

**Access to and impact of information technologies at Balme  
Library, University of Ghana**

BY

DANIEL AKWASI AFRANE

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SUPERVISOR: Prof T B VAN DER WALT

CO-SUPERVISOR: Mr L S MNCUBE

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**DECLARATION**

I, Daniel Akwasi Afrane declare that **ACCESS TO AND IMPACT OF INFORMATION TECHNOLOGIES AT BALME LIBRARY, UNIVERSITY OF GHANA** is the outcome of my own research done under the supervision of Prof. TB. van Der Walt and Mr LS Mncube, except for references made to other works which have been duly acknowledged.

This dissertation has not been submitted to any institution for the award of degree.

.....

Daniel Akwasi Afrane  
**(Student)**

Date.....

.....

Prof. TB Van der Walt  
**(Supervisor)**

Date.....

.....

Mr LS Mncube  
**(Co-Supervisor)**

Date.....

## ABSTRACT

Libraries, particularly academic libraries implement technologies to enhance their services to promote teaching, learning and research. In this thesis the impact of information technologies (library technologies) on delivery of services at the Balme Library of the University of Ghana was evaluated.

The researcher adopted the multi-methods approach to the research by using a semi-structured questionnaire to collect data from users (students) of the library and para-professional staff of the Balme Library of the University of Ghana who formed one group of the study. The interview was used to collect data from professional staff of the library who on the other hand formed the second group of the study.

Responses of the data collected from the two groups formed the components of the study and data collected quantitatively were analysed using univariate analysis method and interpreted by the descriptive and inferential statistics method. The qualitative data, on the other hand, was analysed using the narrative analysis approach.

The findings of the study reveal that a variety of IT facilities such as computers, internet, photocopiers, scanners, braille embossers, magnifiers for reading, reference management software, video conference facility, electronic theses, electronic databases, automated library system, electronic past questions and the library website are available at the library and are very accessible to all users (students) and staff of the library. Students and staff of the library have good IT skills to utilise those resources. The findings also reveal that the IT infrastructure had positive impacts on the delivery of library services ensuring that users received the appropriate services they needed at the right times and places

The study found challenges of slow internet connectivity, unstable power supply, lack of IT skills, inadequate IT infrastructure among others and these hinder the maximum utilisation of IT in and out of the library and recommends periodic training of staff and users, proper maintenance of facilities, increase of internet bandwidth and better marketing of library services.

**Keywords: Information technology; Internet connectivity; Balme Library; Learning; Research; Library services; Impacts; Access; Automation; E-resources; Special needs.**

## DEDICATION

I dedicate this work to my dear mother of blessed memory **Faustina Akua Amankwah**, whose greatest desire was to see me through education to the highest level possible.

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# CHAPTER ONE

## INTRODUCTION

### 1.1 Background to the study

Information technology (IT) is generally accepted as a crucial tool that enhances and promotes efficiency across sectors of development (Oliveira & Martins 2011:110). Since the inception of IT, libraries have made efforts at developing and implementing various kinds of technological innovation to improve the delivery of services to users. Librarians have developed and installed devices and software that enhance their operations from the early 1970s (Blackburn 2011:664). They have done this through collaboration and partnerships with technology agencies and individuals bringing on board the needs of libraries and their patrons in the design and maintenance of these technologies (Bahri & Ibrahim 2013:21).

Anas, Iqbal, and Ahmad (2014:297) emphasise that a library becomes automated when all or most of its operations are performed by using computers and other IT tools. According to Amekuedee (2005:443), automation of a library is “the application of automatic and semi-automatic data processing machines to perform library functions such as acquisition, circulation, cataloging, reference service, and serials control”. The application of technology through automation of library services reduces possible human errors that may occur with the manual service delivery method.

Information technologies have improved over time. It is important that library professionals evaluate the impacts of existing and emerging information technologies regularly to adapt to the changes as library users equally advance in their needs and expectations. Buwule and Ponelis (2017:256) state that the adoption of IT systems by libraries help them to get both local and international access to knowledge sources that help to address national and global

development challenges. Librarians are challenged to investigate the future and anticipate the changing needs and demands of the university community in terms of information collection, storage, and dissemination. The practice will make it easy for management to explore and accept new information technologies and thereby release funds for purchases as academic libraries face a challenge with funding approvals from university administrators (Ingersoll & Culshaw 2014:109).

Information technology systems enable libraries to deliver services to patrons, for instance, telecommunications and networks enable libraries to reach their users at remote locations and provide services to them, the use of database systems for storage, retrieval and easy dissemination of information and more (Wang & Dawes 2012:76-78). Many libraries have set up and managed information services, administrative and management portals, inter-networks aimed at resource sharing, collection development and enhanced competencies using IT (Peyala 2011:308).

Online database systems have enabled libraries to reach and disseminate information to their users across various locations easily. Web 2.0 involved with the use of applications and services over the web (internet), has enabled libraries to create virtual services that aim at expanding user involvement and satisfaction (Mahmood & Richardson 2013:508-509). University libraries acquire IT systems to enhance teaching, learning and research output of their various institutions.

The University of Ghana library system has implemented various IT tools and infrastructure directed at the automation of services. Adanu (2006:102) reports that the central library of the University of Ghana, Balme Library, embarked on automation of services in 1995 following the desire of the University to attain world-class status. Amekuedee (1995:173) however



mentions that Balme library acquired its first computer in 1987. He states that the library started to use this computer for reference services in 1989.

The Balme library has currently installed other IT devices and software including a book theft technology system that prevents the stealing of books from the library. This has been of benefit to the management of the library as well as the University by saving them the cost of purchasing to replace stolen books. Balme Library undoubtedly benefits from the various IT infrastructures implemented as other libraries do, however these IT systems have not been evaluated over a long period of time regarding difficulties associated with them and in terms of patronage or use to ascertain if they have any impact on the delivery of services.

## **1.2 Statement of the problem**

It is the purpose of libraries to provide services that meet the needs and demands of their users, and the infusion of IT into library services has offered libraries a good opportunity to fulfil those aspirations (Asogwa, Ugwu & Ugwuanyi 2014:1134). The growth of IT in libraries have necessitated studies on their usage and impact on services as observed in studies by Adanu (2006:102); Amekuedee (2005:170); Badu (2005) and Dadzie (2005). Their findings show that institutions in Ghana have implemented one form of IT or the other. The purpose of this study was to find out what improvements are derived from the implementation and application of the IT systems in the delivery of library services. Preliminary literature investigations indicate that little research has been done on the topic in Ghana. Library managers particularly in academic libraries in Ghana and other parts of Africa struggle to measure the efficiency and effectiveness of their IT implementations and the extent to which their libraries meet the expectations and demands of users in the same regard. Veyala (2011:308) indicates how findings of a similar research he conducted would help library managers to promote the use of IT in libraries.

### **1.3 Aim of the study**

The aim of the research was to evaluate the impact of information technologies at the Balme Library of the University of Ghana on service delivery at the library. The research additionally analysed the expectations of library users in terms of IT implementation at the library

### **1.4 Objectives of the study**

In view of the aim stated above, the study addressed the following objectives:

- I. To ascertain the level of availability and accessibility of IT in the library.
- II. To determine the skills and competencies of library staff and users in IT.
- III. To analyse the expectations and experiences of users of the library in IT.
- IV. To determine the impacts of IT in the delivery of library services.
- V. To expose challenges and constraints to the use of IT at the library and recommend strategies for improvement.

### **1.5 Research questions**

The following research questions were answered to address the objectives of the study;

- I. What are the IT infrastructure available at the library?
- II. What are the skills and competencies of library staff and users in IT?
- III. What are the expectations of users of the library regarding IT?
- IV. How do IT systems impact/affect the delivery of services at the library?
- V. What challenges do librarians and their users encounter using IT tools in the library?

## **1.6 Justification of the study**

The growth and use of IT in libraries have necessitated studies on their usage and impact on services, as observed in studies by Adanu (2006:102); Amekuedee (2005:170); Badu (2005) and Dadzie (2005). Their findings show that institutions in Ghana have implemented one form of IT or the other. However, those studies have not evaluated entirely the usage, quality, perceptions, and levels of satisfaction of IT by library staff and users. The researcher, therefore, finds it imperative to conduct an evaluative study of the use and impact of IT on the delivery of services at the Balme library to complement the studies already done

Findings and recommendations from this study should be relevant to library service providers to help improve service delivery and guide them in making the appropriate choice of IT for their libraries based on user needs. Library users, on the other hand, will find information on what services are available to them by the library and will be in a good position to utilise those services to improve their research works.

## **1.7 Significance of the study**

The aim of this research was to analyse the impact of IT systems in the library. This study adds to the body of knowledge in the library and information science discipline by serving as a reference point for further attempts by researchers and librarians to investigate library services and IT.

A lot of the studies done on the topic focused on user statistics of IT facilities in libraries, this study, however, looked beyond that and evaluated the levels of awareness, ability to use IT as well as expectations and perceptions of both service providers and library users. The study further looked-out for new publicity strategies that helped the library to improve user patronage and skills in IT facilities usage.

## 1.8 Definition of terms

- **Information Technology (IT):** Ingersoll and Culshaw (2014: xiii) define information technology as “the term used to designate the broad field encompassing areas such as telecommunications and networking, information delivery, office systems, expert systems, digitisation, speech recognition, hardware and software, data formats, and database systems.”

The *Oxford Living Dictionaries, English (2017)* defines IT as “The study or use of systems (especially computers and telecommunications) for storing, retrieving, and sending information.” Considering the broad nature of the definition by Ingersoll and Culshaw, this study will use and refer to IT as such throughout the research.

- **Library automation:** According to Anas, Iqbal and Ahmad (2014:297), Ahmad and Iqbal (2009) define library automation as “ the use of computers and information technology in library operations such as acquisition, cataloging, circulation, and serial control”.

Amekuedee (2005:443) also defines library automation as “the application of automatic and semi-automatic data processing machines to perform library functions such as acquisition, circulation, cataloging, reference service, and serials control”.

The definition of Anas et al. will be used to refer to library automation in this study.

- **Assistive technologies:** “The term assistive technologies refers to the equipment, devices and apparatus, and the services, systems, processes and adaptations made to the environment that supports and facilitate their functions, used by persons with special education needs (Erdem 2017:128).”

Saleem and Sajjad (2016:46), quoting Rose, Hassel, Stahl, and Zavala, (2005) define assistive technologies as “technology that increases, improve, or maintains the functional capabilities of students with disabilities.”

Salem and Sajjad's definition will be used to refer to assistive technologies in this study.

- **Impact:** The term as used in this study refers to “ a marked effect or influence” as defined by the *Oxford Living Dictionaries, English (2017)*.

## **1.9 Review of literature**

Randolph (2009:1) and Webster and Watson (2002:1) point out that a literature review provides a foundation upon which the research builds. Randolph (2009:1) further argues that good research cannot be done if the researcher does not have a good understanding of the field of research. The literature review generally provides a basis to ascertain if the chosen topic for the research is worth investigating or studied (Creswell 2014:23). The following provides a summary to review of existing literature on the topic. Chapter two of the study provides detailed literature review.

### **1.9.1 Information technology in libraries**

Yu (2007); Liu (2011); Bahri and Ibrahim (2013); Makori (2013); Mahmood and Richardson Jr (2013) and Yuvaraj (2016) write about the current technologies libraries are using to complement the existing automated systems such as Lifi technology, RFID, web 2.0

Many researchers have done studies to evaluate the adoption, use, and effects of IT in libraries. Ntui and Inyang (2015) conducted a study to investigate the utilisation of ICT among 225 library staff members of the University of Calabar and Cross River University of Technology in Nigeria. They sought to find the effectiveness of ICT on the job performance of the library staffs of the two universities and their findings indicated that the use of ICT and job effectiveness related significantly. A similar study was conducted in India by Husain and Nazim (2015) to analyse the use of different IT tools in selected academic libraries. Their study found low patronage of modern ICT facilities in Indian academic libraries with many of them

using the traditional ICT-based technologies to manage their libraries. Mbagwu, Reuben, and Emeka (2017); Kumar and Biradar (2010); Aharony and Shonfeld (2015) have equally done studies that investigated IT use, effects and difficulties associated with them.

Mahmood and Richardson Jr (2011) did a survey on the use of web 2.0 applications by academic libraries that belongs to the Association of Research Libraries in the United States of America. The study surveyed the websites of 100 member libraries to ascertain the various tools of web 2.0 and how they were used to support research. It was found that all the libraries under survey used different kinds of web 2.0 tools to market and promote their services, deliver instructions on information literacy among others, and the findings were similar to those of Awang and Abidin (2013) who investigated the use of web 2.0 in academic libraries in Southeast Asia. Mulla and Chandrashekara (2009); Ram, Anbu, and Kataria (2011); Adekunmisi and Odunewu (2016); Tella and Soluoku (2016) did similar studies on web 2.0 in libraries and their findings and recommendations are similar to each other. Details of information technologies in libraries are discussed in Chapter two.

### **1.9.2 Perceptions and expertise of library staff in IT**

A study done by Bilandzic and Johnson (2013) looked at how the penetration of IT has shaped the library as a place and changed the perceptions of library users.

Mohsenzadeh and Isfandyari-Moghaddam (2011) looked at the perceptions of staff on challenges associated with implementing digital libraries. The study was conducted in the seven regional branches of the Islamic Azad University (IAU), Iran and it reports that the staff of the libraries under study lacked adequate skills, and there was also a lack of suitable

equipment (IT tools). The study further recommends training programmes to be designed for staff to enable them to contribute effectively to managing digital libraries.

### **1.9.3 Assistive Technologies in Libraries**

IT has transformed libraries in many ways and enabled them to provide support and services to different users who have diverse needs (Erdem 2017:128). With the aid of IT, libraries can serve students with disabilities and other learning difficulties. Sunrich and Green (2006); Gasparini and Culén (2012); Saleem and Sajjad (2016); Erdem (2017); all conducted studies to investigate the use and effects of assistive technologies in libraries. The results of Saleem and Sajjad's study (2016:46) reveal that many of the libraries do not provide enough assistive technology to students and there was also a lack of awareness of assistive technologies among students, especially blind students. Gasparini and Culén (2012) conducted a descriptive case study on the use of iPad to support students with reading difficulties in Norway. The study shows the important role IT plays in enhancing the reading of students of their research works.

### **1.9.4 IT in Ghanaian libraries**

Badu (2005) on the other hand studied the automation levels in five Ghanaian university libraries and compared them with five others in the UK. His study revealed a relatively low application of IT in the Ghanaian university libraries while those in the UK used IT significantly to deliver services. Amekuedee (1995; 2005) and Adanu (2006) evaluated the automation and barriers to successful automation in some Ghanaian libraries. Their studies factored some perceptions of library professionals and users and Amekuedee (2005) recommends a critical evaluation of IT tools in libraries to ascertain their usefulness.

## **1.10 Research methodology**

Creswell (2014:3) emphasises that research methodology entails the strategies, theories, processes of inquiry, data collection, and analysis, among others, that the researcher uses to set and answer research questions from the research topic. The choice of a research methodology is affected by factors that may include the personal preferences of the researcher (based on their experiences in research) as well as other external factors such as the research purpose, target population and financial constraints (Pickard 2008:83-84). Chapter three of the study provide detailed methodology of this summary.

### **1.10.1 Research approach**

Research approaches outlined by Creswell (2014:4); Pickard (2008:14-18); and Johnson and Onwuegbuzie (2004:17-21) are the qualitative, quantitative, mixed methods and multi-methods approaches.

Qualitative research seeks to unravel the experiences, interpretations, and understandings of the population (individuals or groups) of the research problem in the social or human environment (Beck & Manuel 2008:10-11; Creswell 2014:4). In qualitative research, Powell and Connaway (2004:186-189) argue, that conducting a simple interview is not substantive, rather the researcher needs to use additional methods and as such may need to engage in repeated interviews so that one interview prompts another until the research questions are suitably answered. Qualitative data collection hence is a process and not a procedure (Powell & Connaway 2004:189). Creswell (2014:183) adds that qualitative methods research usually uses text and image data as compared to the quantitative approach that draws on numbers. He further points out that the qualitative approach consists of unique steps in data analyses as



researchers gather several forms of data rather than relying on one data source. Examples of those sources are interviews, documents, audio-visuals, and others (Creswell 2014:185).

Quantitative research, on the other hand, is typically used to test objective theories through a comparison of variables, this is done by comparing what and how many of the population believes, uses, or accepts (Beck & Manuel 2008:11; Creswell 2014:4). The quantitative research approach measures the amount or quantity of research to draw inferences and analyses (Beck & Manuel 2008:11). In a quantitative study, the researcher provides a numeric representation of opinions, attitudes or expectations of the sample population. The researcher then makes generalisations and predictions from those numeric descriptions (Creswell 2014:155). Powell and Connaway (2014:59) agree that the quantitative approach is suitable for a study where the variables of interest are quantifiable, such that hypotheses could be formulated from them and inferences are drawn out of samples.




The mixed-methods approach as defined by Creswell (2014:4) “is an approach to inquiry involving collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks.” The underlying assumption behind this method is that it allows the researcher to attain a deeper understanding of the research problem as compared to using a single approach. Terrell (2012:256), quoting Tashakkori and Teddlie (2008), defines mixed methods studies as “products of the pragmatist paradigm that combine the qualitative and quantitative approaches within different phases of the research process.” The mixed-methods approach to research has also been defined as “an approach that combines quantitative and qualitative research methods in the same research inquiry” (Venkatesh, Brown and Bala 2013:21). The various definitions point out a distinct feature of the mixed methods approach as using both qualitative and quantitative approaches to answer the research questions in a study. This method helps the

researcher to get a deeper understanding of their research problem and present a less biased finding on their study (Creswell 2014:14; Terrell 2012:256; Venkatesh et al 2013:21).

This research used the multi-methods approach which uses two or more research methods to conduct research studies (Venkatesh et al 2013:23). The conceptual difference between multi-methods approach and mixed methods approach is that mixed methods strictly combines qualitative and quantitative approaches while multi-methods allows the researcher to use two of a single approach e.g. two qualitative approaches in a single research and vice-versa. Or combine qualitative and quantitative approaches in a single research work (Johnson & Onwuegbuzie 2004:17; Creswell 2014:4; Venkatesh et al 2012:23). The choice of multi-methods approach was crucial for this research as it provided the avenue for a better understanding of the research problem and helped the researcher to produce reliable and valid analyses. Although this study largely used the quantitative approach, the researcher used the qualitative approach during the data collection and analyses phases to solicit the perceptions, expectations, and aspirations of the respondents since it is usually difficult to quantify those views in human-related studies. Hence the adoption of the multi-methods approach.

### **1.10.2 Research design**

A research design, as noted by Beck and Manuel (2008:24), provides the framework for carrying out the actual research. This is the stage where the researcher outlines activities that would be followed in collecting data. Leedy (1989), as cited in Beck and Manuel (2008:25), outlines four key questions the researcher needs to address when choosing the research design;

-  What data do you need?
-  Where will you get the data?
-  How will you get the data?

### ✚ How will you interpret the data?

The survey research method was adopted for this study. Lynn and Powell (2010:59-60) define survey research as “the research strategy where one collects data from all or part of a population to assess the relative incidence, distribution, and interrelations of naturally occurring variables.”

Kasunic (2005:3) also defines a survey as a “data-gathering and analysis approach in which respondents answer questions or respond to statements that were developed in advance.” From the two definitions, it was realised that the survey method was appropriate for the collection of data using human respondents or individuals as is mostly the case in social science research.

A survey is the best method to adopt when the researcher has a larger population to collect data from, it allows the researcher to make generalisations about opinions from a smaller portion of the larger population using strict processes (Kasunic 2005:3).

This study collected data from library staff at the Balme Library of the University of Ghana. A sample of the student population constituting both graduate and undergraduate was also part of the respondents. Responses from the two groups were compared and analysed to know the different perceptions and expectations. This helped library administrators to know what decisions to make when choosing and implementing technologies in the library. The survey method helped the researcher to collect data by asking questions through questionnaires and interviews.

### **1.10.3 Population**

Pickard (2008:60) defines population as “the entire set of individuals about which inference will be made.” Beck and Manuel (2008:24) also note that the population can be humans as well as things. The target population for research may include people/groups, websites, publications

and more, with certain characteristics that fit into the preferences of the researcher and can lead to the attainment of the research goals (Beck & Manuel 2008:24).

In order to answer the research questions, this study targeted library staff at the Balme library, and a sample of students (from all fields of study including students with special needs, randomly selected) as the population for the research. Their views, aspirations, experiences, and expectations on the accessibility of information technologies at Balme library were collected and analysed to answer the research questions and meet the objectives of the study.

Table 3.1 below provides the breakdown of the total population for the study.

**Table 1.1: Population for the study**

<b>Population Group</b>	<b>Number</b>
Library staff at Balme library (Professional & Non-professional)	118
Library users (Undergraduate & Postgraduate students including students with special needs)	39 249
<b>Total</b>	<b>39 367</b>
<b>Source: UG Facts and Figures (2019:26)</b>	

#### **1.10.4 Sampling**

Onwuegbuzie and Collins (2007:281), quoting the *American Heritage College Dictionary* (1993:1206), define sampling as “the process of selecting a portion, piece, or segment that is representative of a whole.” It states that sampling helps to identify the quality of the inferences drawn from the research findings. This research used the stratified random sampling scheme.

The stratified sampling scheme divides the population into sub-sections with groups that are related in respect of similar characteristics and a random sample selected from each group. The stratified sampling scheme is useful in research as it allows the researcher to divide the population into appropriate groups in order to apply both the qualitative and quantitative approaches to obtain a non-biased outcome from the findings of the research.

For that purpose, the population was sampled into two groups of respondents, namely library staff and library users. The library staff group consisted of professionals, and non-professionals alike while the library users' group was made up of post-graduate and undergraduate students. As at July 2019, the total number of students at the university was thirty-nine thousand, two hundred and forty-nine (39 249), while staff at the Balme library was one hundred and eighteen (118). Together, the total population for this study was thirty-nine thousand, three hundred and sixty-seven (39 367) out of which sampling was made. Out of the one hundred and eighteen (118) library staff, fourteen (14) were professional librarians representing twelve (12%) of the staff population; one hundred and four (104) were non-professionals, also representing eighty-eight (88%) of the staff population. There were 5 546 postgraduate students, making it 14% of the library users' population and 33 703 undergraduate students , representing 86% of the library users' population.

The researcher used proportionate stratified random sampling to draw respondents from the population. Proportionate stratified random sampling ensures minimised sampling errors and allows the sampling to have equal representation of respondent characteristics (Singh 2016:194). The proportionate stratified random sampling size is calculated by multiplying the sample size by the proportion ( $S_s \times P\%$ ). The researcher drew a sample size of 50 from the library staff population and a sample size of 150 from the library users' population. Therefore, the proportionate sample for professionals was:  $50 \times 12\% = 6$ . The sample size for the non-professional library staff was  $50 \times 88\% = 44$ . On the other hand, the sample size for post-

graduate students was:  $150 \times 14\% = 21$  and the sample size for graduate students was:  $150 \times 86\% = 129$ .

#### **1.10.5 Data collection instruments**

The researcher used questionnaires and interviews to collect data from the respondents. Rowley (2014:308) describes research questionnaires as “documents that include a series of open and closed questions to which the respondent is invited to provide answers”. Questionnaires are important for the collection of data about people such as their experiences, behaviours, opinions and other original information about them (McGuirk & O'Neill 2016:246). This study made use of semi-structured questionnaires to solicit the opinions, experiences, and expectations, among others of library staff and users of the Balme library to help achieve the objectives. Both staff and students indicated as respondents respond to the same questions from the questionnaires. The questionnaire was designed in two parts with the first part covering the general background information, IT competencies of respondents and availability of IT in the library. The second part contained statements on the impacts of using IT in the library and the perceptions and expectations of respondents. The questionnaire used the five-point Likert scale that ranges from ‘Strongly Agree’ to ‘Strongly Disagree’ for the statements. The questionnaire also provided spaces where necessary for respondents to write down their opinions. A section of the staff population (Professionals) were interviewed to find out factors that influence management decisions on IT implementation in the library.

