

UNIVERSITY OF GHANA

UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY
FACILITIES FOR RESEARCH OUTPUT IN GHANAIAAN ACADEMIC LIBRARIES:
THE CASE OF UDS LIBRARY SYSTEMS

KONLAN BANLEMAN

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BY

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DECLARATION

I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this University or elsewhere.

Candidate's Signature.....

Date.....

Name: Konlan Banleman

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Ghana.

Principal Supervisor's Signature.....

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ABSTRACT

This study was conducted to assess the Utilization of Information and Communication Technology Facilities for Research Output in Ghanaian Academic Libraries with a focus on the University for Development Studies (UDS) Library systems. The UDS has four satellite Campus libraries in the three northern regions which comprised the sample of the study. The aim of the study was to inquire into the utilization of information and communication technologies in academic library services in Ghana and its level of utilization for research output by postgraduate students. The population of the study was two hundred and fourteen (214) which comprised one hundred and fifty (150) post graduate students' respondents and sixty-four (64) professional and paraprofessional librarians. The descriptive research design was employed for the study with both qualitative and quantitative research strategies, questionnaire, structured interview schedule and observation checklist were the data collection tools used and administered to 150 respondents. Stratified sampling technique was used in choosing the sample.

Relevant literature and statistics on the topic areas and secondary data were reviewed to support primary data collected. Data were analyzed qualitatively in narratives and with charts, graphs, tables, and matrices Statistical Package for Social Sciences (SPSS) software version 22, and Excel were used for the analysis. The findings revealed that, despite the seeming availability of electronic information resources in the universities as well as their benefits to university education, their effective utilization by students and faculty have been hampered by several factors such as students making low level use of electronic information resources in the library, some students not aware of the kinds of information and services that are available, do not know the source of this information as well as cannot trace and retrieve information through the use of these technologies due to being information illiterate and lack the technical knowledge. Also, lack of skilled ICT personnel and that library staff need to obtain continuous training on ICT to advance their skills so that they can easily impart the skills and information they have attained to their users.

Key words: Utilization, ICT facilities, academic libraries, graduate students, UDS.

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DEDICATION

I dedicate this work to my children, Konlan Bright Yenutumah, Konlan Best Banube, Konlan Blessedman Yenunaan and Konlan Benita Yada-Yenu, and my devoted wife - Faustina Lariba Banleman.

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LIST OF ABBREVIATIONS AND ACRONYMS

ARPA	Advanced Research Project Agency
CD-ROM	Compact disc read-only memory
CDS	Credit Default Swap
DVD	Digital Versatile Disc
GSM	Global System for Mobile Communication
ICT	Information and Communication Technology
IFLA	International Federation of Library Association
IP	Internet Protocol
ISIS	Islamic State of Iraq and Syria
IT	Information Technology
ITU	International Telecommunication Union
JPEG	Joint Photographic Expert Group
MARC	Machine-Readable Catalogues
NASA	National Aeronautics and Space Administration
NATIS	National Information System
NDA	Nigerian Defense Academy
NGO	Non-Governmental Organization
OCLC	Online Computer Library Centre
OPAC	Online Public Access Catalogue
PDF	Portable Document File
PMB	Picture Motion Browser
RIFD	Radio-frequency Identification
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
UDS	University for Development Studies
UK	United Kingdom

UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPS	Uninterruptible Power Supply
USA	United States of America
USSR	Union of Soviet Socialist Republic
VCD	Video Compact Disc
VTLS	Visionary Technology in Library Solution

CHAPTER ONE

INTRODUCTION

1.1Background of the Study

The dynamic nature of information use has called for Information and Communication Technologies (ICTs) in entirely every field of the human venture, and information services and academic libraries are not an exception (Mamman, 2015). ICT is a powerful driving force of development because of its profound impact on the economic, scientific, academic, social, political, cultural and many spheres of life (Minishi- Majanja, 2007). The potential of Information and Communication Technology to transform development in both the underdeveloped and developed world is increasingly recognized by governments, Non-Governmental Organizations (NGOs), corporations and global agencies such as the United Nations (UN) (Gujbawu, 2004).

ICT in the view of Oluwarobi (2012) are any electronic-based facilities that generally are used to recover, store, process, and package data and information. They are also used to provide access to information. The advances in laptops, pen drives telecommunication network, television, internet, and many others have enabled the broadening of people's knowledge and access to information as well as facilitated effective communication. This view is similar to those expressed by Ebijuwa (2005) that ICT basically are tools used for collecting, processing, storing, transmitting, and disseminating information.

The introduction of ICT has led to the transformation of many aspects of human endeavours. Some of such areas are education, health, business, agriculture, and others. The growth in information and communication has significantly changed the nature of the work of academic libraries. These changes have resulted in new opportunities such as a digital library, hybrid library, electronic library, online cataloguing and other means of improving resources management and services. Universities globally have advanced in adopting Information and

Communication Technologies based services has provided the platform where information can be sourced and accessed easily (Dhamavanden, Esmail & Mani, 2008). Studies conducted to assess the frequency of information and communication technology facilities applications for the research output of postgraduates of universities in both developed and developing countries have shown that the application of these technologies have not been adequate leading to users having an aesthetic perception on the same (Adetimirin, 2012:130).

Information and Communication Technology tends to expand access to education and research. Through ICT, learning can occur anytime and anywhere. Research works have been enhanced as a result of the existence of ICT. ICT services have enabled research works to move beyond the exclusive dependence on printed materials to electronic platforms such as video clips, images, audio sounds, visual presentation. Currently, ICT has been enabled the transformation of the teaching environment into a learner-centered one (Castro Sánchez and Alemán, 2011).

As a result of the use of ICT, academic libraries have significantly changed in recent times with subsequent libraries' new roles to fulfill the continually changing needs of information in order to remain relevant in the 21st century. An academic library is defined as a library that is attached to institutions of higher education serving two complementary purposes; one purpose is to support the institution's curriculum and the second is to support the research endeavours of the institution (Curson et al., 2009). Academic libraries are there to serve the academic community, as such, their development is tied to their parent institution.

Education systems and academic institutions have greatly been influenced by ICT revolutions. In that regard, academic libraries are not exempted from this revolution but to adapt accordingly. The new development in academic libraries shifted from the old concept

of book-oriented librarianship to user-centered librarianship (Raja, Ahmad, & Sinha, 2009:701).

Universities are established to generate knowledge and train people so that they can serve and advance the wellbeing of humanity. In order to contribute meaningfully to the development of the society, the academic library must be the pivot of the university. This is because all planning activities geared towards the development are derived from research and the library is the source of all research activities (Cox, 2010:120). The three main activities of Academic libraries are teaching, learning and research of the academic community, faculty, students, and researchers.

Despite the seeming availability of electronic information resources in the universities as well as their benefits to university education, their effective utilization by students and faculty have been hampered by several factors such as students' minimal use of electronic resource function of the library, others also being oblivious of the existence of such electronic resource services and the apparent lack of technical know-how to operate and effectively put to use these electronic facilities (Rowley & Hartley, 2008:80). The dynamic and changing face of technologies has brought about the need to deliberate on how in the digital era, ICT facilities have been used in academic libraries for research output.

Ghana has seen a great change in its telecommunications sector over the past years. With the emergence of ICT, various sectors of the economy have to contend with the current dynamics of doing business as well as teaching and learning. The educational sector has therefore not been left out in this current surge in technology. Universities libraries, which hitherto used to be traditional in nature, have metamorphosed into ICT-based academic libraries. Access to the internet in the country with the use of any hand-held device has increasingly been easier than

before. One issue that needs to be looked at now is the affordability of the internet (Quarshie & Ami-Narh, 2012).

The Sustainable Development Goals (SDGs) as one of its agenda advocated for free and affordable internet services to be made accessible to everyone in the globe, particularly those in the lower-income bracket countries. The stakeholders have agreed that the best way to encourage equitable and instant access to information lies in how accessible and affordable internet use is to these fewer developed countries.

To enable the effective use of an academic library through the use of ICT resources, certain facilities need to be in existence. They include both hardware and software. The hardware computer facilities required in an academic library include; laptops, printers, scanners, power point projectors, printers and UPS. The communication media, internet supportive digital cameras, Wifi and others like online databases, pen drives, library application software are some of the software resources available. The various ways of utilizing ICT-based resources are; retrieving informative materials for self-development; Internet browsing; storing information for private use; distribution and receiving e-mail; and social networking (Spacey, Goulding, & Murray, 2003).

Library resources and continues increase in its access by users constitute the aim of library automation. The establishment of library automation in the West Africa sub region has the purpose of automating all academic libraries. Despite these efforts, challenges do abound. These challenges have made it difficult for these library automations to succeed. This has deprived users of the benefits in automating these services. The challenges in the automation process however, did not prohibit University for Development Studies in northern Ghana on embarking on an automation project at one of its campuses. The success of this automation led to the replication of same on all of its campuses which resulted in the full automation of

the cataloguing and circulation operations. Same can be said about the library systems of the University of Ghana. The library systems on the University of Ghana campus are fully automated and provide e-learning and electronic materials to students and faculty.

This study examines the utilization of ICT facilities for research output in Ghanaian academic libraries with a focus on the University for Development Studies (UDS) library systems.

1.2 Problem Statement

Universities across the world have been adopting information and communication technologies-based services for the sole purpose of creating an enabling environment that supports students to access information much easier (Dhanavandan, Esmail, & Mani, 2008). Studies that have been carried out to assess the frequency of ICT facilities usage for research output by postgraduates of universities in developing and developed countries have concluded that the use of these technologies is below expectation (Adetimirin, 2012).

The fast pace of change in technology in the digital era has called for a change in the information environment to help transform the services libraries use to render. It is obvious that traditional libraries face obstacles in rendering services to their users. These challenges require re-orientation and reengineering in the information environment among professionals (Kamila, 2013).

Despite the existence of ICT-based resources in academic libraries, there have been observations that postgraduate students usually underutilize these electronic systems to their benefit. Locating and retrieving information through the use of these technologies is difficult for these students due to the lack of technical knowledge they have about these ICT-based resources (Rowley, 2008).

Studies conducted in Ghana by Dadzie & Kavi (2015) and Ibrahim et.al. (2017) reveals that skilled ICT personnel to steer the affairs of Universities' academic libraries are in short supply. The study further recommended that the staffs that man these libraries require constant and regular in-service training in ICT. The training is required to sharpen their skills and knowledge base to the benefit of end users.

The introduction of ICT-based resources in academic libraries is to offer library services that do not confine users to the regular old-fashioned hard book research work. It was meant to support users access information particularly in areas such as e-learning, e-teaching, and e-research by providing accurate and timely information to library users as a result of the dynamic nature of information technologies. The study is therefore carried out to assess how in this digital era, ICT facilities have been used in academic libraries for research output by students and faculty in the University for Development Studies.

1.3 Research Objectives

Broadly, the study seeks to examine the utilization of Information Communication Technology facilities for research output in Ghanaian academic libraries.

Specifically, the study seeks;

- i. To examine the availability of ICT facilities and utilization for research output in the UDS.
- ii. To determine the user's awareness level of ICT facilities for research output.
- iii. To establish the competence of librarians and library users in support of information services for research output.
- iv. To evaluate barriers that hinder the effective utilization of ICT for research output in the UDS library systems.

- v. To suggest possible strategies that could enhance ICT utilization for research output in the UDS library systems.

1.4 Significance of the Study

The significance of any academic work is seen in the light of its linkages to larger, important or theoretical problems, social policy issues or concerns of practices (Marshall, 1996). It creates a clear rationale for the importance of the study (Creswell, 2014).

The study would attempt to identify which of the variables to be discussed play an important role in students' use of ICT facilities. It will similarly be beneficial to academic researchers, students and also professionals within this area of study.

The findings will be useful to librarians in academic libraries in the sense that they can apply the recommendations in improving the performance of their operations and services to library users. It will also enable them to be up-to-date with current practices in academic librarianship, thus fully equipping them to render efficient services to library patrons.

The findings of this study will also serve as a reference document or tool for library managers in educating stakeholders on the need to adequately fund academic libraries with respect to providing ICT services and facilities. It will further enable academic library managers to be equipped with the knowledge of state-of-the-art technology in library management, thus enhancing their managerial ability in managing information and human resources (Mamman, 2015).

The findings of the study will be useful to researchers in the field of librarianship and information science. It will thus afford researchers the opportunity to see the link or relationship of this study with other studies that have been conducted in the area and enable them to identify the areas that need further studies.

The study will bring to light challenges associated with the utilization of ICT for research output by students and faculty at the UDS library systems. The study will also contribute to a body of knowledge on the use of ICT facilities by students and librarians.

1.5 Limitations of the study

The study was limited to postgraduate students in the UDS and the librarians because postgraduate students mostly use the libraries for research output. Steps would be taken to address any unforeseen challenges that might come in the course of the work.

1.6 Scope of the study

Geographically, the research was conducted in all the UDS satellite campuses libraries thus Northern Region (Nyankpala, Tamale, Graduate School), Upper East Region (Navrongo), Upper West Region (Wa). All these libraries are patronized by postgraduate students for research purposes.

1.7 Organization of the study

The study is organized into the following interrelated six chapters.

The first chapter presents the study's background, statement of the research problem, objectives of the study and the relevances of the study. Chapter two is devoted to the review of related literature and theoretical discussions. Chapter three covers the detailed methodology and profile of the study area. Chapter four covers the data analysis and presentation of findings. Chapter five deals with discussions of findings and lastly, chapter six deals with the summary of findings, conclusions of the study and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter focuses on the literature review in the area of information communication technology facility for research output. The research gap in the use of information communication technology as well as how the present studies intend to bridge the gap identified will be discussed.

Concept of Academic libraries

An academic tertiary institution, serving the teaching and research needs of students and staff, must have an academic library. The purpose of academic libraries is first, support the curriculum being run by the institution and secondly, offer support in the area of research. The success of learning and research rely on a robust academic library. Academic libraries take the form of both print and non-print materials. The materials (Print and Non-Print) have to be well organized. In this vein, academic libraries do not only provide resources for users but also, help in preparing users to be independent in their thought process, as well as the skills required to process information as citizens, as consumers, as professionals for the benefit of the society (Fabunmi, 2002).

Academic libraries have their origin in developed countries of Europe and the U.S.A., whose cultures are based on the printed word (Mamman, 2000). The Roman bath in the Roman empire had a section reserved for Greek and Latin scrolls for the viewing public but these scrolls are not lend out. These were the early libraries opened to the public in the West. (New World Encyclopedia, 2011). Public libraries existed from the 17th century in the true sense of the word and were to be found in countries such as United Kingdom, United States, Poland, Canada, Australia, and a few others.

The promotion of academic library was spearheaded in Africa by UNESCO. The role played by academic libraries in Africa in eradicating illiteracy cannot be overemphasized. The UNESCO project, which was meant to establish academic libraries in Africa and had the backing from UNDP initiated Experimental World Literacy Programme, sought to arrange mass literacy programmes such as adult literacy courses was at the forefront of the promotion of academic library project in Africa. A literacy campaign meant to eradicate illiteracy through the use of libraries was vigorously pursued. This campaign was held under the theme 'National Information System' (NATIS). The NATIS seeks to encourage the establishment of policies that are convenient and effective and provide an information infrastructure and networks (libraries inclusive) at national levels. In view of this, several conferences have been conducted by UNESCO in Sub-Saharan African Countries. In West Africa however, deliberation on the concept of libraries started in the middle 50s. The report of various seminars held in this regard influenced the creation of African library services. Academic libraries were thus, established for the purposes of giving support to educational learning, provide effective services for people and promote reading and research. It should be noted that the literacy campaign led by UNESCO also seeks to produce reading materials at low cost to tertiary institutions (Ranasinghe, 2007). It is therefore apparent that the intervention of UNESCO in library development provided the impetus for library services development in Africa as a whole and Nigeria in particular.

Academic library has for many years played important roles in supporting research in all disciplines. Universities, which constitute the knowledge hub of the development of a nation, stands to be the biggest beneficiary. However, the relationship between researchers and libraries in recent years was brought about by the establishment of these libraries. Breeding 2007, intimated that technological developments and initiatives brought about a significant change in the face of research. Information resources online availability and the services

academic libraries provide to their research communities have seen a marked departure from the old-fashioned traditional library system. This has encouraged researchers and librarians to welcome the positive additions and assistances these changes have offered and quickly adapted and now seeks to exploit their full potential. It should be noted that before the era of ICT-based resources' introduction into the academic library space, researches relied on actual books and photocopies of appropriate journal articles were the order of the day.

In deciding with the essence of academic libraries in the set-up of universities, the decision on the focus of collecting information resources should be adhered to. Examination of the needs of students and staff by librarians and the priorities of the university is also paramount. Niche collections are what specialized areas of academic libraries are referred to. These collections usually form the foundation of a distinct collection division and may comprise original papers, artwork, and artifacts written by a single author or about a definite discipline.

Modern academic libraries have a different focus with respect to the way researches are conducted. It is a lot more convenient to access information today than it was yesteryears. Traditional libraries in the past have allowed users to read as well as borrow books with little annual payment privileges. The privileges however, do not include computer usages. Moreover, in order to access academic libraries in some universities, you need to belong to the student and staff fraternity of that university. Academic libraries in universities have generally transformed themselves to the extent that information is made available in a timely manner. Information needs of users are thus, a click away. The emergence of ICT-based resources in academic libraries enhances the timely nature of providing information to users. Nigerian University libraries make use of ICT tools in rendering services to users according to a study conducted. This safeguards the superior user-accessibility of resources (Ani, Esin, & Edem, 2005).

Haliso (2011) recounts how between the years 2000-2001, academic libraries in Canada had already subscribed to 436,731 electronic journals. Similar attainments were made in libraries in Singapore and Saudi Arabia where ICT initiatives were massively undertaken with the initial design of ICT policies. The earliest record of the use of ICT in academic libraries in Africa and for that matter Sub-Saharan Africa dates to the early part of the 1960s. In Ghana, for example, plans to implement the use of ICT in most academic libraries had been in the pipeline for quite some time (Adanu, 2006; Badu & Loughridge, 1997).

Academic libraries have an essential role to play towards the use of ICTs. For the role of ICT to be seen to be beneficial in the academic research work of the university, library staff needs to obtain continual training on ICT to improve their skills in order that the knowledge and skills acquired can be beneficial to the users.

Concept of Information and Communication Technology (ICT)

There have been several phases of development in the world today. Advanced and industrialized society today came about through technological development. The use of ICT in conducting the affairs of society has led to a change in dynamics in the ways information is accessed. The application of ICT can be manifested in so many ways. Some of the features of technological application can be seen in phones, internet, computers and televisions. These technological features of ICT are able to make people even in the most picturesque area of the globe, able to access information. In the era of traditional societies, there has been an existence of ICT spanning the days of Gutenberg and his discovery of the printing appliance in 1439. But due to technological progressions in the 21st epoch where information is easily administered and shared in within seconds. (Ismail, Ahmad & Affandy, 2013).

Various definitions of ICT abound. Among these definitions was one by Ayodele, 2002. Ayodele defined ICT as an electronic-based-technology which is used to retrieve, store, process and package information as well as provide access to knowledge”. Furthermore, Aluko (2004) view ICT as an enabling technology that is required for the delivery of voice/audio, data and internet services which is carried from one medium; point A to another medium known as point B through both wired and wireless media protocol (IP) and non-IP networks. ICTs in the view of Nwachukwu (2004) refers to the application of computers and related technologies to the acquisition, storage, recovery and broadcasting of information. There are three concepts that ICT is made-up of. These concepts are expressed individually as– Information, Communication and Technology. Interpretation of information take several forms. This interpretation can be manifested in the form of news, messages, events, news, print and electronic or audio. Opera (2004) also viewed information as are facts, data or opinion including what is discovered in the results of research and scholarship in all fields of knowledge. Information at the same time, can be transmitted through messaging, signal or a stimulus. Aiyepoku (1982) cited Ifidon (2007) in his book and defined information “as man’s accumulated knowledge in all subjects, in all forms and from all sources that could help its users to make rational decisions...it is processed data of value in planning, decision-making and execution of programmes”.

