variety of formats. Information repositories are gateways to knowledge and culture. They have the ability to place an organization or individual at a competitive edge. In their endeavor to achieving their objectives, various libraries or information repositories have continued to automate their practices, digitize their collections and adopt new technologies to improve their operations. Hence Librarians and other knowledge or information providers should equal the task of providing the right information, at the right time, to the right people, using the right techniques or tools.

For example; traditionally; librarians were known to be responsible for shelving books, they were generally associated with the collection of books. The role of librarians are unremittingly evolving to suit the current social needs and technological developments. The 21st century libraries operate in the digital world therefore librarians are required to intensify their skills to remain relevant in their profession. The 21st century librarian's roles and skills include (Halder, 2009; Jain, 2013; Khan & Bhatti, 2012; Melchionda, 2007; Rao & Babu, 2001; Uzuegbu & McAlbert, 2012; Verma, 2015);

- a) Knowledge workers/brokers
- b) Digital curators
- c) End user trainer/educator
- d) Web organizer and designer, Interface designer
- e) Knowledge manager/knowledge broker, Knowledge mapping skills
- f) Researcher
- g) Change agents
- h) Website builder and publisher
- i) Sifter of information resources
- j) Content manager
- k) Consortia manager: strategic planning, systems development and project management.
- l) Marketing and presentation skills
- m) Technical, managerial and information technology skills
- n) Advocate (act as a lawyer e.g. concerning issues such as copyright law and intellectual property rights)
- o) Consultant, Service orientation, Collaborator
- p) Mentor, leader, financial manager
- q) Subject experts
- r) Policy makers

21st Century Information Seekers

The use of the internet facilitates instantaneous access to information. This has resulted in massive amounts of information and data available to anyone with a computer, mobile technology device a modem and a provider. The advances in technology has made it easier for information seekers to access information and this has also resulted in changes in information seeking behaviour of library users. Today's information seekers are well conversant with latest trends in the information environment (Jain, 2013). In the past library users had no choice but to come to the library. With the advent of technology, library user are able to access information remotely. However 21st century information seekers should acquire information communication technology skills in order to access information in the digital age. Anyira (2011) avers that unskilled library users will not be able to use library resources because of lack of ICT skills. Furthermore, 21st century information seekers are expected to possess certain information literacy skills as shown in Figure 1.

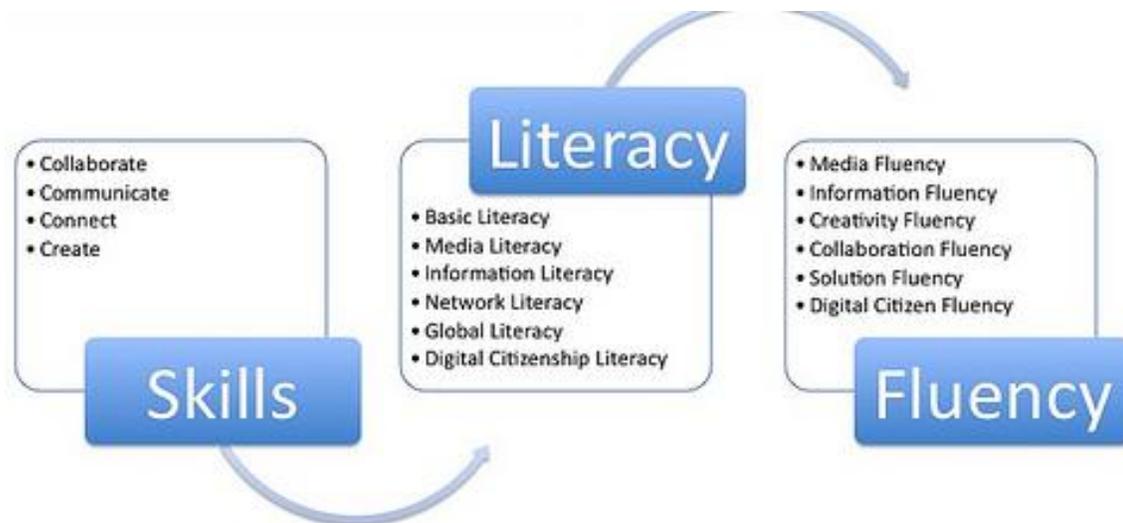


Figure 1: 21st Century Information literacy skills.

