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**IMPACTS OF INFORMATION AND COMMUNICATION TECHNOLOGY ON
LIBRARIES IN GHANA: A REVIEW**

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Abstract

The purpose of this article was to provide a review of literature on the impacts of Information and Communication Technology (ICT) on Libraries in Ghana. Some of the ICT impacts identified were in the area of cataloguing and classification, online public access catalogue, acquisitions, video conferencing, web 2.0 and social media tools, online searching and retrieval, electronic resources, digitization, electronic/digital libraries and institutional repositories, library website, indexing and abstracting, technical services, bibliographic instruction/library instruction, mobile digital library, interlibrary loan and document delivery, information access and video and photo libraries. Our review indicates that despite the tremendous changes brought about by ICT to Ghanaian libraries, they are still faced with a lot of challenges that needs to be addressed to enable these libraries to operate efficiently to provide the required information resources to its users. It also proposes recommendations for policy makers especially management of institutions with libraries, practitioners especially Librarians, researchers, students and all others who have an interest in library activities. Some of these recommendations include the provision of funding for ICT equipment and infrastructure, maintenance and updating of ICT equipment, training of users and staff, involvement of Management in ICT related issues in libraries, provision of uninterrupted power supply supplemented with standby generators and the provision of fast and uninterrupted bandwidth.

Keywords: Information and Communication Technology (ICT), Libraries, Impacts, Ghana, Infrastructure, Recommendations, Review, Manual, Automation

1. INTRODUCTION

1.1 Background to the study

Information and Communication Technology (ICT) has changed how things are done in almost every aspect of human society. The Merriam-Webster online dictionary (2019) defines a library as “a place in which literary, musical, artistic, or reference materials (such as books, manuscripts, recordings, or films) are kept for use but not for sale” (para.1).

Feather and Sturges (2003) also defines a library as “a collection of materials organized for use” (p.371).

From the two definitions it is clear that Libraries now do not only provide physical access as was the case some years back but they are now also able to provide remote access which has been made possible through the application of ICT. Many libraries over the world have therefore now embraced the changes brought about by ICT some of which include the online public access catalogue (OPAC), Inter-library loan, acquisitions etc. On the other hand, those that have not tapped into the benefits connected with ICT have been left behind in this regard.

In the case of Ghana, it seems some encouraging strides have been made following the ICT for Accelerated Development (ICT4AD) policy of 2003.

The ICT4AD (2003) policy “sets out the road map for the development of Ghana’s information society and economy and provides a basis for facilitating the socio-economic development of the country in the emerging information, knowledge and technological age to be dominated by information and knowledge-based economies. The Policy is aimed at addressing a number of developmental challenges facing the country as a basis for achieving a number of policy goals and objectives” (p. 6).

Despite this policy, however, there is still a lot of ground work to be done.

Furthermore, the UN sustainable development (Goal 4) states that each member state should ensure that there is an inclusive and equitable quality education as well as promoting lifelong learning opportunities for all (United Nations, 2015).

In this regard, Libraries in Ghana have a very pivotal role to play in ensuring that this vision is realised in Ghana.

1.2 Purpose of the Paper

The purpose of this paper is to examine literature and current practices been adopted by libraries in Ghana through the application of Information and Communication Technology (ICT) and their impacts.

2. LITERATURE REVIEW

2.1 Information and communications technology

According to Techopedia (2019), Information and communications technology refers to “all the technology used to handle telecommunications, broadcast media, intelligent building management systems, audiovisual processing and transmission systems, and network-based control and monitoring functions” (para.1).

Many libraries all over the world have tapped into the numerous benefits of ICT to allow patrons to access the resources of their libraries without having to be physically present.

2.2 Components of ICT

ICT comprises 3 (three) words, namely, Information, communication and technology.

2.2.1 Information

Information is crucial to the survival and development of any society. A society without information cannot develop. The business dictionary online (2016) views information as “data that is accurate and timely, specific and organized for a purpose, presented within a context that gives it meaning and relevance, and can lead to an increase in understanding and decrease in uncertainty” (para.1).

2.2.2 Communication

The word communication has its roots in the latin word ‘communis’, which means ‘common’. The business dictionary online (2016) defines communication as “a two-way process of reaching mutual understanding, in which participants not only exchange (encode-decode) information, news, ideas and feelings, but also create and share meaning” (para.1).

2.2.3 Technology

Technology has its roots in the Greek word 'technologia'. Dictionary.com (2019) defines technology as "the branch of knowledge that deals with the creation and use of technical means and their interrelation with life, society, and the environment, drawing upon such subjects as industrial arts, engineering, applied science, and pure science".

2.3 Components of ICT in libraries

Patil, Kumbarand and Krishnananda (1994) posit that the major components of ICT infrastructure in libraries can be grouped into three categories as follows:

- (i) Computer technology (e.g. Personal computers and laptops)
- (ii) Communication technology (e.g. Audio visual, telephone, teletext and email)
- (iii) Reprographic, micrographic and printing technology (e.g. Photocopier, microform and laser printer)

2.4 Impacts of ICT on libraries in Ghana

ICT has transformed various aspects of library services in Ghana and brought benefits such as greater speed, storage, reliability of data and ease of use to its patrons and users. The authors will attempt to discuss some of these impacts in libraries in Ghana.

2.4.1 Cataloguing and Classification

ICT has brought tremendous changes in the way technical services such as cataloguing and classification are done. In the words of Eze (2012) "Cataloguing and classification of a book, simply put, has to do with sieving out and organizing the bibliographic information of a reading material, arranging them in a particular order and grouping the reading materials mainly books into classes. Cataloguing and classification as well as other library activities/services have witnessed reasonable changes in the era of ICT" (p.1).