Marchlup and Mansfield (1983) define information as “a signal transmission or the telling of something or something that is being told to a person”. This definition limits the capacity of information to humans. From the perspective of computer experts, information is “any electrical signals or bit pattern with defined meaning”. Shannon (1995) looks at information as how to transmit data most efficiently and economically, and to detect errors in its transmission and reception, while Roger (1996) sees information as the representation of a fact (or of a message) for the receiver. According to Zoglaner (1996), information means the

content or meaning of a message, while Newman and Newman (1985) choose to define information as “that which destroys uncertainty”.

According to Ogunmola (2007) “communication is the codification of a message by a sender who then transmits it through a channel to a receiver, who decodes it, puts it into context, and thereby comprehends it”. From the foregoing, it is evident that communication cuts across every human endeavour. To underscore the importance of communication, the International Telecommunication Union (ITU) and the United Nations Educational, Scientific and Cultural Organization (UNESCO) asserted that the right to communication is a basic human right (UN, 1996).

The invention of technological gadgets such as mobile phones, satellites and the systems that are connected to them have increased the medium in which communication with people occur. Anan (2002) views on the use of the internet were explicitly captured as “people are now enabled to connect directly, who otherwise might remain divided by distance, culture and economic stratification”. The study raises important issues of communication in the way information is created and transmitted. Modern society is therefore shaped by the form of message and ideas through technological advancement.

The USSR and USA began the usage of ICT in the last century. The Soviet Union, in 1957, launched a craft into space. This space craft is called “Sputnik”. The US, seen as the leader of the free world, got irritated with the fact that USSR was the first to record success with this space programme. Not wanting to be seen as a low-ground force of a country, the United States committed time and funds into space research. The result of this space research was the establishment of an Advanced Research Project Agency popularly referred to as ARPA. The ARPA project composed of military researchers and organizations merged into the private sector of the US economy. The ARPAnet, which served as the network link later morphed

into the Internet we are using today. Although there was disengagement of the military space research from the ARPA net a regulatory body called National Aeronautics and Space Administration (NASA) was still in charge of the internet aspect. This ARPAnet continued till this day as the Internet through collaborative efforts of the private sector and the global network for communication (Mohammed, 2007; Onyeneke, 2007; Achonna and Yaya, 2007). To wit, the possibility of people from all spheres of life to communicate seamlessly was as a result of the advent of ICT.

Gupta & Ansari (2007) posit that ICTs primarily hinges on 4 know-hows: Computer hardware know-hows (computers, and the input and output and storage devices that support them); software (web browsers software and software for business applications); telecommunication and network know-hows (telecommunications, media processors and software required for wire-based and wireless access and support for Internet and their networks); and data resource management know-hows (database management systems, software for databases).

Benefits of Utilization of ICTs in Academic Libraries

The benefits derived from the application of ICTs in academic libraries are endless, particularly given the manner in which they have impacted on library users. The adoption of ICT in library operations has resulted in the operational efficiency in its usage. Some of the benefits of ICT in the utilization of academic libraries include the provision of information that is accurate and timely. Access to information, increase in productivity and the formation of library networks from part of the benefits of ICT utilisation. This enables users to self-educate themselves through the use of the internet. Also, collaboration and the establishment of facilitation and reformation centres helps in sourcing data from different outlets.

The opportunities offered by ICT in its usage in academic libraries help develop critical thinking skills. A study conducted by Levin and Wadmany (2006) reveals that ICT has a great impact on students' learning outcomes. This enhances their ability to be creative and imaginative. A study by McMahon 's (2009) shows that there is a correlation between students who learn through the use of ICT and the attainment of academic skills. The study revealed that a longer use of ICT brings about familiarisation and its attendant higher academic skills of the student. Thus, institutions of academic learning are recommended to integrate ICT across all of their learning expanses and among all learning stages. Evidence shows that, when the integration of ICT is conducted, the application of technology in the attainment of learning outcomes by students is immeasurable.

Furthermore, ICT allows the delivery of immediate and easy access to information in libraries. For example, telephone and e-mail ensures the delivery of the anticipated information to library users with much ease. The ability of ICTs assembling electronic resources makes research efforts more effective, convenient and efficient (Dowler,200). Ajibola and Tihamiyu (2000) noted that, while ICT have contributed to information explosion, they are also tools for containing and exploiting information. This way, according to the authors, ICTs offer new techniques in library operations. In other words, ICT has contributed greatly to the revolution of academic library through the introduction of ICT. Dissemination of information used to be an obstacle in the traditional set of libraries. Fortunately, the advent of ICT has made information flow not only easier but also, timely.

Information accessibility has been a major obstacle in the traditional library operations until the introduction of ICT. ICT has therefore brought about a change in the area of information accessibility which hitherto was frustrating and daunting. Mabawonku and Okwilagwe (2004) acknowledged that technology is fast gaining recognition in library and information service delivery and is being increasingly used in library activities.

Utilization of ICTs in Academic Library Procedures

The concept of ICT utilization in library operations has been discussed by several scholars. Library administration/management, circulation/reference services, acquisition/collection development, cataloguing and classification and serials control and management are some of the thematic areas ICTs are utilized.

Library administration and management have been identified as a major area of ICT utilization in countries as diverse as Australia (Fitzgerald and Savage, 2001) and Bangladesh (Islam and Islam, 2004). Gardner (1994) stated that ICT could be deployed in the area of library management as a means of ensuring better organization and control of ICT services in developing countries, while Olagunleko (2004) highlighted the importance of using ICT for administrative purposes in public libraries as it ensures easy manipulation and processing of information for more effective ICT-driven library service for users. Anunobi (2005) found that ICT was mostly used for library administration and management purposes than for other library functions in some university libraries in Nigeria. A related opinion by Okoro (2007) averred that ICT utilization in library operations have become indispensable. He discussed the potency of the computer and allied technologies to convert a huge amount of print information into digital format and stresses that this development has enabled libraries to provide a high quantum of information to users at minimal time.

Anunobi and Edeka (2010) discussed in detail, the process of adopting and using ICT for academic library services in the Federal University of Technology, Owerri (FUTO). The study of Anunobi and Edeka reviewed the historical development of ICT in the library space. This historical development looked at the structure and systems of ICT facilities in the automation process of libraries. Further, the challenges encountered in the provision of effective and efficient ICT-based services, its funding and policies as well as the

environmental challenges were also examined. There has been some tremendous increase in the number of ICT facilities at all levels when it comes to the administration of libraries. These facilities include; ICT infrastructure improvement, institutional strategic policy development, awareness and commitment to ICT among policy and decision-makers. It is believed that the provision of these facilities resulted in the timely information delivery, global access to information and the ease of its use.

In a related development, Emoiorho (2011) explored the essence of ICT in library administration. The aim of the study is to explore ways data is captured and processed, and the ability to make information available to all users. Singh (2013) noted that the technological effect in library services and the critical role ICT plays in the effective and quality management and delivery of information is unparalleled. Jegede and Tolowawi, (2010) noted that automated publishing, evidence of the use of technology, is fast shifting the role of library staff in building and acquiring library resources as well as providing access to such resources. The Internet and the World Wide Web have expanded the scope of accessing information and this has resulted in the availability of resources that were unimagined in years past. The accessibility of information presently, without much difficulty, results from technological advancement. ICT has had a great impact on the acquisition process in libraries of developed countries. It is worth noting also that some developing countries globally, especially Nigeria have had their fair share of ICT-based resources.

The concept of automated systems as posited by Odeh and Akpokurerie 2011, is to help facilitate the process of acquisition with regards to collation, receipting and invoicing. Odeh and Akpokurerie stated that online library catalogues are used to conduct selection exercises. Tiwari (2011) buttressed the above point by stating that the acquisition module, whether it be an integrated system or a single system, offers benefits that are myriad in nature. These systems enable bibliographic verification of data as well as the transfer of data

from cataloguing records. The cataloguing then facilitates in the preparation and simplification of staff training requirements. Moreover, the online availability of information about the holdings of other libraries supports cooperative collection development.

Acquisitions, cataloguing, and classification are being influenced by ICT. The determination of how information is transmitted to other libraries and the utilities through a medium that networks and support resources sharing and subscription are some of the influences of ICT. The information resources selection, in the context of ICT application, also involves matters to do with site licenses and making decisions between stand-alone CD-ROM work stations and networked CD-ROM subscription (Iheaturu, Okafor and Mberu 2006).

Another way ICT is being utilized in libraries is cataloguing and classification. The application of a technical service utilization system, which has brought enormous change in the operations of libraries is ways cataloguing and classification work. Important developments in the academic library space have been seen due to the emergence of cataloguing and classification Ajibero (2006). The production of vital equipment such as Machine-Readable Catalogues (MARC), Online Computer Library Centre (OCLC) and Online Public Access Catalogue (OPAC) was made possible through cataloguing and classification. This has transformed and enhanced the cataloguing system. It further allows libraries to look into national and international networks in order to speed up their cataloguing processes (Ajibero 2006). Imo (2007) however argued that ICT has not changed the way the cataloguer does his work, but rather, accentuated the need for the cataloguer to sound technically and tactically. Imo went further to state that ICT has facilitated the production and also, made available Machine-Readable Catalogues of libraries universally.

Chiang Mai University library management system was thought to be the first (in 1987) to introduce a commercial integrated management system when URICA software and this was

used for the processes of cataloguing and providing online public access, and that by 1992 the National Library of Thailand installed the Dynix Library Automated system software. Additionally, the present range of library management software is used including ALICE, Dynix, INNOPAC, TINLIB and future goal of the library is how to provide users with access to more and better information with a quicker and easier approach, VTLS, in the libraries of higher educational institutions and some private agencies. The paper stated that the trend for library operations now is for electronic information resources, electronic books, and the virtual library.

Difficulties Connected with ICT Utilization in Academic Libraries

The difficulties connected with ICT utilization generally include lack of funds/economic barriers, lack of ICT infrastructure, poor telecommunication facilities, computer illiteracy, low, resistance to change, cultural factors among others. The issue of finance in every venture cannot be downplayed and the development of ICT utilization in academic libraries is not an exception. Availability of adequate finance ensures that ICT facilities are well and properly utilized in academic libraries. However, this appears not to be the case as far as academic libraries, especially in the developing world, are concerned. According to Gardner (1994), one of the problems affecting the effective and efficient utilization of ICT-based resources in academic libraries in developing nations is that of adequate funding. Likewise, Chisenga (2004), in his study of ICT utilization in public libraries in Africa also identified lack of funds as one of the major barriers that affect ICT application in public libraries. Similarly, Okiy's (2005) survey of ICT in Nigerian university libraries highlighted 'economic barrier' to be a challenge in the utilization of ICT in libraries; while Afolabi and Abidoye (2006) posited 'poor funding' as one of the barriers to ICT integration in library services. In the same vein,

Mohammed (2007) indicated 'lack of funds' as one of the problems militating against complete automation of Ghanaian and Nigerian university libraries.

The ICT infrastructure is another important element in ensuring effective and efficient library services in libraries, but most often this is not available in sufficient quantity to guarantee satisfactory services to library users. Okiy (2005) indicated 'lack of ICT infrastructure' as one of the barriers to ICT utilization in Nigerian university libraries, while Nwachukwu (2005) and Onyeneke (2007) also identified unavailability of ICT resources (Internet, e-mail, video conference, fax machines, digital cameras, digital scanners, online information sources, etc.) as one of the blockades to ICT application in academic libraries in Nigeria. Similarly, Afolabi and Abidoye (2006) highlighted among others, 'high cost of ICT equipment' as a barrier to ICT integration in library services, while Mohammed (2007) identified 'limited hardware' as one of the barriers militating against complete automation in Ghanaian and Nigerian university libraries. The provision of adequate ICT infrastructure/equipment in libraries, therefore, is a necessity if libraries must meet their obligation of satisfying users need through ICT-driven library services. Public libraries, whose scope of coverage is wide, both in terms of audience and subject area must ensure that ICT infrastructure/equipment is in place if they are to provide effective service to their patrons.

Access to higher bandwidth is one of the many obstacles hindering the use of ICT. Although countries like South Africa and Egypt are considered relatively advanced in the African sub-region, and also have comparatively high ICT capacities, there is still congestion of bandwidth with regards to internet. Jensen (2002) conducted a survey which revealed that almost 60 percent of African countries have a bandwidth that is less than that of the developed countries. Africa in general has a challenge of private sector investments in the telecommunications infrastructure and this has led to a lack of competition in the sector. The result of this low-level competition is the arbitrary setting of prices. This situation has set the

cost of ICT beyond the reach of most educational institutions in Africa. The provision of universal access to information has therefore become costly and complex. Issues with bandwidth capabilities in the sub-region requires urgent attention. The telecommunication set-up has a weak foundation and sometimes, non-existent in Africa. This makes it difficult for effective establishment of modern library services that will enhance research and development. Urgent attention needed to be paid to the issues of higher bandwidth if progress in the library services provision is to be made. Policy intervention by governments of the sub-region is required to set the tone for open and competitive telecommunications sector which will ensure that under-serviced areas receive infrastructure investment and remote tertiary institutions also get connected to the reliable and effective telecommunications network.

The cultural background of the people should be considered when educational lessons on technological changes is being introduced into the library space. The resistance to change and the inability to consider the cultural environment may create problems in the acceptance of such changes. Change thus ensures development and progress in every society. However, people are reluctant to accept change if the change is not well-explained to them. As a result, innovations that have anything to do with ICT utilization in academic libraries are sometimes considered strange and alien (Okay, 2005; Nwachukwu (2005).

Propositions for Refining ICT Utilization in academic Libraries

There have been several suggestions on various ways of improving ICT utilization in libraries. These obstacles in ICT utilization discussed earlier, rely on facilities, skills acquisition, and planning. The suggestions made, which should help in addressing the challenges raised include; enough funding, provision of telecommunication infrastructure such as, Internet facilities, training as well as capacity building and ICT policy/strategy.

The issue of adequate funding has been discussed by Afolabi and Abidoye (2006) who stated that “government should endeavour to commit a huge amount of money for ICT infrastructural development”. In the same vein, in his study of some Anglo-phone academic libraries in Africa, Chisenga (2004) recommended that governments should offer satisfactory funding’ to library services to enable the deployment of appropriate ICT facilities and a dynamic role in the delivery of access to global information resources.

Academic libraries could be properly utilized through the use of ICT if provisions are made for internet facilities as well as the installation of hybrid collection. The People’s Network which is considered a new library system, coupled with other British government initiatives have been touted as ideas that have been set to give a new direction for academic library services. The introduction of the new technology was to enhance roles easy access to information, promote learning in a convenient manner and support and research development (Boughey, 2000). The paper stated that management of change theory emphasizes the effects of introducing change in one area or the whole of the organization and asserted that if this theory is applied to academic libraries, significant domino effects can be expected. The author gave some examples taken from the practical experience of Bury libraries in Lanchashire, U.K. Similarly, expressing his views on how ICT utilization can be improved in tertiary institutions in Nigeria, Onyeneke (2007) posited that the authorities of the tertiary institutions should provide well ‘equipped computer laboratories’ (especially in libraries) with Internet facilities for students and lecturers use. Public libraries (in Nigeria), by their wide scope of coverage, need Internet facilities to reach their audience. Similarly, they require the hybrid collection of information resources that will complement that on the Internet. This will enable them to be better equipped to provide efficient and effective library services to their clientele.

Another strategy suggested by scholars for improving the skills of both staff and users in ICT utilization in libraries is training and capacity building. With this view in mind, Spacey, Modern societies rely on technology to bring about desired change. It is in light of this that Goulding and Murray (2004) stated the implications of technological dynamics with regards to the stakeholders in the library service with U.K being the focus. They suggested that frequent and effective training is a necessity for staff and managers of libraries. This they noted will enhance staff's efficiency and this can be achieved through variety of training methods. They also believe that training is the only way resistance as a natural response to change can be well managed. In the same vein, Chisenga (2004) recommended that there is the need to equip staff in academic libraries. These staff require appropriate skills relating to the digital age information resources management to enable them function properly. Okore (2005) suggested amongst others, that, e-learning centres should be created within academic libraries as a means of enabling users to acquire ICT knowledge. Afolabi and Abidoye (2006) also recommended that since the concept of e-library is a new phenomenon in the library services space, training in ICT for staff at all levels is needed. In a similar manner, Nwachukwu (2006) suggested that appropriate and essential computer proficiency unit should be established to coordinate effective and efficient application of ICT in library operations and services.

The innovative use of the internet was also considered as a strategy that would improve ICT utilization in libraries. Chisenga (2004), in this light, recommended among other things that the provision of academic libraries should be accompanied with facilities that will help users put it to innovative use. This, he said, can be achieved through the equipment of library staff with appropriate skills that will be beneficial in the present digital age and further the staff in information resources management. He observed that some public libraries in Botswana and South Africa have developed library websites and are making efforts to provide library

services from them. Similarly, Chowdury, Poulter, and Macmenemy (2006) proposed that academic libraries should have a new vision in the digital age.

The provision of ICT policy and strategy has been advanced by some scholars as a planning strategy that could improve the utilization of ICT in libraries. It is for this reason that Chisenga (2004) suggested that, there is the necessity to support library services with the expansion of ‘formal ICT approaches’ in their absences, as most libraries continue to use ICT in an ad-hoc manner, which eventually is not cost-effective. Similarly, Afolabi and Abidoye (2006) recommended the crafting of ‘ICT policies and strategies’ as a means of providing adequate guidance for libraries on how to go about implementing an ICT-driven library services, while Mohammed (2007) also supported this view when he suggested that a ‘well-articulated ICT policy’ will guide Ghanaian and Nigerian university libraries in their automation efforts. Public libraries (in Nigeria), indisputably, need ICT policies/strategies that will guide them and keep them on the right track as they embark on utilizing ICT in their operations and services. This way, they will be in a position to provide more effective and efficient library services to their users, using ICT facilities.

Utilization of ICT in Library Operations

Husain & Nazim, 2015; Cholin, 2005; Malhan, 2006 indicate that activities of libraries consist mainly of “collection and referencing, documentation and accessibility to organized collections in possession by library staff”. Modern IT therefore only assist users in information search and retrieval thereby making library services faster. The new breed of academic library users is technologically savvy and easily access information in various forms and use (Thomas & McDonald, 2005). The world is changing and thus, the new generation has become IT nerds. Technology has, therefore, become the livewire of the present generation. The optimum use of academic library depends upon the satisfaction

derived by its users. In the present scenario, therefore, the quickest library service is more approachable through the world-wide-web and internet due to its speed levels (Berners-Lee, Cailliau, Groff, & Pollermann, 1992).

Library management has seen significant changes in many ways in the modern technological area of ICT. The use of ICT in housekeeping operation to users' management have all been made possible by the advent of ICT. Essentially, the utilization of ICT in libraries is to provide various services in the way libraries are utilised. Having access to OPAC and other library databases help in the automated circulation of library materials. The impact of ICT in promoting and improving activities of academic library is greatly enhanced. ICT utilisation also serves as an opportunity-provider in the area of knowledge as well as adding value to information services and, enhancing easy access to a wide variety of digital-based information resources to its end users (Ghuloum, 2012). Information Technology at present, is used in different sectors. The extensive use of ICT in the field of library and information services is to reduce costs, enhance operational efficiency, and essentially, to improve service quality and customer experience (Law, Leung, & Buhalis, 2009).

Utilization of ICTs by Library Users

Educational institutions around the world have been implored to consider the use the new ICTs in research and development (Yuen, et al., 2008). The importance of ICT shows in its ability to assist learners to inquiry and research on issues of academic concern. The ability to develop skills from experts and peers in a connected global community is also another way ICT is utilised by its users in the library space (Law, 2008).

The modern society demands a workforce that is capable of harnessing technological innovations as a tool to add value to society. The ability to effectively identify reliable sources of information and at the same time, access these information are some of the

benefits of ICT to its users. In addition, the process of sieving information and communicating same to colleagues and associates are all benefits of ICT (Alibi, 2004). Information is said to be a key resource in research as affirmed by Hawkins (1998). Thus, for learning to be effective and efficient in academic institutions, digitized and modern libraries needs to be established. The deployment of film and based facilities in tertiary intitutions were geared towards research and learning. The advent of computer-based innovations became tools in the academic environment in many forms. Lucus and Murray (2002) therefore concurred that for standard research and development to take place across the board, the academic environment needed to be challenged to change because innovative technological advancement has changed the interaction of the new generation with regards to information.