A research interview is also defined as “face-to-face verbal exchanges in which one person, the interviewer, attempts to acquire information from and gain an understanding of another person, the interviewee” (Rowley 2012:260). She further explains that the interviewee could be selected to represent a group or chosen as an individual based on certain characteristics. The researcher used interviews to collect data for the qualitative aspect of the data collection

section. This helped the researcher to understand the attitudes, values, and experiences of the respondents.

#### **1.10.6 Validity and reliability of instruments**

It is important for a researcher to be concerned about the validity and reliability of the outcomes of his or her work. Lynn and Powell (2010:43) stated that research work is valid when its conclusions are true. They add that the study is equally reliable when the findings are repeatable.

The validity of a research instrument is determined by the extent to which that instrument can measure what it was designed to measure (Lynn & Powell 2010:45). They define instrument reliability as “the degree to which an instrument accurately and consistently measures whatever it measures.”

The researcher designed the questionnaire strictly to the objectives of the study to ensure its validity. The researcher also ensured that the questionnaires and interviews were conducted on the specified target population to ensure its reliability. The researcher ensured that the population was equally represented in their respective jurisdictions to avoid an occurrence of bias in the outcome of results.

#### **1.10.7 Data analyses and interpretation**

Beck and Manuel (2008:31-32) believe that the data analysis and interpretation stage of the research process is very crucial. According to them, this is where conclusions and inferences are made by carefully looking at the data gathered from different angles and perspectives.

Data gathered by means of questionnaires was analysed statistically using the data analysis software, Statistical Package for Social Sciences (SPSS, version 25) after the data had been

coded into a numerical format. Using SPSS, the researcher analysed the coded quantitative data by univariate analyses method considering that there is a single variable (impact of information technologies on library services) identified for the research. The researcher interpreted the analysis using the descriptive and inferential statistics method. The descriptive statistics method was used to describe the data in terms of what values were achieved for each variable. The researcher compared percentages in variables to determine what relationships might exist among them. The inferential statistics method was also used to make judgements or draw inferences from the projections from the descriptive analyses.

The qualitative data that collected by face-to-face interviews, was analysed using the narrative analysis approach. By this approach, the researcher shared his understanding of the personal experiences and opinions of respondents of the research (Pickard 2008:241). The outcomes of the data analysis were compared to those of previous studies in the discipline. After seeking both institutional and individual consent of respondents and their institutions, the researcher conducted interviews using an audio recorder in plain English language. Those recordings were transcribed into text for analyses and interpretation. Following the ethical measures, the researcher ensured that all transcribed texts remained exactly as spoken in the recording by the interviewees. The questionnaire for students with special needs (specifically the blind) was brailled to enable them to respond to the research, their responses were then transcribed to plain text for analyses.

### **1.11 Ethical considerations**

Ethics are very important in research, particularly social science research where humans are mostly the subjects of the research (Lynn & Powell 2010:68). Each individual participant in the research study deserves the right to know that they are being studied in the research, they must also understand the purpose and reason why they are being studied (Bell, 1999 cited in



Pickard, 2008:71). Beck and Manuel (2008:250) state that the researcher must seek the informed consent of every prospective subject of the study or their legal representatives.

The University of South Africa's (UNISA) policy on research ethics carefully outlines the institution's guidelines for conducting ethical research (UNISA, 2013). The researcher complied with all the provisions stipulated in the UNISA policy on research ethics and took responsibility for ensuring that the study was conducted ethically. In that manner, the researcher got approval from the research and ethics committee of UNISA before collecting data. The informed consents of all prospective respondents were sought as well as those of their respective institutions and departments.

The researcher kept all information gathered confidential and used them solely for the purpose of the study and protected the identities and privacies of respondents.

Additionally, all literature sources consulted are duly acknowledged and cited in accordance with UNISA's referencing style.

## **1.12 Study outline**

### **1.12.1 Structure of the study**

The study was divided into six chapters with each chapter addressing a portion of the research. Chapter one consists of the background to the study, the statement of the problem, aims, and objectives, research questions, justification and significance of the study, definition of terms.

Chapter two deals with a literature review on the topic of the research. Existing research works on the topic were consulted and analysed in relation to the current study to determine the knowledge gap on the subject area of the study.

The research methodology of the study forms Chapter three, including the research design, research approach, data collection instruments, sampling and target population of the study.

Chapter four deals with data collection and analyses.

Chapter five outlines the presentation and interpretation of research findings.

Finally, chapter six presents recommendations, conclusion, and a summary of the research.

# CHAPTER TWO

## LITERATURE REVIEW

### 2.1 Introduction

The first chapter presented an overview of the research and the research problem relating to the use and impact of information technologies at the Balme library of the University of Ghana. In this chapter relevant literature on the topic is reviewed and analysed. The literature review provides a good understanding and sets the research in the proper context. The chapter seeks to get a good understanding of the impact and use of information technologies in libraries. Several studies have been conducted to identify what effects information technologies have had on library services. A lot of them used case studies and theories to explain the status and situation of libraries and how they use IT to serve their users.

The relevant literature were reviewed with the focus on perceptions, experiences and expectations of librarians and library users on information technologies in libraries, availability of information technologies in libraries and their levels of access and use, the skills and knowledge of librarians and users in the existence and use of IT, the impact of the information technologies on the delivery of library services as well as the challenges associated with them.

### 2.2 Information technology

The term information technology appears in every field of operation including academic institutions (libraries in particular) and several other areas. This is largely due to the diverse nature of information technology, providing solutions to problems and making work easier and more efficient (Gangadharaiah 2009:17). Mitić, Nikoli, Jankov, Vukonjanski and Terek (2017:88) agree that information technologies are essential tools for institutions as they provide the necessary information for good decision making. De Mattos, Kissimoto and Laurindo

(2018:143), in their research on crowdsourcing, add that information technology has enabled the development of virtual platforms that allow institutions to collaborate to build and strengthen relationships. The results of a research study by Altinay, Dagli, and Altinay (2016:1) revealed that collaboration, transparent management, and teamwork are enhanced through information technology and its application in organisations. Their research was focused on schools where they sampled the views and expectations of school leaders and teachers.

In line with the definition of IT by *Oxford Living Dictionaries, English (2017)*, Rossiter (2018:131) describes information technology in six steps as: “(1) data processing ; (2) digital data storage; (3) digital information sources; (4) computer operating systems; (5) computer programs; information standards; (6) communication & networks; and (7) digital sensors (satellite, air, field, lab.) and their associated digital infrastructure to convert raw sensor data into information products.”

Gangadharaiah (2009:17) traced the advent of information technology to the period when the printing press was established to replace the manual writing of books making it easy to print more copies of books at a time. Gangadharaiah further acknowledged that information technology became popular when computers were invented and expanded information technology services and prospects. Several of the research sources on information technology are centered on developed countries and they express the importance of the degree to which they need to be implemented and used. However, most of them do not look into the actual implementation methods and the rate at which information technologies meet the needs of institutions and their users (Mitić et al. 2017:90).

### **2.3 Libraries and information technology**

Libraries, from their inception, have made efforts at controlling their collections and how they disseminate information and documents. Jost (2016:1) describes how the ancient library of Alexandria kept unique identifiers for each of their papyrus rolls for the purposes of dissemination and retrieval. The growth of technologies and their wide range of applications brought phenomenal change and transformation in all aspects of life and thus entered into the library and information science field. Mohsenzadeh and Isfandyari-Moghaddam (2009:986-987) claim that IT was adopted by libraries in the 1960s when information technologies were mostly used by academic and research libraries to improve the delivery of their services. On the other hand, Yang and Li (2016:2) assert that the proliferation of the internet in the 1990s changed the manner in which libraries provided their services and paved the way for technological advancement in the library and information science discipline.

Information technologies have revolutionised the functions of the traditional library which was merely the warehouse of books and thus transforming them into digital libraries. Libraries were enabled to digitise and easily disseminate their collections, and there is now collaboration and resource sharing among libraries (Gangadharaiah 2009:12).

### **2.4 Information technologies in libraries**

Libraries have enhanced and integrated information resources and services using internet platforms and emerging technology tools in the field of computer, network and telecommunication technologies (Yang & Li 2016:1). Technological advancement is rapid and offers better opportunities to industries. Since the technological revolution, there has been continuous development of new technologies for libraries to enhance delivery of services (Chow & Bucknall 2012:105). Sammeta and Madara (2017:662) state that library and

information science is an emerging discipline that continuously explores new methods and systems as the needs and aspirations of users grow. Chow and Bucknall (2012:106) admit that libraries may not be able to implement every new technology that comes into the market. However, libraries need to match the needs of their users and institutions to new technologies to make long term investments into these technologies (Chow & Bucknall 2012:106).

Several library technologies have been in place while new technologies are emerging. Libraries use different kinds of these emerging technologies such as social media tools, e-books, tablets, assistive technologies such as closed-circuit TV (used by visually impaired users to read and write); braille embossers (used to print documents out in braille format) to provide diverse services to their users (Evans 2012:164). Most of these technologies are found and used in libraries in advanced countries like the United States, United Kingdom, and other European countries. Some African university libraries and public libraries have equally acquired these technology tools (predominantly South Africa).

#### **2.4.1 Integrated library automated systems**

Automation of library services is usually the first approach most libraries take to enhance the quality and accuracy of their services. Anas, Iqbal, and Ahmad (2014:297), quoting the Webster's online dictionary, define automation as "the method or system of operating or controlling a process by highly automatic means, as by electronic devices, reducing human intervention to a minimum." They consider a library as fully automated if that library applies information technology and computers to most of their services such as acquisition, cataloguing, circulation, serials, course reserves, and others. Ojedokun, Ola and Adigun (2016:34) and Boateng, Agyemang, and Dzandu (2014:2) acknowledge that an increase in the

collections of libraries, change in user-demands, fast and efficient processing of documents, among other factors, necessitate the adoption and implementation of automation in libraries.

In their research on the implementation of the library automation at the University for Development Studies in Ghana, Thompson and Pwadura (2014:73) outline some of the challenges encountered during and after the automation implementation process. They point out inadequate power supply as a big challenge. The university did not provide constant supply of power to the library and the frequent outages in power supply damaged their electronic equipment and caused delays in progress of the work. Inadequate staff skills in ICT, improper maintenance culture and lack of finance are also mentioned as challenges associated with the automation of library services (Thompson & Pwadura (2014:73).

#### **2.4.1.1 Automation software (open source vs commercial)**

The choice of software for a library's automation is crucial to the success or failure of the project. Library managers have the duty to analyse and select the appropriate software that meets the need and demand of the library and its users. Thompson and Pwadura (2014:73) state that the University for Development Studies' library in Ghana chose the Alexandria Library Management software on the basis that the software is user-friendly, the experiences of other libraries that adopted the software earlier, affordable and above all there was the provision of technical assistance and support by the vendor.

There are several library automation software programmes available ranging between open-source (free) and commercial or proprietary (paid) options when acquiring one. The choice of software from either of the two categories depends on the institutional budget, their staff strength in terms of skills and capabilities. Pratheepan (2014), Upasani (2016) and Pruett and

Choi (2013) outline the advantages and disadvantages of both the open-source and commercial software for automation of library services as follows;

**Table 2.1 Open source versus commercial**

<b>Open Source</b>		<b>Commercial</b>	
Advantages	Disadvantages	Advantages	Disadvantages
Free and cost-effective to implement and operate	There is no “owner” of most open source software and thus it is difficult to assign accountability.	Technical support and training available	Expensive to acquire and maintain
Users can share or redistribute software	There may be no technical support. Users need to hire the services of a technician to maintain the software		Users may not share, resell or further distribute software
Users may modify the software to any level of their satisfaction			Only the vendor holds the right to modify the software.



#### **2.4.2 Digitisation and institutional repository**

Agbo (2015:256) and Nnenna and Ume (2015:35) agree that the concept of digitisation has become a household business of libraries, especially academic libraries. They clearly state that digitisation is essential for the preservation and dissemination of information in the easiest way possible. When digital materials are shared over the internet, accessibility becomes easy and fast, such that millions of users can access the same information at the same time (Agbo 2015:256; Otubelu & Ume 2015:35). Several authors have defined digitisation in diverse ways. Pandey and Misra (2014:136) simply define digitisation as “the process of converting analogue information to a digital format” while Fabunmi, Paris, and Fabunmi (2006:23) also define digitisation as “a process in which materials are converted from the hard copies to electronic copies.” Their definitions are presumably the same in context with different terminologies. Conversion of an item from one state to another (digital) is reflected in their definitions. Otubelu and Ume (2015:35-36), quoting Gbaje (2007) and the Cornell University Library (2001), describe digitisation broadly as “the process of converting non-digital born documents into digital format, this includes selection of collection/materials, imaging or scanning, transcribing, creating mark-up and index, creating metadata, processing images, uploading to the web, preserving and maintaining archival media.”

It is the transformation of information from whatever forms or from whatever support to digital code using computer technology. This may include electronic snapshots taken of a scene or photograph, films, manuscripts, printed texts and artworks scanned from documents (Otubelu and Ume 2015:35-36).

A major challenge most institutions face, is funding for digitisation projects as the equipment and technology are expensive. Fabunmi, Paris and Fabunmi (2006:24) found that the greater number of institutions involved in digitisation projects in the United States are academic

libraries and they have done so through collaborations with their national library and other funding agencies. As indicated in the findings of a study by Dadzie and Van der Walt (2015:104), the University of Ghana's library (Balme Library) started its digitisation project with funds from the Royal Tropical Institute of the Netherlands (KIT).

The process of digitisation would not be complete without a proper storage and dissemination medium as indicated earlier. Institutional repositories complement the digitisation process by providing the platform for storage and dissemination of digitised resources and information (Bhardwaj 2014:186). Zhong and Jiang (2016:739) believe that an institutional repository is a sustainable way of disseminating and preserving the intellectual output of an institution. Their research describes the state of open access with focus on institutional repositories in China. Development and research on institutional repositories are relatively low in Africa. Bhardwaj (2014:198) in his research titled "Institutional repository literature: A bibliometric analysis" found that the United States of American is the leading country in terms of deployment and publishing of research on institutional repositories. The United States of America is followed by the United Kingdom and Germany respectively. Bangani (2018:40) confirms the low development of IR in Africa in his study of the history, deployment, and future of IR in South Africa, the leading nation on the development of IR in Africa. His research found that institutions, particularly academic libraries, started to deploy IR in the year 2000 and there is little publication or research on the subject matter of IR in Africa.

### **2.4.3 Assistive technologies**

Libraries have the responsibility to provide information and services to their patrons both with special needs and those not, for that purpose they are required to acquire specialised equipment that would assist those students with disabilities (Sunrich & Green 2006:30). Assistive

technologies are very essential innovations that are providing a relatively equal opportunity for people with special needs or disabilities in one form or the other to education and other services in society (Koulikourdi 2008:387). Erdem (2017:128) adds that aside from the provision of opportunities to education, assistive technologies build the confidence and help people with disabilities achieve a better quality of life and, they can independently take control of their studies and interactions with their peers.

Rose, Hassel, Stahl and Zavala (2005) Saleem and Sajjad (2016:46); Koulikourdi (2008:387) and Borg, Lindström and Larsson (2011:20), define assistive technologies in simple terms using similar terminologies as “technology that increases, improve, or maintains the functional capabilities of students with disabilities” and “products, devices or equipment that are used to maintain, increase or improve the functional capabilities of people with disabilities.” Their definitions highlight the use of tools to aid the functionality of people with disabilities. However, Erdem (2017:128) provides a detailed definition of assistive technologies as “the equipment, devices and apparatus, and the services, systems, processes and adaptations made to the environment that support and facilitate their functions, used by persons with special education needs.” His definition covers a wide range of the subject areas and explains all that goes into providing the services and devices that support students with special needs.

Assistive technologies have been categorised into various groups by different authors. As cited by Erdem (2017:130), McCulloch (2004), for example, categorised assistive technologies into “low technologies, such as magnifiers and pencil holding devices, and high technologies, such as computers.” Some researchers (Reed, 2007; Gierach, 2009; Day, Dell and Smith, 2011; Coleman, 2011) categorise assistive technologies based on the reading, writing, visual, hearing, and communication skills and competence that students are expected to acquire within the education process. McKnight and Davies (2013), on the other hand, propose that assistive technologies should be analysed by being grouped according to the concepts of 1) users' needs,

competences and aims, 2) technologies and capacities, and 3) content (e.g. educational content).”

Most of the research done on assistive technologies are done on institutions in the United States of America and Europe with little or nothing in Africa, although some academic libraries in Africa have adopted and implemented assistive technologies. Koulikourdi (2008:387), research on the use of assistive technologies in Europe, projected that by 2020 the number of people with disabilities would increase from 11 to 17 percent and therefore innovation and ideas of the developers of AT will need to increase tremendously as demand for AT goes high.

Sunrich and Green (2006:29-33) and Cassner, Maxey-Harris and Anaya (2011:33), sampling some universities in the United States of America for availability of assistive technologies for students with blindness and visual impairments, found that there were approximately ten million people with blindness and visual impairments and out of that number over 450000 attended colleges and universities. The World Health Organisation (2016) and Saleem and Sajjad (2016:46) also estimated people with visual impairment at 285 million worldwide, out of which 39 million are blind and the remaining 246 million have low vision. As reported by Borg et al. (2011:20-21) and Cassner et al. (2011:33) developing countries with low and middle income like those in Africa have less than 15% of students and people with special needs, a percentage that is relatively low compared to some developed nations yet they have not been able to provide adequate infrastructure (assistive technologies) to meet the needs of these students. In that regard, there is a demand for more assistive technologies to support the students.

Institutions are required to acquire and implement AT if they admit students with special needs, the responsibility does not end with just buying and implementing the technology as the need to train both staff and the users to properly utilise the infrastructure. This will promote teaching

and learning and give value to money invested in the technologies. Additionally, it bridges the gap between students with disabilities and regular students by providing an avenue for them to properly pursue the same courses of their aspiration.

**Table 2.2: Assistive technologies in academic libraries**

<b>Technology</b>	<b>Uses</b>
JAWS for Windows	Windows screen reader
Kurzweil 1000	Text to Speech software
Braille Embosser	Prints texts to tactile braille cells
Digital recorders	Recording audio for blind students
Closed Circuit Television	Electronic desktop Magnifier for visually impaired students
Handheld Magnifier	Non-electronic Magnifier for low vision students
Tablet PC's (example, iPad)	For students with reading difficulties (Gasparini & Culén 2012:28)
Web-braille	A service that allows users to get online braille books (Sunrich & Green 2006:35)

#### **2.4.4 Electronic resources/databases**

Widespread and easy access and use of the internet has in recent years shaped the ways and manners by which researchers and information seekers gather information relevant to their needs (Shuling 2007:73). Shuling (2007:73) opined that investigations into the statistical analyses of the availability and use of electronic resources were at the time, the current trend in the library and information science field of study. Tlakula and Fombad (2017:862) state that

the library's electronic resources have grown from databases on CD ROMS to the current online journals, databases, e-books and more.

Libraries have resources in both print and electronic formats but as stated by Imsong and Kharbudon (2016:32) users are more attracted to the use of electronic resources largely due to the availability of the internet and its associated ease of use. Some of the library's electronic resources are available over the internet and this makes accessibility easier in such a way that a large number of users can access a single document at the same time from different locations. Akussah, Asante and Adu-Sarkodee (2015:33), citing Dadzie (2007), also allude to the advantage of the library providing electronic resources in the sense that users get current information and on time. There is also a break-down of the barrier to access to relevant information irrespective of the user's geographical location and or finances.

Imsong and Kharbudon (2016:32) however, caution that the library has the responsibility of creating awareness of their electronic resources and providing training programmes directed at improving the search skills of users to enable them to conduct effective literature searches on the online journals and databases.

As stated by Shuling (2007:73), the library can conduct statistical analyses on the use of their print resources using user-registered logs while administrators of electronic databases provide statistics on the use of electronic resources by the frequency of user logging. Shuling (2007:73) further argues that these statistics provided by databases do not meet the needs of the library justifying the research done on user statistics of electronic resources in libraries.

Findings of the investigations and analysis of the use of electronic resources at the library of Shaanxi University of Science and Technology in China by Shuling (2007) indicate that users of the library are aware of electronic resources and are satisfied with them yet their primary source of information has been the print literature from the library. Shuling concluded from his

findings that despite the usefulness of electronic resources (particularly e-books), they are not a substitute for the printed materials in the library.

Tlakula and Fombad (2017:876-877) surveyed the use of electronic resources by undergraduate students of the University of Venda in South Africa and found that their overall level of usage was low. Their research indicates that the low level of e-resource usage among the undergraduate students was mainly due to the lack of awareness and search skills and they recommend that librarians need to organise periodic training sessions aimed at enhancing the search skills of students as well as creating awareness of library resources. On the contrary, the thesis research of Dolo-Ndlwana (2013:65-66) that focussed on e-resources use and their value for academics and post-graduate students at the Cape Peninsula University Of Technology (CPUT) in South Africa revealed that the majority of the respondents were well aware of and use electronic resources of the library and they did so primarily for the purposes of academic work. He found a problem with the availability and accessibility of e-resources and recommends library technicians to ensure that electronic resources are available regularly.

In Ghana, Ankrah and Atuase (2018:24-35) and Akussah et al. (2015:37) conducted studies to analyse the use and impact of electronic resources and found that library users are generally aware of available electronic resources in their respective universities and use them. 73% of the respondents of Ankrah and Atuase's study were aware of electronic resources which could be attributed to the proactive awareness creation by the library staff through orientations, seminars/workshops, library guide, library website. They however recommend that librarians should do more to increase the awareness and search skills of library users.

#### **2.4.5 Social media tools**

Canty (2012:1) opines that social media has become one of the most remarkable features of the internet that is widely utilised by users. He claims that 22% of internet time by users is spent on social media sites or applications and this has provided a basis for many organisations to prioritise social media in their daily activities to maximise productivity. Perera (2015:2); Wasike (2013:9); Young and Rossmann (2015:20) agree that social media tools are dynamic and offer collaborative platforms for librarians to interact with their users in real-time. This provides an opportunity for users to interact with inventors and get future collaborations with them on projects.

According to Wasike (2013:8), social media encompasses “Blogs, Wikis, MySpace, Facebook, Social marks, Podcasting, Mash-up, YouTube, RSS, Flickr, Tag Cloud, Folksonomy, Twitter, among others.” A study on social media usage and user engagement in academic libraries in Montreal (Canada) found that Facebook and Twitter are commonly used in academic libraries (Winn, Rivosecchi, Bjerke & Groenendyk (2017:297). Stvilia and Gibradze (2017:257) state that social media can be very useful for marketing library resources and services. Their study conducted in a large research university in the United States, titled “examining undergraduate students' priorities for academic library services and social media communication” found that users of the library perceived postings of updates and information on the library’s social media the most useful. A study by Kim and Sin (2016:74) in Nanyang Technological University (Singapore) on the use and evaluation of information from social media identified a gap between the search approach undergraduates and librarians used. There were differences in the strategies used by the student group and what the librarians considered useful. They, however, found that both librarians and the students consulted similar social media platforms for their information seeking needs and purposes.



According to Harrison, Burrell, Velasquez, and Schreiner (2017:248), a survey conducted in 2006 on librarians' attitudes on the use of social media, indicated that the majority of them considered social media, especially Facebook, outside the terrain of professional librarianship. However, there has been a transformation - in 2013 over 86 percent of librarians used social media and 30 percent posting on them for academic purposes (Harrison et al. 2017:249).

## **2.5 Services in academic libraries**

The value and worth of every academic library lie within the kind of services it renders to its users and the way and manner by which those services are structured and delivered. (Singh, nd). The quality of services is equally important as well as the strength and skill levels of the staff of the library in ensuring that the library fulfils the objectives and visions of the university (Singh, nd).