Youngman (1999) postulates that "Cataloguers are also moving into new roles as they attempt to provide enhanced access to the new resources. They now process not only books, but also CD-ROMs, computer discs, and multi-format items. Library automation systems have grown in sophistication. Cataloguers must make informed decisions on matters such as linking to electronic

journals and managing holdings "hooks" to various databases. Cataloguers today create records that accommodate multiple means of accessing a particular resource. Patrons are coming to expect records that include print holdings, microforms, and direct links to an electronic version of the item. Records must successfully interact with not only the library OPAC, but also with a growing variety of indexes, full-text services and browsers" (para.7).

ICT enables several libraries to share their cataloguing information thereby saving time, reducing cost and avoiding duplication in classifying and cataloguing information resources in libraries. For instance, at the cataloguing section at the Balme Library, University of Ghana, Legon, cataloguers are able to copy the cataloguing information from other libraries, since they are hooked onto the Library of Congress library. Secondly, the library uses the library of congress classification scheme and as such, the library of Congress library provides a form of copy cataloguing for the Balme Library and enhances the work of their cataloguers.

These benefits have made cataloguing to be quick, correctly done and of the highest cataloguing and classification quality at the Balme Library, University of Ghana.

Other libraries in Ghana have also tapped into the importance of cataloguing and classification, using ICT. Academic institutional libraries in Ghana such as the Ashesi University library, University of Cape Coast library and the University of Professional Studies libraries (UPSA) all use the library of congress classification for efficient cataloguing and classification of their information resources.

2.3.1.1 Online Public Access Catalogue (OPAC)

ICT has also made it possible for libraries in Ghana to have an online public access catalogue (OPAC), where users can access the contents of a library from any location in the world and at any time of the day. OPAC also makes it possible for patrons who visit the library to access the libraries catalogue using the terminals/ workstations provided by the library.

Defining the OPAC, Feather and Sturges (2003) indicated that it is "a database of bibliographic records describing the holdings usually of one particular library. It allows searching by name, title and subject, and offers online access through public terminals" (p. 466).

Several libraries in Ghana, such as the Balme Library, University of Ghana, Ashesi University, and University of Cape Coast library all have incorporated online public access catalogues into their library systems.

For instance, through the use of ICT, the University of Ghana Catalogue (UGCAT) can be accessed directly from the reference hall of the library. Also, users outside the library can do the same with their laptops, tablets or mobile phones. The UGCAT is also accessible from the various satellite campuses, departmental and hall libraries such as Graduate School of Nuclear and Allied sciences library (SNAS), information studies and political science libraries, as well as Akuafu, Mensah Sarbah, Legon, Commonwealth and Volta Hall libraries.

Using any of these libraries would enable one to know where to get an information resource needed, its availability and the number of copies available throughout the various libraries available on campus.

2.3.2 Acquisitions

In the words of Feather and Sturges (2003) acquisition entails “The operations involved in selecting, ordering and receiving materials for libraries. It includes budgeting and dealing with outside agencies such as library suppliers and publishers. The objective of the acquisitions staff is to obtain material as quickly and as economically as possible in the interests of potential users, and to provide information on the status of all requests” (p. 6).

Acquisition usually involves selection, ordering and receipt. ICT has transformed the way these processes are done in libraries.

Due to limited resources, many libraries all over the world have laid down procedures in the selection and the acquisition of information resources to supplement their present collections. During a practical attachment at the Balme library, University of Ghana in January 2016, it was discovered that ICT has drastically improved and simplified the work done at the acquisitions department.

For instance, when requests are made by faculty and students of the University of Ghana, the acquisition staff of the Balme library check the libraries online public access catalogue to ascertain whether the library has a copy of the information resource suggested. If it is not

available or the copy happens to be a very old edition, then an online search is usually conducted on websites such as amazon.com to ascertain, if the material is available, after which the corresponding or best price, publisher, as well as the vendor details are checked.

When staff are satisfied, they contact the chosen vendor usually by email for invoices, after which the necessary payments are made so that their requests will be supplied. One other observation was that the department uses the Sierra Library Services Platform to manage all its activities. Reports, as well as statistics, can also be easily generated at any time from the platform to cover transactions and purchases within a specified period.

It must be noted, however, that the library makes the final decision on how many materials to acquire.

Acquisition, using ICT, has helped libraries to cut down cost, avoid unnecessary duplication of information resources, such as books, and acquire current, useful and quality resources for the library and its patrons.

2.3.3 Electronic resources

Dadzie (2005) postulates that “Electronic resources are invaluable research tools which complement print-based resources in any traditional library. Electronic resources provide access to information that might be restricted to the user, because of geographical location or finances. They also provide access to current information, as these are often updated frequently. Through their various search techniques, electronic resources provide extensive links to explore additional resources or related content. In addition, electronic resources are convenient to use, since users are able to access information from the library, internet cafe, offices or at times from the comfort of their homes at any time of the day. It is for some of these reasons that university libraries in Ghana are being challenged to provide access to electronic resources to support teaching, research and learning” (p. 290).

The most common types of electronic resources include the following:

2.3.3.1 E-journals

These are periodicals published in electronic format usually over the internet (SOAS University of London, 2016).