This has encouraged the new generation of academics to develop the skills needed to conduct convenient and effective research. The call for proper utilization of ICT-based resources cannot come at a better time. This is because despite the introduction of a digital library system to replace the traditional system, effective and efficient usage of the modern library services has not been encouraging. This concerns necessitated the commissioning of a study to investigate how ICT-based resources are utilised in Kerala The findings suggest that there are the need for orientation programmes to train users of the various ICT resources to help the library increase the application of ICT (Haneefa 2007).

Developing countries like Bangladesh, therefore, stand at an advantage in terms of the snowball effect such a technology would have in their educational institutions if introduced. The study, which was aimed at investigating the how ICT facilities are adopted in the academic libraries of the universities in Bangladesh revealed the positive impact adoption and application of ICT could have on the academic library system in Bangladesh. It was observed that skilled labour was in short supply in most universities in Bangledesh.

According to Shuva et al. (2011), the academic libraries are seen as a vital ingredient in the development of every nation. Shuva et al. (2011) study observed that there is a vast difference in the web connectivity of Bangladesh compared to that of India and the Philippines. The presence of Academic libraries in the social media space is very importance according to a recommendation of the study. They also went further to suggest that the UNDP, UNESCO Bill, and Melinda Gates Foundation and other developmental and funding partners should offer funds to academic libraries in the developing countries to enhance research.

Information literacy skill was a fundamental skill needed to functionally operate modern academic libraries. Library staff must, therefore, embrace this new information literacy skill as this is prerequisite in helping them function properly in the modern age of librarianship. With the frequent changes technology has brought to the way information is sourced and utilised, resources, library staff are handicapped in their effective use of these techonologically inclined resources. The study therefore indicate ICT literacy lessons is an essential service required for library staff if their efficiency is anything to go by. Although the study was centred at Delta State University, its results are still relevant for all library staff. The study showed that although staff in Delta State University libraries are qualified librarians, they are challenged when it comes to keeping abreast with new trend of librarianship due to new technologies (Alakpodia 2010).

Utilization of ICTs by Library Staff

One of the issues discussed in the utilization of ICT by staff is their attitude. Research has been conducted to determine the influence of attitudes of library staff toward the use of computers. This study reveals a positive correlation existing between computer use and also the predictive hours needed to work on a computer (Winter, Chudoba and Gutek,

1998). The study suggested that “it is imperative for all library staff to have a positive attitude towards IT in future”. It should also be noted that there are many essentials which seem to have relations with or have influences on the attitude of the librarians towards the use of ICT in this the information age.

Attitudes form the basis for effective implementation of ICT in academic libraries of Universities. Largely, attitudes of library staff contribute immensely to the patronage of academic libraries. ICT development and its application have caused significant changes in libraries. These changes involved automated cataloguing, circulation, information retrieval, electronic document delivery, and CD-ROM databases. Ostrow (1998), observed that “the advent of the Internet, digitization, and the ability to access library and research materials from remote locations has created dramatic changes during the end of the twentieth century”. Ramzan (2004) also stated that “expert systems, wireless networks, virtual collections, interactive Web interfaces, virtual reference services, and personal Web portals have brought massive changes since the start of the new millennium”. Therefore, to say there have been fast and significant changes in librarianship since the beginning of the 21st century would not be far-fetched.

In a related publication on the Nigerian scenario, Adekunle, Omoba and Tella (2007) explored the attitudes of librarians in Nigeria towards ICT in their libraries. The study adopted the descriptive survey method. A questionnaire was used for data collection. The population of the study comprised librarians in academic libraries in Oyo state of Nigeria, who are 41 in number. The findings revealed that Librarians training and knowledge of ICT influenced their attitude toward it; adequate training and knowledge of ICT are crucial in encouraging librarians to show a positive attitude toward it (ICT), and many others. It recommended that: Training and knowledge are *sine qua non* of a positive attitude toward ICT, and as such it is essential for librarians to keep up-to-date with ICT developments; in

Africa, it is time to bridge the digital gap, therefore, African libraries who are not yet automated should start thinking about it, and a few others.

Fishbein and Ajzen (1975) explore the relevance of attitude by library staff in their work named- The Theory of Reasoned Action (TRA). This theory seeks to examine the relationship between attitudes and norms and their influence on both library staff and its users. The study revealed that attitudes generally affect behaviours and must, therefore, be considered in managing staff, especially during change and innovation.

2.2 ICT in Academic Institutions

Academic libraries have over the centuries played significant roles in assisting research in all subjects and disciplines across universities and colleges. However, the last decade has resulted in a significant change in relationships between researchers and libraries (Namenya, 2014). The availability of new technological developments and information resources online have resulted in changing face of how research is conducted, including the services that academic libraries provide to the research communities. Consequently, researchers and librarians have also embraced the advantages the changes have brought, adapting quickly and seeking to exploit the full benefits for the future and the years ahead (Research Information & Consortium of Research Libraries, 2009).

Asiamah (2011:9) defined ICT “as the umbrella term that encompasses any communication device or application, including radio, television, cellular phones, computer and network hardware and software, satellite systems and also the various services and applications associated such as video conferencing and distance learning”. Additionally, the communication technologies include the internet, wireless network, cell phones, and

telecommunication information and communication encompass capturing storage, communications and display technologies (Namenya, 2014).

The use of computers as the a technological tool for storing and processing information in digital form is a recent phenomenon in library services. While it is acknowledged that information communication technology assist to transfer and share digital information, it also serves as a means in the use of different technological applications in the process of communication and technology (Namenya, 2014). According to Riyasat and Fatima (2008), ICT is explained as “the integration of computing, networking and information processing technologies and their applications”. Hence, ICT is an amalgamation of computer applications as well as a communication technology for collecting, processing, storing as well as sharing of information.

In this period of technological explosion, there is a bulk of information generated and shared across every part of the world either through printed materials, research articles, lectures, seminar presentation videos, technical reports, standards as well as patents. Back in the 20th century, the librarians were confronted with the challenge of how to deal with and accomplish demands by users within the limited time given; hence, the adoption of ICT was seen as the solution based on its products and services (Namenya, 2014). Academic libraries are confronted with problems such as high demand by users regarding ICT facilities, nonetheless efforts are being made in reconsolidating, reshaping, redesigning as well as repackaging ICT services as well as information products by adding ICT based products and services to its way of handling information in order to derive the maximum output for research purposes (Brophy, 2009).

Due to the adoption of ICT enabled products and also services, the face of library usage has drastically changed. The way things are done in the library with regards to the provision of

information services handling is an example of the technological change stated above. It is worth noting that these services are the integration of computer communication technologies. The integration helps in the utilisation, application, storage and sharing of information in a timely and swift manner. It has therefore changed the traditional ways of how libraries deliver their services (Ahmed & Fatima, 2009). The integration and management of information is enabled by the use of ICT. Users are able to create and evaluate information which helps in not only research and development but also, communicating with one another (Ahmed, 2011). The emergence of ICT has significantly changed how information is accessed, processed as well as disseminated. Hence, it is evident that the ICT products, as well as services, collapsed the physical library; as such there are no walls or virtual library.

Further, the advent of ICT has had a significant impact on information dissemination in our society in recent times (Blandy & Libutti, 2011). The speedy execution of information and communication technology in the society has a significant change in our societies as well as its still on the go in altering every aspect of our lives (Anie & Achugbue, 2009).

Educational research and development institutions have been highly affected by the emergence of ICT. There is widespread opportunities in recent times relating to teaching and learning. Organising training by the use of ICT in delivering new digital contents developed is also enhanced (Namenya, 2014). The emergence of ICT promotes storage of information, retrieval, purchasing searching, viewing and also handling of information (Dutton, 2009). The major responsibility of ICT is making available the right information to its users at the right time. Also, there has been tremendous alteration in the traditional approaches of the library profession as well as its practices including its associated challenges and the vast of opportunities all together (Omoniwa, 2011).

2.3 Library automation

Library automation is a significant step in the use of ICT-based products and also services in libraries. It has brought significant change and also saves the time of library users as well as the staff in the gathering and sharing of information. According to literature, libraries automation started in the 1950s and the 1980s (Ahmed, 2011). The term library automation is defined “as the use of computers, associated peripheral media including magnetic tapes, desks, and optical media”. The library automation system enables the provision of the appropriate information to the right reader at the right time and in the appropriate form. Library automation satisfies the demands of libraries in general. It can therefore be deduced that ICT has not only enabled automation of libraries but also ensures its efficiency (Ahmed & Iqbal, 2009).

The modern times have revealed that libraries are making use of the Radio-Frequency Identification (RIFD) to mitigate the stealing of library resources (Ahmad, 2011). The RIFD is noted to be the use of an object which is applied to or made part of an information product for the purpose of being able to identify and track through the use of radio waves. On the part of library automation, certain open source software are available which include Evergreen, CDs/Invenio, Koha, New Genhib, PMB, Phpmy library, openBiblio and several commercial software such as Alice in the case of windows, Netlib and Libsys.

2.3.1 Merits of library Automation

Contributing to the body of knowledge with regards to ICT, Ahmed (2011) in his studies identified several advantages of library automation including;

- i. Due to the automation, circulation is noted to be one of the mainly affected aspects of library services that saved a lot of time and also the staff.

- ii. Through internet connectivity, library users can, therefore, look out for information anywhere and at any time.
- iii. Library users are entitled to simply make a reservation of library sources.
- iv. An advantage to check out the process, therefore, there would be no queue of library users.
- v. An opportunity for Library users to make self-circulation of the library resources.
- vi. Also, the use of ICT helps to prevent stealing of library resources through the RFID system.
- vii. Also, there is the availability of a multimedia facility with some automation providing image of resources in OPAC.

2.4 Library in general

The emergency of technology has led to significant changes as well as a very demanding landscape in academic libraries (Adamou & Ntoka, 2017). Since the introduction of technology into the activities of libraries, the way libraries work, their duties and their roles equally have all changed. Prior to the introduction of technology into library systems, traditional libraries in the past were physical structures or buildings where people could go there and find printed books, journals, and other relevant document work reading. Originally, the libraries had the responsibility for the collection development, processing of materials and also the provision of services devoid of computer use. However, the situation has changed in recent times since academic libraries now make use of technology. Through the use of technology both printed material and digital material (i.e. converted from analogue to digital). Thus, the revolution of the digital era in libraries has led to most of the activities of the library being computerized. Invariably, the way traditional libraries used to work have changed due to the introduction of technology.

In recent times, libraries are making use of technology to purchase, catalogue, presence, diffuse and to offer reference services. The use of technology does not bring closure to traditional libraries. Traditional libraries with regards to the physical buildings will exist to render to support digital libraries. The best is for traditional libraries to keep a good balance between their traditional and digital roles (Namenya, 2014).

In the 21st century, academic libraries rely greatly on technology. With the growing changes in technology, user's information needs to keep changing also and have more expectations from libraries. Libraries would, therefore, need to keep their technological skills up-to-date in line with the technological changes that take place. Similarly, academic libraries would need to adjust to the emergence of technology. It is imperative for libraries to be abreast with the current roles and responsibilities in order to act promptly to the changes by making conscious efforts in learning how to use the new digital technologies effectively and efficiently (Ahmad, 2011).

Education is thus necessary for librarians to acquire the needed technological skills in an environment that is characterized by frequent technological changes. Academic librarians would have to possess the needed skills in order to manage, organize and offer services to library users. Librarians after acquiring the necessary technological skills are poised to offer their services and assistance to library users to achieve their objectives (Adamou & Ntoka, 2017). Furthermore, aside from the technological skills necessary for librarians, possessing skills in teaching, consulting and management are added advantage. Academic librarians in the 21st century have several responsibilities as they combine both traditional and technological skills. Hence, librarians would need to be trained adequately on the new technological changes in order to offer the best of digital library services to its users.

Despite the advantages in the use of technology in the digital era, the introduction of new technologies sometimes creates technostress which is due to frequent development of technology and the implementation in the libraries (Adamou & Ntoka, 2017). According to Ennis (2005) cited by Adamou & Ntoka (2017), technostress is defined as a “modern disease of adaptation caused by an inability to cope with new computer technologies in a healthy manner”. Research conducted into why librarians feel stressed with the use of technology is due to some factor such as “(a) the rate of change of technology (b) absence of standardization (c) absence of trained individuals on the use of the equipment (d) reliability of the technology (e) increased workload on the individuals and (f) the changing roles of librarians” (Laspinas, 2015:206).

Research by Namanya (2014) has shown that some librarians particularly the older professionals lack the technological skills and as such are not familiar with the emergence of the new technology, they are anxious about how to handle a problem they encounter while using the computer while others are just afraid of technology and are not ready to find out how the new technology works (Laspinas, 2015:212). Due to either the lack of knowledge or low knowledge in IT, some librarians may see the computers and other ICT facilities as threats in their expert status. Notwithstanding the notion of some librarians who lack the technological skills and see IT as a threat to the work, there are other librarians who have become use of IT and see that as part of their jobs (Laspinas, 2015:212). In the same vein, instances where the librarians faced any technical challenge with their computer, they sought the services of technicians to find a solution (Laspinas, 2015:212).

2.6 Digital Archives

Library users must derive optimum best in the services provided by libraries. This is necessary in order for library users to meet the requirements by which libraries in the past

years have updated their collections. Notwithstanding activities done in the past, in the present, it is necessary for libraries not only to update their collections but also make available efficient and effective access to information via the recent information highways (Ahmad et al., 2009). The process may be made possible through digital archives. Digitization in modern libraries is a response to swifter and authentic delivery of information to its users via the digital archives. The emergence of the digital archives came after the advancement in ICT. It is agreeable in literature that the emergence of digital archives has significant influence on libraries.

Through digital archives, there is a rapid spread of information to the end users. In simple terms, the digital archive encapsulates gathering information and storing it, in machine readable format or digital format for sharing to end users (Ahmed, 2011). As such the digital content is simple to reproduce worldwide.

2.5.1 Advantages of digital archives

Ahmed (2011) in his studies on the development of library services in the advent of ICT based products and services identified several benefits of digital archives which include; creating access to unique collections, flexibility in the digital materials due to non-fixed nature of the data, easy access to primary materials through publicizing of the materials, time savings among others (Ahmed, 2011).

2.6 Digital Libraries

The digital library is a form of library where all collections of a library are stored up in digital formats, and everyone anywhere can have access to this collection without any restriction or barriers. It is worth noting that the digital content can be stored either locally or accessed

remotely through internet services. Thus, a digital library is a sophisticated collection of electronic resources.

In modern times, there are different perspectives about what a digital library is. To some people, the existence of the World Wide Web where people are able to access thousands of documents in the several formats is regarded as a digital library. However, documents found on one network at a particular moment can disappear as a second (Adamou & Ntoka, 2017). It suffices to say that documents on these sites are not stable. In other perspectives, digital libraries are seen as a large database that provides access to all forms of information and resources to people with the aim of meeting the needs of particular and specific user groups and communities.

In espousing the characteristics of digital libraries, Hemlata & Meena (2013) explained that digital libraries have some basic features which are totally different from traditional libraries. These are; objects that combine with others and facilitate the easy access of information (Hemlata & Meena, 2013, pp. 20-21).

In Alhaji (2009) as cited by Hemlata & Meena (2013), characteristics of digital libraries are established on the selection and acquisition (choosing the right resource to digitized), organization, indexing and storing digital documents as well as search and retrieval (Hemlata & Meena (2013).

A general perspective exist that a digital library is less costly compared to the traditional libraries. On the contrary, digital library creation embodies the establishment of a complete organization of machines and people which can be a costly project. In reality, digitization tools are very costly. Financial budgeting has an important responsibility in development of digital libraries since irrespective of what library professionals intend doing, or what are the

user's needs, the source of all these decisions is money (Kastelle, 2012). The factors to be considered in setting up a digital library are;

- Contingency
- overhead and indirect costs
- Legal fees
- Communication fees
- staff training
- Digitization equipment
- Salaries

It should be noted that the initial cost is subject to the material to be added in the digital library. The process of transforming printed materials into a digital format is certainly costly and time-consuming. Also, the digitized resource must be organized into a particular library application and in the same way; the digital resource should be kept in the digital library database. From the discussions by Admaou and Ntoka (2017), digital archiving demands frequent investment to address obsolescence introduced by speedily technological changes compared to books in the traditional library.

Furthermore, more storage spaces are required for the large digital documents unlike the traditional libraries. Also, the network server and applications require continuous upgrading in order for it to be usable. Similarly, in situations where the services are made available outside the library such as electronic databases, there will be extra cost regarding legal fees. There is also additional cost for library users training and librarians. Although, there is the perception that online resources are free, it is worth noting that there is cost associated to its creation, maintenance as well as dissemination of information.

2.7 Academic Libraries in the Digital Era

The modern times have revealed that academic libraries are not only limited to piles of books any longer but rather a place where academic research can occur due to the presence of ICT. They also have new responsibilities of sharing information. There has been a general change in the library landscape from analogue to digital. Accessibility of information is made possible by the automation system of libraries through the use of computerized library catalogues (on-line Public Access Catalogue-OPAC). This has resulted in digital libraries being proliferated in recent times (IFLA, 2013). The frequent nature by which electronic resources are made available in the area of information science and Information Technology create a convenient usage of academic library in this new age. Dissemination of information through digital platforms has become more attractive for librarians now than ever. The need for digital libraries in academic universities have led to an enhanced educational development. Also, online educational resources to students and scholars as a whole help in making learning effective and convenient.

Sharing of information and knowledge is one of the major objectives of academic libraries as long as they meet the needs of the learning institutions, cultural repositories as well as research centres. However, in this digital era of knowledge, there is the need for academic libraries to expand their roles so as to become receptive to both soft and hard documents. On the other hand, academic libraries are necessitated to upgrade their services to offer education of high quality by storing resources in different forms and maintaining easily accessible information for online use within the academic environment. Digitisation policy and programme will however solve the challenge of access. In the words of Pandey & Mishra (2014; p137) “academic libraries are digitizing materials since they know the continuing value of library resources for learning, teaching, research, scholarship, documentation and public accountability”.

According to Adamou & Ntoka (2017), academic libraries constitute an essential component of the National Educational System. The continues existence of information centres that meet the needs of basic library users will ensure efficiency and effectiveness and above all, utility. Assessment is regarded to be an important role in the enhancement of information services. The expectation of benefits from communities being served with academic libraries, products and services as well as the need bridge the communication barrier gap is enormous. Further expectations by library users for high-quality and user-friendly online services also abound. It is imperative for library managers to apprise themselves with qualitative and quantitative value of the library resources and the intended services for better functionality in order to make the invisible, visible. Academic libraries have some criteria which is significant for the development of enhanced products and services such as;

- Effectiveness: hat is how well the library system operates?
- Efficiency: that is at what cost does it operate?
- Usability: that is services and products utilization
- Accessibility: Features that deals with the digital system like technological performance, error rate, speed and time.

2.7.1 Building Academic Digital Libraries

Every successful digitization project requires planning (Adamou & Ntoka, 2017). The materials to digitize and the human resources engaged in digitization are some of the plans for digitization. In other for the digitization effort to be eventful, when the digitization process begins and ends as well as the hardware and software constituting access to digitized content, should be clearly spelt out and catered for.

From literature, to be able to implement an efficient and effective digitization proper, it is necessary to develop an in-depth plan incorporating steps include setting clear and concise

goals, printing required materials, choosing hardware or software required (Amadou & Ntoka, 2017).

2.8 Preservation of electronic resources

According to Routhier (2014:1) “Digitization is rapidly one of the standard forms of preservation for libraries archives and information centres, analogue materials”. The preservation of books has been an essential aspect of libraries over the years. These preserved books create huge concerns for libraries of which the implementation and preservation programmes for traditional resources for research and education were carried out.