Services that will be provided by the library need to be developed based on the assessment of the information needs of users and the prospective users of the library. Library professionals and managers must make arrangements for periodic evaluation and assessment of the library services due the possibility of changes that may occur in user needs over time (Janes, Carter & Memmott 1999:39-40).

### **2.5.1 Planning academic library services**

Singh (2014:15) emphasises that the planning of academic library services must encompass the larger objectives and visions of the university and should, therefore, be relevant to teaching and learning, helping faculty and student researchers within and out of the university. Services provided by an academic library should promote research that would enhance the academic status of the university and its image (Decker & Hermelbracht 2006:558).

Gonzalez and Bennett (2014:3-7), Adeyoyin (2005:497) and Singh (2014:13) outlines some important factors to consider when planning academic library services:

- External environments such as technological, social and economic forces.
- Internal environments
- User community
- Levels of service.

### 2.5.2 Types of academic library services

Singh (2014:16) categorised academic library services into;

- **Reference service:** He quoted S. R. Ranganathan who defined reference service as “the process of establishing contact between reader and book by personal service”. The emphasis here is on personalised services the reference librarian offers to users of the library that helps them to effectively utilise library resources. Cassell and Hiremath, (2018:4) point out that reference service has gone beyond just the usual one on one assistance given to users, libraries now offer digital reference services by using the internet and other information technology tools. They further explain that this service involves the use of the web (internet) and applications to respond to user queries and aid on information retrieval.
- **Bibliographic service:** A report on bibliographic services at the University of California (The University of California Libraries 2005:11) mentions that bibliographic services are very essential to research support endeavours of an academic library. The report states that “we provide tools in the form of catalogues, indexes and abstracts, and web pages that link our users to the materials they want. What we fail to provide is seamless, simplicity, and common language searching.”

Bibliographic services, as described by Dhamdhere, De Smet and Lihitkar (2017:53), are “services related to the library collection and access to those collections, whether print or online.” The University of California’s report alleges that many academic libraries in their attempts to provide bibliographic services fail to make the service “seamless, simple, and do not use common language searching.” Dhamdhere et al. (2017:54) recommend that librarians should try to serve users in the easiest way possible - for example by “preparing instructional videos, blogs, tutorials, demos, subject guides and reach and educate patrons through various social networks.”

- **User education:** As far as library resources and services are concerned, user education plays a key role in ensuring that library users make optimum use of the library (Singh, 2015:41). Kumar and Phil (2009:3), quoting Shahi (2008) define user education as “a process of activities involved in making the users of the library conscious about the tremendous value of information in day to day life to develop interest among the users to seek information as and when they require”. They further state that user education in an academic library is a life-long activity that does not end. The infusion of technology into library service provision means that users need continuous training on the use and access of library resources. Chalukya (2015:2) also emphasises that user education in the library enhances the image of the library and strengthens the relationship between library users and librarians. He, however, alludes that user education comes with a cost considering the infrastructure build-up. Uwakwe (2016:12) disagrees with Chalukya and states that user education in the library must not bring additional cost to the user and must be incorporated into the schedules of the library.

User education provided by academic libraries may include, but is not limited to orientation (lecture methods, library tour, tutorial, printed guide, video, self-instructional materials), bibliographic instruction (usually designed to teach library

users on the use of resources and their sources), information literacy programmes (created to introduce users to how, when and why to use certain information resources in the course of their research studies. Many universities have made information literacy programmes compulsory to students and contribute to their final average score) (Singh, no date) and (Chalukya 2015:4-5). Chalukya further adds that librarians need to offer intensive training on information searching and retrieval for faculty as they require the requisite search skills to improve on their teaching and learning process.

- **Indexing and abstracting service:** Academic libraries in their quest to satisfy and meet the demands of their users acquiring resources, be it electronic or print, and it, therefore, becomes imperative for librarians to organise these resources in a manner that their users could easily access and use them (Mohammed 2015:7). Musa, Musa and Musa (2014:21) state that academic libraries for centuries have used indexing and abstracting to serve their users by providing tools that help users to discover and manage information in their research activities. They are quoted stating that “indexes and abstract play a central role in the information retrieval process in academic settings. They facilitate rapid and easy access to information resources which to a large extent saves the time of the library user and lead them to pertinent and relevant sources of information.”

Researchers and other library users will encounter problems and experience disorganised information searching and retrieval if librarians do not plan and adequately develop retrieval tools such as index and abstracts opines, Garba, Mohammed and Umar (2015:42).

Akinwumi (2014:1), quoting the British Indexing Standard (BS 3700:1988), and Brown (2010) defines indexing as “a systematic arrangement of entries designed to enable users to locate information in a document.” Mohammed (2015:9), also quoting

Nwadozie (2007), describes abstracting as “the process of producing a brief summary (precise, or synopsis) of a document showing salient issues like the objective, scope, procedure or methodology, findings, discussions, and recommendations”.

The findings of Musa et al.'s (2014:28) study at the Nuhu Bamalli Polytechnic in Nigeria indicate a 62.5 percent usage of indexes and abstracts, a percentage that is slightly below average and they attribute the low patronage to a lack of awareness of indexes and abstracts by the users. A similar study by Mohammed (2015:13) in twelve special libraries in Zaria, Nigeria found that five out of the twelve libraries were not involved in building indexes and abstracts. They found that those that created indexes and abstracts mostly concentrated on journals and newspapers and usage by users was relatively low which they equally attributed to lack of awareness. Librarians have the responsibility to create awareness of the resources and services they render to their users and train them to use those services efficiently.

- **Reprographic and digitisation services:** Reprographic services have been one of the oldest services academic libraries provide as indicated in the work of Saffady (1975:147). He emphasises the need to incorporate reprographic study into the course content of library schools. Already in the 1975's Saffady considered reprographic services as photoduplication and microphotography as that was the common practice associated with reprographic services in libraries. These included photocopying and microfilm production of library materials.

However, the advent of modern technology has expanded the range of reprographic services as indicated in the definition of reprographic service by Agyen-Gyasi (2009:3) as “the reproduction of documents, graphics, or images, especially those that are

virtually indistinguishable from the original. It can be by mechanical, electronic, or photographic means such as photocopying or xerography, scanning, digital printing, and photography”.

Singh (2014:13) emphasises that reprographic services are providing support to research, teaching, and learning and outlines some significance of the service as:

“preserving material issued on poor quality paper, providing readable copies of very rare or precious material, increasing the accessibility of documents which are unique or few in number, reducing storage problems, and providing a means of publication for specialist material uneconomic to publish commercially”.

Modern academic libraries offer digitisation and 3D printing services in addition to the regular photocopying, text printing and microfilming and information technology specialists are researching into more sophisticated methods of reprography to improve library services (Gonzalez & Bennett 2014:6-7).

## **2.6 IT skills and competencies of library staff**

Information technologies in academic libraries as already mentioned, are geared towards the improvement of service delivery and Ayoku and Okafor (2015:502) state that the IT infrastructure requires librarians to be aware of and equipped with the requisite knowledge and skills to complement the use of these technologies and also to help users to understand and use them effectively. Hamada and Stavridi (2014:102) agree that librarians in the new era of technological advancement are expected to advance from providing only their traditional functions to becoming professionals who can facilitate, evaluate and manage information technology systems to provide services to their users.

Considering the skills required of librarians, there is a need for research to be conducted to determine what training programmes would be relevant to them. Hashim and Mokhtar (2012:152-153), in their study on “preparing new era librarians and information professionals” classified the skills needed by librarians to work efficiently into professional and personal skills. Their description of the professional skills is related to the IT expertise that librarians must acquire. According to them, academic librarians should possess the professional IT skills to have knowledge on content management systems and be able to evaluate them critically, be able to develop and manage information services that meet the needs of users and be able to use appropriate information technology to assist users. They outlined the personal skills as “seeks out challenges and sees new opportunities both inside and outside the library; creates an environment of mutual respect and trust; effective communications skills; committed to lifelong learning and personal career planning and others” (Hashim and Mokhtar, 2012:154).

Soo-Guan Khoo (2007), cited by Hamada and Stavridi (2014:103), on the other hand, describes the competencies of librarians in the context of his country Singapore as “traditional skills, value-added skills, IT, computer literacy, personal attitudes and traits, and subject knowledge”.

Ayoku and Okafor (2015:) and Missingham (2006:260) in their literature survey listed some specific IT skills librarians ought to have to improve their work: online database search, “use of computer applications, computer hardware, networks (LAN, WAN), internet searching, various electronic formats of materials, digital imaging and multimedia skills”.

An intensive research survey on the technology skills of librarians conducted by Burke (2015:1-4) received 2216 responses. These responses were received from 40 U.S states, 8 Canadian provinces, and 43 other countries. He admits that the respondents were not a perfect cross-section of librarians from all types of libraries as a higher number of them were from academic libraries. His survey sought to find the IT skills of librarians and as such asked questions on all the various IT infrastructure and services available in libraries as well as

emerging technologies. Findings of the survey indicated a positive response to the use of IT in libraries. 80 to 90 percent of the respondents were IT inclined and use their skills to assist their users.

In Africa, not much research has been conducted to ascertain the levels of IT knowledge and skills of librarians. In contrast, studies conducted by Ashcroft and Watts (2005); Ayoku and Okafor (2015); Owusu and Adjei (2015) Anyim (2018), mostly in Ghanaian and Nigerian academic libraries, reveals a low level of IT skills of academic librarians. Based on the results of their survey, Ayoku and Okafor (2015:521) conclude that a higher percentage of librarians in Nigeria lack IT skills and recommends that librarians need to acquire IT skills to determine a better future for academic and research libraries. Owusu and Adjei (2015:11740) also recommend that library staff should be trained by sending them to conferences, workshops and training seminars to equip and upgrade their IT skills so that they can manage their IT resources and serve their users effectively in this digital age.

A recent study by Oyewumi and Laaro (2018:25-26) on the “assessment of ICT competencies of library staff in selected universities in Kwara State, Nigeria” contrary claims that staff of the selected libraries are highly proficient in what they termed basic ICT skills (such as word processing, statistical analysis, electronic presentation as well as scanning and uploading for digitization of library resources) and intermediate ICT skills (library management software, database management, content management on library website/portal, use of internet, online selection and acquisition of library materials, information search using search engines as well as copying bibliographical information of materials online).

They, however, admit that their competencies in advanced IT skills are not as good as the basic and intermediate ones. Their recommendations include advocacy on governing councils and management of universities to provide the required IT infrastructure in libraries and funds for



library staff and development. They stress that library staff with high IT knowledge and skills should not be reluctant to train their colleagues and finally library schools should incorporate IT related modules into their curricular.

In South Africa however, the case is slightly different compared with Ghana and Nigeria. Earlier research done by Hoskins (2005:62) to investigate the ICT knowledge and skills of subject librarians at the university libraries of KwaZulu Natal (KZN) suggested an average IT skill level of respondents. She recommended staff training and development in IT and also suggested that library schools balance their curriculum to blend the traditional librarianship with IT. Raju (2014:169) studied the knowledge and skills for the digital era in academic libraries in South Africa. Her work looked basically into IT requirements found in Library and Information Science job advertisements and the hiring rate of librarians. Findings of his work indicate relatively good IT skills and knowledge of librarians.

## **2.7 IT perceptions and expectations of library users**

Information technologies evolved and advanced with time and generations and therefore libraries, especially academic libraries, had to adapt to the changing trends (Alharbi 2016:144; Atilgan, Özel & Çakmak 2014:661). Changes in technologies affect the ways and modes of service delivery in academic libraries and this awakened the need for librarians to study the perceptions and expectations of their users to enable them to make the right choices in selecting and implementing new technologies that will meet the needs and satisfy users (Becker, Hartle & Mhlauli 2017:2). Kim (2017:209) agrees with Becker et al. (2017:2) and adds that academic libraries should provide facilities and services that are primarily tailored to the needs, understanding, and expectations of users. He further explains that when an academic library adapts to the developing trends in IT services and infrastructure, it remains essential within the university community and attracts users to the library. Gowda and Lingaiah (2013), cited by

Prakash and Patil (2014:1), claim that the preference or choice of IT by users is dependent on the availability and nature of the IT infrastructure in the library.

A lot of studies have reported the use of IT in academic libraries, user expectations, and experiences. Swapna, Jagdish, and Manjula (2017:356) conducted a study into library users' perceptions and expectations towards the academic library in Mysore University Library in India. Their study found that many students visited the library to look for reading space, and respondents of the survey had the opinion that the quality of journals and book collection of the library was average. Most of the respondents had the expectation that librarians should understand user needs and be willing to offer help at any point in time. A similar study done in India by Bhattacharjee, Bhattacharjee and Sinha (2016:351-352), a case study among the student community belonging to different universities in Tripura, found that the majority of the respondents perceived the library to be a centre of excellence and expected that the library should engage with users more on social media tools. The findings show that the users were aware of and use social networking sites and therefore wanted the library to offer services in that direction.

Kayaoglu's (2018) research conducted in Turkey; sampling 643 respondents who were randomly selected from 15 public libraries also discovered that library users preferred to spend their free time to watch television rather than visit the library. 44.3 percent of the respondents expected that the library should be equipped with more computers and internet access to attract them to visit the library. 33.6 percent expects the library to add current books to the library's collection with 32 percent asking that the library extend its opening hours and include Sundays as well.

In Africa, Nkechi (2015:239-240) did research to investigate the perceptions of library users of resources and services in South-Eastern Nigeria covering about 10 university libraries. Her

study reported 60 percent of the respondents alluding that libraries in that region do not have up-to-date materials on science and technology. Respondents were also of the view that library staff does not possess the requisite skills and knowledge to serve them to their satisfaction. Library users who responded to her questionnaire expect the libraries to embrace emerging technologies and provide training to staff and or hire qualified staff to respond to their needs.

The study of Namugera (2014:1) on user' awareness, perceptions, and use of Makerere University library in Uganda on the other hand indicates a good rating of the quality of services provided and knowledge of staff with regards to assisting users. The study, however, found that Makerere University libraries had a wide range of resources that were under-utilised by students largely due to the lack of awareness and it recommended more marketing strategies to create awareness and maximised usage. A dissertation by Nyantakyi-Baah (2016) on user perception of academic library service quality and value in two selected Ghanaian university libraries (Ashesi University College and Ghana Institute of Journalism) did a comparative case study of the two institutions by collecting data from students, faculty and library staff. The study found that users of the libraries from both institutions perceived the quality of service to be poor but considered the staff as friendly and willing to assist. The poor quality of service was mainly due to lack of adequate IT infrastructure. The study recommended an upgrade of the libraries with current IT infrastructure and services.

A lot of the research on user perceptions and expectations of academic libraries, as has been outlined above, indicate that users develop perceptions about libraries primarily on the availability of resources and skills of library staff. They also expect that libraries should be equipped with modern technologies and well-trained staff to assist them with their academic endeavours (Kayaoglu 2018:13).

## **2.8 Challenges associated with IT use in academic libraries**

Jameel (2018:233) agrees that information technology is beneficial to academic libraries in the provision of services to their patrons. Verma (2018:354) also states that information technologies enhance the development of libraries and societies at large. Despite the numerous benefits of information technologies to academic libraries, Oghenetega, Umeji and Obue (2014); Haliso (2011); Emmanuel and Sife (2008); Awuor, Rabah and Maake (2013); and Rathnabahu (2015) in their various studies have identified some challenges libraries face as they adopt and use information technologies. Both library professionals and their users encounter these challenges in their day to day activities and research endeavours.

Among the challenges academic libraries face in using information technology as outlined in the various studies mentioned above were:

- Funding
- Expertise/skills
- Sustainability of Technology
- Awareness of facilities
- Unreliable power supply.

### **2.8.1 Funding**

Many of the studies done to ascertain the challenges of implementing and using information technologies in academic libraries found the problem with funding. A lot of universities, especially in Africa, do not factor IT funding for their libraries in their budgets and as such the libraries are unable to acquire, implement, and train staff and users on IT infrastructure to improve their service delivery (Mahwasane & Mudzielwana 2016:217).

Oghenetega et al. (2014:5) recommend the need for library professionals to inform/enlighten their university management and or governments, and justify the acquisition of information technologies in the library in order to attract funding to undertake projects in IT. In line with the recommendation made by Oghenetega et al. (2014:5), Emmanuel and Sife (2008:138), state that the Sokoine National Agricultural Library (SNAL) board established a team to prepare a technical paper to justify their funding needs of acquiring IT infrastructure. Although they claim that the justification paper did not convince their institution's management to approve their funding proposal, it was worth trying. Awuor et al. (2013:) also urge local government authorities to support libraries with adequate funds and play an active role in assisting libraries to get connected to global information resources.

Academic libraries must equally look beyond the option of securing funds from their respective institutions and write proposals for project funding to external donor agencies as was done by the Balme Library of the University of Ghana. The Balme Library has implemented most of its IT projects with funding from external donor agencies such as the Carnegie Corporation of New York, which funded the establishment the Andrew Carnegie Research Commons, an ultra-modern IT facility for postgraduate students and faculty to help with research work, and the KIT (Royal Tropical Institute of Netherlands) which funded the acquisition of the first two digitisation scanners for the library when it started its digitisation project.

### **2.8.2 Expertise/skills**

The primary motive of academic libraries acquiring information technologies is to improve the quality of services they render to their users and improve the research output of the university. The library, therefore, expects users to fully utilise IT resources and receive the necessary support from staff of the library when needed. Mahwasane and Mudzielwana (2016:217) agree

that users and library staff require relevant computer and information literacy skills to maximise the use of information technologies in the library. Lack of expertise on IT use has been found as one of the common challenges hindering effective use of information technologies in libraries in many studies conducted (Rathnabahu 2015; Verma 2018 and Mahwasane & Mudzielwana 2016).

Verma (2018:361) mentions that on the part of library staff, there is the need for technical expertise on a high level in IT in order to easily identify system problems and provide efficient maintenance and support to users and ensure that IT facilities are regularly available. In his recommendation on the challenges libraries face with IT, Rathnabahu (2015:123) urges libraries to provide high quality IT training programmes for library staff. He adds that the training should be both external and in-house with practical sessions. On the part of academic library users (students and faculty) Mahwasane and Mudzielwana (2016:218) recommend that the library should provide information literacy training to improve the information retrieval and information search skills of users. Universities must incorporate core information literacy and ICT courses into their curriculum to train students on the basic computer literate skills.

### **2.8.3 Sustainability of technology**

Regular maintenance of technology, including upgrades, updates, and hardware replacement, is paramount to the sustainability of these technologies (Emmanuel and Sife 2008:139). Academic libraries, particularly in developing countries, have been cited to be found wanting when it comes to sustainability of information technologies they implement to improve service delivery (Oghenetega et al. 2014:5 and Rathnabahu 2015:123). They claim that the poor maintenance culture of libraries usually results from lack of technical expertise, they, therefore, recommend intensive training for library staff.

On the issue of sustaining information technologies in academic libraries, Verna (2018:362) suggests that libraries should purchase products and services that integrate technical support to clients, though he admits it comes with a cost. He further advises that libraries should collaborate with the central IT units of their universities, if there is one, otherwise they can employ and retain their own professional technical staff to do the maintenance.

#### **2.8.4 Awareness of facilities**

Lack of awareness of information technology infrastructure and service in the library has been a contributing factor to the actualisation of the impact of IT in the delivery of library services in academic libraries (Rathnabahu 2015:122). Mahwasane and Mudzielwana (2016:218-219) emphasise that poor marketing of academic library resources to students, faculty and the entire university community has been a challenge to successful utilisation of information technology facilities in the library. Jameel (2018:235), in his study to identify problems of students of Cihan library in Iraq, found that only a moderate number of the respondents were aware of information technology in the library and their uses. He attributed the problem to the library not providing IT training, seminars and workshops to enlighten the students on the available facilities and their uses and therefore recommended that librarians should take up the challenge and create awareness of their IT facilities and services.

A study on the awareness and use of electronic resources in the University for Development Studies library in Ghana, Yebowaa and Plockey (2017:18) report that 65% of the respondents were aware of electronic resources of the library. The study further reveals that the sources of the awareness of the respondents were their mailing system, personal interaction with librarians, through friends, workshops organised by the library and the university website. They recommend that libraries should make use of their mailing systems to sensitise users and create awareness of their resources by sending frequent emails showing how to access IT facilities whether outside or within the library.

Awareness creation of library facilities will be much easier when libraries adopt social media tools to broadcast what they have and do. Kim and Sin (2016); Stvilia and Gibradze (2017); and Harrison et al. (2017) throw more light on the use of social media by academic libraries in their research. Kim and Sin (2016:75) mention that social media sites have become widely used especially among the youth. They claim that users between the ages of 18 and 29 are more active on social media sites and this offer academic libraries the opportunity to reach their users and promote their services and facilities. Stvilia and Gibradze (2017:260) found that students (library users) considered social media as very important and supportive of their studies. Social media tools such as Twitter, Facebook, Wiki, Blogs, and others have helped students to receive updates and instructions from librarians. Harrison et al. (2017) on the other hand recommends that academic libraries have their own social media accounts, designate a library staff member to operate the social media accounts, add links of their social media accounts to their website and the university website as well and ensure that their social media accounts are always active and updated.

### **2.8.5 Unreliable power supply**

Information technologies rely on the electric power supply to function effectively, the servers, preservation equipment, and other IT infrastructure depend on electricity (Oghenetega et al. 2014:3). In many developing countries, there is erratic supply of power and academic libraries in these countries encounter this challenge in their quest to use information technologies to improve their service delivery (Haliso 2011:12).

Emmanuel and Sife (2008:141) admit that there are frequent power outages in Tanzania, and this affects university libraries in their day to activities especially with their information technology equipment. They recommend that supplementary power sources be made available to sustain the availability of IT resources. Oghenetega et al. (2014:3) agree with Emmanuel



and Sife (2008) on the provision of a constant electric power supply to the library. They suggest that generator sets be purchased and installed as standby power supply units that will ensure that the library is always on target.

## **2.9 Conclusion**

Extensive studies have been done to determine the state and impact of information technologies in libraries, especially academic libraries. A lot of these have come from developed countries while Africa and other developing continents struggle to get up to date.

Further research needs to be conducted to unravel the technological needs of libraries and the challenges they face utilising the emerging technologies and develop human resources to manage technologies effectively.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

Creswell (2014:3) emphasises that research methodology entails the strategies, theories, processes of inquiry, data collection, and analysis, among others, that the researcher uses to set and answer research questions from the research topic. He states that the research methodology covers ideas, assumptions, and adoption of specific methods of data gathering and interpretation. The choice of a research methodology is affected by factors that may include the personal preferences of the researcher (based on their experiences in research) as well as other external factors such as the research purpose, target population and financial constraints (Pickard 2008:83-84).

The research methodology of this study consists of the research approach, research design, population, sampling methods, and data collection instruments. The research methods are also the ways or how the researcher collects information or data from the samples, and he must clearly choose an appropriate method that suits the study or research.

Other important aspects discussed are the validity and reliability of data collection instruments, data analysis and interpretation, ethical considerations and the evaluation of the methodology. Data in this study were collected using a questionnaire for library users and some library staff and interviews for professional library staff. This methodology was adopted because it is most appropriate in situations where data are collected both in the form of numbers and words. Leedy and Ormrod (2005) observe that quantitative research is more relevant when collecting statistical information. In relation to this study, statistical information provided a general pattern of access and impact of information technology, what IT facilities are used and by whom (staff and students).

The research design, on the other hand, is the overall strategy and plan the researcher takes to answer his research questions and propose solutions to the underlying problem of the study and objectives. The research design collectively involves the collection of data, interpretation, and discussion to writing of conclusions.

### **3.2 Research approach**

Grover (2015:1) describes a research approach as “plans and the procedure for research that encompass the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation.”

The common research approaches outlined by Creswell (2014:4); Pickard (2008:14-18); and Johnson and Onwuegbuzie (2004:17-21) are the qualitative, quantitative, mixed methods and multi-methods approaches. The researcher used the multi-methods approach for this study.