Source: Tolisano (2010)

It is therefore vital for libraries to ensure that they cater for 21st century information seekers. As stated by Anyira (2011), the collections of the library must reflect the needs of the users.

21st Century Libraries

Traditionally, libraries were known to be physical buildings for housing collections of books, journals, manuscripts and other recorded information (Ogunsola, 2011). In today world we see a greater change in the way libraries were operated. Through the use of technology, the library walls have been broken. Users are now able to access information remotely through digital and/ virtual libraries. Terminology associated with 21st century libraries include; automated library, digital library, hybrid library, virtual library and library 2.0 (Halder, 2009). Some of the principles guiding 21st century libraries are: library services access everywhere and anytime, library has no barriers, library invites participation- more active then passive, library uses flexible, best of breed systems (Ramos, 2007). 21st century libraries identity with library information management systems, cloud information management systems, 24/7 reference services, e-books/content and Online Public Access Catalogue (OPACS) (Chutia, 2015). In the 21st century library there is more life and energetic atmosphere unlike in the traditional libraries. Many libraries are renovating their library spaces and environments around the concept of ‘learning commons’ (Litzenberger, 2016). It is the norm for a 21st century library to have wireless connectivity and outlet access. Some libraries even have extended services such as coffee café. 21st century information seekers view the library as their second home due to conducive environments and services offered in the digital age.

Gisolfi (2014, para. 1) States that “public libraries are busier and more popular with patrons than ever. Today’s library is a place for social interaction as well as quiet reading. It is a community cultural center, not simply a repository for books. It is a welcoming building with a design focus on transparency, not a series of isolated spaces.” The following are some of the emerging trends in the 21st century library spaces; an informal community cultural center, transparency among spaces so patrons can be seen and more easily served, reading spaces interspersed within the various collections, larger and more varied spaces for children and teens, community, meeting, and activity rooms of varied sizes, daylight in all areas of the building, connections to outdoor space, spaces devoted to computer and internet instruction and online research, flexibility to accommodate future requirements and the library as a community model for sustainable practice (Gisolfi, 2014).

21st Century Information Dissemination Techniques

The birth of technology and continuous ICT developments are changing libraries in terms of information acquisition, storage, organization, maintenance and the methods of rendering services (Fagbola, Uzoigwe, & Ajegbomogun, 2011). The following are some of the methods used to disseminate information in the 21st century era. Most of these methods are self-service techniques which involve the use of technology such as laptops, smartphones, PDAs, MP3s, computers and many more.

Online Public Access Catalogues and networked databases: due to online presence of catalogues, users are able to retrieve and access information resources in a timelier manner. Current OPACs can be accessed through the use mobile technology such as cell phones. Library users no longer need to be within the library walls for them to access OPACS and library databases. Information seekers retrieve various information sources through mobile Online Public Access Catalogues and mobile based databases such as Pub Med (contains biomedical literature with more than 26 million citations which may include Full-text content (PubMed, 2017). The New York public library, University of Liverpool library, Jefferson county public library and Nashville public library are some of the best practices examples in the use of mobile OPACs (Nalluri & Gaddam, 2016).

Personal space/My Library: is a self-service platform where library users manage their personalized accounts with custom-made collections. Here users can set up and manage their profile, preferences for catalogue searches, receive alerts on reserved items, check their records, track interlibrary loan request, renew borrowed items and document delivery requests (Saxena & Yadav, 2013; Verma & Verma, 2014). National Tsing-Hua University (NTHU) library makes use of this technology by embedding the item's call number, location, title and ISBN (Wang, Ke, & Lu, 2012). This platform presents a new opportunity for electronic data interchange and selective information dissemination (Liu & Briggs, 2015). Information providers are able to send customized scanned documents, images, audio books and eBooks to library users' personalized accounts (Saxena & Yadav, 2013). This library service is also a good platform for e-learning and / distance learning (Prabhakaran & Kalyani, 2014). Academic libraries can harness the advantages of mobile technology to implement structures for distance learning by making information ubiquitous (Nalluri & Gaddam, 2016). For example; Duke University implemented a free iPhone

application called DukeMobile, it contains information on digital library resources. It also allows widespread access to the library's digital photo archive (Vollmer, 2010). Personalized user accounts and library collections helps the users to feel in control of their information resources and increases more interest in accessing library resources.