Resources in the digital era can be either born digital (i.e. Originated from an electronic or digital source) or in a digitize format (that is transforming from analogue equivalent). A technology provides opportunities through which an information can be accessed and processed in a digital form. The challenge however is that digital resources as a result of their short-term lifecycle brings about a general awareness about how to manage them effectively and efficiently in too enable future generations enjoy the benefits. The advent of the digital era has eliminated the worries of librarians with regards to climate control or the deterioration of papers. This problem although looks obsolete now, used to be the standard in the traditional era. As part of the preservation of digital resource, major concerns about technological obsolesce, changing formats, data loss, human error, lack of expertise and copyright issues were being addressed (Kasteller, 2012). Digital preservation has a broad range of activities which are arranged in place to extend the usable life of machine-readable computer files as well as safeguard them from-media failure, physical lose and obsolesce. Library of Congress official website defines Digital preservation as a “conscious management of digital content over time to ensure ongoing access”.

Despite the relevance of digital library, concerns exist in respect of a possible loss of data. Usually, data resources stored in older media can get missing due to appropriateness of a readable hardware or software over time. This is because technology evolve overtime and what may be relevant today might be obsolete tomorrow. The software in addition to the formats for storing digital information can be a challenge. The solution therefore lies how the software is preserved since several software companies have designed them for obsolesce or subject to expiration in order to promote the sales of their newer software (Reyes, 2013). Preservation of hardware and software created alongside the media is thus imperative.

2.9 Libraries in the digital era

There is a vast difference between the ways traditional librarians provide their services compared to the digital librarians. Printed catalogues and books are the focus of traditional libraries. The modern digital era offers academic librarians to possess different technological skills in order to offer services to students and other stakeholders that will match up with the digital world (Adamou & Ntoka, 2017).

In recent times, librarians offer both analogue and electronic services. Delivering electronic services to users have become easier due to users' acquisition of different digital skills. Academic librarians have acquired knowledge and expertise in "accessing, searching, browsing, navigating, retrieving, indexing, storing, organizing and dissemination of digitized information" (IFLA, 2013). Librarians in general have an additional responsibility of not only providing services to users but also, offering advice to them in the effective and efficient use of analogue and electronics services. Seeking opinions of library users by librarians on the various use of digital library tools such as OPAC catalogue or databases should be easy in order to assist users in accessing the right information. One of the great attributes of the E-

services is that it does not need any physical presence of the user in the library before the user can access information.

Additionally, librarians have an added role as people who preserves information. Many librarians present resources in a digital format these days. This is because many librarians have attained familiarity on how to reserve the digital resource for future use.

2.10 Librarians as Teachers

The role of the librarian is not only restricted to helping users locate the needed information but also to teach them with regards to how to locate what they want on their own. According to Julien & Genious (2011, p.108) cited by Amadou & Ntoka (2017), the frequent technological changes as well as the introduction of it in academic libraries has altered the teaching roles of librarians and has affected their teaching tools and methods. Librarians have the capacity to organize training programmes in order to educate users on how to make use of the electronic resources of the library in the appropriate way. Librarians, having learnt the appropriate way of using digital resources, can then teach users on ways to identify information as needed as well as the ability to find, assess and use effectively that needed information.

Chen & Lin (2011:401) cited by Adamou & Ntoka (2017), defines information literacy “as an understanding and set of abilities that enable individuals to identify when information is needed as well as to have the capacity to locate, assess and also use effectively the required information”. Users are therefore educated and trained to have enough skills and knowledge to enable them seek and use printed or digital resources effectively and ethically. In the era of digital information literacy, teaching skills that encapsulate computer skills are very relevant. According to Kulkarni (2014:199) “there is the need for the library professionals to play crucial role in promoting information literacy in the digital environment”. Generally,

information in the digital era means one's ability to use digital technology, comprehending and use information in many formats (Kulkarni, 2014:198).

It should be noted that digital resources can be accessed both inside and outside of the library. In recent times, academic libraries provide the chance to users who wanted to access electronic materials at any place and at any time. In that regard, users can access the library even from the comfort of their homes. Students these days utilize extensively the digital library resource to find the needed information. The latest is the internet which offers users access to digital resources. According to Chen & Lin (2011, p.399) cited by Adamou & Ntoka (2017) "digital technologies enables ultra-rapid access to the richest sources, any place they are found in the world's collection".

In the face of much information, the services of librarians are eminent in identifying the appropriate information because of the variety of sources that exist in today's digital landscape. Librarians, once well trained in digital literacy skills, can offer digital skills lessons to students on how to enhance their information skills. Seminars is one of the approaches that can be used in educating library users. Librarians, who also have the requisite knowledge and technological skills regarding the digital resources can offer to assist library users on the use the digital information in the right way. Librarians can also users to acknowledge when the retrieval information is the right resource for them and also teach them how they can make the appropriate decisions regarding the information.

2.11 Challenges faced by Academic Libraries in the use of ICTs

The evolution of technologies has improved significantly library services. This was achieved through the introduction of new and innovative ways in which information is collected, stored and retrived., However, these information technologies do not exist without challenges

(Emmanuel & Sife, 2008). The challenges include financial, technological, human and cultural factors. These could be possible obstacles in ensuring full utilization of ICTs (Ghuloum & Ahmed, 2011). The obstacles also include inadequate funds to support the purchase of the technology, lack of qualified library professionals, lack of motivation and also the need among libraries to adopt ICT in their daily operations (Ani, 2008).

2.11.1 Financial factors

Academic libraries in higher learning institutions need adequate financial support to purchase modern ICT facilities such as computers, servers, scanners, photocopiers, software and also to either buy or subscribe to online/offline resources including e-journals, e-books and digital books among other resources. According to Amutabi (2009), with the decrease financial support from donors, the situation is not likely to improve.

Similarly, Kamba (2011) suggested that libraries which were fully automated in the 1990s but were unable to afford to migrate, find their current software very limiting and until one could afford to migrate onto new and updated systems, the early start could be a challenge. He further states that the migration of up-to-date systems of automated libraries are successful due to donor support.

2.11.2 Technological factors

The existence of inadequate technological infrastructure that can help with the integration of ICTs in the academic libraries functions has been noted by many writers as the main concern faced by these libraries. From research conducted by Kamba (2011), it has been established that patronage and utilization of ICT in most African universities have been less due to weak communication network limited access to ICT hardware and software. The challenge encountered with regards to low ICT usage in the African universities is as a result of weak ICT policy, poor internet connectivity, an insufficient supply of electricity, insufficient

number of computers just to mention a few. Notwithstanding the poor computer access ratio in some academic institutions, Kamba (2011) suggest that the acquisition of ICT resources for the past years have been neglected for so long. Similarly, those computers available in the libraries equally need serious upgrading since some of them are out of usage and these compounds the difficulty of handling the ICT resources.

Revelations made by Chisange on the use of ICT in libraries suggest that, though many libraries had access to internet connectivity, the majority of them were not providing web-based information to their patrons. It is noted that the telecommunication services are to blame for these situations with regards to poor bandwidth, technical faults as well as challenges associated with network configuration (Pandey & Mishra, 2014). Similarly, the rampant power outage was noted by many researchers to be obstacles in the adoption and utilization of ICT (Siddike et al, 2011).

2.11.3 Human factors

It is imperative to note that organizational culture, library leadership as well as trained librarians play very important roles in shaping the responsibilities and the status of academic libraries. However, many researchers (Sife, 2008; Minishi-Majanga, 2007; Odero-Musakali & Mutual, 2007) have revealed that the absence of professional personnel, as well as the poor response of university management on IT, issues as crucial factors that hinder effective adoption and utilization of ICT in university libraries. The essence of employing the services of professional and experienced technical personnel to manage, control as well as maintain ICT resources available in academic libraries cannot be ruled out (Kamba, 2011). Similarly, Emmanuel and Sife (2008) suggest that most libraries lack professional ICT personnel whiles many conventional librarians have poor skills in ICT are sometimes resistant to new technologies.

The absence of trained professionals and poor attitudes of university management towards IT are crucial concerns that hinder effective adoption of ICT in many university librarians. In the absence of well-trained professionals and skilled personnel, and also the capability to offer quality information services can be hindered.

2.12 Theoretical framework: Technology Acceptance Model (TAM)

The theoretical underpinning of this research is the Technology Acceptance Model (TAM) (Masrom, 2007). The technology acceptance model (TAM) has its backgrounds in the theory of reasoned action (TRA) by Davis (1989). Davis (1989) theory of seasoned action (TRA) postulates that the behaviours of individuals are motivated by behavioural intention. An individual's behavioural intention is determined by his/her attitude toward the conduct and the subjective rules surrounding the act of his conduct. Conversely, an individual's behaviour and the intent to behave is determined by his/her attitude toward the behaviour and their discernments about the behaviour. Hence, conduct is the function of both attitudes and beliefs (Masrom, 2007).

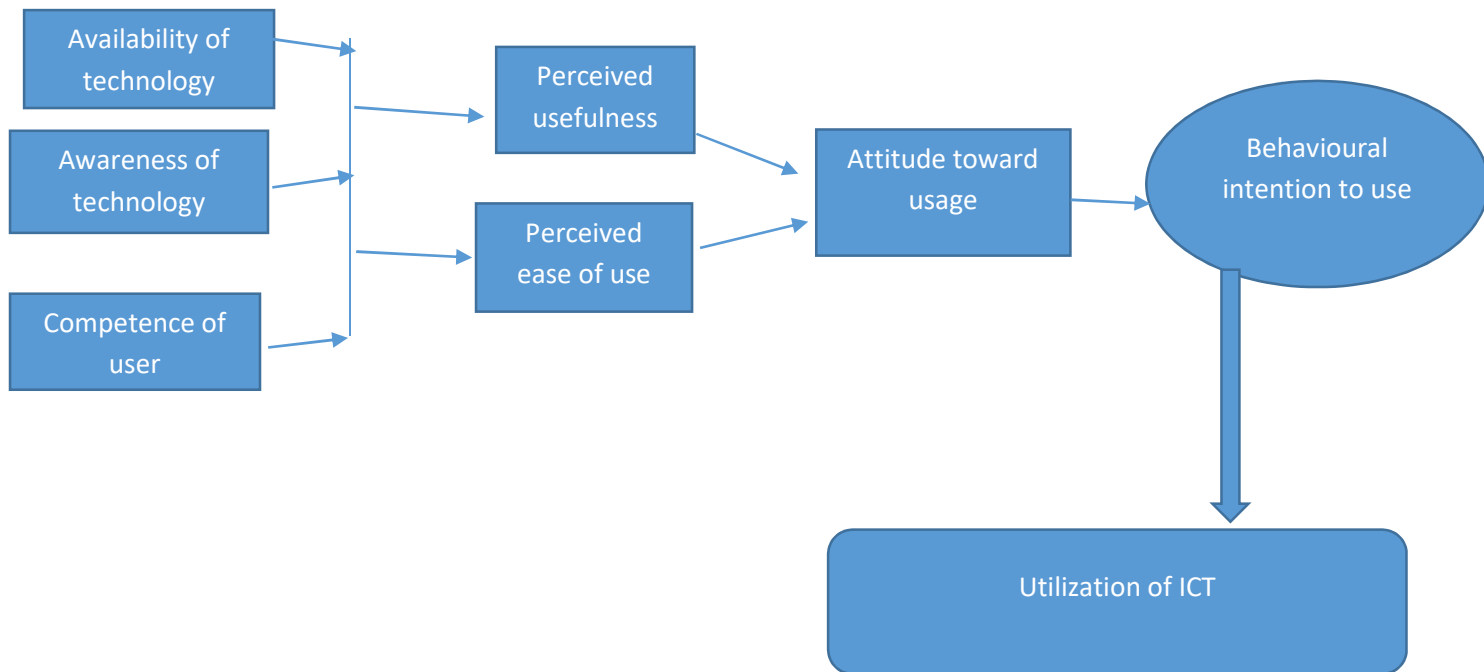
TAM on the other hand propositions that technology perceived ease of use and perceived usefulness are predictors of user attitude towards using that technology. Consequently, behavioural intentions and actual usage. Perceived ease of use equally determines the perceived usefulness of technology (Masrom, 2007). TAM has been applied in several studies trying to assess user acceptance of information technology, for instance, spreadsheet applications (Mathieson, 1991), e-mail (Szajna, 1996), telemedicine (Hu et al., 1999), websites (Koufaris, 2002), blackboard (Landry, Griffeth & Hartman, 2006) and e-learning (Masrom, 2007).

The application of this theory (TAM) in library information and communication technologies in the Ghanaian context has been limited. The theory (TAM) will be considered in this study

to assess e-learning systems that make use of web and internet know-how in achieving the goal of delivering information to students, interacting and communicating with students via computer. In the application of TAM in this study, perceived usefulness refers to the extent to which the user believes that using the technology will enhance his or her performance. Perceived ease, on the other hand, refers to how effortless or unproblematic the user perceives will be when using the technology. Perceived ease and perceived usefulness are both considered different factors that influence users' attitude towards using technology (Masrom, 2007). However, Perceived Ease of use is also postulated to influence perceived usefulness and attitude toward using the technology. Finally, the TAM postulates that attitude towards using the technology influences the behavioural intention to use that technology.

This study postulates that apart from the perceived ease of use and perceived usefulness of technology, there are other critical determinants that influence the attitude and intention towards the use of technology. These variables include the availability of the technology, awareness of the technology and competence of the user/individual. These three variables in addition to perceived ease of use and perceived usefulness determine the technology adoption and use (also attitude and behavioural intention).

Figure 2.1: Technology Adoption/utilization Model (TAM)



Adapted and modified from (Masrom, 2007).

All over the world, University students and staff are becoming more diverse and demand for e-learning based developments are increasing (Masrom, 2007) and Ghana for that matter UDS is not an exception. The factors influencing the acceptance, utilization, and use of e-learning need to be uncovered in the context of Ghana in order to aid in the development and improvement of the e-learning system. This requires issues of technological, pedagogical, and individual factors be taken into account. However, the absence of theoretical understanding in the context of Ghana on what factors determines the effective delivery, utilization, and acceptance of e-learning has inhibited and continue to inhibit its development and improvement (Masrom, 2007).

It is undoubtedly clear that the arrival of e-learning know-how has lately made training, instruction and learning achievable on the Internet. E-learning comprises all forms of instruction that are simplified by the internet and its know-hows, and encompasses the use

of the World Wide Web to sustain education and to deliver course content. Alavi and Leidner (2001) pointed out that e-learning represents one form of technology-assisted learning, which is defined as “an environment in which the learner’s interactions with the e-learning materials..., peers, and/or instructors are made possible through innovative information technologies” (Masrom, 2007).

At the individual level of information acceptance studies, the user’s attitude toward the application of technology are addressed in TAM (Davis, 1989). TAM is developed specifically for explaining as well as predicting user acceptance of computer technology (Hu et al., 1999).

Therefore, this study applies the TAM to study the acceptance of e-learning technology. The underlining aim of this study is to assess the availability of ICT technology, user awareness and competences (both students and librarians) of information services technologies as well as evaluate the determinants of effective utilization and acceptance of information communication technologies (e-learning) in the libraries of UDS.

2.13 Knowledge gaps

There have been several publications on the use of ICT. Some literature within the period 2000-2010 has primarily focused on ICT infrastructure and also how ICT has been integrated into education. For the period 2010-2013, the literature on ICT primarily focused on usage patterns, gender, characteristics, ease of use of ICT, perception, and intention of ICT usage and also the usage difficulties of ICT facilities (Asiamah, 2011). Considering the dynamics in information technologies, it is necessary to throw light on how in this digital era, ICT facilities have been utilized in academic libraries for research output.

Evidently, virtual libraries have now become a significant component of the services offered by universities in western countries. According to Bako (2008), there are open access resources available to researchers through their library internet infrastructure.

Further, It is worth noting that ICT is the major push behind all changes. It has affected all sectors such as education, culture, teaching, learning, research, scholarly communication, libraries and information centre, medical health, agriculture, governance, security, etc. Everything now depends on ICT and going electronic is the way forward in each sector. Evidently, today we have telemedicine, e-business, e-governance, etc. All this progress in ICT has major impacts on libraries and information profession. Academic libraries have adopted contemporary technologies to achieve a visible impact of technological applications.

2.14 Conclusion

It is conclusive that libraries worldwide are changing significantly due to the introduction of ICT-based facilities. The technological change brought about by ICT and its associated facilities has facilitated numerous changes in the academic library environment. Therefore, the provision of a platform as a means for overcoming historically intractable challenges of isolation as well as lack of access to information and knowledge is imperative in minimising the limitations to libraries development. Consequently, the ICT products and services have reshaped the educational background by transforming the content and modes information is released. This has also led to enhancing knowledge creation and innovation apart from bringing about global networked ICT. In conclusion, the use of ICT based products and services by libraries can be largely valuable in terms of its 4Es which are economy, ease, extension or expansion, and efficiency. The introduction of ICT in library services has changed the face of conducting research. Hi-tech users of ICT are the biggest beneficiaries of this innovation.

CHAPTER THREE

STUDY AREA AND RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the profile of the study area and the research methodology. The chapter explains the research design, population, sample and the sampling procedure employed in this study. The methodology chapter describes actions the study took to investigate the research problem and the rationale for the application of specific procedures or techniques used to identify, select, process, and analyze information applied to understand the problem. The methodology section attempts to answer how the data was collected or generated and analyzed (Creswell, 2013; 2014).

3.2 Profile of the University for Development Studies

The University for Development (UDS) came into existence in May 1992 through the PNDC Law 279 to combine the academic environment with the community in order to make a constructive and significant interaction between the two in order to ensure the total Development of Northern Ghana and Ghana at large. The University commenced work in September 1993 with its first batch of students been admitted into the faculty of Agriculture (FOA), Nyankpala. The University has four satellite campuses across the 3 northern regions of Ghana. The University has library facilities on all the four campuses with ICT systems to aid in research.

3.3 Methodology

The research methodology includes data collection sources, research design, methods of data collection, population, sample size and sampling technique as well as data collection instruments and data management and analysis (Creswell, 2014).

3.3.1 Research Design

The descriptive research design was used for the study which Creswell (2014) designates as a kind of research that portrays the state of activities as it occurs, where the researcher cannot modify the variables but can only account for what has occurred or what is occurring and makes significant attempts to discover causes when he regulate the variables. According to kothari (2011), descriptive research is an orderly gathering and analysis of information in order to answer inquiries concerning the present status of a study. It is used to attain data valuable in evaluating contemporary practice and providing a basis for the conclusion (Mugenda & Mugenda, 2013). The descriptive research offers the opportunity to ask questions concerning what the characteristics of the study population are or what the situation under study are (Shield & Rangarian, 2013).

A case study as a form of descriptive research design was used for the study. Case study according to Stake (1995) is a strategy of inquiry by which the researcher explores deeply of a program, events, activity, process or one or more individuals. For the purpose of this study, the case study was used as a strategy of enquiring and exploring the benefits of applying information and communication technology in academic libraries in higher learning institutions particularly the case of UDS.

3.3.2 Research Approach

The deductive research approach was used for the study which is purposely inclined towards quantitative data. Although the study made use of both the qualitative and quantitative research strategy, the deductive approach was used not to generate new theories but to carry out the study to see if similar results may be concluded as seen in other research works done around the research topic in other jurisdictions (Creswell, 2014).

3.3.3 Research Strategy

Both qualitative and quantitative research strategies were used. The quantitative strategy used questionnaire; a strategy under the descriptive research strategy to ask questions pertaining to the characteristics of the population being studied. Also, the quantitative approach used helped the study to reduce data collection from numbers for statistical computation in the form of frequencies, correlation and charts to assist analysis of the data collected (Anderson and Taylor, 2009; Creswell, 2014).

For the qualitative strategy, the interviewing technique for gathering useful in-depth information necessary for the study was used. The qualitative strategy was applied to solicit empirical support with regards to the research questions as well as in-depth interviews that lead to non-numerical data (Denzin & Lincoln, 2011)

This approach also enabled the researcher use a mixture of data collection procedures to collect detailed information on the various benefits in the use of ICTs in academic libraries of higher learning institutions and its effect on library services, users and research.