#### **3.2.1 Qualitative approach**

A qualitative approach is described as “research that seeks to unravel the experiences, interpretations, and understandings of the population (individuals or groups) of the research problem in a social or human environment” (Beck & Manuel 2008:10-11; Creswell 2014:4). In qualitative research, Powell and Connaway (2004:186-189) argue, conducting a simple interview is not substantive, rather the researcher needs to use additional methods and as such may need to engage in repeated interviews in such a way that one interview prompts another until the research questions are suitably answered. In qualitative research data collection hence is a process and not procedure (Powell & Connaway 2004:189).

Creswell (2014:183) adds that qualitative research usually uses text and image data as compared to the quantitative approach that draws on numbers. He further points out that the qualitative approach consists of unique steps in data analyses as researchers gather several forms of data rather than relying on one data source. Examples of those sources are interviews, documents, audio-visuals, and others (Creswell 2014:185).

### **3.2.2 Quantitative approach**

Quantitative research, on the other hand, is “typically used to test objective theories through a comparison of variables. This is done by comparing what number of the population believes/uses/accepts etc. in answering the research questions” (Beck & Manuel 2008:11; Creswell 2014:4).

The quantitative research approach measures the amounts or quantity of research to draw inferences and analyses (Beck & Manuel 2008:11). In a quantitative study, the researcher provides a numeric representation of opinions, attitudes or expectations of the sample population, and then the researcher makes generalisations and predictions from those numeric descriptions (Creswell 2014:155). Powell and Connaway (2014:59) agree that the quantitative approach is suitable for a study where the variables of interest are quantifiable, such that hypotheses could be formulated from them and inferences are drawn out of samples.

### **3.2.3 Mixed methods approach**

The mixed-methods approach as defined by Creswell (2014:4) “is an approach to inquiry involving collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks.” The underlying assumption behind this method is that it allows the researcher to

attain a deeper understanding of the research problem as compared to using a single approach. Terrell (2012:256), quoting Tashakkori and Teddlie (2008), defines mixed methods studies as “products of the pragmatist paradigm that combine the qualitative and quantitative approaches within different phases of the research process.”

The mixed-methods approach to research has also been defined as “an approach that combines quantitative and qualitative research methods in the same research inquiry” (Venkatesh, Brown and Bala 2013:21). The various definitions point out a distinct feature of the mixed methods approach, namely using both qualitative and quantitative approaches to answer the research questions in a study. This method helps the researcher to get a deeper understanding of their research problem and present a less biased finding on their study (Creswell 2014:14; Terrell 2012:256; Venkatesh et al 2013:21).

### **3.2.4 Multi-methods approach**

The multi-methods research approach was defined by Bryne and Humble (2007: 2) as research that “involves qualitative and quantitative projects that are relatively complete on their own, and then used together to form essential components of one research program.”

This implies that both qualitative and quantitative approaches are used to answer different questions and sub-questions of a study, the findings of which are compared and or put together to draw a common conclusion or inference. The multi-methods approach unlike mixed method allows a researcher to use two or more of the same approach (eg. Two qualitative approaches or two quantitative approaches).

For the purpose of this research, the multi-method approach was adopted, and it included both quantitative and qualitative approaches. The choice of multi-methods approach was crucial for this research as it provided the avenue for a better understanding of the research problem and

helped the researcher to produce reliable and valid analyses. The researcher at large used the quantitative approach to collect data from much of the population (library users and para-professional staff of the library) using self-administered questionnaires. The researcher also used the qualitative approach during the data collection and analyses phase to solicit the perceptions, expectations, and aspirations of the respondents since it is usually difficult to quantify those views in human-related studies. For the qualitative phase, the researcher collected data from respondents with a semi-structured self-administered questionnaire and interpreted them using the descriptive and inferential approach.

The researcher conducted face to face interviews with a sample of the professional staff of the library for the qualitative phase of the research which was interpreted using the narrative analysis approach. The qualitative approach addressed the issues of perceptions and expectations of staff and users of the library. Professional staffs of the library were interviewed one-on-one to gather their responses in relation to the research questions and objectives.

### **3.3 Research design**

“A research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure” (Kothari, 2004:31).

A research design as noted by Beck and Manuel (2008:24) provides the framework for carrying out the actual research. This is the stage where the researcher outlines activities followed in collecting data. Beck and Manuel (2008:25), citing Leedy (1989) outlines four key questions the researcher addresses when choosing the research design;

- ✚ What data do you need?
- ✚ Where will you get the data?

✚ How will you get the data?

✚ How will you interpret the data?

The survey research method was adopted for this study. Lynn and Powell (2010:59-60) define survey research as “the research strategy where one collects data from all or part of a population to assess the relative incidence, distribution, and interrelations of naturally occurring variables.”

Kasunic (2005:3) also defines a survey as a “data-gathering and analysis approach in which respondents answer questions or respond to statements that were developed in advance.” From the two definitions, it is realised that the survey method is appropriate for the collection of data using human respondents or individuals as is mostly the case in social science research.

A survey is one of the best methods to adopt when the researcher has a larger population to collect data from, as it allows the researcher to make generalisations about opinions from a smaller portion of the larger population using strict processes (Kasunic 2005:3).

The researcher collected data from library staff at the Balme library of the University of Ghana, a sample of the student population constituting both graduate and under-graduate were also part of the respondents. Responses from the two groups were compared and analysed to know the different perceptions and expectations of both groups. This may provide help to library administrators to know what decisions to make when choosing and implementing technologies in the library. The survey method helped the researcher to collect data by asking questions through questionnaires and interviews.

### **3.4 Population**

Pickard (2008:60) defines a population as “the entire set of individuals about which inference will be made.” Beck and Manuel (2008:24) also note that the population could be humans as

well as things. The target population for research may include people/groups, websites, publications and more, with certain characteristics that fit into the preferences of the researcher and can lead to the attainment of the research goals (Beck & Manuel 2008:24).

. Table 3.1 below provides the breakdown of the total population for the study.

**Table 3.1: Population for the study**

<b>Population Group</b>	<b>Number</b>
Library staff at Balme Library (Professional & Non-professional)	118
Library users (Under-graduate & Postgraduate students including students with special needs)	39 249
<b>Total</b>	<b>39 367</b>
<b>Source: UG Facts and Figures (2019:26)</b>	

### **3.5 Sampling**

Onwuegbuzie and Collins (2007:281), quoting the *American Heritage College Dictionary* (1993:1206), define sampling as “the process of selecting a portion, piece, or segment that is representative of a whole.” It states that sampling helps to identify the quality of the inferences drawn from the research findings. In order to answer the research questions, the researcher targeted library staff at the Balme Library and a sample of registered students of the library (from all fields of study including students with special needs randomly selected) as the population for the research. Their views, aspirations, experiences, and expectations on accessibility of information technologies at Balme Library were collected and analysed to answer the research questions and meet the objectives of the study.



### **3.5.1 Sampling procedure**

This researcher used the stratified random sampling scheme for the study. The stratified sampling scheme divides the population into sub-sections with groups that are related in respect of similar characteristics and a random sample selected from each group. The stratified sampling scheme is useful in research as it allows the researcher to divide the population into appropriate groups in order to apply both the qualitative and quantitative approaches to obtain a non-biased outcome from the findings of the research. For that purpose, the population was sampled into two groups of respondents namely library staff and library users. The library staff group consisted of professionals and non-professional alike, while the library users' group was made up of post-graduate and under-graduate students.

Turner (2003:3) defines sampling frame as “the set of source materials from which the sample is selected”. His definition takes into consideration the idea behind the sampling frame which is to determine how to select the population of the study. Leedy and Ormrod (2005:183) also described the sampling frame as “a comprehensive list that closely approximates all the elements or units in the target population that the researchers often prepare”.

The sampling frame for this study was drawn from the University of Ghana's facts and figures statistical publication (2019). The book provided the researcher with the total number of staffs at Balme Library forming one group of the population. The other group consisting of users of Balme Library was obtained from the list of registered library users which comparatively was equal to the total number of the student population found in the facts and figures publication of the University. This was possible because the University of Ghana automatically registers students to access library resources upon admission through a central database that is linked to the library system.

### 3.5.2 Sampling size

As at July 2018 the total number of students at the university was 39 249 (all registered with the library), while staff at Balme Library were 118. The total population for this study was 39 367 out of which the sampling was done. Out of the 118 library staff members, 14 were professional librarians representing 12% of the staff population and 104 were non-professionals representing 88% of the staff population. The post-graduate students numbered 5 546 constituting 14% of the library users' population and the under-graduate students numbered 33 703, representing 86% of the library users' population.

The researcher used proportionate stratified random sampling to draw respondents from the population. Proportionate stratified random sampling ensures minimised sampling error and allows the sampling to have equal representation of respondent characteristics (Singh 2016:194). The proportionate stratified random sampling size is calculated by multiplying the sample size by the proportion ( $S_s \times P\%$ ). The researcher drew a sample size of 50 from the library staff population and a sample size of 150 from the library users' population. Therefore, the proportionate sample for professionals was:  $50 \times 12\% = 6$ . The sample size for the non-professional library staff:  $50 \times 88\% = 44$ . On the other hand, the sample size for post-graduate students:  $150 \times 14\% = 21$  and sample size for under-graduate students:  $150 \times 86\% = 129$ .

The stratified random sampling method is highly representative of the sample population and most likely to get a valid result. The sampling method applied ensured fair representation of both library staff and users (students) of Balme Library, including users with special needs.

**Table 3.2: Proportionate sampling size for the study**

<b>Group</b>	<b>Sample size</b>
Library staff (professionals)	6
Library staff (non-professionals)	44
Library users (Post-graduate)	21
Library users (under-graduate students including special needs students)	129
<b>Total</b>	<b>200</b>

### **3.6 Data collection instruments**

In conducting research, the researcher uses one form of data collection instrument or the other. The common data collection instruments in social science research are questionnaires and interviews or both. The researcher used questionnaires and interviews to collect data from the respondents.

#### **3.6.1 Questionnaires**

Rowley (2014:308) describes research questionnaires as “documents that include a series of open and closed questions to which the respondent is invited to provide answers”. Questionnaires are important for the collection of data about people such as their experiences, behaviours, opinions and other original information about them (McGuirk & O'Neill 2016:246). Questionnaires could be deployed either electronically (through email, internet

address links) or in print (direct delivery or by post) to respondents with each form of delivery having its advantages and disadvantages.

This study used semi-structured questionnaires to solicit the opinions, experiences, and expectations, amongst others, of library staff and users of Balme Library to help achieve the objectives of the study. Both staff and students indicated as respondents responded to the same questions from the questionnaire to solicit their experiences and expectations. The questionnaire was designed in two parts with the first part covering the general background information, IT competencies of respondents and availability of IT in the library. The second part contained statements on the impact of using IT in the library and perceptions and expectations of respondents. The researcher used the five-point Likert scale that ranges from ‘Strongly Agree’ to ‘Strongly Disagree’ for the statements of the respondents. The questionnaire also provides spaces where necessary for respondents to write down their opinions.

#### **3.6.1.1 Advantages and challenges of using questionnaires**

When using a survey in research the use of questionnaires is very common and research methodology experts such as Creswell (2014), Ngulube (2010) and Onwuegbuzie and Collins (2007) have pointed out some benefits and challenges associated with them.

- Questionnaires are easy and cheap to administer when the researcher does it by email. The researcher alone can distribute the questionnaire by sending a single email to many respondents at a go. However, the researcher faces the difficulty of ensuring the emails get to all respondents and he cannot physically do follow-ups on the questionnaire and may end up receiving poor response from the respondents exposing the study to biased results. Contrary to the electronic mode of distributing

questionnaires, the print mode is expensive and time-consuming to administer. The researcher needs more “hands-on board” to administer the questionnaires and those sent by post may never reach the target respondents. It is however easy for the researcher to do follow-ups on the respondents (Kasunic 2005:79).

- Kumar (2011:147-148) admits that respondents have ample time and the convenience to read through and answer questions in the questionnaire as compared with an interview where a respondent has limited time to answer the interview questions from the researcher.
- The anonymity of respondents is ensured especially when the questionnaires are distributed by email or electronically. Leedy and Ormrod (2005:208) state that when the anonymity of respondents of research is granted, the integrity of the study is assured. Most respondents do not want their identity to be known and questionnaires offer them the privacy to answer the research questions.
- Another challenge to the use of a questionnaire is that the researcher does not get to see the physical characteristics and setting of respondents. In cases where the respondent gives false information, the researcher would not know that, as compared with a face to face interview where the researcher speaks directly to the respondent and has a better chance of realising information is false.

### **3.6.1.2 Structure of the questionnaire**

The questionnaires for this study were designed with the objectives of the research in mind and the researcher also adopted some questions from similar works that were consulted to form a total of 30 questions (for para-professional staff) and 25 questions (for library users) in both structured and unstructured formats.

Structured questions are designed to present answers from which respondents select (close-ended survey questions) which are quantitative, while unstructured questions are open to respondents to produce their own answers (open-ended survey questions) which on the other hand are qualitative. Close-ended questions ensure uniformity of responses and are easy to tabulate and analyse. Open-ended questions, on the other hand, allow respondents to provide their own answers soliciting their experiences and expectations.

The questions were divided into seven (7) sections each namely:

- Section A: Demographic Information
- Section B: Availability of IT infrastructure in the Library
- Section C: Access and Use of IT facilities in the library
- Section D: Skills, knowledge and competencies of library staff
- Section E: Impacts of IT facilities in the Library
- Section F: Attitudes and Preferences of Library staff toward IT
- Section G: Challenges associated with the use of IT facilities in the library

The sections were carefully formulated with sub-questions to address the objectives of the study by answering the research questions. Section A of the questionnaires addressed the socio-demographic information of respondents for comparative analysis based on the different personalities of respondents.

The questionnaire used as data collection instrument was crucial for the study looking at the time constraints. Conducting many interviews would have delayed the data collection process.

### **3.6.1.3 Questionnaire administration**

The questionnaires for this study were administered at the Balme Library of the University of Ghana as the study used the library as the sole cause for the study. Library users (students) were randomly selected as and when they came in to use the library.

The staff members of the library were equally selected randomly to answer questionnaires.

### **3.6.2 Interviews**

A research interview is also defined as “face-to-face verbal exchanges in which one person, the interviewer, attempts to acquire information from and gain an understanding of another person, the interviewee” (Rowley 2012:260). She further explains that the interviewee could be selected to represent a group or chosen as an individual based on certain characteristics. The researcher used interviews to collect data for the qualitative aspect of the data collection section. This helped the researcher to understand the attitudes, values, and experiences of the respondents.

Creswell (2014:190) expands on Rowley’s definition of an interview by stating that research interviews could be conducted face to face, by telephone or by engaging focus groups consisting of 6 to 8 participants in each group for the interview.

#### **3.6.2.1 Advantages and challenges of conducting interviews**

Conducting research interviews in a study, as pointed by Creswell (2014), has its positive and negative sides and effects on the study.

- Interviews in a research study receive a high response rate as a result of the respondent being contacted either physically or over the telephone. There is however no anonymity and questions asked by the researcher may intimidate the respondent increasing the rate of bias in response.
- There is better clarification of questions and answers during a research interview. The respondent can ask for explanations if he does not understand the question being asked

and in the same manner, the researcher can ask for clarification if an answer given by the respondent is not clear.

- Using an interview to collect data also allows the researcher to reach a wider range of persons. Interviews can be conducted on aged, adults, and young alike. Literate as well as illiterate people can also be interviewed in research unlike with questionnaires that are mostly administered to those who can read and write.

Professional staff (those with post-graduate qualifications) of the library were randomly selected and interviewed.

The table below shows the various categories of the population and the data collection instrument used.

### **3.6.2.2 Interview structure and schedule**

The researcher designed the interview questions to answer the objective questions of the study. Section A of the interview schedule took the demographic information of the professional librarians which included their ages, years of experience and qualifications.

The rest of the interview schedule was organised as follow;

- Availability of IT infrastructure in the Library
- Access and use of IT facilities in the library
- Skills, knowledge, and competencies of library staff and users
- Impacts of IT facilities in the Library
- Challenges associated with the use of IT facilities in the library



**Table 3.3: Data sources**

<b>Respondents</b>	<b>Design</b>	<b>Nature of Data</b>	<b>Mode of Collection</b>
Library staff (professionals)	Survey	Qualitative	Face-to-face Interview
Library staff (non-professionals)	Survey	Quantitative/Qualitative	Semi-structured Questionnaires
Library users (post-graduate)	Survey	Quantitative/Qualitative	Semi-structured Questionnaires
Library users (under-graduate)	Survey	Quantitative/Qualitative	Semi-structured Questionnaires

### **3.7 Data analysis and interpretation**

Beck and Manuel (2008:31-32) believe that the data analysis and interpretation stage of the research process is very crucial. According to them, this is where conclusions and inferences are made by carefully looking at the data gathered from different angles and perspectives.

Data gathered by means of questionnaires were analysed statistically using Statistical Package for Social Sciences (SPSS), version 25, after the data have been coded into numerical format. The coded data were then captured in the analysis software which then generated the analysis. Using SPSS, the researcher analysed the coded quantitative data by the univariate analysis method considering that there is a single variable (impact of information technologies on library services) identified for the research. The researcher interpreted the analysis using the descriptive and inferential statistics method. The descriptive statistics method describes the data in terms of what values were achieved for each variable. The researcher compared percentages in variables to determine what relationships may exist among them. The inferential

statistics method was used to make judgements or draw inferences from the projections from the descriptive analyses.

The qualitative data that were collected by face-to-face interviews, on the other hand, were analysed using the narrative analysis approach. By this approach, the researcher shared his understanding of the personal experiences and opinions of respondents of the research (Pickard 2008:241). Outcomes of the data analysis were compared to those of previous studies in the discipline. After seeking both institutional and individual consent of respondents and their institution, the researcher conducted interviews, using an audio recorder, in plain English language. Those recordings were later transcribed into text for analyses and interpretations. Following the ethical measures, the researcher ensured that all transcribed texts were exactly as spoken in the recording by the interviewees. The questionnaire for students with special needs (specifically the blind) was converted to braille format to enable them to respond to the research, and their responses were then transcribed to plain text for analyses.

### **3.8 Validity and reliability of instruments**

It is imperative for a researcher to be concerned about the validity and reliability of the outcomes of his work. Lynn and Powell (2010:43) state that research work is valid when its conclusions are true. They add that the study is equally reliable when the findings are repeatable.

The validity of a research instrument is determined by the extent to which that instrument can measure what it was designed to measure (Lynn & Powell 2010:45). They define instrument reliability as “the degree to which an instrument accurately and consistently measures whatever it measures.”

The researcher carefully designed the questionnaire according to the objectives of the study to ensure its validity.

The researcher also ensured that the questionnaires and interviews were conducted on the specified target population to ensure its reliability. The researcher made sure that the population was equally represented in their respective jurisdictions to avoid an occurrence of bias in the outcome of results.

Many social science studies have used the survey research design for their studies and investigations and have drawn meaningful and useful inferences from scores of the instruments (Creswell 2014:160). The researcher of this study, therefore, is confident that the selected instruments for the study have been tried and tested and have proved to be reliable over the years in research activities.

### **3.8.1 Pre-testing of data collection instruments**

Krosnick and Presser (2010:294) state categorically that irrespective of how a researcher carefully and critically designs questionnaires and interview questions, pre-testing of the instruments is important. They describe the process of pre-testing of the data collection instruments as a formal evaluation of the instruments before the main survey is conducted. Pre-testing the data collection instruments helps the researcher to determine whether he can answer his research questions with the instrument to attain a valid conclusion (Krosnick & Presser 2010:295). The researcher, after the pilot process, can make the necessary changes to improve the quality of responses.

Pre-testing was crucial for this study to determine the effectiveness of the questionnaires and interview questions. A smaller sample of the target population was selected for the purpose of pre-testing the data collection instruments. Five (5) library staff, twenty (20) students and one

(1) professional staff members were selected randomly to test the questionnaires and the interview process.

The outcome of the pre-testing process exposed some weaknesses in the questionnaire and the researcher effected the necessary modifications to ensure that the results of the survey are accurate and valid.

The pilot of the data collection instruments conducted helped the researcher to determine whether the questionnaire and interview questions were appropriate and easily understood by the respondents. After the pre-testing process, the researcher found some errors and made the necessary adjustments in the questionnaire. The interview questions were found to be appropriate and suitable for the study.

### **3.9 Ethical considerations**

Ethics are very important in research, particularly social science research where humans are mostly the subjects of the research (Lynn & Powell 2010:68). Each individual participant in the research study deserves the right to know that they are being studied in the research, they must also understand the purpose and reason why they are being studied (Pickard 2008:71). Beck and Manuel (2008:250) state that the researcher must seek the informed consent of every prospective subject of the study or their legal representatives.

The University of South Africa's (UNISA) policy on research ethics carefully outlines the institution's guidelines for conducting ethical research (UNISA, 2013). The researcher complied with all the provisions stipulated in the UNISA policy on research ethics and take responsibility for ensuring that the study is conducted ethically. In that manner, the researcher sought approval from the Research and Ethics Committee before collecting data. The informed consents of all prospective respondents were sought as well as those of their respective

institutions and departments. The researcher wrote to the institution where data was collected for permission to do so and was granted permission before he collected data.

The researcher kept all information gathered confidential and used it solely for the purpose of the study and protected the identities and privacies of respondents.

Additionally, all literature sources consulted were duly acknowledged and cited in accordance with UNISA's referencing style.

### **3.11 Conclusion**

This chapter explained the research design, approaches adopted, the target population, the population sample, and procedure, sample frame, data collection tools, ethical considerations.

The chapter provided justification for the choice of the various approaches and tools. These range from the design, sampling techniques to data collection instruments. The study adopted the quantitative approach as the primary methodology and however used a qualitative approach, in addition, to get a better understanding of the data collected.

## **CHAPTER FOUR**

### **DATA ANALYSIS AND PRESENTATION OF FINDINGS**

#### **4.1 Introduction**

The aim of the research was to evaluate the impact of information technologies on service delivery at the Balme Library of the University of Ghana. The previous chapter provided the methodology used for the study. The choice of the mixed-methods approach adopted by the researcher allowed him to employ quantitative as well as qualitative methods to understand the opinions, expectations, experiences, and challenges of users and staff at the Balme library of the University of Ghana.

Kothari (2004:122) explains that after a researcher collected data, it must be processed and analysed according to the outline selected for the purpose of achieving the objectives and aim of the study. He further points out the technical processes involved with data analysis and interpretation as “editing, coding, classification and tabulation” of the data collected so that it can be analysed to make meaning. The term analysis was defined by Kothari (2004: 122) as “the computation of certain measures along with searching for patterns of relationship that exist among data-groups”.

This chapter presents and analyses the findings from the data collected. The first section presents the findings of data collected quantitatively using a questionnaire. Responses from library users are presented first followed by the responses from the library staff. The second section presents the qualitative data from the interviews conducted on professional library staff.

### **4.1.2 Data analysis process**

After the data was collected, the researcher coded the questionnaires using Statistical Package for Social Science (SPSS), version 25, in line with the data analysis process as outlined by Kothari. Bhattacharjee (2012:114) defines coding as the process of converting data into a numeric format. Each questionnaire was labelled or tagged with a unique identifier (numbers) to help the researcher to go back to them easily when an error is identified in any of them for later for correction.

The researcher cleaned the data to prepare them for analysis. Data cleaning is necessary to enable the researcher to correct any avoidable error that might have occurred during the coding process.

The numeric data was then analysed quantitatively using descriptive and inferential statistics. The descriptive analysis presents interests in a statistical manner and brings out relations between them (Singleton & Straits 2010:509).

The interviews, on the other hand, were recorded and transcribed before they were analysed using thematic content analysis.