ICT has enabled libraries in Ghana to provide electronic resources to their patrons to conduct learning and research activities. It has significantly enhanced the quality of research undertaken especially in academic and research institutions. For instance, students and faculty at institutions such as the University of Ghana and the University of Professional Studies are able to access the Emerald Insight journal for their academic work, as their libraries have subscribed to that journal. Students in both institutions can also access other electronic resources that their institutions have subscribed to using the of-campus platform which allows both Faculty and students to register online with their staff or student identification respectively, which then allows them to remotely access these electronic journals whenever they are not using their institutions Local Area Network (LAN) to access the internet.

2.3.3.2 Online databases and e-books

Rouse (2016) views an e-book as “an electronic version of a traditional print book, and can be read using a personal computer, or an e-book reader” (para. 1).

On the other hand, the business dictionary online (2019) defines an online database as “a web based filing system designed to store information. The database can be accessed by web scripts and are purchased by subscription” (para. 1).

The Balme Library, University of Ghana has three e-book projects namely Mylibrary e-books, Elsevier e-books and JaypeeDigital to which patrons can subscribe to, read online or download a specified number of e-books on a wide array of subjects for each semester using the personal computers, laptops, tablets or mobile phones.

The Ashesi University also has an online database comprising articles, magazines, journals, newspapers and online reference books. These can be accessed directly provided that one is accessing the internet via the Universities Internet Protocol (IP) address or through the wifi network.

2.3.3.3 Optical storage

Rouse (2019) defines optical storage media as “storage media that hold content in digital form and that are written and read by a laser; these media include all the various CD and DVD variations, as well as optical jukeboxes and autochangers”.

They include Compact disk read only Memory (CD-ROM), which can store up to 900 megabytes of data, the Digital video disk (DVD) which can store up to 17 gigabytes of data, and the Blu-Ray disk which can store up to 25 or 50 gigabytes of data depending on whether it is a single or dual layer disk.

ICT application through the use of optical storage mediums can be said to have benefited Ghanaian libraries greatly by enabling them to store orientation, instructional and reference materials like encyclopaedias and dictionaries.

Amekuedee (2005) is of the view that the CD-ROM is of importance particularly in developing countries of which Ghana is a part. It allows unprecedented access to almost any word in the records as opposed to the lead term in the title, author, and exact subject heading in printed publications. It is not surprising that the results from a survey by Amekudee (2005) revealed that 31 (66.0 percent) respondents from the Balme Library answered positively to the use of CD-ROM databases, whereas 15 (31.9 percent) answered in the negative. According to the author, although not all respondents at the Balme Library can access the CD-ROM databases, a sizeable number of them know how to use it, which is a positive point for ICT applications in Ghanaian Libraries.

2.3.4 Video conferencing, IT training and support

In the words of Feather and Sturges (2003) videoconferencing involves “The use of telecommunications networks and video technology to permit people in remote locations to participate in meetings where all or some of the participants are ‘present’ in the form of an interactive video link” (p. 651).

The Balme Library, University of Ghana, seems to be among one of the few libraries in the country that have tapped into the benefits of having a video conferencing facility.

In 2012, the South Korean government established the Ghana-Korea Information Access Center at the Balme Library, University of Ghana. The facility consists of an internet lounge, Information Technology (IT) training laboratory, five seminar rooms and an administrative office, wireless internet access and video conferencing facilities. The facility is to provide an opportunity for the general public to access information, increase IT literacy and the promotion of IT cooperation between Ghana and Korea (Dennis, 2012).

Some of the benefits that ICT has brought through the establishment of this facility include the following:

- (i) Postgraduate students resident in Ghana, who are enrolled in foreign universities, are able to pay a fee to the Library, arrange a suitable time during the library's working hours, and present their research seminars/papers to faculty members in the institutions they are enrolled in abroad. This saves them money and time from having to apply for a visa, buy a roundtrip airfare ticket, as well as make hotel reservations.
- (ii) Secondly, both local and foreign seminars and workshops are organised at the facility.
- (iii) Thirdly, the facility is also used to train faculty, senior and junior staff, as well as students. For instance, cataloguing M.A (Master of Arts) students of the department of Information Studies, University of Ghana, have used the facility on several occasions for their practical training in cataloguing.

Despite the successes chalked by the Balme library in making use of videoconferencing, many libraries are yet to incorporate this technology, as a result of not having the right infrastructure, inadequate funding and bandwidth limitation.

2.3.5 Online searching and retrieval

Another impact ICT has had on libraries in Ghana is in the area of online searching and retrieval, which provides patrons with other alternatives for getting the desired information.

According to Feather and Sturges (2003) a search simply is “The act of a user, an information worker on the user’s behalf, or an automated system activated by the user or the intermediary, in making a systematic investigation to obtain data or information” (p. 569).

Feather and Sturges (2003) also view a search engine as “a computer program that allows the user to search the internet and find particular terms or phrases” (p. 569).

Amekuedee (2005) evaluated library automation in the three older public university libraries in Ghana. The results of the study revealed that (95.7 percent) respondents at the Balme Library and (53.0 percent) respondents at the University of Cape Coast (UCC) library used the internet for academic online searching. This could be attributed to the easy and quick means in which online

searching and retrieval can aid users in answering their information needs. However, in the case of the Kwame Nkrumah University of Science and Technology (KNUST), the library had only (10.7 percent) respondents.

A practical attachment at the reference section of the Balme library in January, 2016 revealed that numerous patrons requested for help in doing online searching and retrieval at the reference hall. Since the computers at the reference section are solely for searching the UGCAT, patrons mostly used their own laptops, tablets and phones with which they were assisted with their search requests.