3.4 Sources of data collection

To gather reliable and valid data, the study employed two methodological approaches in which the qualitative approach was used to complement the quantitative approach. In addition to the primary data, the study collected secondary data including a review of available literature and statistics on the topic areas, including reports and working documents prepared by academic institutions as well as other official publications. The secondary data analysis also involved archival research from books, journals, magazines, articles, internet materials and other related information (Creswell, 2014).

3.4.1 Instruments for data Collection

The instruments used in collecting data were a questionnaire, structured interview schedule and observation checklist. The checklist was used to get eye witness of happenings with regards to the library users, particularly in the library rooms. This helped the researcher to justify if indeed the emergence of ICT and its use had transformed the services and products provided by academic libraries and research (Creswell, 2014).

3.4.2 Data Collection Methods

The selected method for primary data collection was done in the form of interviews, questionnaires, and observations. Both closed-ended and open-ended interviews were conducted as well as in-depth interviews and observations (Creswell, 2013;2014).

3.4.3 Questionnaire

The questionnaires used essentially helped provides first-hand and new information regarding the topic under study. It also will encourage respondents to talk and go more deeply into the issue of concern. The questionnaires will be structured in both closed and open-ended questions to get the views of respondents. The questionnaires will be administered to 150 respondents.

3.4.4 Interview

The use of the interview was to support fill in the gaps where the research questionnaire is not able to cover. Also, it helped brought to bear the opinions and perceptions of respondents pertaining to the research problem. The interview tool was regarded to be very useful in getting information as well as very relevant when dealing with case study issues as stated in the research design (Yin, 1994). For the purpose of this study, interviews were used to collect information from the library at the University for Development Studies.

3.4.5 Observation

The study employed the method of observation as part of the data collection method. The observation process included looking and listening attentively in order to unravel particular information about the respondent's behaviour (Merriam, 1998). Observation is significant to qualitative data collection as it makes available first-hand and new information regarding the topic under study. It also provided accurate and reliable data since the method of collection is less influenced by externalities but dependent on the observer (Merriam, 1998). The tool was also used to get eye witness of happenings with regards to the research problem. This helped the researcher to justify if indeed the emergence of ICT and its use has transformed the services and products provided by academic institutions libraries.

3.5 Population

The target population comprised of all individuals, objects or things that the researcher reasonably generalizes his/her findings to (Cooper, Schindler, & Sun, 2006; Mugenda, 2008). The population of the study refers to the objects that are of interest to the study and which the researcher wants to investigate (Turner, 2011). The population included post-graduate library users from UDS satellite campus libraries: Nyankpala campus library, Tamale campus library, Navrongo campus library, Wa campus library, and graduate school library and professional librarians and paraprofessional librarians. A sampling frame of 300 will be used. The sampling frame is a list or quasi list of elements from which a probability sample is selected (Babbie, 2005). Table one gives a tabular form of the sample frame.

Table 1: Population of UDS Library Staff and Users

CAMPUSES	Library Staff		Library Users (PGS)	Total Sample Frame
	Professionals	Paraprofessionals		
Nyankpala	11	19	45	75
Medical School	1	6	55	62
Graduate School	1	2	22	25
Navrongo	2	7	51	60
Wa	2	11	65	78
Total Sample Frame	17	45	62	300

3.6 Sample size determination

In determining the required sample size of library users for the study, the Slovin's sampling method will be applied. The formula is illustrated as; $n = N [1+N (e)^2]$ (n= sample size, N=sample frame; and e= margin of error or confidence level).

As shown above, a sample frame of 300 library users, librarians and library officers were used.

A margin of error of 5% was then used. The sample size for the library users was then calculated by:

$$n = \frac{N}{1 + N(e)^2} = \frac{300}{1 + 300(0.05)^2} = \frac{300}{2} = 150$$

The use of this sample size is due to limited resources and time constraint. Table one gives a tabular form of the sample size.

Table 1: Sample size for the study

Library users	Total sample size
Wa campus	45
Tamale campus	25
Navrongo campus	27
Nyankpala campus	38
Professional librarians and paraprofessional librarians	15
Total sample size	150

3.7 Sampling Technique

The sample of this study will consist of 10% of library users which will be drawn from the UDSLibraries, 15 librarians and library officers. This sample size will be drawn using a multi-stage sampling technique and occurring in two stages thus:

Stage one – a selection of respondents from the UDS academic libraries, in which proportionate stratified random technique will be used to select library users, librarians and library officers.

For the library users, 10% will be used in the proportionate stratified random technique. According to Nworgu (2006), this is usually adequately representative.

Stage two – first, the selection of librarians and library officers will be used because they are manageable and accessible. The strata, therefore, will be academic libraries, library users, librarians and library officers. The samples comprised academic institutions library, library users, librarians and library officers.

3.8 Method of Data Analysis

Analyses of data were done with regards to the specific objectives stated at the beginning of the study. Special steps will be taken to categorize the findings into specific themes and summarized by way of descriptive analyses. Observations and discussions resulting from the interview will be assessed by way of categorizing them in themes and inputting the information into the computer for both qualitative analyses. Statistical Package for Social Sciences (SPSS), STATA and Excel will be used for analyzing the collected data. SPSS is a data management and statistical analysis tool which has a very versatile data processing capability. SPSS software version 22 is most preferred because of its ability to model latent variables under both normal and non-normal conditions. Excel will also be used to generate and manipulate graphs and charts.

3.9 Ethical Consideration

Critical attention will be paid to ethical issues regarding scientific research in order not to compromise the research quality, protect the rights and welfare of respondents and the institutions that the information was taken from. Also, issues of misrepresentation, causing any harm or infringement to the rights of respondents will be avoided while ensuring privacy

and confidentiality of respondents. This will be done by giving a consent form to the respondent to read, understand and give their consent to participate.

CHAPTER FOUR

DATA ANALYSIS AND FINDINGS

4.1 Introduction

This chapter presents the analysis and discussions on the utilization of information and the communication technology facilities for research output in Ghanaian academics' libraries. The findings presented are direct with reference to the University for Development Studies, Ghana and structured as follows; the first aspect presents the background information of the respondents, the second part of the analysis presents library's users perception of the availability of Information Communication Technology facilities, the level of awareness of users about Information Communication Facilities in the library, competency of the library users towards the provision of information services for research output, and the barriers hindering effective utilization of Information Communication Technology for research output in the University for Development Studies' libraries.

4.1 Background Characteristics of the Respondents

This segment presents some background features of the respondents cutting-across their ages, sex, educational level, marital status and professions (See Figure 4.1). Results from the survey show that about 59% of the respondents are within the age of 20 – 29 years. It further implies that the ages of most library users at the tertiary level of education in Ghana is between 20 and 29. This is followed by 29% of the respondents who age ranges between 30 – 39 years. Also, majority of the respondents were males, representing 79.7% of all the respondents interviewed, with just a few of them being females (21.3%). In terms of their educational background, at least all respondents interviewed were library users with obvious

formal educational background, profoundly up to the tertiary educational level. However, the study realized

Table 4.1: Background characteristics of the respondents

Background information	Frequency	Percentage
Ages		
20 – 29	89	59
30 – 39	44	29
40 – 49	12	8
50 – 59	5	4
Total	150	100
Sex of Respondent		
Male	118	78.7
Female	32	21.3
Total	150	100.0
Level of Education		
Training colleges	1	0.7
Tertiary	149	99.3
Total	150	100
Marital status		
Single	99	66.0
Married	50	33.3
Divorced/Separated	1	0.7
Total	150	100
Profession		
Accountant	4	3
Administrative work	4	3
Civil Service	10	7
Student	95	63
Research Assistant	7	4
Teaching	26	17
Journalism	4	3
Total	150	100

Source: Field Work, 2019.

differences in the level of education attainment of the respondents. The study realized that about 99.3% of all respondents (library users) at the UDS(UDS) libraries have attained or already in the tertiary level education specifically University level education, with just about 0.7% of the respondents indicated that they have schooled up to training college. This implies that almost all the respondents interviewed hold capacities suitable for the utilization of library facilities towards undertaking research work.

On the aspect of marital status, the study realized that majority of the respondents or library users are single, representing about 66% of unmarried persons. While about 33.3% of them are married, with only 0.7 % disclosed to have been divorced or separated. This implies that most library users, especially at the University libraries, are not married either due to the difficulty in blending academic requirements with homes or marital responsibilities. It further implies the pursue of higher education has a tendency to influencing marital timing.

Moreover, on the aspect of education, the study realized that most library users in the University libraries are students (63%) who utilize libraries resources in order to fulfill their academic requirements. However, just a few (17%) of the respondents disclosed that they work in the formal employment sector.

4.2 Availability and Utilization of ICT in libraries

In this part of the analysis, two major issues are presented. Firstly, the user's perception about the level of availability of Information Communication and Technology facilities in the UDSlibraries. And secondly, the nature of the utilization of library facilities in the UDS libraries. It also looks at the knowledge level of library users and their ability to use the existing facilities in libraries for research to enhance studies. The study obtains information on the availability and utilization of ICTs through survey and key informants' interviews of librarians.

4.2.1 The availability of libraries technologies in UDS library

From the study, all library users (100%) disclosed that they employ Information Communication Technologies (ICT) in their day to day search for information in the libraries. However, according to the library users, four major Information Communication Technologies (ICT) are available across the five campuses' libraries of the University for Development Studies, Ghana. They included Wi-Fi, internet technology, digital library resources, and online public access catalog. According to the library users, the commonest technologies available in all the libraries is the Wi-Fi, disclosed by about (45%) of the respondents interviewed (See Table 4.2). And followed by the Digital library resources (22.2%), internet technology (15.2%) and Online public access catalog (13.6%).

Table 4.2 Information Communication Technologies (ICT) available in the libraries

Library Technologies	Responses	
	Frequency	Percent
Internet technology	37	15.2%
Wi-Fi	109	44.9%
Digital library resources	54	22.2%
Laptops and iPad	0	0%
Online public access catalogue	33	13.6%
E-mail facilities	8	3.3%
CD-ROM technology	2	0.8%
Total	243	100%

Source: Field Work, 2019.

NB. Frequency exceeded 150 because of

multiple responses

However, less available facilities/services in the UDSlibraries are the E-mail facilities (3.3%) and the CD-ROM technology facilities (0.8%). None of the campus's library has Laptops and iPads for library users to independently search for information in the absence of their personal laptops.

Besides, the increasing usage of ICT services in all the study libraries was observed to have been informed by ICT training services users received in the past. From the study, 85% of the respondents interviewed disclosed that they have received prior training in ICT services and facilities usage, with most of the users observed to have attained such knowledge outside the University libraries. Comparatively, the training received varies from campus to campus within the University for Development Studies. For instance, majority of the library users (90%) in Wa campus of the UDSrevealed that they received ICT training, followed by 88% of library users in the Navrongo campus, 87% of that of users in the Medical school, 84% of the users in that of Nyankpala campus and the least of all (57%) of that of library users in the Graduate school, Tamale.

Apart from the above, 93% of library users disclosed that their libraries use software for services circulation, draw on web-based support (89%), and with all software online (84.0%). However, on campus-specific cases, all the library users (100%) in the Medical school and the Graduate school asserted that their libraries use software for services circulation compared to the other three campuses (Wa, Nyankpala and Navrongo campuses). Also, with the exception of the Nyankpala campus, all library users interviewed in the other campuses disclosed that web-based services were available in the libraries for utilization.

4.2.2 Information Communication Technological facilities available in the libraries

Across all the campuses, respondents (library users) were asked to indicate the availability of Information Communication Technological (ICT) facilities in their libraries. From the study several Information Communication Technological (ICT) facilities specifically ICT hardware were found. They included computers, laptops, Networked servers, scanners, printers, local area network, LDC, World Wide Area Network and projectors amongst others (See Table 4.3).

Table 4.3 Library facilities/ICT Hardware

<i>Library facilities (ICT Hardware)</i>	<i>Yes</i>	<i>No</i>	<i>Not sure</i>
	N (%)	N (%)	N (%)
Computers	136 (90.7)	14 (9.3)	0 (0.0)
Laptops	35 (23.3)	107 (71.3)	8 (5.3)
Networked servers	125 (86.0)	10 (6.7)	11 (7.3)
Printers	126 (84.0)	16 (10.7)	8 (5.3)
Scanners	90 (60.0)	53 (35.3)	7 (4.7)
Local Area Network (LAN)	110 (73.3)	24 (16.0)	16 (10.7)
World Wide Area Network	99 (66)	21 (14.0)	30 (20.0)
LDC Projector	72 (48.0)	57 (38.0)	21 (14.0)
Video cameras	30 (20)	84 (56.0)	36 (24.0)
TV stations	17 (11.3)	108 (72.0)	25 (16.7)
Microfilm readers	6 (4.0)	104 (69.3)	40 (26.7)
Bar code readers	18 (12.0)	86 (57.3)	46 (30.7)
CD-ROM Readers/Writers	83 (48.7)	43 (28.7)	34 (22.7)
Book Check systems	82 (48.0)	42 (28.0)	36 (24.0)
Security check systems	61 (40.7)	62 (41.3)	27 (18.0)
Photocopying machines	130 (86.0)	17 (11.3)	3 (2.0)
Photo cameras	6 (4.0)	103 (68.7)	41 (27.3)
Generators to supply electricity during load shading	68 (45.3)	74 (49.3)	8 (5.3)

Source: Field Survey, (2018).

In general, computers, networked servers, printers, scanners, local area network (LAN), World Wide Area Network, LDC projectors, CD-ROM readers/writers, book check systems, photocopying machine, and generators were the most available hardware/facilities in the various libraries. 90.7% of the respondents disclosed the availability of computers in the libraries in which they search for materials, 86% disclosed of the availability of network servers, 84% disclosed of the ability of printers, and 60% disclosed that of scanners. In addition, 73.3% disclosed that of local Area network (LAN), 66% mentioned that of World

Wide Area Network, 48% disclosed that of the LDC projector, 49% that of CD-ROM Readers/Writers, 48% disclosed of the availability of book check system, while 86% of the respondents revealed that their libraries have photocopying machines to support photocopying of information from books, reports, and articles that are limited in the libraries for borrowing and mostly place as reserve. However, hardware such as video cameras, micro-film readers, bar code readers, security check systems, generators for alternative power supply and photo cameras were observed not available in all the five (5) campuses libraries.

4.2.3 Services available in the UDSLibraries

Across the entire University, several library services are provided to library users in the various libraries, ranging from internet web browsing services, the Email services, full text journal articles services, online public access catalogue, Bibliographic databases, the CD-ROM services, electronic book services, library website service, document scanning services, electronic reference and information services amongst others.

However, the most commonest services available in all the libraries for users include the internet web browsing services disclosed by about 86% of the library users interviewed, 77% of E-mail services, 98% of the online public access catalogue, full text journal articles services confirmed by 77% of the respondents, the online public access catalogue confirmed by 98% of the library users, the electronic book services, 84%, the library web services, 95%, the electronic reference and information services, 84%, the book reservation and call services, printing services, 80% and the digitisation services, 72% (See Table 4.4).

Table 4.4 Services available in the UDSlibraries

Library services	Yes	No	Not sure
	N (%)	N (%)	N (%)
Internet web browsing services	129 (86.0)	15 (10.0)	6 (4.0)
E-mail services	120 (68.0)	42 (28.0)	6 (4.0)
Full-text journals articles services	115 (76.7)	7 (4.7)	28 (18.7)
Online Public Access Catalogue (OPAC)	147 (98.0)	0 (0.0)	3 (2.0)
Bibliographic databases	90 (60.0)	22 (14.7)	31 (20.7)
CD-ROM services	89 (59.3)	33 (22.0)	28 (18.7)
Electronic Books services	125 (83.7)	14 (9.3)	11 (7.3)
Library Website service	143 (95.3)	7 (4.7)	147 (98.0)
Document scanning services	91 (60.7)	42 (28.0)	17 (11.3)
Electronic reference and information services	126 (84.0)	18 (12.0)	6 (4.0)
End users training program	94 (62.7)	20 (13.3)	36 (24.0)
Barcoded circulation services	76 (50.7)	51 (34.0)	23 (15.3)
Current awareness services	93 (62.0)	14 (9.3)	43 (28.7)
Book reservation and recall	107 (71.3)	23 (15.3)	20 (13.3)
Printing services	120 (80.0)	24 (16.0)	6 (4.0)
Photographic services	87 (58.0)	33 (22.0)	29 (19.3)
Digitization services	108 (72.0)	28 (18.7)	14 (9.3)

Source: Field Survey, 2019

Other services such as photographic services (58%), the bar-coded circulation services (50.7%), the end-users training program, document scanning services, CD-ROM services, bibliographic databases (60%) and email services (68%) are less prevalence across all the libraries in the various campuses of the University for Development Studies.

4.2.4 The utilization of library facilities in the University for Development Studies

Despite the perceived availability of library facilities and services, the usage of library services and facilities among library users in the UDSs generally modest. Across all the

campuses' libraries, evidence from the survey indicates varying degree of library usage. For instance, many of the users confirmed to have occasionally visited the library for the purpose of research, represented by about (53.3%) of the respondents, with just a few (25.3%) of the respondents confirmed to have been using library facilities and services frequently basically for studies and research.

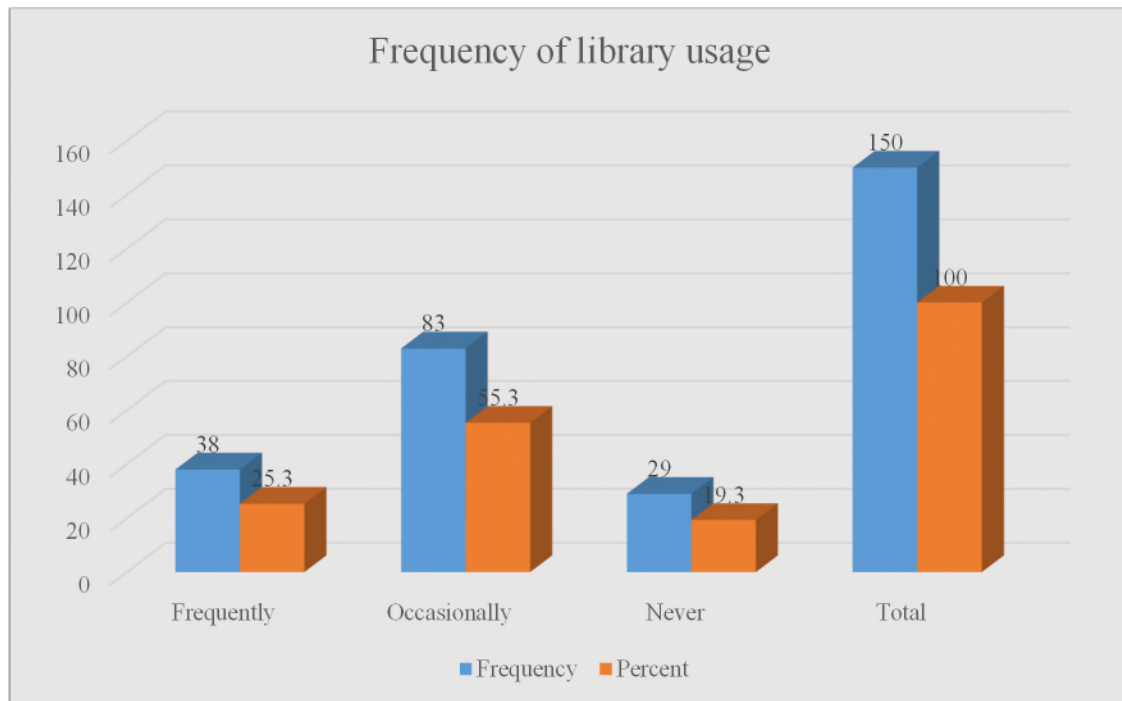


Figure 4.1 The nature of library facilities usage

Source: Filed survey, 2019.

However, few of the respondents disclosed to have never used the library facilities. Notwithstanding the above, most of the library users (42.7%) disclosed that their knowledge has improved greatly through the usage of ICT facilities in the libraries, followed by respondents who perceived slight improvement (40.7%) of their knowledge (See Figure 4.2).