## **4.2 Presentation of findings**

### **4.2.1 Quantitative analysis of data (library users - questionnaires)**

#### **4.2.1.1 Response rate**

A total of 150 (100%) questionnaires were distributed to the library users out of which 129 (86%) were returned. 86% of the total questionnaire is considered reasonable indicating that the researcher can make inferences and generalisations from it.

**Table 4.1: Library users' response rate**

<b>User group</b>	<b>Distributed</b>	<b>Returned</b>
Post-graduate students	21 (14%)	19 (12.6%)
Under-graduate students	129 (86%)	110 (73.4%)
<b>Total</b>	<b>150 (100%)</b>	<b>129 (86%)</b>

#### **4.2.1.2 Demographic information**

Of the 129 responses that were received, 87 of the respondents, representing 67.4%, were male. The remaining 42 of the responses collected were from females and this represents 32.6% of the received responses, an indication of male dominance in the Ghanaian educational system. Figure 4.1 below presents the gender frequency and percentage rate of the respondents.

**Figure 4.1: Gender profile (users)**

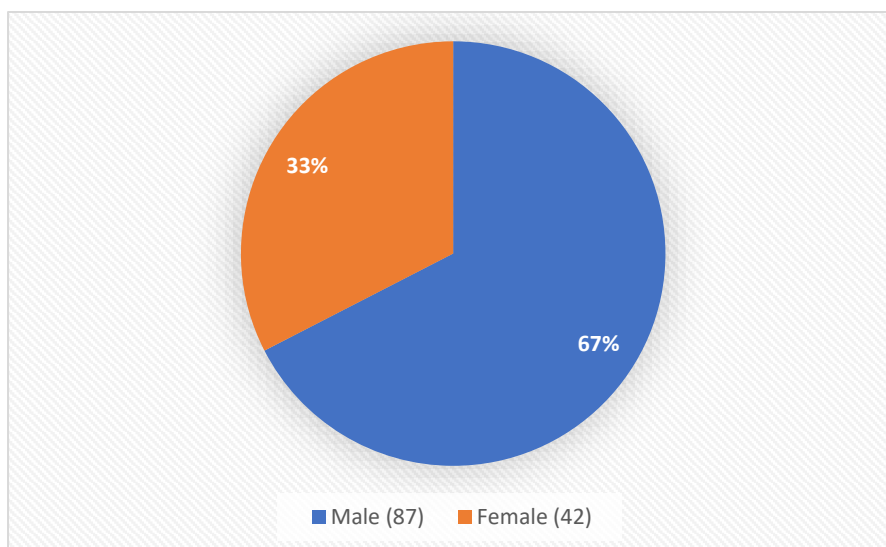
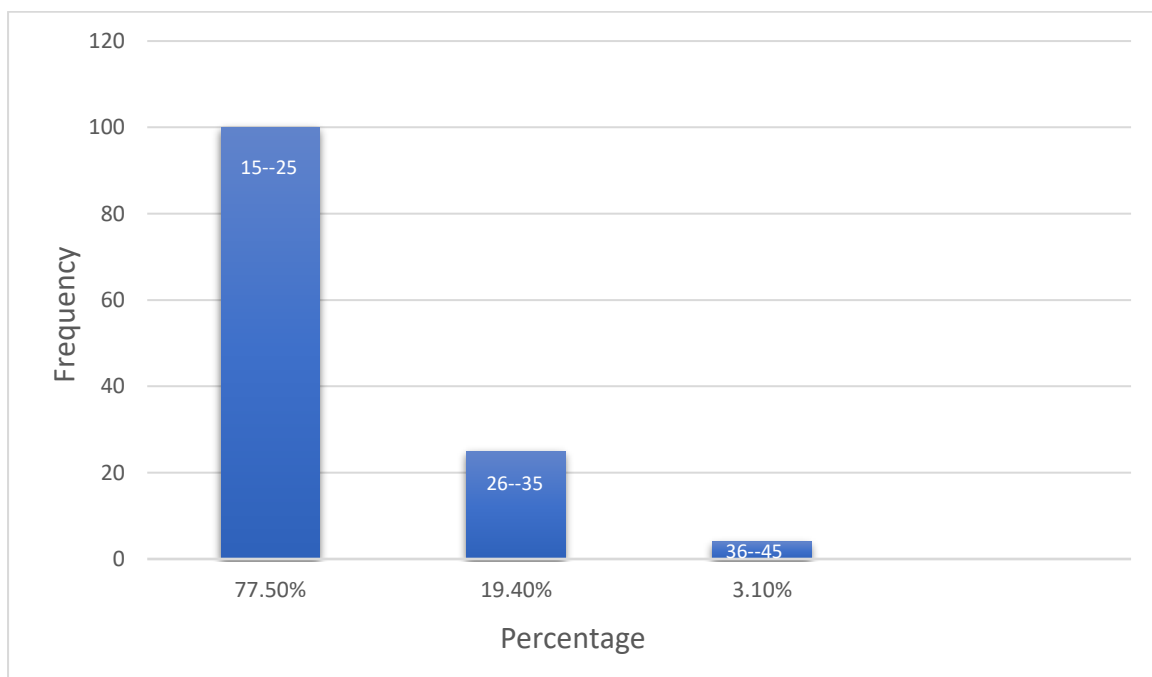




Figure 4.2 below presents the age frequencies and percentages of respondents. Using the 10-year range interval starting from 15 to 56 and above, one hundred (100) of the respondents, representing 77.5 percent of the returned questionnaires, fall between the ages of 15 and 25.

Twenty-five (25) of them, representing 19.4 percent, were between the ages of 26 and 35 while the remaining four (4) of the respondents, representing 3.1 percent, were of the ages between 36 and 45.

**Figure 4.2: Age profile (students)**



From table 4.1, information on the levels of study of the respondents (students) shows that 19 of them, representing 14.7 percent, were post-graduate students while the rest of the 110, representing 85.3 percent, were under-graduate students.

**Table 4.1: Level of study**

<b>Level of study</b>		
	Frequency	Percent
Post-graduate	19	14.7
Under-graduate	110	85.3
Total	129	100.0

#### **4.2.1.3 Availability of IT infrastructure in the library**

Table 4.2 below presents the available hardware facilities in the library per the knowledge of respondents. Six of them, representing 4.7 percent, indicated that computers were available in the library. Twenty-seven (27) respondents, representing 20.9 percent, said computers, printers, scanners, projectors, photocopiers, video conference facility, telephones, multimedia facility were available in the library.

Thirteen (13) of the respondents, representing 10.1 percent, indicated the availability of computers, printers, scanners, photocopiers, book theft security system. Nineteen (19) respondents (14.7 percent) indicated that computers, printers, scanners, photocopiers, book theft system, CCTV were available. 20 (15.5%) said computers, printers, photocopiers, book theft security system were available hardware facilities in the library. Another four (4), (3.5%) responded with computers, printers, CCTV available in the library.

One (0.8%) respondent indicated computers, printers, photocopiers, braille embossers , on the availability of hardware facilities in the library.

**Table 4.2: Available hardware facilities**

<b>Available hardware facilities for use in the Library</b>		
	Frequency	Percent
Computers	6	4.7
Computers, printers, scanners, projectors, photocopiers, video conference facility, telephones, multimedia facility	27	20.9
Computers, printers, scanners, photocopiers, book theft security system	13	10.1
Computers, printers, scanners, photocopiers, book theft system, CCTV	19	14.7
Computers, printers, photocopiers, book theft security system,	20	15.5
Computers, printers, CCTV	4	3.1
Computers, printers, photocopiers, braille embossers	1	.8
Computers, printers, projectors, photocopiers	26	20.2
Computers, printers	3	2.3
Computers, scanners, photocopiers, CCTV	3	2.3
Computers, scanners, closed circuit television, magnifiers	3	2.3
Computers, magnifiers, braille embossers	4	3.1
<b>Total</b>	<b>129</b>	<b>100.0</b>

Furthermore, 26 users, representing 20.6 percent, selected computers, printers, projectors, photocopiers as the available hardware facilities in the library. Three (3), (2.3%) respondents each selected computer, printers; computers, scanners, photocopiers, CCTV; computers, scanners, closed-circuit television, magnifiers respectively. The last four (4) respondents, making it 3.1 percent of the returned responses, selected computers, magnifiers, braille embossers on the question of available hardware facilities in the library.

Respondents were also asked to select from a list of software facilities what they knew were available in the library. Table 4.3 below presents the responses to that question. Eight (8), (6.2%) selected the internet. Thirty-two (32), (24.8%) selected internet, reference management software, electronic databases, library website, OPAC, electronic past questions. Twenty-three (23), (17.8%) selected “internet, reference software, e-databases, library website, IR, off-campus access, e-theses, e-past questions” while 44 (34.1%) selected “internet, e-databases, library website, IR, off-campus access, e-theses, e-past questions”.

Eight (8), (6.2%) of the respondents selected “internet, library website”, while seven (7), (5.4%) selected “internet, library website, e-theses, e-past questions” and “internet, library website, JAWS” respectively.

**Table 4.3 Available software facilities**

<b>Available software facilities for use by library users</b>		
	Frequency	Percent
Internet	8	6.2
Internet, reference management software, electronic databases, library website, OPAC, electronic past questions	32	24.8
Internet, reference software, e-databases, library website, IR, off-campus access, e-theses, e-past questions	23	17.8
Internet, e-databases, library website, IR, off-campus access, e-theses, e-past questions	44	34.1
Internet, library website	8	6.2
Internet, library website, e-theses, e-past questions	7	5.4
Internet, library website, JAWS	7	5.4
Total	129	100.0

#### 4.2.1.3 Access and use of IT facilities in the library

As shown in Table 4.4 below, respondents were asked to provide their feedback on how accessible IT resources in the library have been to them. Eighty-five (85) of them, representing 65.9 percent, selected “very accessible”, thirty-one (31), (24.0%) selected “accessible only within the library”.

**Table 4.4: Accessibility of IT facilities**

Accessibility of IT facilities in the library		
	Frequency	Percent
Very accessible	85	65.9
Accessible ONLY within the library	31	24.0
Neutral	11	8.5
Not accessible	2	1.6
Total	129	100.0

A further eleven (11) respondents, who represent 8.5 percent, indicated that they were neutral on the accessibility of IT facilities while the remaining two (2), (1.6%) said IT facilities were “not-accessible”.

On the frequency of use of IT facilities provided by the library, seventy-four (74) of the respondents, representing 57.4 percent, selected “daily”. 49 (38.0%) selected “weekly” while the remaining six (6), (4.7%) selected “monthly”, as presented below in Table 4.5.

**Table 4.5: Frequency of the use of IT facilities**

<b>Frequency of the use of IT facilities in the Library</b>		
	Frequency	Percent
Daily	74	57.4
Weekly	49	38.0
Monthly	6	4.7
Total	129	100.0

Table 4.6 indicates the purposes for which users accessed IT facilities, 114 of them, representing 88.4 percent, selected “to support research/course of study” while 15 (11.6%) selected “to support research/course of study, for leisure”.

**Table 4.6: Purposes of IT facilities use**

<b>Purposes for which IT facilities are used</b>		
	Frequency	Percent
To support research/course of study	114	88.4
To support research/course of study, for leisure	15	11.6
Total	129	100.0

One hundred and three (103) of the respondents, representing 79.8 percent, responded “yes” to having alternative IT facilities outside of the library. Another 26 (20.2%) responded “no” to having access to IT facilities other than those provided by the library, as shown in table 4.7.

**Table 4.7: Alternative IT facilities**

<b>Alternative IT facilities outside the library</b>		
	Frequency	Percent
Yes	103	79.8
No	26	20.2
Total	129	100.0

Respondents were further asked to indicate the sources of their alternative IT facilities, and as presented in table 4.8. Out of the 103 that responded yes to having alternative IT facilities, 45 (34.9%) indicated “home”, seven (5.4%) selected “office”, eight (6.2%) chose “cybercafe”, six , (4.7%) selected “home, hall of residence”, and 12 (9.3%) selected “home, cyber cafe”.

**Table 4.8: Sources of alternative IT facilities**

Source of alternative IT facilities		
	Frequency	Percent
Home	45	34.9
Office	7	5.4
Cybercafe	8	6.2
Home, hall of residence	6	4.7
Home, cybercafe	12	9.3
Home, office, cybercafe	4	3.1
Home, office, graduate school	1	.8
Home, UGCS computer lab	5	3.9
Hall of residence	4	3.1
Home, cybercafe, hall of residence	2	1.6
UGCS computer lab	7	5.4
Home, office	2	1.6
Office, cybercafe	1	.8
None	25	19.4
Total	129	100.0

Four of the respondents representing 3.1 percent selected “home, office, cybercafe”, one, (0.8%) selected “home, office, graduate school”, five , (3.9%) selected “home, UGCS computer lab”, four , (3.1%) selected “hall of residence”, two , (1.6%) selected “home, cybercafe, hall of residence”, seven (7), (5.4%) chose “UGCS computer lab”, two (2), (1.6%) selected “home, office”, one (1), (0.8%) selected “office, cyber cafe”.

#### 4.2.1.4 Skills, knowledge and competencies of library users (students) and staff

Rating their skill-levels shown in table 4.9, 33 respondents representing 25.6 percent selected “very good”, 70 of them, making it 54.3 percent, selected “good”, 23 (17.8%) selected “average”, three (3), (2.3%), selected “poor”.

**Table 4.9: Level of skills**

Level of skills on the use of IT facilities in the library		
	Frequency	Percent
Very good	33	25.6
Good	70	54.3
Average	23	17.8
Poor	3	2.3
Total	129	100.0

Table 4.10 below presents the responses to training received from the library on how to use the IT facilities provided. Seventy-one (71), (55.0%) of the respondents selected “yes” on whether they received formal training from the library, while the remaining 58 (45.0%) selected “no”.

**Table 4.10: Formal training from the library on the use of IT**

Formal training from the library on the use and assistance with IT		
	Frequency	Percent
Yes	71	55.0
No	58	45.0
Total	129	100.0

Following on the responses on the previous question, respondents were asked to indicate the kinds of training they received from the library, and 46 (35.7%) indicated “user orientation”, thirteen (13), (10.1%) selected “workshop”, eight (8), (6.2%) chose “Information Literacy



training”, one (1), (0.8%) selected “user orientation, e-resources training” and “user orientation, workshop, information literacy training” respectively.

**Table 4.11: Types of training received**

<b>Kinds of training received</b>		
	Frequency	Percent
User orientation	46	35.7
Workshop	13	10.1
Information Literacy training	8	6.2
User orientation, e-resources training	1	.8
User orientation, workshop, Information Literacy training	1	.8
User orientation, workshop	2	1.6
None	58	45.0
Total	129	100.0

Furthermore, two (2), (1.6%) selected “user orientation, workshop” while the remaining 58 (45.0%) indicated they did not receive any formal training from the library on the use of IT.

On the ability of library staff to help solve IT related issues in the library, three (3), (2.3%) of respondents selected “disagree”, 19 (14.7%) chose “neutral”, 61 (47.3%) selected “agree” while 46 (35.7%) selected “strongly agree” as presented in table 4.12.

**Table 4.12: IT competency of staff**

<b>Competency of staff in the use of IT</b>		
	Frequency	Percent
Disagree	3	2.3
Neutral	19	14.7
Agree	61	47.3
Strongly agree	46	35.7
Total	129	100.0

Table 4.13 also presents the perception of respondents based on their experiences in the library on whether library staff could help them with IT problems: One (1), (0.8%) selected “disagree”, 25 (19.4%) were “neutral” while 65 (50.4%) selected “agree”.

**Table 4.13: Staff support in solving IT related problems**

<b>Staff support in solving IT related problems</b>		
	Frequency	Percent
Disagree	1	.8
Neutral	25	19.4
Agree	65	50.4
Strongly agree	38	29.5
Total	129	100.0

The remaining 38 (29.5%) of the respondents chose “strongly agree” to indicate that staff of the library could help users with IT problems.

#### **4.2.1.5 Impact of IT facilities in the Library**

One of the objectives of the study was to determine the impact of IT on service delivery and as such respondents were asked to rate the importance of IT on them. Table 4.14 indicates that one (1), (0.8%) selected “neutral”.

**Table 4.14: Importance of IT facilities**

<b>Importance of IT facilities to library user</b>		
	Frequency	Percent
Neutral	1	.8
Important	25	19.4
Very Important	102	79.1
None	1	.8
Total	129	100.0

Twenty-five (25), (19.4%) selected “important”, 102 of the respondents, representing 79.1 percent, selected “very important” while one (1) respondent, which represents 0.8 percent, did not answer the question.

Further, to determine the perception of library users on IT facilities, they were asked how relevant IT facilities are and 113 (87.6%) selected “essential services”, seven (7), (5.4%) selected “liability to the library”, the remaining eight (8), (6.2%) selected “supplementary service to other library services”. This is shown in table 4.15.

**Table 4.15: Relevance of IT facilities**

<b>IT facilities are:</b>		
	Frequency	Percent
Essential services	113	87.6
Liability to the library	7	5.4
Supplementary service to other library services	8	6.2
None	1	.8
Total	129	100.0

Table 4.16 presents the views of the users on whether IT facilities in the library could improve learning and research: twenty-six (26) of the respondents, representing 20.6 percent, selected “agree”, 103 (79.8%) selected “strongly agree”.

**Table 4.16: IT facilities improve learning**

<b>IT facilities to improve learning and research</b>		
	Frequency	Percent
Agree	26	20.2
Strongly agree	103	79.8
Total	129	100.0

Two (2), (1.6%) respondents selected “disagree” on whether IT facilities promoted collaboration and teamwork, 23 (17.8%) selected “neutral” while 56 (43.4%) selected “agree”.

**Table 4.17: IT facilities promote collaboration**

<b>IT facilities promote collaboration and teamwork</b>		
	Frequency	Percent
Disagree	2	1.6
Neutral	23	17.8
Agree	56	43.4
Strongly agree	48	37.2
Total	129	100.0

The remaining 48 respondents, representing 37.2 percent, selected “strongly agree”.

Indicated in Table 4.18, the usefulness of IT in the library, all 129 respondents selected “yes”.

**Table 4.18: Usefulness of IT in the library**

<b>Usefulness of IT in the library</b>		
	Frequency	Percent
Yes	129	100.0

To further clarify the previous question, respondents were asked to choose from a list of reasons why they considered IT to be useful in the library and eight (8), (6.2%) selected “convenience”, 34 (26.4%) selected “easy access to information”, 35 (27.1%) selected “vital source of information”.

**Table 4.19: Reasons for usefulness of IT**

Reasons for usefulness of IT		
	Frequency	Percent
Convenience	8	6.2
Easy access to information	34	26.4
Vital source of information	35	27.1
Reliable	11	8.5
Easy and efficient learning	29	22.5
Promotes learning with disabilities	4	3.1
None	8	6.2
Total	129	100.0

Eleven (11), (8.5%) chose “reliable”, 29 (22.5%) selected “easy and efficient learning” while four (4), (3.1%) selected “promotes learning with disabilities”.

Eight (8) of the respondents, representing 6.2 percent of the returned respondents did not answer this question. None of the respondents selected any reason denying the usefulness of IT facilities in the library as presented in able 4.20.

**Table 4.20: Reasons against the usefulness of IT**

Reasons against the usefulness of IT			
		Frequency	Percent
	None	129	100.0

#### 4.2.1.6 Attitudes and preferences of library users on IT

Respondents were further asked to select their preferred IT facilities in the library to ascertain their preferences and attitudes on the use of IT tools. As indicated in Table 4.21, 19 (14.7%) selected “computers”, 17 (13.2%) selected “computers, photocopiers”, two (2), (1.6%) chose “computers, scanners, photocopiers”, 37 (28.7%) selected “computers, printers, scanners, photocopiers, video conference facility” while 19 (14.7%) also selected “computers, printers”.

**Table 4.21: Preference of IT hardware**

Preference of IT hardware used in the library		
	Frequency	Percent
Computers	19	14.7
Computers, photocopiers	17	13.2
Computers, scanners, photocopiers	2	1.6
Computers, printers, scanners, photocopiers, video conference facility,	37	28.7
Computers, printers	19	14.7
Computers, printers, photocopiers	19	14.7
Computers, printers, scanners, photocopiers	11	8.5
Computers, printers, scanners, closed circuit television, magnifiers, braille embossers, digital recorders	5	3.9
Total	129	100.0

In addition, 19 (14.7%) selected “computers, printers, photocopiers”, eleven (11), (8.5%) selected “computers, printers, scanners, photocopiers” and the remaining five (5), (3.9%) selected “computers, printers, scanners, Closed Circuit Television, magnifiers, braille embossers, digital recorders”.

On their preferences of software IT facilities, 24 (18.6%) of the respondents selected “internet”, 11 (8.5%) selected “internet, reference management software, library website”, 18 (14.0%) selected “internet, reference software, e-databases, library website, OPAC, IR, chat with

librarian, e-theses”, 14 (10.9%) chose “internet, e-databases, e-theses”, while 20 (15.5%) selected “internet, library website, chat with a librarian, e-theses”.

**Table 4.22: Preference of software**

Preference of software used in the library		
	Frequency	Percent
Internet	24	18.6
Internet, reference management software, library website	11	8.5
Internet, reference software, e-databases, library website, OPAC, IR, chat with librarian, e-theses	18	14.0
Internet, e-databases, e-theses	14	10.9
Internet, library website, chat with a librarian, e-theses	20	15.5
Internet, e-databases, library website, OPAC, IR, e-theses	16	12.4
Internet, library website, e-past questions	18	14.0
Internet, e-databases, library website, OPAC, e-past questions	2	1.6
Internet, e-databases, library website, OPAC, JAWS, e-past questions	6	4.7
Total	129	100.0

Sixteen (16), (12.4%) selected “internet, e-databases, library website, OPAC, IR, e-theses”, 18 (14.0%) selected “internet, library website, e-past questions”, two (2), (1.6%) selected “internet, e-databases, library website, OPAC, e-past questions” and six (6), (4.7%) selected “internet, e-databases, library website, OPAC, JAWS, e-past questions”.

Asked whether library management should invest further into acquisition and implementation of IT facilities, 125 of the user respondents, representing 96.9 percent, selected “yes”, three (3) of them, representing 2.3 percent, selected “no” and one (1) (0.8%) respondent did not answer. This is presented in table 4.23.

**Table 4.23: Investment into IT facilities**

<b>Investment of extra income into IT facilities in the library</b>		
	Frequency	Percent
Yes	125	96.9
No	3	2.3
None	1	0.8
Total	129	100.0

Respondents were further asked to indicate the reason for their previous answer and 23 (17.8%) selected “easy access to information”, 20 (15.5%) selected “resourceful”, 40 (31.0%) selected “effective research and academic work”, 14 (10.9%) chose “saves time and cost” and “easy access to information, reliable” respectively.

Seven (7), (5.4%) selected “convenient” and the rest 11 (8.5%) did not answer. Respondents that answered “no” in table 4.24 did not provide any reason for their choice of answer on whether they would recommend further investment into IT facilities as presented in table 4.27 below.

**Table 4.24: Reasons for investment**

<b>Reasons for investment of extra income into IT</b>		
	Frequency	Percent
Easy access to information	23	17.8
Resourceful	20	15.5
Effective research and academic work	40	31.0
Saves time and cost	14	10.9
Easy access to information, reliable	14	10.9
Convenient	7	5.4
None	11	8.5
Total	129	100.0



**Table 4.25: Reasons against investment of extra income into IT**

<b>Reasons against investment of extra income into IT</b>		
	Frequency	Percent
None	129	100.0

#### **4.2.1.7 Challenges associated with the use of IT facilities in the library**

Table 4.26 presents the views of respondents on some challenges they encounter using IT facilities in the library. 17 (13.2%) selected “inadequate IT infrastructure”, seven (7), (5.4%) selected “lack of IT skills”, three (3), (2.3%) selected “lack of training and support from the library”, two (2), (1.6%) chose “negative attitude of library staff”, 32 (24.8%) cited “slow internet connectivity”, four (4), (3.1%) selected “unstable power supply”, two (2), (1.6%) selected “frequent downtimes of server resources” and “lack of IT skills, non-user-friendly IT facilities” respectively while ten (10), (7.8%) chose “lack of IT skills, slow internet connectivity, unstable power supply”.