Through the use of search engines like google, librarians in Ghana are able to assist or direct patrons in using boolean searching by combining logical operators comprising AND, OR and NOT. It also offers searching options such as truncation, stemming, field searching, wildcards etc. which all aid in making the patrons retrieve relevant information.

2.3.6 Circulation

According to the University of Wyoming Libraries (2019), “Circulation is a library term that means checking out library materials to users. It is used to designate the service desk where you check out and return materials, as well as the library staff that work at those desks. Typically, circulation units process returned items and prepare them to be returned to the book stacks” (para.2).

A practical attachment at the circulation unit of the Balme library in January, 2016 revealed that circulation of information resources has been greatly improved through the use of ICT. The circulation department uses the sierra library services platform to manage all circulation related issues. The library also has a barcode security device situated at the main entrance of the library providing security to the libraries information resources.

Some of the impressive changes ICT has brought to the circulation department at the Balme library through the use of the sierra library services platform, which include the following:

- Automatically informing users who have not returned borrowed books and issuing overdue charges and fines. They also issue fines for lost or damaged books.

- Deactivating the barcode of borrowed books for users so that they can exit the library with their borrowed books without the security device alarm sounding.
- Generating statistics of books borrowed or reserved as well as fines and over dues.

These processes have simplified, centralised and provided security and control for the circulation of information resources in the library.

2.3.7 Digitisation, electronic/digital libraries and institutional repositories

Libraries in Ghana have now recognised the importance of collecting, storing and preserving useful academic, historical and cultural heritage output of their organisations, since ICT has made it possible for these libraries to provide their materials through open access.

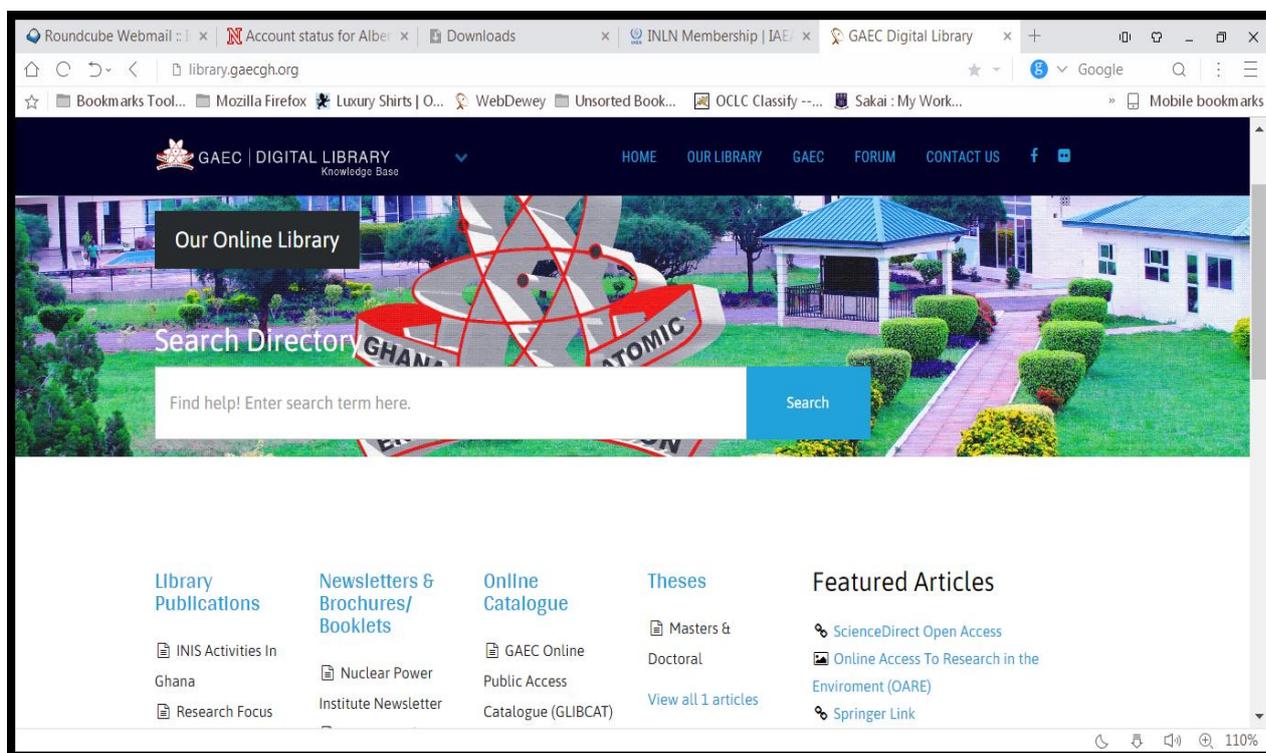
Dadzie and Walt (2015) postulate that “In universities, digital libraries serve as gateways to information and knowledge offering essential support for teaching, learning and research. They provide access to the intellectual and scholarly output of the university community and play an important role in promoting the university to the rest of the world by exposing works to the wider community” (para. 2).

Ghana seems to be making important strides especially in its academic and research institutions, although some institutions are lagging behind. For instance, a visit to the University of Ghana digital collections website (ugspace.ug.edu.gh) revealed that the university has over 6350 items housed under sections namely: collections of heritage materials, journals, lectures and speeches, policies, newsletters and newspapers, reports, research articles, theses, united nations, university of Ghana readers and work in progress. These materials have been digitised by the digitization unit at the Balme Library, University of Ghana, and all the digitized contents have open access, and as such can be accessed anywhere within and outside Ghana, where there is internet connectivity.