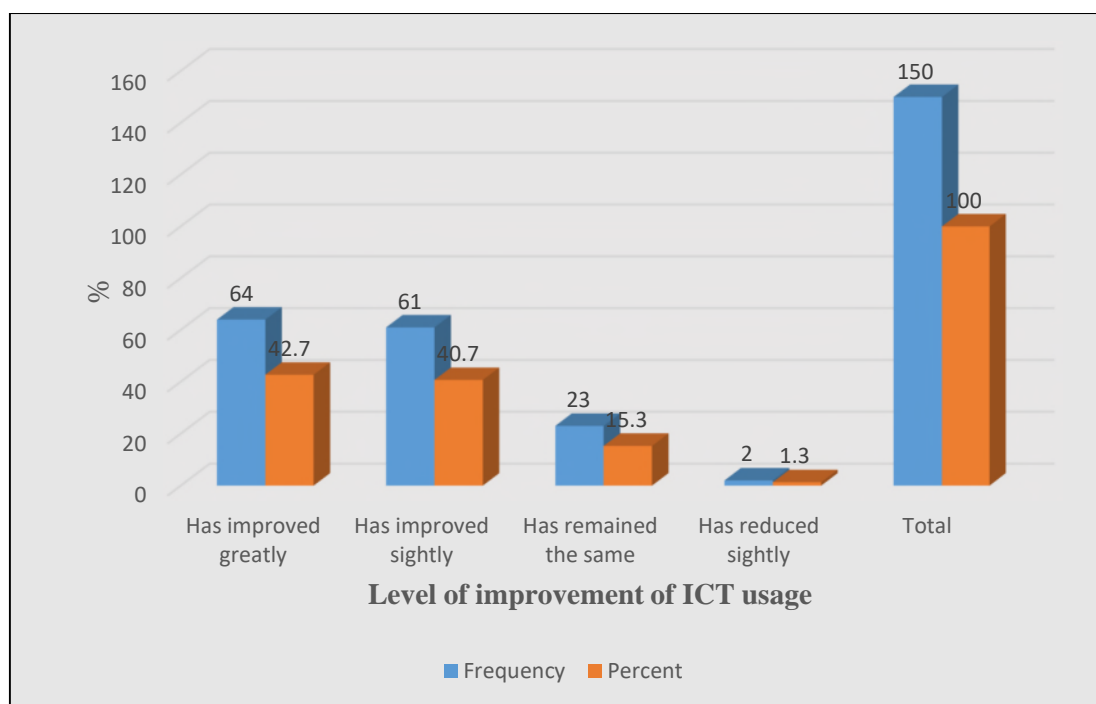


Figure 4.2 Level of improvement in ICT usage

Source: Field survey, 2019.

Also, 23 respondents representing (15.3%) of the library users studied confirmed that their knowledge level has remained the same, in order words unchanged, with just a few, (1.3%) perceived a slight reduction in ICT usage over the years.

4.2.5 Comparative analysis of library's facilities usage among libraries in the various campuses

Given that the UDS operates a multiple campus system, this aspect comparatively analyzed the frequency of usage of the various hardware and software facilities in the libraries. The comparison takes into consideration how often library users used software and hardware such as acquisition, cataloging, circulation, serial control, and administration.

In terms of *acquisition* usage among the library, users vary across the five (5) campuses, library users in the Wa campus were found to have used it more often (41.4%) and always (13.8%) compared to the other campuses. Library users in all the other four campuses disclosed to have never used *acquisition* in their libraries, specifically, (54.2%) of the

respondents in the medical schools have never used acquisition, (42.2%) of that library users in Nyankpala, (50%) of the users in Navrongo and (57.1%) in the Graduate school disclosed no knowledge of the usage of the acquisition facility in their library.

In terms of the frequency of *cataloging* usage, the majority of the library users across the University expressed high usage compared to the acquisition facility. However, most of the library users in the Wa campus have utilized it very often (58.6%) and often (20.7%). In the Medical school (33.3%) library users confirmed to have used it often, very often (16.7%) and always (16.7%). In Nyankpala campus, most libraries has equally used cataloging facility often (25%), very often (15.6%) and always (23.4%). In the Navrongo campus, library users also revealed that they use it very often (38.5%), and always (23.4%). Similarly, in the Graduate school, the cataloging hardware is used often (54%) and always (43%) (See Table 4.5).

Table 4.5 Frequency of the usage of library software/hardware in the library

Soft/hardware	Campuses	Frequency of usage					
		<i>Never</i>	<i>Rarely</i>	<i>Often</i>	<i>Very often</i>	<i>Always</i>	<i>Total</i>
		<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>
<i>Acquisition</i>	Medical school	13 (54.2)	4 (16.7)	7 (29.2)	0 (0.0)	0 (0.0)	24 (100)
	Wa Campus	12(41.4)	1 (3.4)	12 (41.4)	0 (0.0)	4 (13.8)	29 (100)
	Nyankpala	27 (42.2)	9 (14.1)	17 (26.6)	10 (15.6)	0 (1.6)	64 (100)
	Navrongo	13 (50.0)	7 (26.9)	3 (11.5)	3 (11.5)	0 (0.0)	26 (100)
	Graduate school	4 (57.1)	0 (0.0)	3 (42.9)	0 (0.0)	0 (0.0)	7 (100)
<i>Cataloguing</i>	Medical school	4 (16.7)	4 (16.7)	8 (33.3)	4 (16.7)	4 (16.7)	24 (100)
	Wa Campus	0 (0.0)	3 (10.3)	6 (20.7)	17 (58.6)	3 (10.3)	29 (100)
	Nyankpala	6 (9.4)	17 (26.6)	16 (25.0)	10 (15.6)	15 (23.4)	64 (100)
	Navrongo	0 (0.0)	3 (11.5)	4 (15.4)	10 (38.5)	9 (23.4)	26 (100)
	Graduate school	0 (0.0)	0 (0.0)	4 (54.1)	0 (0.0)	3 (42.9)	7 (100)
<i>Circulation</i>							
	Medical school	3 (12.5)	3 (12.5)	4 (16.7)	7 (29.2)	7 (29.2)	24 (100)
	Wa Campus	3 (10.3)	6 (20.7)	6 (20.7)	10 (34.5)	4 (13.8)	29 (100)
	Nyankpala	10 (15.6)	9 (14.1)	12 (18.8)	8 (12.5)	25 (39.1)	64 (100)
	Navrongo	6 (23.1)	4 (15.4)	7 (26.9)	3 (26.9)	6 (23.1)	26 (100)
	Graduate school	0 (0.0)	4 (57.1)	0 (0.0)	3 (42.9)	0 (0.0)	7 (100)

<i>Serials control</i>							
	Medical school	11 (45.8)	6 (25.0)	4 (16.7)	0 (0.0)	3 (12.5)	24 (100)
	Wa Campus	11 (37.9)	0 (0.0)	13 (44.8)	4 (13.8)	1 (3.4)	29 (100)
	Nyankpala	20 (31.2)	11 (17.2)	23 (35.9)	1 (1.6)	9 (14.1)	64 (100)
	Navrongo	23 (88.5)	0 (0.0)	0 (0.0)	0 (0.0)	3 (11.5)	26 (100)
	Graduate school	4 (57.1)	3 (42.9)	0 (0.0)	0 (0.0)	0 (0.0)	7 (100)
	Medical school	5 (20.8)	7 (29.2)	0 (0.0)	5 (20.8)	7 (29.2)	24 (100)
	Wa Campus	10 (34.5)	3 (10.3)	13 (44.8)	3 (10.3)	0 (0.0)	29 (100)
<i>Administration</i>	Nyankpala	19 (29.7)	12 (18.8)	18 (28.1)	5 (7.8)	10 (15.6)	64 (100)
	Navrongo	3 (11.5)	17 (65.4)	3 (11.5)	0 (0.0)	3 (11.5)	26 (100)
	Graduate school	0 (0.0)	3 (42.9)	4(57.1)	0 (0.0)	0 (0.0)	7 (100)

Source: Field Survey, 2019.

As shown in Table 4.5, the study also found the usage of circulation as prevalent across all the campuses libraries of the University for Development Studies. For instance, in the case of the medical school, about (29.2%) of the library confirmed to have used it very often, always (29.2%), and often (16.7%), with just a few users (25%) in the medical school confirmed to have never or barely used the facility. However, in the Wa campus, the usage of circulation was also observed higher than library users who confirmed no knowledge of it. For instance, (35%) of the library users in the case of Wa, used it very often, followed (21%), users who used it often and (14%) those who used it always. The usage of circulation was also observed

as common in Nyankpala, the Navrongo campus library, and the Graduate school library in Tamale. Overall, administration and serials control usage frequency was found pronounced across all the campuses libraries of the University.

4.3 The Competency of Library Users using Information Communication and Technology

This aspect examines the competency of library users on the use of Information Communication Technologies in the University libraries. Findings from the study indicate that about (56.7%) of the library users studied have never used the digital library. Only 43.3% of the respondents disclosed that they have ever used a digital library for research work. Aside from the usage of the digital library system, varied competencies were observed among the library users studied. For instance, most of the respondents (40%) disclosed that they have used digital library resources through their own laptops and iPads to access online public access catalog but not through the University libraries (See Table 4.6).

Table 4.6 Perceived competencies of the library users

<i>Perceive competencies</i>	<i>Frequency</i>	<i>percent</i>
The use of Wi-Fi and own laptop	19	13
The use of digital library resources by own laptop and iPad to access online public access catalogue	60	40
The use of Information and Technology to access e-books from online	15	10
the books and WIFI connection	14	9
The use of own internet source to access e-books online	23	15
The use of internet service with school computers to access e-materials	19	13
Total	150	100

Source: Field Work, 2019.

For some users, their competencies in the usage of ICT facilities is limited to the usage of their own internet sources to access e-books from online. About 15% of the respondents

disclosed such competencies, followed by (13%) of the respondents who use Wi-Fi through their own laptops to access information.

In general, results from the survey conducted revealed that at least about 60.7% of all library users have average knowledge in the usage of Information Communication and Technology for research purposes in libraries. Also, 43% described their level of competency in the usage of ICT facilities for studies and research works as high, with just a few users (5.4%) who described their competencies level as moderately low.

Findings from the study suggest varying views on the usage of ICT facilities and services in the University library. The study found that some library users use desktop computers most frequently with the reason that they are accessible especially to students even when they are outside the library's premises. Others also use digital library research because it is the main source of obtaining relevant related research information about the world. With the digital library resource; students can sit at the comfort of their homes and search for materials. It is perceived as easy to access. The digital library resources are perceived as relevant especially for gathering research materials towards thesis work.

Also, most users use the library WIFI for research work, because of its conveniences and services accessibility even when outside the library. It is the internet facility mostly available on campus enabling users' access to information to support research with the physical library. For most undergraduate students, the Wi-Fi is often used to do different research works, especially project works, and course assignments, etc. However, most of the times, some do use internet technology for similar researches. Students connect the internet facility to their phones and do personal educative research whiles outside the library.

That apart, the study also found most of the librarians in the various libraries have gained competency in library usage and the support for library users (students) through training in

the following; automation, information dissemination, web information retrieval, and the search for digital information online, they are also trained on how to manage institutional repository, searching for literacy skills and internet navigation and its management. Some also include educational and technical skills training and books classification and management.

4.4 Factors hindering effective and efficient utilization of ICT facilities in the Libraries

Across all the study campuses, several factors were found as a hindrance to effective utilization of Information Communication Technology (ICT) facilities in the UDSlibraries. The challenges cut-across the cost of computer hardware and software, cost of e-journal and eBooks, poor communication networks, access to computer hard and software, low internet connectivity, power outages, the challenge in establishing long-term contracts with book publishers, unfriendliness and difficulty involved in using library facilities.

However, not all the above-mentioned factors are a major hindrance to effective and efficient utilization of ICT facilities. The major challenges observed included the cost of computer software, about (38.7%) of the library users strongly agreed, (46%) agreed with access to computer hardware, access to software (28.7%), the cost of computer hardware (36.7%) as challenges to (40.7%) and (30%) strongly agreed that cost of e-journal and e-book, and poor communication network respectively as the major challenges to effective utilisation of ICT facilities (See Table 4.7).

Table 4.7 Factors hindering effective ICT facilities utilization

<i>Limiting factors</i>	<i>Strongly agree</i>	<i>Agree</i>	<i>Moderate</i>	<i>Disagree</i>	<i>Strongly Agree</i>
	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>	<i>N (%)</i>
Cost of computer hardware	30 (20)	55 (36.7)	32 (21.3)	21 (14.0)	12 (8.0)
Cost of computer software	58 (38.7)	41 (27.3)	28 (18.7)	18 (11.3)	6 (4.0)
Cost of e-journal & e-book	61 (40.7)	46 (30.7)	10 (6.7)	32 (22.0)	0 (0)
Poor communication networks	45 (30.0)	37 (24.7)	29 (19.3)	29 (19.3)	10 (6.7)
Access to computer hardware	20 (13.3)	43 (28.7)	36 (24.0)	29 (19.3)	22 (14.7)
Access to computer software	27 (18.0)	69 (46.0)	20 (13.3)	20 (13.3)	14 (9.4)
Low internet connectivity	74 (49.3)	30 (20.0)	19 (12.7)	24 (16.0)	3 (2.0)
Power outages	69 (46.0)	51 (34.0)	15 (10.0)	12 (8.0)	3 (2.0)
Long-term contracts with book publishers	21 (14.0)	36 (24.0)	25 (17.3)	41 (27.3)	27 (18.0)
Unfriendly and difficult to use	15 (10.0)	21 (14.0)	26(17.3)	51 (34.0)	37 (24.7)
Fear of technology	15 (10.0)	38 (25.3)	20 (13.3)	33 (22.0)	44 (29.3)
Lack of ICT skilled librarians	19 (12.7)	11 (7.3)	47 (31.3)	31 (20.7)	42 (28.0)
Negative attitude by users	12 (8.0)	22 (14.7)	30 (20.0)	24 (16.0)	62 (41.3)
Lack of computer culture	21 (14.0)	27 (18.0)	40 (28.7)	25 (16.7)	36 (24.7)
No perceived economic or other benefits	30 (20.0)	34 (22.7)	35 (23.3)	31 (20.7)	20 (13.3)

Source: Field Survey, 2019.

Aside these, factors such as negative attitude of library users towards ICT usage (41%), fear of technology among users (29%), frequent power outages (46%) and low internet connectivity (46%) were found as major hindrance to effective utilization of ICT facilities (See Table 4.7). Also, factors such as lack of ICT skills among librarians (31%), lack of computer culture (29%) were found as fewer challenges against the utilization of ICT facilities in the University libraries. However, factors such as a long-term contract with book

publishers (27%) and unfriendly and difficulty in the use of library facilities were strongly disagreed as not challenges affecting library usage.

4.4.1 Library users perceived benefits with the use of ICTs in the University library

This aspect of the study presents benefits library users perceived to be associated with the usage of ICT facilities in the UDSlibraries instead of outside the libraries. All the respondents (library users) were asked to either agree, strongly agree, disagree, strongly disagree or moderately assert to the listed benefits including whether the existing facilities promote easy access to information, linkage with other libraries, various sources of information, easy to manage, acquire, store and allocate information or enable the provision of current information. Though all the above were found as benefits across all the study campuses libraries, some were perceived as more crucial than others.

For instance, majority of the respondents (78%) strongly agreed that the existing library facilities and their usage facilitate access to information compared to the usage of such facilities outside the libraries, (68%) of the respondents agreed that the usage of libraries were useful as they are directly linked to various sources of information across the globe (See Table 4.8).

Table 4.8 Perceived benefits of using ICT facilities in libraries

<i>Benefits of ICT usage</i>	<i>Strongly agree</i>	<i>Agree</i>	<i>Moderate</i>	<i>Disagree</i>	<i>Strongly disagree</i>
	N (%)	N (%)	N (%)	N (%)	N (%)
Ease accessibility of information	117 (78.0)	22 (14.7)	3 (2.0)	2 (1.3)	6 (4.0)
Linkage with other libraries	93 (28.0)	42 (28.0)	7 (4.7)	2 (1.3)	6 (4.0)
Linkage with various sources of information	102 (68.0)	25 (16.7)	10 (6.7)	7 (4.7)	6 (4.0)
Ease of communication with library users	87 (58.0)	40 (26.7)	17 (11.3)	0 (0.0)	6 (4.0)
Easy to acquire, manage, store and distribute information	90 (60.0)	37 (24.7)	6 (4.0)	7 (4.7)	10 (6.7)
Enable provision of current information	108 (72.0)	29 (19.3)	2 (1.3)	2 (1.3)	9 (6.0)

Source: Field Survey, 2019

That apart, the study also realized that the utilization of the ICT technologies in the various libraries was useful and promoted easy communication with other library users and the librarians in times of difficulty compared to using similar facilities outside the University library. About (58%) of the respondents interviewed confirmed this. The usage of ICT facilities in the library also contributed to easy acquisition, management, storing and distribution of information obtained during the research in the library. This was disclosed by (60%) of the library users across all the campuses libraries studied. Finally, using library facilities are perceived as useful as they contribute to the provision of current information.

4.4.2 Library users' perspectives in favor and against the usage of ICT facilities in the library

This part presents two major disputing views concerning library usage. The aim is to understand how different library users perceive the utilization of ICT facilities in assembled places especially the libraries and the possible disincentives. Respondents in favor of the assemblage of materials through the library system possess five major arguments basing on the incentives associated with the use of the library. According to this group, who constitute

the majority (37%), the usage of ICT facilities in the library promotes all-time access to librarians who are capable of assisting users to realize and find their research materials. Other supportive views indicate that the usage of ICT facilities in the library promote easier access to materials (15%) compared to the usage of similar facilities outside the library or at homes. For others, most library internet services are faster and good to use (3%), the presence of digital library provide more information (23%), and last of all, digital library services provided by the libraries make the discovery of research materials easier and faster (See Table 4.9).

Table 4.9 Perspectives in favor and against the usage of ICT facilities in libraries

<i>Reasons in favor of the usage of ICT facilities in Libraries</i>	Frequency	Percent	Rank
Access to Librarians all-time	55	37	1 st
Materials are easily accessed	23	15	4 th
The internet is good and fast	5	3	5 th
Digital library has more information	35	23	2 nd
Digital library makes a discovery and researches much easier and faster	32	21	3 rd
Total	150	100	
<i>Reasons against the Usage of ICT Facilities in Libraries</i>			
At times internet connectivity may be weak	60	40	1 st
Inability to use ICT Equipment's	20	13	3 rd
Not conversant with the use of E-library	10	7	5 th
The absence of computers in the library	15	10	4 th
Congestion and distance may lead to prefer to stay at home	45	30	2 nd
Total	150	100	

Source: Field survey, (2019)

In contrast, some respondents against the usage of ICT facilities in libraries also indicated that, confine the usage of such facilities may be dis-incentive to users either through the fault

of technological facilities or the weakness of the user of the facilities available in the library. Most of the respondents who attributed library facilities usage limitation to technology indicated that weak connectivity of the internet in the library may be a dis-incentive (40%) to users who frequently rely on internet facility for their research in the library. For those against the usage of library facilities in the library due to possible human weakness asserted that, users who are not conversant (13%) especially with the use of ICT equipment and the E-library (7%) may find it less suitable given that most libraries units in the University do not provide immediate training to new users of the library. For others, less availability of computers (10%) in libraries makes the usage of ICT facilities not reliable, and lastly, human factors such as congestion in the library due to limited space may compel users to rather stay at home to depend on out-library ICT facilities than being in the libraries.

CHAPTER FIVE

RESULTS AND DISCUSSIONS

5.1 Introduction

This segment presents discussions of the results with the literature reviewed. The issues discussed are structured along with the major thematic focus of the study. They include, the availability of technologies in the university libraries, ICT facilities in the libraries, the services available in the libraries, the utilization of available facilities by library users, comparative analysis of these facilities on campus bases, the competency level of users, factors hindering the ability of library users to enjoy library facilities available and the benefits gained by library users.