**Table 4.26: Challenges faced with the use of IT facilities**

<b>Challenges faced with the use of IT facilities in the library</b>		
	Frequency	Percent
Inadequate IT infrastructure	17	13.2
Lack of IT skills	7	5.4
Lack of training and support from the library	3	2.3
Negative attitude of library staff	2	1.6
Slow internet connectivity	32	24.8
Unstable power supply	4	3.1
Frequent downtimes of server resources	2	1.6
Lack of IT skills, non-user-friendly IT facilities	2	1.6
Lack of IT skills, slow internet connectivity, unstable power supply	10	7.8
Inadequate infrastructure, slow internet connectivity	27	20.9
Inadequate IT Infrastructure, lack of IT skills	12	9.3
Slow internet connectivity, unstable power supply	1	.8
Lack of training from library, slow internet connectivity, unstable power supply	4	3.1
Inadequate IT infrastructure, negative attitude of library staff, slow internet connectivity, unstable power supply	2	1.6
Inadequate IT infrastructure, lack of training and support from library, slow internet connectivity	4	3.1
Total	129	100.0

Twenty-seven ((27), (20.9%) selected “inadequate infrastructure, slow internet connectivity”, 12 (9.3%) selected “inadequate IT Infrastructure, lack of IT skills”, one (1), (0.8%) respondent selected “slow internet connectivity, unstable power supply”, two (2), (1.6%) chose “inadequate IT infrastructure, negative attitude of library staff, slow internet connectivity, unstable power supply” and the rest of four (4), (3.1%) selected “inadequate IT Infrastructure, lack of training and support from library, slow internet connectivity”.

The researcher, aiming to provide possible solutions to the various difficulties users and staff encounter in using IT facilities, asked respondents to suggest ways to improve on the challenges encountered and 41 (31.8%) of the respondents said “increase internet speed and accessibility”, 19 (14.7%) suggested “periodic training of users”, six (6), (4.7%) said “provide adequate internet and affordable printing services”, three (3), (2.3%) said “independent IT infrastructure from the university”, 13 (10.1%) suggested “adequate IT infrastructure, skilled staff with good attitude, increase internet speed”, seven (7), (5.4%) said “effective maintenance of IT infrastructure”, six (6), (4.7%) suggested “skilled IT staff needed”, while 25 (19.4%) suggested “provide adequate IT resources”.

**Table 4.27: Ways to improve challenges**

<b>Ways to improve challenges</b>		
	Frequency	Percent
Increase internet speed and accessibility	41	31.8
Periodic training of users	19	14.7
Provide adequate internet and affordable printing services	6	4.7
Independent IT infrastructure from the University	3	2.3
Adequate IT infrastructure, skilled staff with good attitude, increase internet speed	13	10.1
Effective maintenance of IT infrastructure	7	5.4
Skilled IT staff needed	6	4.7
Provide adequate IT resources	25	19.4
Effective maintenance of IT infrastructure, skilled IT staff needed	4	3.1
Acquire supplementary power supply	4	3.1
None	1	.8
Total	129	100.0

As indicated in Table 4.27, four ... (4), (3.1%) suggested “effective maintenance of IT infrastructure, skilled IT staff needed” and “acquire supplementary power supply” respectively while one (1), (0.8%) did not provide an answer.

## 4.2.2 Quantitative analysis of data (library staff questionnaires)

### 4.2.2.1 Response rate

A total of 44 questionnaires were distributed among the staff of the Balme library out of which 40 were returned, as indicated in table 4.30 below. 90.1% of the questionnaires returned provided an adequate and strong basis for the researcher to make inferences and generalisations.

**Table 4.28: Response rate**

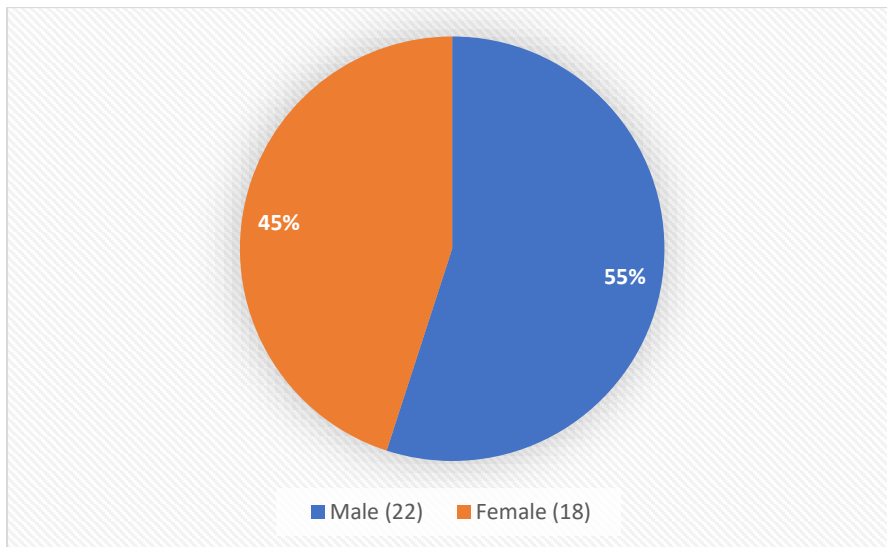
<b>User group</b>	<b>Distributed</b>	<b>Returned</b>
Library staff	44 (100%)	40 (90.1%)

### 4.2.2.2 Demographic information

Out of the 40 responses returned, 22 (55.0%) were male and 18 (45.0%) female staff members.

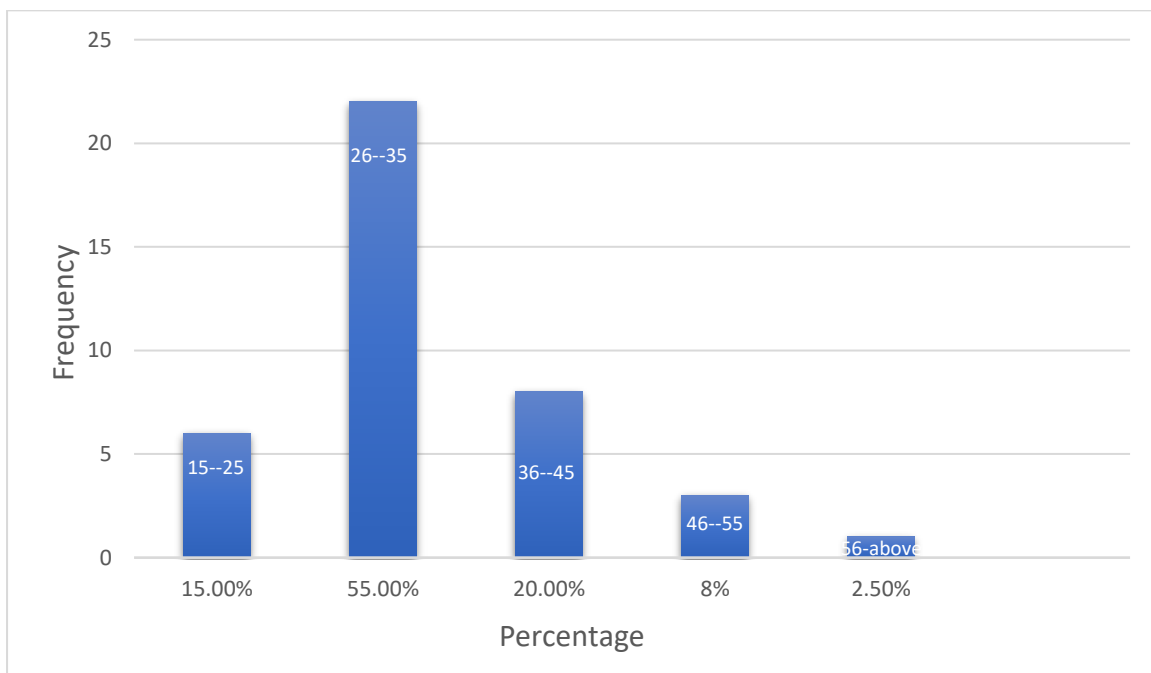
This is represented in figure 4.3.

**Figure 4.3: Gender profile (staff)**



As Figure 4.4 shows, six (6) of the respondents, representing 15.0 percent, were between the ages of 15 to 25, 22 (55.0%) were between the ages of 26 to 35 while eight (8) of them, representing 20.0 percent, were between the ages of 36 to 45. Three (3) of the respondents, representing 7.5 percent, were in the age group 46 to 55, while one (1) (2.5%) respondent was above the age of 56.

**Figure 4.4: Age profile (staff)**



On their level of education: 11 (27.5%) had a masters’ degree qualification, 20 (50.0%) on the other hand had a bachelor’s degree and nine (9) of them, representing 22.5 percent, had diploma qualifications, as shown in table 4.30.

**Table 4.30: Level of Education**

<b>Level of Education</b>		
	Frequency	Percent
Masters' degree	11	27.5
Bachelor's degree	20	50.0
Diploma	9	22.5
Total	40	100.0

Table 4.31 presents the job title of the staff of the library who answered the questionnaires. All 40 making it a 100.0 percent of the respondents selected “library assistant” as their job designation.

**Table 4.31: Job title/designation**

<b>Job title/designation</b>		
	Frequency	Percent
Library assistant	40	100.0

Out of the 40 respondents, 27 (67.5%) had worked for 5 years or less and the remaining 13, representing 32.5 percent, had worked for 10 years or more, as indicated in table 4.32.

**Table 4.32: Years of experience**

<b>Years of experience</b>		
	Frequency	Percent
5 or less	27	67.5
10 or more	13	32.5
Total	40	100.0

**4.2.2.3 Availability of IT infrastructure in the library**

One of the objectives of the study was to determine the IT facilities available in the library and respondents were therefore asked to indicate the hardware IT resources that were available. Four (4), (10.0%) selected “computers, printers, projectors, photocopiers, telephones, CCTV”, ten (10), (25.0%) indicated “computers, printers, scanners, telephones, CCTV”, 21 (52.5%) selected “computers, printers, scanners, projectors, photocopiers, braille embossers, book theft devices, telephones, CCTV”, while five (5), (12.5%) indicated “computers, printers, CD-ROMS, photocopiers”. This is shown in Table 4.33 below.

**Table 4.33: Available hardware facilities**

<b>Available hardware facilities for use in the library</b>		
	Frequency	Percent
Computers, printers, projectors, photocopiers, telephones, CCTV	4	10.0
Computers, printers, scanners, telephones, CCTV	10	25.0
Computers, printers, scanners, projectors, photocopiers, braille embossers, book theft devices, telephones, CCTV	21	52.5
Computers, printers, CD-ROMS, photocopiers	5	12.5
Total	40	100.0

Respondents were further asked to select the software facilities available in the library and 15 of them, making it 37.5 percent, selected “internet, e-databases, library website, OPAC, IR, off-campus access, e-theses, e-past questions”, 23 (57.5%) selected “internet, reference management software, e-databases, library website, OPAC, IR, off-campus access, e-theses, e-past questions” while the remaining two (2), (5.0%) selected “internet, library website” - shown in table 4.34 below.

**Table 4.34: Available software facilities**

<b>Available software facilities for use by library users</b>		
	Frequency	Percent
Internet, e-databases, library website, OPAC, IR, off-campus access, e-theses, e-past questions	15	37.5
Internet, reference management software, e-databases, library website, OPAC, IR, off-campus access, e-theses, e-past questions	23	57.5
Internet, library website	2	5.0
Total	40	100.0

As presented in table 4.35, on the question whether Balme Library was fully automated, one (1), (2.5%) selected “disagree”, eight (8), (20.0%) selected “neutral”, 20 (50.0%) of the respondents selected “agree” while 11 (27.5%) selected “strongly agree”.

**Table 4.35: Automation of the library**

<b>The library is fully automated</b>		
	Frequency	Percent
Disagree	1	2.5
Neutral	8	20.0
Agree	20	50.0
Strongly agree	11	27.5
Total	40	100.0



#### 4.2.2.4 Access and use of IT facilities in the library

Table 4.36 below projects the level of accessibility of IT infrastructure of the library as indicated by respondents: 33 (82.5%) selected “very accessible”, six (6) (15.0%) selected “accessible only within the library”, and one (1), (2.5%) selected “neutral”.

**Table 4.36: Accessibility of IT facilities**

Accessibility of IT facilities in the library		
	Frequency	Percent
Very accessible	33	82.5
Accessible ONLY within the library	6	15.0
Neutral	1	2.5
Total	40	100.0

On the frequency of use of IT facilities by staff, 39 of them, representing 97.5 percent, selected “daily” and one (1) respondent, representing 2.5 percent, selected “weekly” as displayed in table 4.37.

**Table 4.37: Frequency of the use of IT facilities**

Frequency of the use of IT facilities in the Library		
	Frequency	Percent
Daily	39	97.5
Weekly	1	2.5
Total	40	100.0

Respondents were further asked to indicate what they used the IT infrastructure for in the library and nine (9), (22.5%) selected “to render services to users”, four (4), (10.0%) selected “to perform my work duties”, one (1), (2.5%) selected “to support student research/course of study”.

**Table 4.38: Purpose of IT use**

<b>Purposes for which IT facilities are used</b>		
	<b>Frequency</b>	<b>Percent</b>
To render services to users	9	22.5
To perform my work duties	4	10.0
To support student research/course of study	1	2.5
To render services to users, to support student research/course	3	7.5
To render services to users, to perform my work duties, to support student research/course	11	27.5
To render services to users, to perform my work duties, to support student research/course, for leisure	8	20.0
To render services to users, to perform my work duties	4	10.0
<b>Total</b>	<b>40</b>	<b>100.0</b>

Three (3), (7.5%) selected “to render services to users, to support student research/course”, 11 (27.5%) selected “to render services to users, to perform my work duties, to support student research/course”, eight (8), (20.0%) selected “to render services to users, to perform my work duties, to support student research/course, for leisure” and four (4), (10.0%) selected “to render services to users, to perform my work duties”. This is presented in table 4.38 above.

#### **4.2.2.5 Skills, knowledge and competencies of library staff**

To determine the levels of skills and competencies of the library staff, they were asked about these issues. On their skills, 11 of the respondents, representing 27.5 percent selected “very good”, 23 (57.5%) selected “Good” and six (6), (15.0%) selected “average”, as shown in table 4.39.

**Table 4.39: Level of skills in the use of IT**

<b>Level of skills in the use of IT facilities in the library</b>		
	Frequency	Percent
Very good	11	27.5
Good	23	57.5
Average	6	15.0
Total	40	100.0

Asked whether they were computer literate, 39 of the respondents, representing 97.5 percent, responded “yes” and one (1), (2.5%) responded “no” in table 4.40

**Table 4.40: Computer literacy**

<b>Computer Literacy</b>		
	Frequency	Percent
Yes	39	97.5
No	1	2.5
Total	40	100.0

Respondents were asked if the library has provided them with training in the use of IT facilities and 35 of them, representing 87.5 percent, responded “yes” while the remaining five (5) (12.5%) responded “no”.

**Table 4.41: Training from the library**

<b>Formal training from the library in the use and assistance with IT</b>		
	Frequency	Percent
Yes	35	87.5
No	5	12.5
Total	40	100.0

As a follow up to the previous question, respondents were asked to indicate the modes of training they received from the library in IT use. Two (2), (5.0%) selected “certificate course”, seven (7), (17.5%) selected “workshop”, 18 (45.0%) selected “on the job training”, six (6), (15.0%) selected “workshop and on the job training”, two (2), (5.0%) selected “certificate course, workshop, on the job training”. This is shown in Table 4.42.

**Table 4.42: Modes of training received**

<b>Kinds of training received</b>		
	Frequency	Percent
Certificate Course	2	5.0
Workshop	7	17.5
On the job training	18	45.0
Workshop, on the job training	6	15.0
Certificate course, workshop, on the job training	2	5.0
None	5	12.5
Total	40	100.0

Asked whether they had the ability to help their users with IT issues, one (1), (2.5%) of the respondents selected “disagree”, 31 (77.5%) selected “agree” and eight (8), (20.0%) selected “strongly agree” as shown in table 4.43 below.

**Table 4.43: Staff competencies in IT**

<b>Staff competencies in the use of IT facilities</b>		
	Frequency	Percent
Disagree	1	2.5
Agree	31	77.5
Strongly agree	8	20.0
Total	40	100.0

Respondents were further asked to indicate if they were able to help users solve IT related issues in the library. Two (2), (5.0%) selected “disagree”, three (3), (7.5%) selected “neutral”, 30 (75.0%) selected “agree” and five (5), (12.5%) selected “strongly agree”.

**Table 4.44: Assistance in solving IT related problems**

<b>Assisting in solving IT related problems</b>		
	Frequency	Percent
Disagree	2	5.0
Neutral	3	7.5
Agree	30	75.0
Strongly agree	5	12.5
Total	40	100.0

#### **4.2.2.6 Impact of IT facilities on the library**

Another objective of the study was to investigate the impact of IT on the delivery of services of the library. Respondents were therefore asked to indicate the level of importance of IT facilities of the library to users and as indicated in table 4.45, three (3), (7.5%) selected “important”, 37 (92.5%) selected “very important”.

On the importance of IT facilities to the staff of the library, four (4), (10.0%) selected “important”, and 36 (90.0%) selected “very important”, as shown in table 4.46.

**Table 4.45: Relevance of IT facilities to users**

<b>Relevance of IT facilities to library users</b>		
	Frequency	Percent
Important	3	7.5
Very important	37	92.5
Total	40	100.0

**Table 4.46: Relevance of IT facilities to the staff of the library**

<b>Relevance of IT facilities to the staff of the library</b>		
	Frequency	Percent
Important	4	10.0
Very important	36	90.0
Total	40	100.0

On the relevance of IT facilities of the library, 32 of the respondents, representing 80.0 percent, said IT facilities were “essential services”, one (1), (2.5%) said “liability to the library”, two (2), (5.0%) selected “supplementary service to other library services”, four (4), (10.0%) selected “essential services, supplementary service to other library services” as shown in table 4.47.

**Table 4.47: Relevance of IT facilities**

<b>IT facilities</b>		
	Frequency	Percent
Essential services	32	80.0
Liability to the library	1	2.5
Supplementary service to other library services	2	5.0
Essential services, and supplementary service to other library services	4	10.0
None	1	2.5
Total	40	100.0

Considering the effects of IT facilities, the respondents were asked if IT facilities had the ability to improve work output and one (1), (2.5%) selected “neutral”, 14 (35.0%) selected “agree”, while 25 (62.5%) selected “strongly agree”.

**Table 4.48: Effects of IT facilities (a)**

<b>The ability of IT facilities to improve work output</b>		
	Frequency	Percent
Neutral	1	2.5
Agree	14	35.0
Strongly agree	25	62.5
Total	40	100.0

Respondents were also asked to indicate if IT facilities made them redundant at work and 16 (40.0%) of them selected “strongly disagree”, 15 (37.5%) selected “disagree”, six (6), (15.0%) were “neutral” while three (3), (7.5%) selected “agree”. See Table 4.49 below.

**Table 4.49: Effects of IT facilities (b)**

<b>The ability of IT facilities to make staff redundant</b>		
	Frequency	Percent
Strongly disagree	16	40.0
Disagree	15	37.5
Neutral	6	15.0
Agree	3	7.5
Total	40	100.0

Asked whether IT facilities made work easier, 12 (30.0%) responded “agree”, and 28 (70.0%) selected “strongly agree”, as shown in table 4.50.

**Table 4.50: Effects of IT facilities (c)**

<b>The ability of IT facilities to make work easier</b>		
	Frequency	Percent
Agree	12	30.0
Strongly agree	28	70.0
Total	40	100.0

On whether IT facilities made work difficult and demanding, 18 (45.0%) selected “strongly disagree”, 15 (37.5%) selected “disagree”, three (3), (7.5%) selected “neutral” and “agree” respectively while one (1), (2.5%) selected “strongly agree” (table 4.51).

**Table 4.51: Effects of IT facilities (d)**

<b>The ability of IT facilities to make work difficult and demanding</b>		
	Frequency	Percent
Strongly disagree	18	45.0
Disagree	15	37.5
Neutral	3	7.5
Agree	3	7.5
Strongly agree	1	2.5
Total	40	100.0

**Table 4.52: Usefulness of IT (a)**

<b>The usefulness of IT in the library</b>		
	Frequency	Percent
Yes	40	100.0

As shown in table 4.52 above, all 40 respondents, making 100 percent, responded “yes” to the question of whether they found IT facilities useful.



**Table 4.53: Usefulness of IT (b)**

<b>Reasons for usefulness</b>		
	Frequency	Percent
Easy and effective teaching and learning	3	7.5
Improves information access and sharing	7	17.5
Easy and effective teaching and learning, improve information sharing	5	12.5
Makes work easy and effective	17	42.5
Easy delivery of services, and improved access to services	6	15.0
None	2	5.0
Total	40	100.0

The respondents were further asked to provide reasons why they found IT facilities useful and as shown in table 4.53, three (3), (7.5%) selected “easy and effective teaching and learning”, seven (7), (17.5%) selected “improves information access and sharing”, five (5), (12.5%) selected “easy and effective teaching and learning, improves information sharing”, 17 (42.5%) selected “makes work easy and effective”, six (6), (15.0%) selected “easy delivery of services, improved access to services”.

#### **4.2.2.7 Attitudes and preferences of library staff towards IT**

To determine the preferences and attitudes of library staff to IT facilities, they were asked to select the hardware IT facilities they were comfortable to use in the library. As indicated in table 4.54, three (3), (7.5%) selected “computers”, 19 (47.5%) selected “computers, printers, scanners, photocopiers, telephones”, 14 (35.0%) selected “computers, printers, digital recorders, scanners, photocopiers, projectors, telephones, braille embossers, magnifiers”, three (3), (7.5%) selected “computers, printers, projectors, photocopiers, CCTV” and one (1), (2.5%)

chose “computers, printers, digital recorder, scanners, photocopiers, projectors, telephones, braille embossers, barcode reader”.

**Table 4.54: Preference of hardware IT facilities**

<b>Preference of IT hardware used in the library</b>		
	Frequency	Percent
Computers	3	7.5
Computers, printers, scanners, photocopiers, telephones	19	47.5
Computers, printers, digital recorders, scanners, photocopiers, projectors, telephones, braille embossers, magnifiers	14	35.0
Computers, printers, projectors, photocopiers, CCTV	3	7.5
Computers, printers, digital recorder, scanners, photocopiers, projectors, telephones, braille embossers, barcode reader	1	2.5
Total	40	100.0

On the other hand, when asked to select the software IT facilities they preferred (as indicated in table 4.55), one (1), (2.5%) selected “internet”, 12 (30.0%) selected “internet, e-databases, library website, OPAC, IR, e-theses, e-past questions”, 19 (47.5%) selected “internet, reference management software, e-databases, library website, OPAC, IR, e-theses, e-past questions”, and four (4), (10.0%) selected “internet, library website, e-past questions” and “internet, library website, OPAC” respectively.

**Table 4.55: Preference of Software IT facilities**

<b>Preference of Software used in the library</b>		
	Frequency	Percent
Internet	1	2.5
Internet, e-databases, library website, OPAC, IR, e-theses, e-past questions	12	30.0
Internet, reference management software, e-databases, library website, OPAC, IR, e-theses, e-past questions	19	47.5
internet, library website, e-past questions	4	10.0
internet, library website, OPAC	4	10.0
Total	40	100.0

To further explore the attitudes of the staff, they were asked if they would recommend extra funds for the acquisition and implementation of IT facilities and all 40 (100.0%) responded positively as shown in table 4.56.