The Ghana Atomic Energy Commission (GAEC) also has an electronic/digital library which came about as a result of its corporate strategic plan (2012 - 2016) which required the GAEC Library to provide local area network access to its library database, online public access catalogue (OPAC) to enhance library material & access to remote digital information (GAEC, 2011).

As a result, in 2015 the GAEC library with assistance from the institutions ICT department developed the GAEC electronic/digital library to serve as the organizational repository and to enhance access to relevant nuclear literature. The electronic/digital library can be accessed online at (library.gaecgh.org). Some of the useful materials that users can access include the masters and doctoral theses from the Graduate School of Nuclear and Allied Science (SNAS), University of Ghana, GAEC law/legislative instruments, electronic resources, newsletters and publications by the library. The digitisation of these documents have been made possible through the use of a scanner available at the library. The homepage of the GAEC electronic/digital library is illustrated in figure 1 below.

Figure 1: Ghana Atomic Energy Commission electronic/digital library



Source: Ghana Atomic Energy Commission (GAEC) electronic/digital library homepage

Again there are other notable electronic/digital libraries in Ghana worth mentioning. These include the safari online library of the Ghana Technology University College, the recently launched e-library by the Central University at its Mataheko campus, the Goethe-Institut Ghana e-library portal which is useful for those who want to learn the German language and the street

library Ghana e-library, a very useful portal for children to download e-books and audiobooks to help them develop their reading habits.

Also, Adzobu (2014) in a study found out that the University of Cape Coast (UCC) has the basic digital library technical architecture in place. The author further reiterates that the digitized materials can be broadly categorized into three, that is cultural collections, teaching and learning resources, and research collections. Collections of cultural and historical significance to the University comprise content from the University Archives and the Library's Special Collection photos of memorable events such as matriculation and congregation by past presidents of Ghana and other dignitaries (Adzobu, 2014).

Again Adzobu (2014) further indicates that teaching and learning resources comprise readings online for various courses taught at the UCC, as well as examination papers from 2000 to the present moment that are searchable either by year or subject, audio resources, video resources, and off-air recordings. Finally, the author also shows the research collections available, which include research output from university students and staff, such as graduate theses and research publications.

Other academic institutional repositories in the country include the Kwame Nkrumah University of Science and Technology institutional repository (KNUST Space), Regent University online institutional repository (RUCST Space), Central University institutional repository services, Ashesi University institutional repository (AIR), University for Development Studies (UDS Space), University of Cape Coast institutional repository (UCC Space).

2.3.8 Web 2.0 and social media tools

Web 2.0 and social media tools have become valuable instruments used by some libraries in Ghana to market their services and products.

According to Techopedia (2019), web 2.0 is “the name used to describe the second generation of the world wide web, where it moved static HTML pages to a more interactive and dynamic web experience. Web 2.0 is focused on the ability for people to collaborate and share information online via social media, blogging and web-based communities” (para. 1).

On the other hand social media according to the Business dictionary online (2019), is “primarily internet or cellular phone based applications and tools to share information among people. Social media includes popular networking websites, like Facebook and Twitter; as bookmarking sites like Reddit. It involves blogging and forums and any aspect of an interactive presence which allows individuals the ability to engage in conversations with one another, often as a discussion over a particular blog post, news article, or event” (para. 1).

In a survey by Mingle, Lamptey and Hassan (2014) on the use of social media and web 2.0 for information service delivery in academic libraries in Ghana, all the respondents surveyed confirmed and reiterated that social media and web 2.0 technologies have become a very major platform for libraries to share information and interact with their patrons and users.

Through the use of ICT, some Ghanaian libraries have already tapped into the numerous benefits that come with web 2.0 and social media tools. These benefits include the following:

- (i) Reaching out to its followers by currently updating them of any additions to their collections.
- (ii) Informing followers of the library's activities such as open days, orientation programs, seminars, workshops etc.
- (iii) Using it as a tool in taking statistics of the number of followers.
- (iv) Providing an interactive link with patrons by adding pictures, audio and videos.
- (v) Answering user queries (Mingle, Lamptey and Hassan, 2014).

Mingle, Lamptey and Hassan (2014) further reiterate that library and information centers need to make use of the advantages that come with social media in enhancing information access and delivery.

Some of the Ghanaian libraries that have taken advantage of web 2.0 and social media tools include the northern regional library (Ghana library Authority), Osu children's library fund, Multimedia library, Alliance Française d'Accra, Regional Maritime University library, Ghana Broadcasting Corporation gramophone library and the Street Library Ghana project which all

have facebook pages. In the case of the Balme Library it has a twitter page in addition to a facebook page.

2.3.9 Mobile Digital library

This happens to be a current trend mostly found in developing countries where resources are scarce. According to Feather and Sturges (2003) “the term tends to be applied to motor vehicles that are used to transport collections of library materials for the benefit of users whose access to libraries is limited by distance or other impediment” (p. 427).

The use of mobile libraries in Ghana is commonly found in the rural communities. ICT has enabled information in electronic format to reach people especially children in rural communities, who could not have access to information, due to their geographical location. Children in such deprived and neglected areas are able to improve their reading skills by reading print and e-books on mini laptops normally housed in a mini van referred to as the mobile van. It has also helped such children to be computer literate.

One of such notable digital library projects is the mobile digital library, which is a partnership between Tigo Ghana and its 2012 digital change winner Hayford Siaw, founder of the street library Ghana project (Ghana News Agency, 2015). Through the digitization of books the library has increased its stock and has a mobile van beautifully fitted with tables, chairs and laptops as well as extra tables, chairs and laptops to cater for additional children outside the van. (Ghana News Agency, 2015). The street library Ghana project gives them the chance to not only see but interact, discover and learn with ICT (Ghana News Agency, 2015).