5.2 The availability of libraries technologies in the University for Development Studies

Generally, it was revealed that library users made use of a modern and advanced form of library facilities in the University libraries system ranging from the Communication and Technologies (ICT) based in their day to day search for information in the libraries. It demonstrates that most academic libraries have transformed from analog towards the usage of more advanced ICT technologies in assisting research and academic works across Universities especially in Ghana in contemporary times (Namanya 2014).

The usage of these technologies has improved significantly in the Universities libraries, manifesting in the users gaining access to the global web of information, facilitated research and academic works, whiles making the act of searching for information easier. This is in consistence with Alhaji (2009) postulation of the usage of digital library in contemporary times, where such connections facilitate access to e-books, journals and data sets for research work.

Also, it partially confirmed Iqbal and Ahmed (2010), findings on the evolution of e-learning technologies in contemporary times. Accordingly, the evolution of e-learning is making learning and research effective and easier, most especially in the tertiary level libraries where an advance form of technological adaptation predates (Iqbal & Ahmed, 2010). While Iqbal and Ahmed (2010) postulate the emerging usage of modern technologies in Universities libraries as the driving force in educational development, the findings of this study are partially inconsistent with the accessibility and affordability of digital libraries observed in Pakistan. Rather, materials and internet services for accessing online information is unaffordable to most library users in the case of Ghana.

Following findings of the study, the use of online study system by library users in the university libraries was observed dependent on many factors such as the availability of web and internet quality which have a significant positive influence on the perceived values of the users and their satisfaction level as indicated by Nneka (2010). It determines the intention of users to continue using the e-learning system in the academic libraries (Nneka, 2010). While this is factual, not all libraries are equipped with all the facilities required of a digital library. For examples, in the context of UDS, the library users pointed out that three major forms of ICT facilities exist in their libraries and utilized across the five campuses' libraries of the University for Development Studies, Ghana. These included; Wi-Fi internet technology, which is the commonest technologies available in all the libraries, followed by digital library resources internet technology and online public access catalog.

On the other hand, less available facilities/services in the UDS libraries are the e-mail facilities and the CD-ROM technology facilities. None of the campus libraries has Laptops and iPads for library users to independently search for information in the absence of their personal laptops' hardware, justifying Ali, et al., (2018) observation of software, facilities, and network capabilities as key challenges within colleges and Universities.

Furthermore, the increasing usage of ICT services is informed by in-service training which librarians received in the past on facilities usage and how to assist library users across all the University campuses. From the findings, librarians have been trained on the usage of the following software and services available. Thus, software for service circulation, draw on web-based support and online available in the libraries to facilitate the use of the digital library system in the University. However, there are variations in the availabilities of the facilities among the campuses. For instance, the use of software for service circulation is found in the medical and graduate school's libraries compared to the other three campuses (Wa, Nyankpala and Navrongo campuses). Also, all campuses with the exception of the Nyankpala campus, enjoy the utilization of web-based services.

5.3 Information and Communication Technological facilities available in the libraries

The study revealed that several Information Communications Technological (ICT) facilities, specifically hardware, predominate across all the University campuses. They included computers, laptops, printers, scanners, LDC projector amongst others. However, hardware such as video cameras, micro-film readers, bar code readers, security check systems, generators for alternative power supply and photo cameras were observed not available in all the five (5) campuses libraries.

In a more specific domain, most of the respondents 90.7% disclosed the availability of computers in the libraries to facilitate the search for materials, 86% disclosed of the availability of network servers, 84% disclosed the ability of printers, and 60% of that of the scanners. In addition, 73.3% of (LAN), 66% of World Wide Area Network, 48% of the LDC projector, 49% of CD-ROM Readers/Writers, 48% disclosed of the availability of book check system, while 86% of the respondents revealed that their libraries have photocopying

machines to support photocopying of information from books, reports, and articles that are limited in the libraries for borrowing and mostly placed as reserve.

Also, the internet facility in the libraries was observed as the most widely utilized service for accessing e-learning materials. Consistently, library users especially students have more interest in the use of e-journals, e-books, e-articles but less interest in reading material like e-dissertations (Swain, 2010). Based on these, it is imperative that academic institutions put great value in digital literacies and prepare students adequately to meet the standard knowledge of the new age of digitization of learning at the university level. As Littlejohn, et al., (2012) indicated, digital knowledge and practices have the tendency of redefining the academic world of date.

Therefore, libraries that adopt the use of ICT as a means of management, utilize many forms of communication technologies such as the internet, wireless network, cell phones (Namenya, 2014). This is paramount because, from the study, computer hardware is often used in capturing, storing, communicating and displaying all forms of information for research and course assignments. Nevertheless, automation, otherwise known as computerized or the application of ICT in the provision of services is useful when there are computers and its associated peripherals media such as the magnetic tapes, disks, and optical media. These accordingly facilitate readers to easily search for information.

5.4 Services available in the UDS Libraries

Across the entire University, several library services are provided to library users in the various libraries, ranging from internet services, the email services, full text journal articles services, online catalogue, Bibliographic catalogues, the CD-ROM services, automated book services, library website service, scanning services, automatic reference and information services amongst others.

As stated earlier, on a 100% respond base, the commonest services available in all the libraries for users include the internet web browsing services disclosed by about 86% of the library users interviewed. However, the slow speed of internet and high internet traffic during e-learning experience are key challenges of internet usage in the libraries as observed in a related study (Ali, et al., 2018). Other services observed included E-mail services disclosed by (77%) of the library users, 98% of the online public access catalogue, full text journal articles services confirmed by 77% of the respondents, the online public access catalogue confirmed by 98% of the library users, the electronic book services, 84%, the library web services, 95%, the electronic reference and information services, 84%, the book reservation and call services, printing services 80% and the digitisation services 72%.

On the other hand, there are some services that are not readily available in the University libraries. These are; photographic services, barcoded circulation services, end-user training program, document scanning services, CD-ROM services, bibliographic databases, and email services are less prevalence across all the libraries in the various campuses of the University for Development Studies.

5.5 The utilization of library facilities in the University for Development Studies

There is modest utilization of digital library resources available in the various libraries of the University for Development Studies. There is a varying degree of utilization of library facilities in the libraries of the various campuses. This variation in the utilization of library facilities in Universities libraries is perceived to have been influenced by the knowledge and familiarity in the usage of library facilities among library users (Namenya, 2014). Also, it partly re-enforces Barclay and Osei-Bryson (2012) claims on the utilization of library facilities, where they observed that developing countries are still challenged by digital gaps in

both the households and in educational institution levels, which have the tendency of impacting negatively on access to and effective use of e-learning systems.

From the study, many of the library users occasionally patronized the library services available. Few people, however, showed interest in utilizing the library services regularly due to fear of committing simple technological errors and not willing to find out the new technology techniques and application as justified by Laspinas (2015). This to some extent can serve as a challenge in the acceptability of emerging technologies in libraries by users in the near future.

Also, providing such services without prior training has the likelihood of losing delivery, effectiveness, and acceptance (Venter et al., 2012). For instance, only a few of the library users utilize library services and are of the view that the usage of ICT facilities in the libraries has improved their knowledge in using new technologies for research-related purposes. Invariably, users who are technologically disadvantaged gain no knowledge even in the presence of the ICT facilities in libraries. Therefore, it is worth concluding that the introduction of ICT in academic libraries has not often commensurate with utilization.

5.6 Comparative analysis of the library's facilities usage among libraries in the various campuses

Given that the UDS operates a multiple campus system, there are remarkable variations in the usage of ICT hardware and software across the campuses. Specifically, the use of acquisition, cataloging, circulation as well as administrative and serial control. Overall, administration and serials control usage frequency was found pronounced across all the campuses libraries of the University. Across all the study campuses, the digital libraries were found helpful in facilitating access to materials using the on-line computerized library analog (IFLA, 2013).

The usage of the *acquisition* among users varies across the five (5) campuses, library users in the Wa campus were found to have used it often (41.4%) and always (13.8%) compared to the other campuses. Library users in all the other four campuses disclosed to have never used *acquisition* in their libraries, specifically, 54.2% of the respondents in the medical schools have never used acquisition, 42.2% of that library users in Nyankpala, 50% of the users in Navrongo and 57.1% in the Graduate school disclosed no knowledge of the usage of the *acquisition* facility in their library.

In terms of the frequency of *cataloging* usage, the majority of the library users across the University revealed high usage compared to the acquisition facility. However, most of the library users in the Wa campus have utilized it very often (58.6%) and often (20.7%). In the Medical school (33.3%) library users confirmed to have used it often, very often (16.7%) and always (16.7%). In Nyankpala campus, most libraries have equally used *cataloging* facility often (25%), very often (15.6%) and always (23.4%). In the Navrongo campus, library users also revealed that they use it very often (38.5%), and always (23.4%). Similarly, in Graduate school, the *cataloging* hardware is used often (54%) and always (43%). The digitization of the library towards the modern standard in this era has made analog materials easily accessible as indicated by Routhier (2014).

Comparatively, it is more prevalent in the Wa campus instead. For instance, whilst users in the Wa campus have ever used *acquisition*, users in the other four campuses (Medical school, Nyankpala, Graduate school, and Navrongo) expressed no knowledge of its utilization. Therefore, it is possible that resolving the unequal distribution of the library resources in a multi-campus University or college system (Admaou & Ntoka, 2017), has the tendency of addressing some of the challenges that relate to the utilization and knowledge of ICT in the modern society.

5.7 The Competency of Library Users using Information Communication and Technology

Despite the fact that the majority of potential library users have never utilized the University library before, the few who patronize it frequently have average knowledge in the utilization of digital library. Users apart from the operating system in the library premises equally utilize Wi-Fi services. In general, about 60.7% of all library users have average knowledge in the usage of Information Communication and Technology (ICT) for research purposes in libraries. Also, 43% described their level of competency in the usage of ICT facilities for studies and research works as high, with just a few users (5.4%) who described their competencies level as moderately low.

Upon the many benefits in the use of e-learning library systems in the tertiary educational level, it is bedeviled with many problems against successful implementation and management of the technology in many institutions including the availability of few modern computer systems and its accessories to facilitate learning and its outcomes. Though most libraries in Universities have adopted the e-learning technology that has not been translated into the user's competency in the utilization of the facilities available. Unfortunately, most users lack adequate knowledge and skills to operate it coupling with low availability of computers and internet services in the libraries as observed by Arif and Mahmood, (2012) in their study of library facilities usage.

In the case of UDS, the few competent users of the ICT facilities were observed to have been utilizing their own internet sources and laptops in accessing e-books from online. As observed by Reyes (2013), the maximum realization of benefits from digitized libraries in the current management of libraries is possible through ownership and frequent usage of the ICT facilities by users themselves. In other words, library users who have frequent interaction with both hardware and software components are most likely to be more competent of the

usage of the ICT facilities compared to users who do not own an ICT facility for personal use. This was found consistent with the experience of library users in the University for Development Studies. Library users who own laptops were found more conversant with the usage of ICT facilities in the library compared to others.

That aside, the competency of the librarians in ICT facility usage was observed to influence some level of knowledge of the users. From the study, librarians in the various libraries who have gained some level of competency in library usage were observed to have been giving support to library users (students) in the form of training in the following; automation, information dissemination, web information retrieval, and the search for digital information online, managing institutional repository, searching for literacy skills and internet navigation and its management. This finding justifies Adamou and Ntoka (2017) observation of the relationships between the competency of the librarians and the associated effect on utilization of digitized libraries. Digital libraries with competent librarians who have diverse skills are able to offer adequate services to meet the needs of the users and influence their knowledge compared to libraries with less competent staff.

Again, the ability of librarians to work hard and support the progress in the use of modern ICT services in the libraries of UDS was centered on the level of knowledge and experience they acquire and possess. Based on the findings, the knowledge of librarians can, therefore, be improved through in-service training programs to update them on new things that are emerging. The application of computer-based e-learning in the academic libraries services and operations is beneficial to the users as it improves efficiency and faster ways for searching and consumption of useful information as observed by Ivwighrehweta (2013).

Therefore, it is worth indicating that whilst there has been series of debate on library utilization, facilities, and services provision, the competency of the librarians is key to successful provision and utilization of the facilities and services. Again, librarians with

adequate knowledge in the digital system are able to provide educational and technical skills training and books classification and management as a basic distinct feature for easier access to facilities among users. In the contrary view, Kasteller (2012) perspective of human errors, where errors committed by users in the process of utilization affect the effective and efficient utilization of digitizing libraries seems to partially differ from the findings of this study. Whiles that may be a key distractor, in the context of this study, utilization was largely driven by the librarian's competency and the availability of library facilities in the study libraries. Most importantly, Kulkarni (2014) asserts that in order to promote better library services in the digital age in libraries, librarians should have the comprehensive ability of new things introduced to be able to teach users, this is useful for findings of this current study.

5.8 Factors hindering effective and efficient utilization of ICT facilities in the digital library

There are numerous challenges hindering the efficient and effective application of ICT facilities in the University library across all the various campuses, despite the numerous benefits related with the application of the ICT facilities especially in academic libraries (Brophy 2009). In a theoretical sense, most observed challenges often include but not limited to high demand by users in the midst of limited ICT facilities in University libraries especially in developing countries, where library facilities' provision does not often take into consideration the database of the current users and future users. In the case of this, the limited ICT facilities are equally preceded by limited knowledge and utilization. In that regard, rebranding and reshaping of the ICT application and management of the ICT system can be useful in dealing with the menace.

However, though the study realized campus-based specific challenges. The prevailing challenges across all the campuses included the following; the cost of computer software,

access to computer hardware, access to software, the cost of computer hardware, the cost of e-journal and e-book and poor communication network. Other campuses specific basis includes poor internet connections and power outages as indicated earlier. For instance, on a 100% response bases, about 38.7% of the library users strongly agreed that the cost of computer software serves as a hindering factor in the utilization, 46% agreed with access to computer hardware, access to software, 28.7%, the cost of computer hardware, 36.7% as challenges to 40.7% and 30% strongly agreed that cost of e-journal and e-book, and poor communication network respectively are the major challenges to effective utilization of ICT facilities

The above observations corroborate with Kamba (2011) findings, where inadequacy of ICT facilities and resources in libraries affect the use of the digitized system in learning and research. However, problems in establishing long-term contracts with book publishers and difficulties in using modern library facilities are seen as a not major hindrance to effective and efficient utilization of ICT facilities in the university libraries.

Also, limiting factors to the utilization of ICT facilities in the university libraries emanates from human resource-specific such as low skills among some librarians and lack of computer culture affecting the adoption of the modern mode of library operations. Again, some of the problems obstructing the efficient and effective utilization of ICT facilities in the university libraries are peculiar to the library users themselves. For instance, the negative attitude of library users towards ICT facilities usage and the fear of technology usage among users. This is not in line with the findings of Ghuloun & Ahmed (2011), where financial related problems were observed as the major challenge facing library users in the age of digitization.

5.9 Library users perceived benefits with the use of ICTs in the University library

There are a number of benefits that library users assumed to obtain from the use of the digital library system of the university. For instance, majority of the respondents (78%) strongly agreed that the existing library facilities and their usage facilitate access to information compared to the usage of such facilities outside the libraries, (68%) of the respondents agreed that the usage of libraries was useful as they are directly linked to various sources of information across the globe. It implies that library users in the digital realm easily access information through directly linking to different sources of information online than the use of library facilities outside. It further implies that users have wide ranges of information and hence capable of applying information sought through ICT in the libraries towards societal development (Blandy & Libutti 2011). This can be deduced from the fact that global information is made readily accessible through the digital library system. This has really altered the lives of many library users especially, researchers in the search for information in support of their works (Anie & Achugbue, 2009)

That apart, the study also realized that the utilization of the ICT technologies in the various library was useful and promoted easy communication with other library users and the librarians in times of difficulty compared to using similar facilities outside the University library. About (58%) of the respondents interviewed confirmed this. The usage of ICT facilities in the library also contributed to easy acquisition, management, storing and distribution of information obtained during the research in the library. This was disclosed by 60% of the library users across all the campuses libraries studied. Finally, using library facilities are perceived as useful as they contribute to the provision of current information.

The above observation is in consonance with Ahmed, (2011) perspective, where the application of ICT in the era of technology is perceived to have a long way in helping information accessed, process and dissemination. It was realized that the analog system is

gradually collapsing, manifesting in the reduction of the traditional manual library service provision in the academic realm.

There are also easy and faster ways of communication between other library users and librarians online in difficult situations than the use of library facilities outside the university library. This justifies findings of the Research Information and Consortium of Research Libraries report (2009) where libraries users have gained many benefits from the modern technologies used by library facilities in recent times especially, academic libraries. This has motivated the adoption of the new technology by libraries that are not yet scaled up to this standard. Similarly, the study also discovered that the use of ICT in the university libraries helps users to store and retrieve information online and handling information. As Dutton (2009) puts it, the introduction of modern ICT in the libraries of universities helps users to be able to store and retrieve information, searching for materials, viewing and handling information.

Meanwhile, the study disagrees with the assertion of Dutton (2009) that library users are able to buy online material through the ICT library system in universities. In the context of this study, the use of ICT as a mode of delivering services in university libraries help information circulation among users. However, this does not apply to protected materials. Most users of the digital library libraries are unable to access protected materials for circulation. The few that access such protected materials, thus journal articles, are able to circulate to other users, hence limiting the theft of analog materials in the libraries (Ahmed, 2011).

Nevertheless, it was revealed that the digital library in the university contributed to easy acquisition, management, and distribution of information obtained during the research in the library apart from the provision of current information. This conforms with the assertion of Ahmed & Fatima (2009) that the integration of computer-based application together with

communication services in academic libraries system helps users store and share literature in the fastest way. In that regard, there are tremendous benefits associated the use of ICT in libraries which has gone a long way to addressing some challenges that are embedded in the traditional way of searching for information in libraries as in the past.

5.10 Library users' perspectives in favour of and against the usage of ICT facilities in the library

It was deduced that the usage of ICT facilities in the library promote all-time access to librarians who are capable of assisting users to realize and find their research materials. This serves as an incentive to the use of library facilities by users in line with the perspective of Ahmed (2011). Other favoring arguments showcase how the usage of ICT facilities in the library promote easier access to materials compared to the usage of similar facilities outside the library or at homes. According to this group, who constitute the majority (37%), the usage of ICT facilities in the library promotes all-time access to librarians who are capable of assisting users to realize and find their research materials.

Other supportive views indicate that the usage of ICT facilities in the library promote easier access to materials (15%) compared to the usage of similar facilities outside the library or at homes. For others, most library internet services are faster and good to use (3%), the presence of digital library provide more information (23%), and last, of all, digital library services provided by libraries make the discovery of research materials easier and faster. Overall, Hemlata & Meena (2013) preposition where internet services are observed as one the of the many ICT techniques adopted by libraries to facilitate the usage of academic libraries in recent times was found consistent with findings of this study.

Contrarily, some users are of the view that factors such as the confined usage of some ICT facilities may discourage users either through the fault of technological facilities or the weakness of the user of the facilities available in the library. Other issues included weak or no internet connectives sometimes in the libraries. Users who frequently rely on internet facility for their research in the library are often demoralized under such situations.

Some of the limiting factors are human-related factors ranging from possible human weakness in the form of users who are not conversant especially, with the use of ICT equipment and the E-library. These categories of users may find it less suitable given that most libraries units in the University do not provide immediate training to new users of the library. In addition, users of the studied libraries attributed less usage of the library facilities or attendance in libraries to issues of congestion in the library due to limited space, compelling users to rather stay at home to depend on out-library ICT facilities than being in the libraries of the university. This was observed peculiar to campuses with limited library space like the Wa and Navrongo campuses. Furthermore, the problem is worse due to less availability of computers in libraries. It made the usage of ICT facilities not reliable especially to those who do not have laptops, Ipads and/or tablets on their own.

CHAPTER SIX

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

6.0 Introduction

This chapter presents the summary, conclusions, and recommendations pertaining to the study. The summary cuts across the major findings of the study drawing directly on the research objectives. Thus, the availability level of libraries technologies in the UDS library, users of the library level of awareness of Information Communication Technology facilities for research outputs, the level of competency of the librarians and library users in support of the information and factors hindering the effective application of ICT in the UDS. The latter part presents recommendations drawing on the major findings of the study.