Short Message Service (SMS) notification: It entails the use of mobile telephony systems to disseminate information in the form of text messages and multimedia content such as videos, images and audio files. Libraries use this service to alert patrons regarding outstanding fees, renewals, provision of call numbers, interlibrary loan, issue return notification, items on hold and new arrivals (Kumar & Chitra, 2008; Kumar, 2014; Negi, 2014; Wang, Ke, & Lu, 2012). An integrated library management software is used to generate such notifications, for example; Libsys 0.7, AIM Hack, My Info Quest, Mosio's Text a Librarian, Upside wireless-used by UCLA Libraries (Verma & Verma, 2014).

Social media networks: information professionals also make use of the social platforms for information dissemination. Social networks are more appropriate for use on marketing information and delivering personalized information resources to groups of people or individuals. SMS notification can also be used through the use of social media networks (WhatsApp, Imo) and other web applications such as Google SMS, twitter, Facebook and Pinterest (Prabhakaran & Kalyani, 2014). A best practices Wiki offers a list of libraries which uses various types of SMS notification service (including web based SMS) and other mobile library services to interact with their clients. Examples include; Denton public libraries, Swiss National library and Simmons College library (Library success, 2014).

Quick Response (QR) codes are two dimensional barcodes that direct users to the desired websites (Library success, 2014). It is time saving technology that acts as a pointer to indexed or programmed URLs. The barcodes contain information about an item to which QR code is attached. Users with smartphones use their camera features to scan images and decode the information (Saxena & Yadav, 2013). QR codes are also known as mobile tagging (Verma & Verma, 2014). Information professionals use this technique to direct users to relevant or important websites, either on a certain topic or library adverts.

Online reference services: The high volumes of inquiries received by librarians can be overwhelming at times. Without being able to help clients within the least reasonable time, customer service satisfaction will be affected. Technology has made it possible for librarians and information providers to attend to multiple customer queries at the same time (Lippincott, 2010). Using mobile reference service technologies, brief responses to customer enquiries such as opening hours, call numbers, and dictionary definitions can be provided instantly in real time (Liu & Briggs, 2015; Saxena & Yadav, 2013; Verma & Verma, 2014). For example: live video calling can be done through Skype, Imo and WhatsApp to chat with a reference librarian. Online platforms allow reference librarians to create a bond with patrons and improve their efficiency through provision of 24/7 reference services (Barnhart & Pierce, 2011). A study by Tao, McCarthy, Krieger, & Webb, (2009) revealed that due to provision of mobile reference services, the Saint Louis University School of Public Health library experienced improved marketing and delivery of library resources and services. The library was also able to cultivate and strengthen liaison relationships (Tao, McCarthy, Krieger, & Webb, 2009).

Online VOD (MVOD) system allows patrons to play videos on their mobile device through the use of Wi-Fi or 3G network (Wang, Ke, & Lu, 2012). Videos can be searched using access points such as name of creator or title of the video (Prabhakaran & Kalyani, 2014). For example; the Oriental Institute of Technology (OIT) library uses the MVOD system (Wang, Ke, & Lu, 2012).

Library web sites are being used in various libraries for marketing purposes and announce news or upcoming events to their clients. Techniques such as CSS (Cascading Style Sheets) or ADR (Auto-Detect and Reformat Software) are used to enable websites to rearrange and adapt to the size of the mobile device being used (Nalluri & Gaddam, 2016). With the influence of mobile technology, libraries are transforming websites into mobile friendly interfaces (Nalluri & Gaddam, 2016; Negi, 2014). Every library should have a website that will enable information dissemination and access by all types of users.

Mailing lists: This is the most common method of information dissemination. Using email in library services is paramount and allows for groups of people to receive personalized information at the same time.