Again, according to the Ghana Library Authority (2019), a memorandum of understanding (MOU) was signed with the Ghana Investment Fund for Electronic Communications (GIFEC) to start a collaboration which aims to provide libraries in the country with Information Communication Technology (ICT) tools. The MOU has already seen the GIFEC providing 100 laptops to the Ghana Library Authority (GhLA) to support its Mobile Library Van services in providing digital access to reading materials, as well, conduct ICT training in rural communities and schools in the country (Ghana Library Authority, 2019).

One other notable mobile library in the country is the Mobile library instituted by the Asantehene, Otumfuo Osei Tutu II whose focus has been on education since his enstoolment as the King of the Asante Kingdom 20 years ago.

2.3.10 Information access

Badu (1990) found that another significant development created by technology was the use of computers in the 1980s in Ghanaian libraries in which the first library to acquire a computer was the University of Ghana Balme library, which was allocated a Wang Personal Computer by the Ministry of Education as part of a World Bank Project, to increase the efficiency of some institutions and establishments.

ICT has tremendously transformed information access in Ghanaian libraries since those days as it has now moved from one of shared access where users had to wait in queues to use a desktop computer in the library to access information on a computer or on the internet to one of personal access, where a user can use their personal laptop, tablet or mobile phone to directly access information at the library.

Many libraries in Ghana now provide Wireless Local Area Network (WLAN) or WIFI to patrons thereby reducing the pressure on the desktop computers available in those libraries. For instance, at some institutions such as the Ghana Atomic Energy Commission Library, Ashesi University and the University of Professional Studies (UPSA), faculty, staff and students just have to use their laptops, tablets or phones to log onto their libraries' wireless local area network by authenticating their user identification and password.

2.3.11 Library Website

ICT has tremendously transformed how libraries communicate with their users. Several libraries in Ghana now have their own personalised websites. These websites are very interactive and simple to access. For instance a visit to the Balme library website of the University of Ghana (library.ug.edu.gh) shows the simplicity with which the website was designed which makes it easy for even the inexperienced user to access its contents.

These websites also provide links to the libraries' resources through their OPAC system. Also information on training programs and workshops by some libraries in Ghana are communicated to patrons through the libraries website. Academic libraries in Ghana most often provide training to

students and faculty to develop their research and academic capabilities, and they normally do this by informing their patrons through their local website. For example, academic libraries, such as the Kwame Nkrumah University of Science and Technology library, Balme Library, University of Ghana provide information of upcoming training programs on their websites.

Libraries in Ghana also use their websites to inform patrons of ongoing projects that are being undertaken.

2.3.12 Indexing and Abstracting

According to Feather and Sturges (2003), indexing involves “Analysing the contents of a document (book, pamphlet, audiovisual or machine-readable item, etc.) or collection of documents and translating the results of the analysis into terms for use in an index – an organized grouping of such terms to allow location and retrieval of information” (p. 261).

Furthermore Feather and Sturges (2003), postulate that “the main purpose of abstracting and indexing services is to help researchers overcome the difficulties of tracing potentially useful articles scattered over periodical and other literature. Abstracts are of especial benefit as they provide an overview of the article and thus aid researchers in their selection of what they consider worth reading” (p. 2).

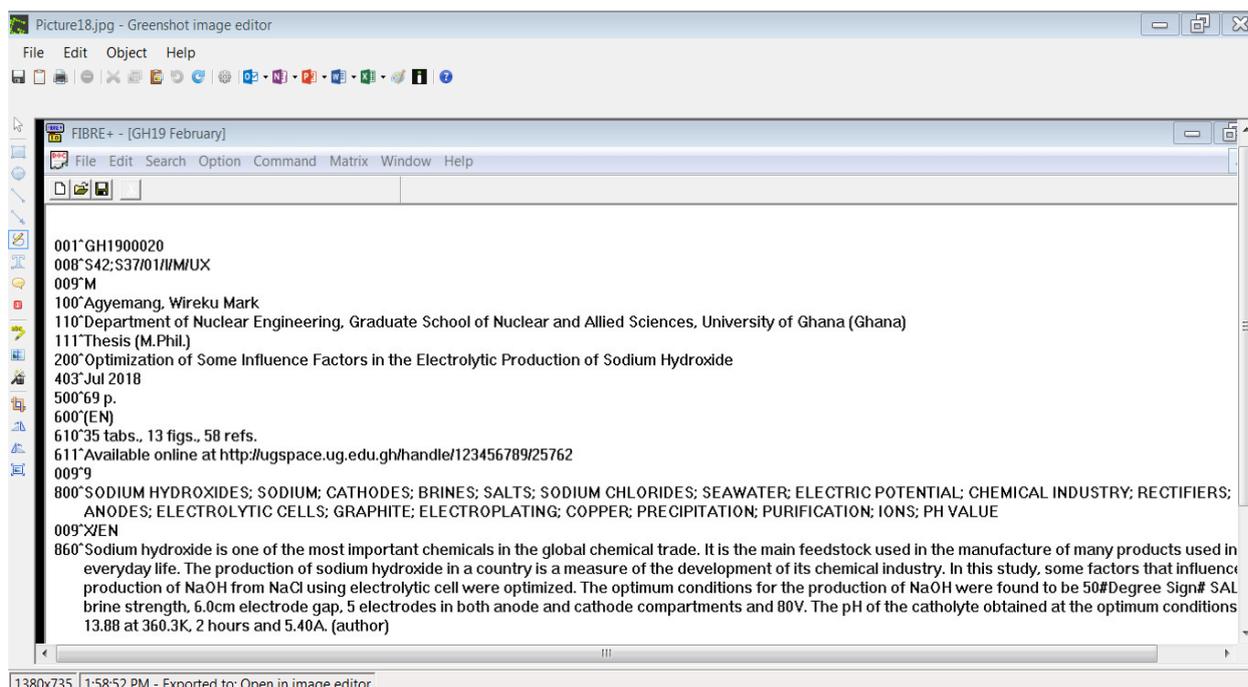
Indexing and abstracting services tend to be very technical in nature and it is not all libraries in Ghana that carry out these services. They are very common with specialised libraries who focus more on a specific field of knowledge.