The study employed the mixed research strategy, thus both the qualitative and quantitative to examine the utilization of Information and Communication Technology Facilities for Research Output in Ghanaian Academic Libraries of the University for Development Studies, Ghana. Data were collected from 150 library users specifically; from Post-graduate students, Undergraduate students, Lecturers, and librarians from the following campuses; Nyankpala campus, Tamale campus, Navrongo campus and that of the Wa campus. The data was gathered through a questionnaire and interviews. Interviews were conducted with individuals, thus librarians at the various libraries. However, critical attention was paid to ethical issues especially in the course of the data collection and analysis in order not to compromise the research quality. For instance, the study ensures that the rights and welfare of the respondents at the various institutions were protected, consents were sought prior to personal interviews

conducted with the respondents at the various institutions. The data were analyzed both qualitatively and quantitatively drawing on the support of SPSS and Excel.

6.1 Summary of Major findings

Several issues were gathered as key findings regarding the utilization of information communication technologies from research outputs in the UDSlibraries. The key findings are structured along with the major thematic areas of the study. Thus, the level of availability of libraries technologies as stated above, library users' level of awareness of Information Communication Technology facilities for research outputs, the level of competency of the librarians and library users in support of the information and factors hindering effective utilization of Information Communication Technology in the University for Development Studies.

The availability of Information Communication Technology facilities in libraries

Firstly, on the availability of libraries technologies in the UDSlibrary, the library users pointed to four major forms of ICT facilities that are available across the five campuses' libraries of the University for Development Studies, Ghana. They included; Wi-Fi internet technology which is the commonest technologies available in all the libraries, followed by digital library resources internet technology and Online public access catalog.

On the other hand, technologies that were observed less available included the E-mail facilities and the CD-ROM technology facilities. None of the campus's library has Laptops and iPads for library users to independently search for information in the absence of their personal laptops.

Overall, the study observed variations in the level of availability of library technologies among campuses. For instance, the use of software for service calculation was found in the medical and graduate schools libraries compared to the other three campuses (Wa, Nyankpala

and Navrongo campuses). Also, all campuses with the exception of the Nyankpala campus, all library users enjoy the utilization of web-based services.

User's awareness level of Information Communication Technology facilities for research output

Generally, it was revealed that library users made use of a modern and advanced form of library facilities in the university libraries system with an Information Communication and Technologies (ICT) based on their day to day search for information in the libraries.

According to library users, computers, laptops, Networked servers, printers, scanners, LAN, LDC projector amongst others are common facilities they have observed in their libraries. However, hardware such as video cameras, micro-film readers, bar code readers, security check systems, generators for alternative power supply and photo cameras were observed not available in all the five (5) campuses libraries.

Furthermore, the increasing usage of ICT services according to users is informed by in-service training which librarians received in the past on facilities usage and how to assist library users across all the university campuses.

Across the entire University, several library services are provided to library users in the various libraries, ranging from internet services, the Email services, full text journal articles services, online catalogue, Bibliographic catalogues, the CD-ROM services, automated book services, library website service, scanning services, automatic reference and information services amongst others.

However, the commonest services available in all the libraries for users include the internet web browsing services, e-mail services, online public access catalog, full-text journal articles

services, electronic book services, library web services, electronic reference and information services, and book reservation

There the other hand, there are some services that are not readily available in the university libraries. These are; photographic services, barcoded circulation services, end-user training program, document scanning services, CD-ROM services, bibliographic databases, and email services are less prevalence across all the libraries in the various campuses of the UDS.

Competence of librarians and library users in support of information services for research output

There are modest utilization of digital library resources upon the availability of them in the various libraries of the University for Development Studies. There is a varying degree of utilization among the various campuses. Many of the library users occasionally patronized the library services available. Few people, however, showed interest in utilizing the library services regularly, even though the library users are of the belief that the usage of ICT facilities available in the libraries have improved their knowledge in using the new technology for research-related purposes.

Despite the fact that mainstream of potential library users never used the university library before, the few who patronize it frequently holds an average knowledge in the usage of the digital library. Users apart from the operating system in the library premises utilize wi-fi services and e-book from online.

The digital library resource is relevant to users in obtaining important related research information about the world especially, in writing thesis/dissertations/long essays and assignments. However, it only the wi-fi services that are available on the campuses all the time, with an exception of that, computers are not available to aid full utilization of the digital library resource.

Most of the librarians in the various libraries have gained some level of competency in library usage and giving support to library users (students) through training in the following; automation, information dissemination, web information retrieval, and the search for digital information online, managing institutional repository, searching for literacy skills and internet navigation and its management. Some also include educational and technical skills training and books classification and management.

Factors hindering the effective and efficient utilization of ICT facilities in the digital library

There are numerous challenges that are deterring the efficient and effective utilization of ICT tools in the university library across all the various campuses.

However, some problems are campus-specific. The major problems include the following included cost of computer software, access to computer hardware, access to software, the cost of computer hardware, the cost of e-journal and e-book and poor communication network. Others campus-specific basis include poor internet connections, power outages.

However, problems in establishing long-term contracts with book publishers and difficulties in using modern library facilities are seen as a not major hindrance to effective and efficient utilization of ICT facilities in the university libraries.

Also, limiting factors to the utilization of ICT facilities in the University libraries emanates from human resource-specific such as low skills among some librarians and lack of computer culture affecting the adoption of modern modes of library operations. Again, some of the problems obstructing the efficient and effective utilization of ICT facilities in the university libraries are peculiar to the library users themselves. For instance, the negative attitude of library users towards ICT facilities usage and the fear of technology usage among users.

6.2 Conclusion

Globally, it is worth concluding that library users obtain several benefits in the digital era. Library users easily access information through directly linking to different sources of information online than the use of library facilities outside. The increasing availability of Information Communication Technology facilities and services has facilitated communication between libraries and among library users.

Nevertheless, the digital library in the university contributed to easy acquisition, management, storing and distribution of information obtained during the research in the library apart from the provision of current information. At the same time, the usage of ICT facilities in the library promotes all-time access to librarians who are capable of assisting users to realize and find their research materials. This serves as an incentive for the use of library facilities by users. There are also motivating factors like the usage of ICT facilities in the library to promote easier access to materials compared to the usage of similar facilities outside the library or at homes.

Contrarily, the confined usage of some ICT facilities was perceived as a disincentive especially in the midst of faulty of technological facilities, for example, weak or no internet connectivity. Users who frequently rely on internet facility for their research in the library mostly get demoralized under situations of dysfunctional internet services.

Nevertheless, some of these limiting factors are human-related factors including possible human weakness in the form of users who are not conversant especially, with the use of ICT equipment and the E-library. Such users may find it less suitable given that most libraries units in the University do not provide immediate training to new users of the library.

Overall, the problem of congestion in libraries driven by space limitations often compels users to rather stay at home to depend on out-library ICT facilities than being in the libraries

of the university. This is peculiar to most Universities and campuses with limited library spaces. In many instances, the situation is worsened by less availability of computers in libraries.

6.3. Recommendations

Base on the findings obtained in the utilization of the Information Communication Technologies (ICT) facilities for research output.

6.3.1. Provision of In-service Training

The provision of Information and Communication Technologies, facilities and services in University libraries must be accompanied by in-services training. Following the study, one of the major limiting factors to the utilization of ICT facilities in the University libraries emanates from human resource-specific such as low skills among some librarians and lack of computer culture affects the adoption of the modern mode of library operations. Therefore, while they are urgent to promote the availability of Information and Communication Technologies, efforts must also focus on training users especially students at the undergraduate levels to effectively put into good use the available facilities and services.

6.3.2. Periodic review of services utilisations

The researcher recommends that a periodic review of services utilisations among library users be conducted as a basis for understanding contemporary challenges in a specific context. There is an urgent need for library staffs especially in the Universities to frequently conduct a periodic review on library services utilization among users to identify immediate challenges facing users. This can be done either quarterly or bi-annually in the form of electronic surveys.

6.3.3. Provision and maintenance of effective internet library services

From the study, most library users felt reluctant in visiting or utilizing the library facilities because of perceived congestion, discomfort and the likelihood of finding no sitting space. Rather, many of such users who are mostly students often opt from studying in their rooms. It is therefore recommended that there should be an increase in the provision and maintenance of all-weather internet online library services has the tendency of reducing congestion and facilitating the usage of the Information and Communication Technologies in libraries.

6.3.4. The mechanism to identify and bridge the gap in the digital divide

Understanding different users and their level of competency as a basis for targeting user groups for training. Just as there are varieties of library services and facilities, they are equally variations in the level of competency of the various users. For example, basic users of ICT facilities, average users and advanced users. The level of knowledge of the users depends on the type of facility they are conversant with. Therefore, it is recommended that there is an urgent need for library staffs to identify the different skills and levels of competency of the users and match them with the service or Information Communication Technological facilities different users can better work with and at the same time realize their research goal.

6.3.5. Provision of Funding

The University authorities and government stakeholders should ensure that enough funding is provided to Academic libraries to procure ICT facilities and information resources in their center's. At least a certain percentage of budget allocation quarterly should be made available for the development of ICT facilities, resources, and services

6.3.6. Adequate Power Supply

The authorities should ensure that there is a constant and effective supply of electricity in the library to facilitate efficient and maximum utilization of ICT facilities. It is of much-needed benefits for the library to acquire high powered generators to serve as a backup in case of a power outage in the library.

6.3.7. Provision of Accommodation

The study reveals congestion and lack of adequate spaces for normal academic library operations as a bigger challenge and as such, there is every need for the government and authorities to ensure the establishment of strategically situated independent library accommodation furnished with ICT infrastructures for effective and efficient service delivery to users.

6.3.8. Formulation of ICT Policy

The Academic library board and committee should ensure the formulation of ICT Policy to guide and inform library management and staff on the acquisition, application, and utilization of ICT facilities in their routine operations and service delivery to users.

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APPENDIX ONE
University of Ghana
Department of Information Science
MPhil Information Studies

Utilization of ICT Facilities for Research Output in Ghanaian Academic Libraries: The Case of UDS Library Systems.

Introduction: This questionnaire was used to gather information for research on the above topic. The data collected was for the sole purpose of academic activities only and all data given will be preserved with maximum confidentiality. Please respond by ticking (✓) against your preferred response for questions with options.

Questionnaire for librarians and paraprofessional librarians

Section A: Demographics

1. Age category ☐ Less than 20 years ☐ 20 – 29 years ☐ 30 – 39 years ☐ 40 – 49 years ☐ 50 +
2. Sex ☐ Male ☐ Female
3. Position _____
4. How many years have you worked as a librarian ☐ Less than 1 year ☐ 1 – 2 years ☐ 3 – 8 years ☐ 9 – 10 years ☐ More than 10 years
5. How long now have you worked with the UDS ☐ Less than 1 year ☐ 1 – 2 years ☐ 3 – 8 years ☐ 9 – 10 years ☐ more than 10 years
6. How long now since have you held your current position? ☐ Less than 1 year ☐ 1 – 2 years ☐ 3 – 8 years ☐ 9 – 10 years ☐ more than 10 years

7. Please state your level of education? ☐ Certificate ☐ Diploma ☐ Bachelor's degree ☐
Master's Degree ☐ PhD

8. What is the title of your position? _____

Section B: ICT Usage

9. Are you using ICTs for your library services? Yes ☐ No ☐

10. Have you been given any ICT education in the past two years? Yes ☐ No ☐ a. If yes,
indicate the training(s) received

.....

b. If No, why?

.....

11. How would you describe the library you currently with now in terms of computerization?
☐ Not computerized ☐ Planning to computerize ☐ Computerized ☐ fully computerized

12. Which library Software do you use for circulation services? i. Is the software web-based?
Yes ☐ No ☐ ii. Is it online? Yes ☐ No ☐

Sections: Competence of ICT Facilities to library users in the digital era

13. What digital skills you personally adopted due to changes in technological currently
taking place in libraries?

.....

14. can you say if you have the needed knowledge and skills in applying a digital library?

a. Yes ☐ b. No ☐ c. I can't tell ☐.

15. How would you illustrate your modification to the changes in technology?

a. Proud and excited ☐ b. anxious and afraid ☐ c. demoralized and discouraged ☐

16. Are there any noteworthy differences between digital and traditional libraries? A. Yes []
b. No []

17. Please state any difference between digital and traditional libraries.

.....

18. Do these differences have different functions in their working atmosphere? A. Yes [] b.
No []

19. What categories of digital facilities do you offer in the UDS library? Please state

.....

20. Is the UDS library used as meeting places for some people? a. Yes [] b. No []

21. What category of people normally meet in the UDS library? (i.e. students, professors)
Please state:

.....

22. Do you solve challenges associated with the preservation of online materials? a. Yes []
b. No []

23. What type of challenges do you face? Please state

.....

24. How can academic libraries preserve digital materials? Please state

.....

25. Can you be guaranteed that online materials will be accessible for the usage of upcoming
generations? a. Yes [] b. No

[]

26. Do economic challenges in the UDS affect the availability of online resources?

a. Yes [] b. No []

SECTION D: Available software/hardware used in academic libraries

27. How often do you use the library software (Indicated above) for Please, tick any

27.	Limiting factor	Never	Rarely	Often	Very Often	Always
A	Acquisition					
B	Cataloging					
C	Circulation					
D	Serials control					
E	Administration					
F	Other					

28. Do you offer the following ICT services? Tick **Yes, No or Not Sure**

28	category of Service	Yes	No	Not Sure
a.	E-mail			
b.	Internet web browsing			
c.	Online Catalogue			
d.	Journals articles			
e.	Bibliographic catalogs			
f.	CD-ROM Services			
g.	Automated Books			
h.	Website			
i.	Scanning			
j.	Reference and Information			
k.	Users Training Program			
l.	Circulation Services			
M	Awareness services			
n.	Reservation and recall			
o.	Printing Services			
p.	Photographic services			
q.	Digitization Services			
r.	Others (Specify)			

29. Are the ICT facilities accessible in your library? Please, tick **Yes, No or Not Sure**

29.	Hardware	Yes	No	Not Sure
a.	Laptops			
B	Computers			
c.	Printers			
D	Networked Servers			
e.	Scanners			
F	LDC Projector			
G	World Wide Area Network			
H	LAN			
i.	Microfilm readers			

j.	TV Stations			
K	video and cameras			
l.	Bar code readers			
M	CD-ROM			
N	Check Systems (security)			
O	Book Check Systems			
P	Machines for Photocopying			
Q	digital cameras			
r.	standby generators			
s.	Others			

30. What are the sources of pressure for ICT adoption in your library?

i. University administration [] ii. Library user's [] iii. Changing nature of information medium []
iv. Other (Specify)_____

Section E: Challenges

Please tick, if you agree that the ff are limiting factors towards implementing ICT in your library – Where 1 = Strongly Agree 2 = Agree 3 = Moderate 4 = Disagree 5 = Strongly Disagree

31.	Limiting factor	1	2	3	4	5
a.	Cost of computer hardware					
b.	Cost of computer software					
c.	Cost of e-journals & e-books					
d.	Poor communication networks					
e.	Access to computer hardware					
f.	Access to computer software					
g.	Low internet connectivity					
h.	Power outages					
i.	Long –term contracts with book publishers					
j.	Unfriendly and difficult to use					
k.	Fear of technology					
l.	Lack of ICT skilled librarians					

m.	Negative attitude by librarians					
n.	Negative attitude by users					
o.	Lack of computer culture					
p.	No perceived economic or other benefits					

SECTION F: BENEFITS OF USING ICTs IN YOUR LIBRARY

Please tick if you agree with the given statements - Where 1 = Strongly Agree 2 = Agree
3 = Moderate 4 = Disagree 5 = Strongly Disagree

32	Benefits of ICT determinants	1	2	3	4	5
a.	Ease availability of information					
b.	Linkages with other libraries					
c.	Linkage with various sources of information					
d.	easy of communication					
e.	Easy to the acquisition, management, and storage of data.					
f.	Enables provision of current information					

Thank you

APPENDIX TWO

University of Ghana Department of Information Science MPhil Information Studies

Utilization of Information and Communication Technology Facilities for Research Output in Ghanaian Academic Libraries: The Case of UDS Library Systems.

This questionnaire is to collect data for research on the above topic. The data collected is for academic purpose only and all information provided will be treated with maximum confidentiality. Please respond by ticking (✓) against your preferred response for questions with options. Questions that require suggestions or comments, please use the provided space.

QUESTIONNAIRE FOR LIBRARY USERS

A. Demographic characteristics

- 1.Age of respondent
- 2.Sex of respondent: a. Male [] b. Female []
- 3.Level of education: a. None [] b. Primary [] c. Middle/JSS [] d. SSS/Tech [] e. Training colleges [] f. Tertiary []
- 4.Marital status? A. single [] b. Married [] c. Divorced/separated [] d. Widowed []
- 5.Profession

Frequency of ICT usage by library users in the libraries

6. How often do you use the university's libraries? a) Frequently [] b Occasionally [] c. Never[]
7. What is your information communication technology literacy level? a Very High [] b Average [] c. Low []

Available ICT Facilities Being Utilized for Research Output

8. From the listed ICT facilities, select the ones that are available in the library system.

- a) Internet technology [] b. WIFI [] c. Digital library resources [] d. Laptops and Ipads[]
e. Radio Frequency technology [] f. Online Public Access Catalogue [] g. E-mail facilities []
h. [] i. CD-ROM technology []

9. Which amongst the above ICT facilities are frequently used for research output? Please explain

.....
.....

Competence of ICT Facilities to library users in the digital era

10. Do you have knowledge in the application of a digital library? a. Yes [] b. No []

11. explain your answer in Q10 above

.....

12. how has the application of digital library helped you?

.....

13. How effectual and convenient is the application of digital library? Please state:

.....

what are your outlooks concerning the digital library? a. Yes [] b. No []

15. What type of outlooks do you have? Please state:

.....

16. Do you think the economic challenges in UDS disturbs the availability to online resources? a. Yes [] b. No []

17. explain your answer above?

.....

18. explain your answer in Q14

.....

do you often seek help from a librarian? a. Yes [] b. No []

19. Why (explain your answer above?

.....

Do you desire using the online library on your own or with the assistance of a librarian?

22. Why?

23. Do librarians assist in improving your skills regarding online material? a. Yes [] b. No []

24. In which way (i.e. please state)?

25. Do you have enough skills to recover the right material by yourself?

a. Yes [] b. No []

26. Do you apply online communication channels to communicate with librarians? a. Yes []
b. No []

27. Why do you choose to communicate with librarians through electronic means (i.e. asking a question, request for services)? Please state

.....

28. do you know your rights and obligations regarding the usage of digital resources? a. Yes [] b. No []

29. Do you comply with the obligations? a. Yes { } b. No { }

Challenges and Possible Solutions in ICT Usage in the library

30. Highlight the challenges that hinder the effective and efficient utilization of ICT facilities for research in the university library or any of the public libraries system.

.....

31. What are the possible solutions to the identified challenges?

.....

32. To what extent has your research output improved by utilization of the available ICT facilities in the library system?

a) Has improved greatly { } b) Has improved slightly { } c) Has remained the same { } d) Has reduced slightly { } e) Has reduced a lot { }

33. What are your perception levels about the utilization of ICT resources for research in the library?

.....

.....

THANK YOU

APPENDIX THREE

INTERVIEW SCHEDULE FOR LIBRARY USERS

1. Do you frequently use the university library systems for your research output?
2. What is your perception of the available ICT facilities that are used for research output?
3. How have the library staffs facilitated your research output by using the available ICT facilities?
4. What challenges do you encounter while using ICT facilities for research output?
5. What are the possible solutions to the problems you have mentioned above?

APPENDIX FOUR

OBSERVATION CHECKLIST FOR LIBRARY USERS

Please Tick	YES	NO
1. Utilization of ICT facilities in research output by students.		
2. The extent to which ICT facilities are being utilized for research output?		
3. Do the students utilize the library for research output frequently		
4. Are there ICT facilities that are frequently used by students for research output?		
5. Ascertain if the students are computer literate		
6. Do the student frequently uses the librarian's assistance while utilizing the ICT facilities for research output?		
7. Factors inhibiting against utilizing ICT facilities for research output?		