**Table 4.56: Recommendation of Extra funds for IT facilities (a)**

<b>Investment of extra income for IT facilities in the library</b>		
	Frequency	Percent
Yes	40	100.0

Asked why they would recommend extra funds for IT facilities, 11 of the respondents, representing 27.5 percent, said: “to promote quick information dissemination”, 13 (32.5%) said “to improve work output”, 12 (30.0% ) said “to improve service delivery”, one (1), (2.5%) said “to reduce cost of production”, and two (2), (2.5%) said “to enhance research and academic works”.

**Table 4.57: Recommendation of extra funds for IT facilities (b)**

<b>Reasons for recommendation</b>		
	Frequency	Percent
To promote quick information dissemination	11	27.5
To improve work output	13	32.5
To improve service delivery	12	30.0
To reduce the cost of production	1	2.5
To enhance research and academic works	2	5.0
None	1	2.5
Total	40	100.0

#### **4.2.2.9 Challenges associated with the use of IT facilities in the library**

To identify challenges associated with the use of IT facilities of the library, respondents were asked to indicate such difficulties and three (3), (7.5%) selected “lack of IT skills”, one (1) (2.5%) selected “lack of training and support from the library” and “negative attitude of library staff” respectively. Five (5), (12.5%) selected “slow internet connectivity”, two (2), (5.0%) selected “unstable power supply” and 11 (27.5%) selected “inadequate IT infrastructure, lack of training, slow internet connectivity, unstable power supply, poor IT skills”.

**Table 4.58: Challenges faced with the use of IT facilities**

<b>Challenges faced with the use of IT facilities in the library</b>		
	Frequency	Percent
Lack of IT skills	3	7.5
Lack of training and support from the library	1	2.5
The negative attitude of library staff	1	2.5
Slow internet connectivity	5	12.5
Unstable power supply	2	5.0
Poor IT skills and knowledge of library staff	1	2.5
Inadequate IT infrastructure, lack of training, slow internet connectivity, unstable power supply, poor IT skills	11	27.5
Inadequate IT infrastructure, slow internet connectivity, unstable power supply, poor skills, poor maintenance	9	22.5
Slow internet connectivity, unstable power supply	7	17.5
Total	40	100.0

Nine (9), (22.5%) also selected “inadequate IT infrastructure, slow internet connectivity, unstable power supply, poor skills, poor maintenance” and seven (7), (17.5%) selected “slow internet connectivity, unstable power supply”.

Respondents were also asked to suggest ways to improve on the challenges they faced utilising IT facilities in the library and 13 (32.5%) suggested “provide adequate training for staff and users”, seven (7), (17.5%) suggested “increase internet speed and scope” and “provide supplementary power supply, increase internet speed and scope”, respectively, while 11 (27.5%) suggested “proper maintenance of facilities, marketing of services to users, alternative power supply” and two (2), (5.0%) suggested “proper maintenance of facilities, alternative power supply, proper training of staff, increase internet speed and scope”.

**Table 4.59: Ways to improve on the challenges**

<b>Ways to improve on challenges</b>		
	<b>Frequency</b>	<b>Percent</b>
Provide adequate training for staff and users	13	32.5
Increase internet speed and scope	7	17.5
Provide supplementary power supply, increase internet speed and scope	7	17.5
Proper maintenance of facilities, marketing of services to users, alternative power supply	11	27.5
Proper maintenance of facilities, alternative power supply, Proper training of staff, Increase internet speed and scope	2	5.0
<b>Total</b>	<b>40</b>	<b>100.0</b>

### 4.2.3 Qualitative analysis of data (Interviews)

#### 4.2.3.1 Introduction

The researcher conducted face to face interviews with selected professional librarians to further explore the usage and impact of information technology facilities of Balme Library. As discussed in the methodology chapter of the study, a sample of six professional staff members of the library was interviewed. The researcher sent the interview schedule to the six randomly selected professional librarians ahead of time to book time for their interviews

Four out of the selected librarians honoured the interviews and the researcher decided to make inferences from their interviews due to time constraints.

#### 4.2.3.2 Demographic data of professional staff interviewed

As shown in Table 4.60, the researcher interviewed three females who were between the ages of 26 to 35, 46 to 55 and 56 or more respectively. One male was also interviewed, and he was between the ages of 46 to 55. The first respondent had a qualification of Master of Philosophy in Information Studies (MPhil) and had worked in the library for a period of 5 years or less. The second respondent's qualification was a Doctoral degree in Information Science (Ph.D.) and 10 years or more experience in the library. The third respondent had a Master of Information Technology (M.IT) and 10 years or more experience in the library.

**Table 4.60: Demographic data**

<b>Respondent</b>	<b>Gender</b>	<b>Age</b>	<b>Level of Education</b>	<b>Job description</b>	<b>Experience</b>
1	Female	26-35	MPhil.	Asst. Librarian	5 or less
2	Female	46-55	PhD	Snr. Asst. Librarian	10 or more
3	Male	46-55	M.IT	Asst. Librarian	10 or more
4	Female	Above 56	PhD	University Librarian	10 or more

### 4.2.3.3 Results of interviews

#### Question one

What IT infrastructure (hardware & software) are available in the library?

Respondent 1:

*“We have computers, printers, photocopiers, electronic databases, IP phones”.*

Respondent 2:

*“There are computers, electronic resources, printers, photocopiers, scanners, software resources, IP phones”.*

*“Our software resources include Reference management systems (Endnote, Mendeley) and Research analysis tools such as SPSS and STATA that we install for our users.”*

Respondent 3:

*“The library has computers, internet, electronic resources, braille embossers and braille printers”.*

Respondent 4:

*“There are computers, scanners, printers, photocopiers, internet, electronic databases, and others.”*

#### Question two

Is Balme Library fully automated?

Respondent 1:

*“I won't say so, from what I know the routine library operations are automated but not entirely the library. Some of our services are automated but the library is not fully automated”.*

*“We still have our manual catalogue cards around, and our books are equally available to users.”*

Respondent 2:

*“Our library is automated to some extent”.*



*“I will say we have a hybrid system because we still do some manual library works but we have a fairly automated library in general”*

Respondent 3:

*“A good number of our services have been automated but not the entire library, so I won’t say we are fully automated”.*

Respondent 4:

*“No, though we have automated certain aspects of our services”.*

### **Question three**

Are your IT facilities easily accessible?

Respondent 1:

*“Computers are accessible if students use our labs but we have just a few computers for the OPAC so I think we should have more computers.”*

*“Users, however, are not restricted to our electronic resources provided they have internet and their own devices at home.”*

Respondent 2:

*“Our IT facilities are very accessible to users both within the library and outside the library. In the library, users have access to computers, scanners, internet, and others and they equally have off-campus access to our electronic databases provided the person is a registered student of the university. Our institutional repository is freely accessible to all”*

Respondent 3:

*“Yes, our IT facilities are very accessible to users especially those who visit the library in person. Our computers, the internet, and other facilities are there for them. Users also have easy access to electronic web resources through our off-campus access portal.”*

Respondent 4:

*“Our IT facilities are very accessible to users. They can use those in the library as well as access those online from their various locations.”*

### **Question four**

Do your patrons use the IT facilities provided?

Respondent 1:

*“Yes, they do.”*

Respondent 2:

*“Of course, they do.”*

Respondent 3:

*“Yes, they use them.”*

### **Question five**

Do you get feedback from library users on their experiences with IT facilities in and out of the library?

Respondent 1:

*“We do get feedback from our users especially when there is downtime of servers and also when computers do not function, they report to us.”*

Respondent 2:

*“Yes, we get feedback from our users.”*

Respondent 3:

*“Users give us feedback as and when necessary. We usually get feedback when users encounter problems using our facilities, but we have not developed any formal system to collect feedback from users.”*

Respondent 4:

*“Yes, our users give us feedback”*

### **Question six**

If Yes, by what means do you get feedback from your users regarding the use of your library’s IT facilities?

Respondent 1:

*“Users usually report directly to staff on duty”.*

*“We do not have a formal feedback procedure.”*

Respondent 2:

*“Sometimes they report issues directly to our staff and other times they use our live chat system to give us feedback.”*

Respondent 3:

*“The users give feedback directly to staff at service points and through our live chat system.”*

Respondent 4:

*“Sometimes they talk to staff directly, other times they use our chat with a librarian platform.”*

### **Question seven**

Are there programmes aimed at training library users and staff (including users with special needs) on the use of IT facilities?

Respondent 1:

*“The programmes I know are the orientations we do at the beginning of every academic year. We provide library instructional guides to users and we introduce what services and facilities we have to them. We also run exhibitions for users.”*

*“Yes, the library usually organises training for staff on library technologies so that they are able to assist users of the library.”*

Respondent 2:

*“We periodically organise workshops and other short training for our users and staff, sometimes we bring on board experts from our IT partners outside the country to train them on specific facilities. We also have our routine orientation for newly admitted students to introduce to them our resources and how to utilise them”*

*“The central IT department of the university (UGCS) has a training course for students with special needs especially the blind students, they are trained on how to use the computer with their special voice software.”*

Respondent 3:

*“Yes, we organise orientation for fresh students at the beginning of every academic year. We also organise workshops and refresher training for staff to improve their skills.”*

Respondent 4:

*Yes, we organise workshops and orientations for our users and staff. Sometimes we sponsor some of our staff to attend conferences and workshops outside of the university to in turn train others and users.*

### **Question eight**

If Yes, what are those programmes and are they sustainable?

Respondent 2:

*“Yes, they are in the sense that a lot of the training we do are facilitated by our staff which means less cost.”*

### **Question nine**

Do you have skilled library staff to handle IT-related problems for users?

Respondent 1:

*“Yes, we do have skilled library staff who manage our IT related issues.”*

*“The academic computing unit is there in the library to support our server administration, website management, and others, the digitisation unit also has skilled IT staff who manage our repository and the Research and Knowledge commons equally have skilled staff who attend to the daily needs of users.”*

Respondent 2:

*“Yes, we do have skilled library staff and we also receive support from the central IT department.”*

Respondent 3:

*“We have skilled library staff in IT who help users with their problems.”*

*“A unit called academic computing unit is staffed with qualified IT personnel and are responsible for the administration of the library’s IT.”*

Respondent 4:

*“Yes, we have staff who are skilled IT.”*

### **Question ten**

Do you find the IT infrastructure in your library useful?

Respondent 1:

*“Yes, in the sense that when it comes to the routine library tasks which have been automated, it makes work easier and users are able to access library resources at the comfort of their homes and hostels by the help of IT.”*

Respondent 2:

*“Yes”*

Respondent 4:

*“Yes, very useful both to users and staff of the library.”*

### **Question eleven**

What are the impact on your library regarding the delivery of services through IT facilities?

Respondent 1:

*“I think we are able to answer more queries of users on time (with our chat with the librarian platform) and I think it’s a positive impact on our service delivery.”*

*“I know that our social media platforms serve as service points, we advertise our services and products there and educate our users on how to patronise the library. We have had a good reception of our social media sites by our users.”*

Respondent 2:

*“With IT facilities, we are able to help our student researchers to produce credible research output. The reference management tools have made their research easier and our*

*plagiarism checker has ensured that our students and faculty come out with genuine research output.”*

Respondent 3:

*“We are able to satisfy our user needs by providing them with information accurately and timely with the help of IT.”*

Respondent 4:

*“We are able to provide services very quick and easy with IT facilities as compared to the manual library system. For example, users can search for books on our OPAC before they come to the library to pick them which is very easy and convenient.”*

### **Question twelve**

Would you recommend further investment in IT facilities for the library?

Respondent 1:

*“Yes, because we have limited IT facilities which may not meet all the demands of our users. Sometimes users’ queue to use computers and printers at our commons. There is room for improvement.”*

Respondent 2:

*“Yes, we need to invest more in IT to catch up with the industry as it keeps growing.”*

### **Question thirteen**

What challenges does the library face with IT facilities’ implementation and uses?

Respondent 1:

*“We do not have adequate IT infrastructure; certain parts of the library do not have internet connectivity.”*

*“Another challenge is funding; the library has a limited budget.”*

Respondent 2:

*“We have slow internet connectivity which frustrates our users sometimes, we also struggle with power since we rely directly on power from the government which is not very stable. Some of our staff also lack the requisite IT skills to supplement our facilities.”*

Respondent 3:

*“A lot of our users do not have IT skills and yet refuse to attend the training programmes we organise for them and this makes our work difficult since they always need assistance with everything.”*

#### **Question fourteen**

Suggest ways to address those challenges.

Respondent 1:

*“I think the University should invest more into the library so that we can acquire sufficient IT infrastructure to meet the high demand from our users.”*

Respondent 2;

*“I would recommend more funds to support the library to carry out its operations.”*

Respondent 3:

*“I think we need to get a way to bring all our users on board to properly train them to utilise our resources effectively.”*

#### **4.2.3.4 Conclusion**

This chapter provided a detailed analysis of findings of the study and presented the findings using tables and figures. The researcher analysed and presented findings of the quantitative phase of the study followed by that of the qualitative phase.

The next chapter will present interpretations of the findings of the study.

## **CHAPTER FIVE**

### **INTERPRETATION AND DISCUSSION OF FINDINGS**

#### **5.1 Introduction**

The aim of the research was to evaluate the impact of information technologies at the Balme Library of the University of Ghana on service delivery at the library. The researcher collected data on the issues addressed in the objectives and presented the findings and analyses in the previous chapter. This chapter will provide interpretations and discuss the findings of the study showing the relations and disparities with previous studies.

The discussion of findings allows the researcher to interpret and explain the importance of his research findings compared to the already existing knowledge in the subject area and present discoveries made from his research (Gray, 2017:823). The researcher brings to the fore his understanding of his findings and explains what his research found (Singleton and Straits 2010:522).

#### **5.2 Demographic characteristics of respondents**

The demographic information of respondents in a research study is often crucial to determine certain choices and accessions they make. In social research, demographics data of study participants have helped researchers to draw inferences and conclusions.

In this study, 67% of the user population were male while their female counterparts were 32%. Comparatively, the male staff participants were 55% while the females were 45%, a clear indication of male dominance in higher learning and the educational system which conforms to the UNICEF (2008-2012) report on education in Ghana stating a higher percentage of youth literacy of males (88.3%) to female (83.2%).



The study also reveals that 77.5% of the library users were between the ages of 15 and 25 while 55% of the library staff fell between the ages of 26 to 35. This implies a high percentage of young and vibrant people in education and a positive absorption of them into the labour force. The gender demographic characteristic of this study is in contrast with a similar study by Saleem and Sajjad (2016:48) in India which recorded 61% female respondents as against 39% of males. However, both studies recorded similar age bracket percentage of young users.

Demographic data such as age and gender have been instrumental in several research studies. Researchers have studied and made inferences based on demographics such as patterns of choices, preferences and decision making in social science. A study on career patterns of female librarians by Adjah (2015) revealed a slow and in most cases stagnated progress due to factors that affect them as females.

### **5.3 Availability of IT infrastructure**

One of the objectives of the study was to ascertain the knowledge and familiarity of the library users and staff on the availability and accessibility of IT infrastructure at the Balme Library and in that regard, respondents were asked to indicate from a list what IT infrastructure was available at the library. Both library users and staff indicated computers and internet-based facilities as well as other auxiliary facilities such as printers, photocopiers, braille embossers. All the respondents indicated the availability of one form or the other of IT infrastructure measuring a 100% affirmation that the Balme Library has implemented IT infrastructure to promote service delivery.

In the interview, respondent 2 stated that:

*“There are computers, electronic resources, printers, photocopiers, scanners, software resources, IP phones”.*

*“Our software resources include Reference management systems (Endnote, Mendeley) and Research analysis tools such as SPSS and STATA that we install for our users.”*

That response confirms the availability of IT tools and services in the library and indicates that the Balme Library is conscious of the educational needs of users. Provision of computers, reference tools, electronic databases, and others are crucial and important for research and academic works. The library in that sense promotes effective research and academic work.

### **5.3.1 Accessibility and use of IT infrastructure**

The researcher further inquired about the accessibility of the available IT infrastructure of the library by asking respondents to indicate the accessibility of the library’s IT facilities and 65.9% of the user respondents indicated that the facilities were very accessible to them. Comparatively, 82.5% of the library staff indicated that the IT facilities from the library were very accessible. Those responses indicate a positive remark that the IT facilities provided by the library are not only available, but they are easily accessible to both users and staff to facilitate efficient delivery of services. Respondents 2 and 3 reiterates the accessibility of IT resources saying: *“Our IT facilities are very accessible to users both within the library and outside the library. In the library, users have access to computers, scanners, internet, and others and they equally have off-campus access to our electronic databases provided the person is a registered student of the university. Our institutional repository is freely accessible to all”*

*“Yes, our IT facilities are very accessible to users especially those who visit the library in person. Our computers, the internet, and other facilities are there for them. Users also have easy access to electronic web resources through our off-campus access portal.”*

The study found that users provide feedback to the library on their experiences with the IT facilities. Respondents from the interview clearly stated that they do receive feedback from their users which justifies their positions on the accessibility of IT to their users. Feedback is important to the management of the library as it informs future decision making in terms of facility acquisition and implementation. Feedback from users of the library brings to the management the challenges and preferences of users on IT facilities and library managers become aware of the weaknesses in their IT systems.

However, 8.5% of the user respondents indicated that they were neutral about the accessibility of IT facilities while 1.6% said the facilities were not accessible. This raises a concern and implies that management of the library still has work to do to ensure fair accessibility of resources to all users.

On the frequency of use of IT facilities of the library, the study reveals that a 57.5% majority of the library users accessed and used IT facilities in the library on a daily basis with 88.4% of them mainly use it to support their research and/or studies. This reveals the high demand for IT resources by users of the library. Similarly, 97.5% of the library staff were found to have used IT resources daily with most of them using IT to perform their work duties and to serve their users.

These findings are in line with that of a study by Chukwu (2016) who found that the majority of the users of the library of the Federal University of Technology, Nigeria used ICT resources frequently for both academic and personal purposes.

#### **5.4 Skills and competencies of library staff and users**

Another objective of the study was to determine the level of skills and competencies of library users and staff in using IT facilities. The study reveals that 54.3% of the library users indicated

they had good IT skills while 25.6% rated their IT skills as very good. Comparatively, 57.5% of the library staff indicated they had good IT skills while 27.5% had very good IT skills. The study found that a small percentage of the staff and users lacked relevant IT skills and needed help. It is a good sign that the greater number of staff and users have good IT skills to utilise the IT resources of the library. These findings are in contrast with that of Chukwu (2016) whose study found a poor adaptation to ICT resources by users due to a lack of skills and awareness.

The researcher further sought to find out if provisions had been made to train users and staff of the library in IT use. Respondent 2 stated that *“We periodically organise workshops and other short training for our users and staff, sometimes we bring on board experts from our IT partners outside the country to train them on specific facilities. We also have our routine orientation for newly admitted students to introduce to them our resources and how to utilise them”*

*“The central IT department of the university (UGCS) has a training course for students with special needs especially the blind students, they are trained on how to use the computer with their special voice software.”*

Respondent 4 also stated that *“Yes, we organise workshops and orientations for our users and staff. Sometimes we sponsor some of our staff to attend conferences and workshops outside of the university to in turn train others and users.”*

They clearly indicated efforts made by the library to train staff and users to utilise IT facilities. The study reveals that 55% of the library users had received training from the library while a worrying 45% had never received any form of training from the library. Comparatively, 87.5% of the library staff (quite higher) had received training from the library. The relatively high percentage of users who had not received any form of training from the library raises concern and weakens the assertions made by respondents in the interview. These findings imply that

management of the Balme Library needs to pay attention to their training activities to make sure it is representative of all users.

The study further shows the competencies of staff of the library: 47.3% of the library users agreed, while 35.7% strongly agreed that the staff of the library were supportive and helpful with IT services in the library. Comparatively, 77.5% of the staff agreed and 20% strongly agreed that they were helpful with IT staff in the library. Another 75% of the staff agreed that they had assisted users with IT issues while 12.5% strongly agreed to the same. Similarly, 50.4% of users agreed and 29.5% strongly agreed that staff had assisted them with IT problems.

One respondent of the interview indicated that:

*“Yes, we do have skilled library staff who manage our IT related issues.”*

*“The academic computing unit is there in the library to support our server administration, website management, and others, the digitisation unit also has skilled IT staff who manage our repository and the Research and Knowledge commons equally have skilled staff who attend to the daily needs of users.”*

This means the library is well positioned in terms of staff expertise in IT and its related issues in the delivery of services.

Although it is important to note the 19.4% of users who were neutral on the same subject, the findings indicate that the library staff is up to date with provision of support to users in IT at the Balme Library. The findings conform to the outcome of the study by Ntui and Inyang (2015) who found that library staff competencies in IT relate significantly with job satisfaction. Haliso (2011) equally found a relation between the use of IT facilities by librarians and the enhancement of their jobs.

Management of the library needs to strategically organise their training schedules for both library users and staff to ensure justification of investments made by the university into the implementation of IT resources. When users know their way around with IT facilities of the

library, they utilise them effectively to improve their academic work and research outputs which in return enhances the quality of education as well as the image of the university globally.

### **5.5 Expectations and experiences of users**

When the experiences and expectations of users of a facility are known to the management of an institution, they stand a good opportunity to make informed decisions and choices to provide effective services and improve on the existing products (Akinde & Adetimirin, 2017:17).

One of the objectives of this study was to find out the experiences of users of the library and discover their expectations of the library in terms of IT facilities and their implementations in the library.

The study reveals that users of the library had good experiences with the IT facilities provided by the library. Notwithstanding this, the study also revealed that users and staff of the library expected improvements in IT infrastructure of the library as indicated by respondent one:

*“Yes, because we have limited IT facilities which may not meet all the demands of our users. Sometimes users’ queue to use computers and printers at our commons. There is room for improvement.”*

Notwithstanding efforts made by the management of the library to implement modern IT facilities in the library, the study revealed that the facilities are not adequate to meet user demands especially the shared facilities within the library such as computers, printers, scanners, and the internet. Respondents of the study complained about slow internet connectivity among others. It is therefore important that management of the library look for alternatives to close that gap to ensure fair distribution of IT resources to users of the library.

Reflecting on their experiences, 79.1% (users) and 92.5% (staff) of the respondents indicated that IT facilities were very important, while 87.6% (users) and 80% (staff) considered IT resources as essential to service delivery.

All the user respondents indicated the IT resources they preferred to use in the library, with the majority of them stating “computers, printers, scanners, photocopiers” as their preferred hardware resources and “internet, reference software, e-databases, library website, OPAC, IR, chat with librarian, e-theses” as their preferred software resources. Some respondents who had special needs indicated the braille printer and JAWS as their preferred IT resources, an indication that they promote their learning and research activities as they compete with other regular users.

96.9% of the users and 100% of the staff responded “yes” to the need for further investment into IT facilities considering how important and useful they found them.

## **5.6 Impact of IT in the delivery of library services**

It was the objective of the study to determine the impact of IT facilities on the delivery of services in the library and the study reveals a positive impact of IT resources on service delivery. Respondent four (4) stated that:

*“We are able to provide services very quick and easy with IT facilities as compared to the manual library system. For example, users can search for books on our OPAC before they come to the library to pick them which is very easy and convenient.”*

Respondent two (2) also stated that:

*“With IT facilities, we are able to help our student researchers to produce credible research output. The reference management tools have made their research easier and our plagiarism checker has ensured that our students and faculty come out with genuine research output.”*

Both alluded to the positive impact the library has seen over the years with the help of IT facilities. 79.8% of the library users agreed strongly with the statement while the remaining 20.2% agreed that IT facilities improved their learning. 37.2% also agreed strongly while 43.4% agreed that IT facilities from the library promoted collaborations among them. 62.5% of the library staff stated that IT facilities improved their work output while 40% and 37.5% strongly disagreed and disagreed respectively that IT facilities made them redundant.

Both users and staff of the library indicated the usefulness of IT facilities, with the majority of them stating that IT facilities “provided easy access to information”, 3.1% of the users stated that IT facilities “promoted learning with disabilities”, among others.