The Ghana Atomic Commission Energy Commission Library happens to be an example of a specialised library that is involved in indexing and abstracting services using the application of Information and Communication Technology (ICT). The library is a regular contributor of relevant nuclear publications published in Ghana on the peaceful applications of nuclear science and technology to the International Nuclear Information System (INIS) repository. The library is able to do this by indexing and abstracting these publications.

The winfibre plus software is used to do the indexing and abstracting of these records which must have an abstract included in English and at least ten descriptors. These documents are then checked by the INIS Liaison Officer for Ghana before sending the indexed records electronically

by email to the INIS secretariat in Vienna, Austria for it to be added to the repository. ICT has transformed this activity as records sent some years back were done so manually by post which created delays and sometimes loss of these records. A sample of how the GAEC library indexes and abstracts relevant nuclear publications published in Ghana is illustrated in figure 2 below.

Figure 2: Indexing and abstracting of a record to be sent to the INIS repository at the GAEC library



Source: Indexing and abstracting services carried out at the GAEC library using winfibre plus

2.3.13 Interlibrary loan and document delivery

With the emergence of ICT in Ghana the traditional means of interlibrary loan and document delivery has now been made much easier with electronic interlibrary loan and document delivery which does not require both the sender and the receiver to be present as there is no geographical boundary. Information can also be sent within a short period of time at less cost. The Ghana Atomic Energy Commission Library which is a member of the International Nuclear Library Network (INLN) a consortium of nuclear libraries has been providing these services to the International Atomic Energy Agency (IAEA) member states and the library also benefits from these services when it sends requests by its Scientists, Technicians and Technologists to other INLN member states.

2.3.14 Bibliographic instruction/Library instruction

According to Reitz (2004), Bibliographic instruction/library instruction are “Instructional programs designed to teach library users how to locate the information they need quickly and effectively. BI usually covers the library's system of organizing materials, the structure of the literature of the field, research methodologies appropriate to the discipline, and specific resources and finding tools catalogs, indexes and abstracting services, bibliographic databases, etc” (p. 71).

ICT has made it possible for libraries in Ghana to provide orientation for new students enrolled in their institution. A lot of libraries provide library bibliographic instruction/library instruction for its users. Examples include the three traditional Universities in Ghana namely the University of Ghana, Kwame Nkrumah University of Science and Technology and the Cape Coast University. Other Universities in Ghana such as Ashesi University, Lancaster University Ghana and the Wisconsin International University College Ghana also provide this service for their users,

2.3.15 Technical Services

ICT has enabled services such as photocopying and bindery services to be done within a short period of time for users in libraries in Ghana. For instance through the use of technical services students in a class can now reproduce and share the same material quickly without having to struggle to read or borrow a limited number of copies of that document from their institutional library. The three traditional Universities in Ghana namely the University of Ghana, Kwame Nkrumah University of Science and Technology and the Cape Coast University all provide these services for faculty and students at their various institutions.

2.3.15 Photo and video library

According to the Collins dictionary online (2019), a photo library is “A collection of photographs that is held by a particular company or organization. Newspapers or publishers can pay to use the photographs in their publications” (para. 1).

The Collins dictionary online (2019) on the other hand defines a video library as “A library from which members can rent films on video and DVD” (para. 1).

The Chief Videographer at the Manhyia Palace in an interview with the Daily Graphic, disclosed that two landmark projects at the Kings Palace that have played great roles in the success story of

Otumfuo Osei Tutu II since his enstoolment as the King of the Asante Kingdom 20 years ago is his photo and video libraries (Boasiako, interview with Boadu and Asare for the Daily Graphic, 2019).

Boasiako (2019), further explains in the interview that “while the video library has now become a source of research for individuals, organisations and institutions, the photo studio which has captured many of his high- profile local programmes and foreign trips, has become the magnet pulling personalities to the palace, especially during exhibitions as occurred on Monday April 15, this year” (p.31).

Boasiako (2019) again states in the interview that the photo and video library has “played a vital role in the adjudication of the Effiduase Chieftancy dispute which had been with the Supreme Court for 23 solid years. It has helped in creating sanity in Otumfuos’s quest to forge a united front in Asanteman because anytime disputes arose in the previous sitting, Otumfuo Osei Tutu II quickly adjourned the case, asked Nananom to assemble to watch the recorded videos and when that was done, it cleared the air for the King and his paramount chiefs to arrive at the correct verdict” (p. 31).

2.4 Challenges faced by libraries with the emergence of ICT

Despite the enormous benefits derived by libraries through ICT in Ghana, there are still some challenges.