Conclusion and Recommendations

From the literature review, it is clear that ICTs allow simultaneous and multiple information access. It is time saving and increases innovativeness. Though it provides various advantages, it has brought with it challenges in the information management profession as roles and skills are changing to suit the era. It is also evident from the literature that information seekers in the 21st century era are also required to possess certain skills especially computer literacy skills. Libraries that drive access to knowledge will accelerate economic development, build stronger relationships between information providers and the community at large. Though the use of technology, libraries can employ various information dissemination techniques such as personalized collections, SMS notifications, QR codes, online reference services, social networks, websites, mailing lists and OPACs. The call to re-organize libraries in developing countries is long overdue. Technology, especially mobile technology is changing the way information is delivered and accessed. Therefore it is only appropriate for information repositories to challenge themselves to cope with the changes and adopt appropriate information dissemination methods. These move will enable libraries and related institutions to remain relevant in the 21st century era and gain competitive advantage. From the literature reviewed, the researcher deduced that information literacy skills and technology are necessary for effective/ timely information provision and access. This will facilitate growth of a knowledge based society with varied benefits as shown in figure 2.

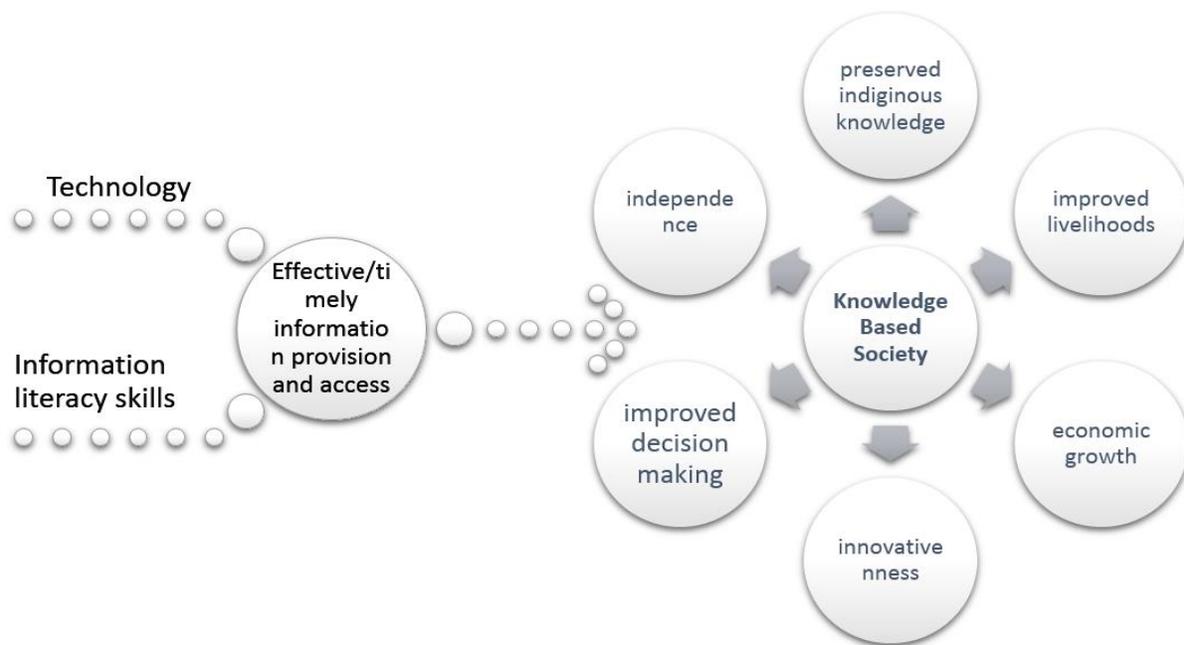


Figure 2: Vision for 21st Century libraries.

Further research Areas

This paper was aimed at raising awareness about information dissemination methods that can be used in the 21st century era. It is therefore recommended that further research be conducted in the following areas:

- Status of public libraries in developing countries and information dissemination techniques being used.
- Funding strategies that can be employed by information repositories to raise funds for transforming information centers to suit the 21st century area.
- Competency levels of information professional in developing countries to provide information in the 21st century era.

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