Chisenga (2006) postulates that despite the several benefits to be gained by using ICT, some of the challenges faced by libraries in developing countries include the following:

- Financing and sustainability of ICT infrastructure
- ICT technical infrastructure
- Using and managing ICT facilities
- Preservation of digital-based information resources
- Management of intellectual property rights
- Institutional policy and strategy

In addition to the above challenges in the use of ICT in libraries, these other challenges seem to be a common problem in Ghana. They include the following:

- The Republic of Ghana (2005) copyright law Act 690 which does not favour libraries in Ghana as it restricts them to make few or single copies of documents. Subsection 21.1 of the law states that “A library and archive with activities that are not for gain may, without the authorisation of the author or other owner of copyright, make a single copy of the work by reprographic reproduction” (p. 7).

Libraries in a bid to satisfy the numerous requests of their users as well as struggling with the limited copies of information materials are, sometimes therefore, left with no option but to indiscriminately make copies of these materials.

- Badu (1990) postulates that “Electricity power supply cuts is a very serious problem. For instance, in Accra power cuts occur on average about seven times a month. They are unpredictable, so frequently work and services are disrupted, and in certain cases the computer software is affected” (p. 115).
- The present number of photocopiers in the three traditional universities is very small considering the large student populations (Badu, 1990).
- Accepting outdated ICT equipment as gifts
- Users lack of knowledge of ICT
- Lack of training of personnel
- Low bandwidth

3. CONCLUSIONS AND RECOMMENDATIONS

The researchers concludes this paper and provide recommendations for policy makers especially management of institutions with libraries, practitioners especially Librarians, researchers, students and all others who have an interest in library activities in Ghana.

3.1 Conclusions

In conclusion, it must be noted that ICT has dramatically transformed the activities and processes in libraries in Ghana. This study has shown that despite the challenges with ICT there are several benefits to be derived by libraries in adopting ICT use. Ghanaian libraries, therefore, need to take advantage of the benefits that come with ICT so that they are not left behind in the information era. Information professionals also have a role to play in increasing awareness and training their personnel and patrons in ICT use in the library.

3.2 Recommendations

Based on the paper, it is recommended that all libraries in Ghana adopt and apply the following recommendations:

3.3.1 Provision of funding for ICT equipment and infrastructure

Funding is very crucial to every library achieving its objectives. Funding can be viewed as the fuel to propel libraries in functioning properly. The provision of the right equipment and infrastructure is essential to the survival of libraries in Ghana and also in other developing countries.

It is recommended that the Ghanaian government supports libraries by setting aside sufficient funds in their budgetary allocation for libraries. The availability of funding will help Ghanaian libraries to perform their functions effectively to develop, promote, and expand the activities of libraries in the provision of information to the society.

Funding should also be sought from international donors to supplement those provided by government.

3.3.2 Maintenance, updating and security of ICT equipment

The maintenance of ICT equipment in libraries is one of utmost importance in ensuring their sustainability. It is recommended that libraries in Ghana adopt a good maintenance culture in ensuring that ICT equipment are serviced regularly and not to wait for their breakdown before action is taken. A good maintenance culture ensures that these equipment can last for a very long time before replacement.

Updating of ICT equipment is also essential in this regard. ICT equipment are constantly updated as such one turns to lag behind in terms of functionality if they do not also update their equipment. This could just be a software upgrade to ensure that the equipment has the current functionality to ensure proper and efficient functioning of these equipment.

It is also recommended that libraries in Ghana ensure that their ICT equipment are constantly updated with the current software versions as well as any required parts.

Security of ICT equipment is also very pivotal in the libraries in Ghana. It is recommended that libraries should provide security for the libraries' equipment and data.

3.3.3 Training of users and staff

The provision of current ICT equipment without well trained staff and users is another important area to be looked at. More often than not libraries tend to have sophisticated ICT equipment which its staff and users cannot use. It is recommended that libraries in Ghana employ and train competent personnel who have skills, knowledge and experience in ICT use. These personnel should also be regularly sponsored to attend national and international seminars and workshops to aid them to be current with ICT issues in their various libraries. In this regard, Ghanaian libraries need to employ the services of skilled and experienced librarians with vested knowledge of ICT use and adoption in libraries.

The libraries should also organise orientation programs, training models or programs and open days for its users from time to time to assist them to be confident and skilled in applying ICT when accessing information from the library. They should also be trained on employing ethics in the use of ICT activities.

3.3.4 Involvement of management in ICT related issues in libraries

In most cases libraries in Ghana and also in other developing countries have failed to involve management and decision makers in their respective institutions and organisations. Management and decision makers are most often not made aware of the importance of supporting ICT projects in libraries, which is seen as a major obstacle.

It is recommended that management and decision makers are constantly involved in ICT related initiatives in libraries in Ghana.

3.3.5 Provision of uninterrupted power supply supplemented with standby generators

It is recommended that the Ghana government ensures that power supply is constantly maintained in the country to benefit the proper functioning of all sections of the society in which libraries are a part. Libraries should also ensure that they have working standby backup generators which can be relied upon whenever the power goes out.

3.3.6 Provision of fast and uninterrupted bandwidth

It is recommended that libraries in Ghana employ the services of renowned internet service providers to provide fast and uninterrupted broadband internet connectivity to ensure that libraries can operate effectively to satisfy the needs of their patrons.

3.3.7 Copyright ACT modified

Policy makers in the library field in Ghana especially the Ghana library authority (GhLA) must ensure that the copyright act is revisited to ensure that the legislature in Ghana amends the Act to make libraries benefit from the Act.

3.3.8 Areas of future research

The paper provided a review of literature on the impacts of Information and Communication Technology (ICT) on Libraries in Ghana. Nevertheless, further studies/reviews could be done in the future to find out how well Information professionals in Ghana have been adapting to the changes brought about by ICT to their profession.

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