These findings are similar to the outcome of research by Sammeta and Madara (2017) on data innovation, mobile application, radio frequency identification, self- check-out kiosk in the scholastic Amity University Dubai library. The study titled “impact of information technologies on library services in educational institutions” revealed positive impacts of implemented IT facilities in the Amity University Dubai library as against the traditional modes of service delivery.

IT facilities of the library have affected teaching and learning in a positive way as responses of the study indicated. Users of the library stated that they can conduct their research easily and conveniently while they do their assignments with ease. The staff of the library also provide effective services at appropriate times as and when needed. They equally do so easily and effectively.

### **5.7 Challenges and constraints to the use of IT facilities**

IT resources have changed and improved service delivery of libraries as users demand a better-quality service within the appropriate times. However, there have been challenges and barriers



with the adoption, implementation, and use of these IT resources (Awuor, Rabah & Maake, 2013:256).

One of the objectives of this study was to expose the barriers to IT use in the library and recommend solutions to those challenges. In the literature review, the lack of funding leading to inadequate IT infrastructure in libraries, high rate of ICT illiteracy, poor attitude to IT use among others, was identified as some of the hindrances to IT use in libraries (Awuor, Rabah and Maake, 2013; Nkechi, 2015). The researcher sought the opinion of the respondents on the challenges they encountered using IT resources in and out of the library and found that users and staff of the Balme Library faced similar challenges to those mentioned above.

Respondents (users) of the study indicated “inadequate IT infrastructure, negative attitude of library staff, slow internet connectivity, unstable power supply, lack of IT skills as prominent among the challenges they faced using IT resources of the library.

In the interviews, the following were cited as challenges to IT use in the library by the professional staff;

Respondent 1

*“We do not have adequate IT infrastructure; certain parts of the library do not have internet connectivity.”*

*“Another challenge is funding; the library has a limited budget.”*

Respondent 2

*“We have slow internet connectivity which frustrates our users sometimes, we also struggle with power since we rely directly on power from the government which is not very stable. Some of our staff also lack the requisite IT skills to supplement our facilities.”*

Respondent 3

*“A lot of our users do not have IT skills and yet refuse to attend the training programmes we organise for them and this makes our work difficult since they always need assistance with everything.”*

The responses above confirm the challenges users stated and indicate that the library in its efforts to provide IT resources face challenges that require solutions to make the library a haven of information. Some users of the library lack the requisite skills to use IT facilities in the library while the available facilities are not adequate to meet the high demand of users. The negative attitude of some staff of the library towards users is another challenge that discourages users from patronising library facilities as revealed by the study.

## **5.8 Conclusion**

This chapter provided an interpretation and discussion of the findings of the study, and this discussion and interpretation were presented in line with the objectives of the study. Chapter six will provide a summary of the study, conclusions, and recommendations.

## **CHAPTER SIX**

### **SUMMARY OF FINDINGS, CONCLUSION, AND RECOMMENDATIONS**

#### **6.1 Introduction**

In the previous chapter, the findings of the study were interpreted and discussed. This chapter presents a summary of the major findings of the study, as well as conclusions drawn from the findings of the study and recommendations. This research was conducted at the Balme library of the University of Ghana with the aim to evaluate the impact of information technologies on service delivery at the library.

The study aimed at finding answers to the following objective questions:

- VI. What are the IT infrastructure available at the library?
- VII. What are the skills and competencies of library staff and users in IT?
- VIII. What are the expectations of users of the library regarding IT?
- IX. How do IT systems impact/affect the delivery of services at the library?
- X. What challenges do librarians and their users encounter using IT tools in the library?

#### **6.2 Summary of findings**

The summary of the findings below is presented based on the various objectives set out by the researcher for the study.

### **6.2.1 To ascertain the level of availability and accessibility of IT in the library**

The findings of the study show that the Balme Library has implemented several IT facilities to promote easy and convenient delivery of services to users. Among the IT resources available at almost no charge in and out of the library, as found in the study, were computers, printers, scanners, projectors, photocopiers, video conference facility, telephones, multimedia facility, book theft security system, braille embossers, Closed Circuit Television, magnifiers and software applications such as internet, reference management software, E-databases, library website, institutional repository, Off-campus access, e-theses, e-past questions and JAWS.

The study reveals that these facilities were available to all users both within and out of the library.

The study further reveals that the IT facilities available from the library were very accessible to users and staff of the library with minimal barriers to them. Users indicated that they could easily and freely access the IT resources of the library.

### **6.2.2 To determine the skills and competencies of library staff and users in IT**

The study has revealed that over fifty percent of users of the library are “good” in terms of their skills and competencies in the utilisation of IT facilities. A self-assessment was done through the self-administered questionnaires which indicated the level of skills of users and staff.

The study also shows that over fifty percent of library staff equally had good IT skills to deliver library services effectively to users. Over fifty percent of the users of the library agreed that the staff of the library were skilful and helpful with the utilisation of IT facilities in the library.

### **6.2.3 To analyse expectations and experiences of users of the library in IT**

Regarding the experiences and expectations of users of the library, the study reveals that the majority of the library users had good experiences using the IT facilities of the library. Most of them used the IT facilities daily and had their challenges addressed by library staff as and when they arose.

The study further shows that both users of the library and staff agreed that the university should invest more into the implementation of IT facilities in the library as they expected improvements in services through IT resources.

### **6.2.4 To determine the impact of IT in the delivery of library services**

The findings of the study reveal a positive impact of IT facilities on the delivery of library services at Balme Library. Despite some challenge's users and staff of the library encountered using IT in the library, the study shows significant improvement in access to information, computers and their accompanying resources like the internet and other IT resources.

A staff member respondent of the study stated that the library served its users by providing appropriate information to them at the appropriate times with the help of IT facilities. The study, therefore, concludes that the IT infrastructure at Balme Library impacted positively on the delivery of quality services to users and the university community.

### **6.2.5 To expose challenges and constraints to the use of IT at the library and recommend strategies for improvement**

Existing literature on the subject of this study gives the assumption that the challenges users face using IT facilities in libraries prevent them from fully utilising the facilities to support their research work and courses of study (Anyim, 2018; Uwakwe, 2016; Winn *et al.*, 2017).

This study reveals among others, the following challenges: inadequate IT infrastructure, lack of IT skills, slow internet connectivity, unstable power supply, negative attitude of library staff, lack of training and support from the library and lack of training from the library.

### **6.3 Conclusion**

The study aimed at evaluating the impact of information technologies at Balme Library on the delivery of services and in line with the objectives of the study, the researcher concludes that:

- A variety of IT facilities such as computers, internet, photocopiers, scanners, braille embossers, magnifiers for reading, reference management software, video conference facility, electronic theses, electronic databases, automated library system, electronic past questions and library website are available at the library and are very accessible to all users and staff of the library.
- Despite the lack of intensive training from the library on the utilisation of IT resources, most of the library users and staff possess skills and competencies in IT and its related subjects.
- Staff and users of the library had good user-experiences of the library's IT infrastructure and they expect improvements to IT facilities in terms of acquisition of emerging IT facilities and proper training on their uses.

- The IT infrastructure had positive impacts on the delivery of library services ensuring that users of the received the appropriate services they needed at the right times and places.
- Users and staff of the library encounter challenges of slow internet connectivity, unstable power supply, lack of IT skills, inadequate IT infrastructure among others and they hinder the maximum utilisation of IT in and out of the library.

## **6.4 Recommendations**

The following recommendations were arrived at from the findings of this research to improve and possibly provide remedies to the challenges associated with the use of information technologies in libraries.

### **6.4.1 Train library users and staff**

IT tools and equipment constantly change, and emerging technologies require new and/or upgrading of skills and knowledge to effectively utilise them. It is therefore imperative for the management of libraries to provide periodically and up to date training to their staff and users to equip them to fully utilise IT resources the library.

The researcher recommends that library managers and directors plan a comprehensive training schedule for their staff that would include staff exchange programs for their staff to get experiences from other institutions, international conferences, certificate programs, on-the-job training, and workshops. When library staff is properly trained, they will pass the knowledge and skills on to users to promote research and learning.

It is also recommended that library management provide training for library users to equip them to use IT resources of the library. When users are not familiar with IT resources, they are discouraged to patronise them and the purpose for acquiring those equipment gets defeated.

#### **6.4.2 Increase internet scope and speed**

The findings of this study showed that users and staff of the library rely on the internet for most of their learning activities. It was also revealed that slow internet and limited connectivity was a problem users encountered using the library. The researcher, therefore, recommends that library managers should ensure that users have reliable internet connectivity in the entire library. This can be done by increasing the bandwidth and ensuring stability.

#### **6.4.3 Maintain IT facilities**

Respondents of the study indicated the lack of proper maintenance of facilities in the library, and therefore the researcher recommends proper and routine servicing of IT facilities to ensure continuity. Maintenance may include replacement of accessories, service upgrading and the acquisition of new equipment and services. The researcher also recommends alternative power supply acquisition. The inadequate power supply can cause damage to IT resources and bring downtimes to remote users of the library. Management should, therefore, make provision for a standby power source to curb the power fluctuation menace usually experienced in African countries.

Managers of libraries must have service agreements with their vendors which legally binds them to periodic servicing of the facilities to save cost and bring good returns on investment.



#### **6.4.4 Market services to users**

This study revealed that a small percentage of the library users were not aware of the IT facilities available at the library and therefore did not utilise them for their learning activities.

Marketing of the library services to users is therefore recommended.

The library must use all avenues possible to reach potential users, then introduce and explain the various services to them presenting the benefits. This can be done by using social media, the library website, LibGuide, flyers, pull-up-banners and outreach programmes.

#### **6.5 Suggestions for further studies on the subject**

- The use of information technologies by students with special needs.
- Exploring whether the level of IT skills affects the use of facilities in libraries.
- Assessing the use of electronic resources by postgraduate students.

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## APPENDIX A

### INTERVIEW SCHEDULE (LIBRARY ADMINISTRATORS)

Dear Participant,

I am a Masters' student with the Department of Information Science at the University of South Africa, Pretoria. I am gathering data for a research study titled "*Evaluating the access and impact of information technologies at Balme library, University of Ghana*".

The aim of the research is to examine the impact of information technologies at Balme Library of the University of Ghana on service delivery at the library. Findings of the study will be crucial for the demand and implementation of appropriate IT tools in the library to improve service delivery and research support.

You are kindly requested to grant a short interview that will take approximately 10 to 15 minutes of your time to complete. Please be assured that all information provided will be treated with confidentiality and used solely for the purpose of the study. However, your participation in this study is voluntary and you are at liberty to withdraw from it anytime you feel you no longer want to be part of it.

Thank you for your willingness to participate, you may reach me for further clarification by email at: [daafrane@ug.edu.gh](mailto:daafrane@ug.edu.gh)

#### \* Participant consent declaration

Do you consent to take part in this study?

Yes [  ]      No [  ]

If Yes, please sign your participation consent declaration below. **Do not write your name.**

I declare that I willingly consent to participate in this study without fear or favour.

Sign.....

Date.....

**Demographic Information:**

Please tick [ ✓ ] appropriately as applicable.

- 1. Gender:            i. Male [    ]    ii. Female [    ]
  
- 2. Age:                i. 15-25 [    ]    ii. 26-35 [    ]  
                          iii. 36-45 [    ]    iv. 46-55 [    ]  
                          v. Above 56 [    ]
  
- 3. Level of Education:    i. PhD [    ]    ii. Masters' Degree [    ]  
                                  iii. Post-graduate Diploma [    ]    iv. Bachelor's Degree [    ]  
                                  v. Diploma [    ]  
                                  vi. Other (Specify).....
  
- 4. Job title / designation:    i. University librarian [    ]    ii. Assistant librarian [    ]  
  iii. Library assistant [    ]
  
- 5. Years of experience:    i. 5 or Less [    ]    ii. 10 or more [    ]

## **INTERVIEW QUESTIONS**

### **SECTION A: Availability of IT infrastructure in the Library**

1. What IT infrastructure (hardware & software) are available in the library?
2. Is Balme library fully automated?

### **SECTION B: Access and Use of IT facilities in the library**

3. Are those facilities easily accessible?
4. Do your patrons use the IT facilities provided?
5. Do you get feedback from library users on their experiences with IT facilities in and out of the library?
6. If Yes, by what means do you get feedback from your users regarding the use of your library's IT facilities?

### **SECTION C: Skills, knowledge and competencies of library staff and users**

7. Are there programmes aimed at training library users and staff (including users with special needs) on the use of IT facilities?
8. If Yes, what are those programmes and are they sustainable?
9. Do you have skilled library staff to handle IT related problems for users?

### **SECTION D: Impacts of IT facilities in the Library;**

10. Do you find the IT infrastructure in your library useful?
11. What are the impacts on your library regarding the delivery of services through IT facilities?
12. Would you recommend further investment into IT facilities for the library?

### **SECTION F: Challenges associated with the use of IT facilities in the library;**

13. What challenges do the library face with IT facilities implementation and uses?
14. Suggest ways to address those challenges.

Thank you for your time and participation.

## APPENDIX B

### QUESTIONNAIRE FOR LIBRARY STAFF

Dear Participant,

I am a Masters' student with the Department of Information Science at the University of South Africa, Pretoria. I am gathering data for a research study titled "*Evaluating the access and impact of information technologies at Balme library, University of Ghana*". Data collection is part of the process to enable me to fulfil the requirements for completion of the study.

The aim of the research is to examine the impact of information technologies at Balme Library of the University of Ghana on service delivery at the library. Findings of the study will be crucial for the implementation of appropriate IT tools in the library to improve service delivery and research support.

You are kindly requested to answer the questions in this survey questionnaire based on your experience, use and expectations of the library. It will take approximately 10 to 15 minutes of your time to complete. Be assured that all information provided will be treated with confidentiality and used solely for the purpose of the study. However, your participation in this study is voluntary and you are at liberty to withdraw from it anytime you feel you no longer want to be part of it.

Thank you for your willingness to participate, you may reach me for further clarification by email at: [daafrane@ug.edu.gh](mailto:daafrane@ug.edu.gh)

#### \* Participant consent declaration

Do you consent to take part in this study?

Yes [  ]      No [  ]

If Yes, please sign your participation consent declaration below and proceed to answer the survey questions that follow. **Do not write your name.**

I declare that I willingly consent to participate in this study without fear or favour.

Sign.....

Date.....



## SECTION A: Demographic Information

Please tick [ ✓ ] appropriately as applicable.

1. Gender:        i. Male [    ]    ii. Female [    ]
  
2. Age:            i. 15-25 [    ]    ii. 26-35 [    ]  
                      iii. 36-45 [    ]    iv. 46-55 [    ]  
                      v. Above 56 [    ]
  
3. Level of Education:    i. PhD [    ]    ii. Masters' Degree [    ]  
                                  iii. Post-graduate Diploma [    ]    iv. Bachelor's Degree [    ]  
                                  v. Diploma [    ]  
                                  vi. Other (Specify).....
  
4. Job title / designation:    i. University librarian [    ]    ii. Assistant librarian [    ]  
                                  iii. Library assistant [    ]
  
5. Years of experience:    i. 5 or Less [    ]    ii. 10 or more [    ]

## SECTION B: Availability of IT infrastructure in the Library

Please answer by ticking [ ✓ ] where appropriate.

6. The following hardware facilities are available for use in the library:  
    **(Select as many as applicable)**
  - i. Computers [    ]    ii. Printers [    ]
  - iii. CD-ROMs [    ]    iv. Scanners [    ]
  - v. Projectors [    ]    vi. Photocopiers [    ]
  - vii. Closed Circuit Television [    ]
  - viii. Magnifiers [    ]    ix. Braille embossers [    ]
  - x. Video Conference facility [    ]    xi. Book theft security system [    ]
  - xii. Telephones [    ]    xiii. Digital recorders [    ]
  - xiii. CCTV security cameras [    ]    xiv. Multi-media facility [    ]
  - xv. Other (specify) .....

7. The following software facilities are available for library users:

(Select as [ ✓ ] many as applicable)

- i. Internet [   ]
- ii. Reference Management Software [   ]
- iii. Electronic Databases [   ]
- iv. Library website [   ]
- v. Online Public Access Catalogue (OPAC) [   ]
- vi. Institutional Repository (IR) [   ]
- vii. Off-campus access to Databases [   ]
- viii. Electronic Theses [   ]
- ix. Electronic Past Examination Questions [   ]
- x. JAWS for Windows [   ]
- xi. Web-braille [   ]
- xii. Other (Specify).....

8. My library is fully automated:

- i. Strongly Disagree [   ]
- ii. Disagree [   ]
- iii. Neutral [   ]
- iv. Agree [   ]
- v. Strongly Agree [   ]

### SECTION C: Access and Use of IT facilities in the library

Please rate the level of accessibility and use IT facilities in the library. Please answer by ticking [ ✓ ] where appropriate.

9. How accessible are IT facilities in the library?

- i. Very accessible [   ]
- ii. Accessible **ONLY** within library [   ]
- iii. Not sure [   ]
- v. Not accessible [   ]

10. How often do you use IT facilities in the library?

- i. Daily [   ]
- ii. Weekly [   ]
- iii. Monthly [   ]

11. For what purpose do you use the IT facilities?

- i. To render services to users [   ]
- ii. To perform my work duties [   ]
- iii. To support student research/course of study [   ]
- iv. For leisure [   ]

v. Other (specify).....

**SECTION E: Skills, knowledge and competencies of library staff**

Rate the level of your expertise in IT:

12. What is your skill level on the use of IT facilities in the library?

- i. Very Good [ ] ii. Good [ ] iii. Average [ ] iv. Poor [ ]

13. Are you a computer literate?

- i. Yes [ ] ii. No [ ]

14. Have you received any formal training from the library on the use and assistance with IT?

- i. Yes [ ] ii. No [ ]

15. If Yes, indicate the kind of training received:

- i. Certificate Course [ ] ii. Workshop [ ]

- iii. On the job training [ ]

- iv. Other (specify).....

16. You are skilful and helpful in IT:

- i. Strongly Disagree [ ] ii. Disagree [ ] iii. Neutral [ ]

- iv. Agree [ ] v. Strongly Agree [ ]

17. You can help solve IT related problems:

- i. Strongly Disagree [ ] ii. Disagree [ ] iii. Neutral [ ]

- iv. Agree [ ] v. Strongly Agree [ ]

**SECTION F: Impacts of IT facilities in the Library;**

18. How important are IT facilities to library users?

- i. Not Important [ ] ii. Somewhat Important [ ] iii. Neutral [ ]

- iv. Important [ ] v. Very Important [ ]

19. How important are IT facilities to you personally in the library?  
i. Not important [ ] ii. Somewhat Important [ ] iii. Neutral [ ]  
iv. Important [ ] v. Very Important

20. Select the statement that reflects your view:

IT facilities in the library are;

- i. Essential services [ ] ii. Liability to the library [ ]  
iii. Supplementary service to other library services [ ]

21. IT facilities improve my work output.

- i. Strongly Disagree [ ] ii. Disagree [ ] iii. Neutral [ ]  
iv. Agree [ ] v. Strongly Agree [ ]

22. IT facilities make you redundant.

- i. Strongly Disagree [ ] ii. Disagree [ ] iii. Neutral [ ]  
iv. Agree [ ] v. Strongly Agree [ ]

23. IT facilities make work easier.

- i. Strongly Disagree [ ] ii. Disagree [ ] iii. Neutral [ ]  
iv. Agree [ ] v. Strongly Agree [ ]

24. IT facilities make work difficult and demanding.

- i. Strongly Disagree [ ] ii. Disagree [ ] iii. Neutral [ ]  
iv. Agree [ ] v. Strongly Agree [ ]

25. Do you find IT facilities in the library useful?

- i. Yes [ ] ii. No [ ]

Please provide reasons for your answer;

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**SECTION G: Attitudes and Preferences of Library staff toward IT;**

26. Which hardware IT facilities do you prefer to use at the library?

(Select as [ ✓ ] many as applicable)

- i. Computers [   ]    ii. Printers [   ]    iii. Digital recorders [   ]
- iv. CD-ROMs [   ]    v. Scanners [   ]    vi. Projectors [   ]
- vii. Photocopiers [   ]    viii. Closed Circuit Television [   ]
- ix. Magnifiers [   ]    x. Braille embossers [   ]
- xi. Video Conference facility [   ]    xii. Telephones [   ]

xiv. Other (specify).....

27. Which software facilities do you prefer to use at the library?

(Select [ ✓ ] as many as applicable)

- i. Internet [   ]    ii. Reference Management Software [   ]
- iii. Electronic Databases [   ]    iv. Library website [   ]
- v. Online Public Access Catalogue (OPAC) [   ]
- vi. Institutional Repository (IR) [   ]    vii. Chat with a Librarian [   ]
- viii. Electronic Theses [   ]    ix. Electronic Past Examination Questions [   ]
- x. JAWS for Windows [   ]    xi. Web-braille [   ]

xii. Other (Specify).....

28. Will you recommend extra investment into IT facilities in the library?

- i. Yes [   ]    ii. No [   ]

Provide reasons for your answer;

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**SECTION H: Challenges associated with the use of IT facilities in the library;**

29. Please select among the following, the challenges you face in your quest to use IT facilities in or out of the library.

**(Tick [ ✓ ] as many as applicable)**

- i. Inadequate IT infrastructure [    ]
- ii. Lack of IT skills [    ]
- iii. Lack of training and support from the library [    ]
- iv. Negative attitude of library staff [    ]
- v. Slow internet connectivity [    ]
- vi. Unstable power supply [    ]
- vii. Non-user-friendly IT facilities [    ]
- viii. Frequent downtimes of server resources [    ]
- ix. Poor IT skills and knowledge of library staff [    ]
- x. Constant change of software and hardware [    ]
  
- x. Other (Specify).....

30. Please suggest ways to improve or alleviate the challenges indicated above;

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Thank you for your time and participation in this study. Cheers!!

## APPENDIX C

### QUESTIONNAIRE FOR LIBRARY USERS (STUDENTS)

Dear Participant,

I am a Masters' student with the Department of Information Science at the University of South Africa, Pretoria. I am gathering data for a research study titled "*Evaluating the access and impact of information technologies at Balme library, University of Ghana*". Data collection is part of the process to enable me to fulfil the requirements for completion of the study.

The aim of the research is to examine the impact of information technologies at Balme Library of the University of Ghana on service delivery at the library. Findings of the study will be crucial for the implementation of appropriate IT tools in the library to improve service delivery and research support.

You are kindly requested to answer the questions in this survey questionnaire based on your experience, use and expectations of the library. It will take approximately 10 to 15 minutes of your time to complete. Be assured that all information provided will be treated with confidentiality and used solely for the purpose of the study. However, your participation in this study is voluntary and you are at liberty to withdraw from it anytime you feel you no longer want to be part of it.

Thank you for your willingness to participate, you may reach me for further clarification by email at: [daafrane@ug.edu.gh](mailto:daafrane@ug.edu.gh)

#### \* Participant consent declaration

Do you consent to take part in this study?

Yes [  ]      No [  ]

If Yes, please sign your participation consent declaration below and proceed to answer the survey questions that follow. **Do not write your name.**

I declare that I willingly consent to participate in this study without fear or favour.

Sign.....

Date.....



## SECTION A: Demographic Information

Please tick [ ✓ ] appropriately as applicable.

1. Gender:            i. Male [    ]    ii. Female [    ]
  
2. Age:                i. 15-25 [    ]    ii. 26-35 [    ]  
                          iii. 36-45 [    ]    iv. 46-55 [    ]  
                          v. Above 56 [    ]
  
3. Level of Study:        i. Post-graduate [    ]  
                                  ii. Under-graduate [    ]

## SECTION B: Availability of IT infrastructure in the Library

Please answer by ticking [ ✓ ] where appropriate.

4. The following hardware facilities are available for use in the library:  
    **(Select as many as applicable)**

- i. Computers [    ]    ii. Printers [    ]
- iii. CD-ROMs [    ]    iv. Scanners [    ]
- v. Projectors [    ]    vi. Photocopiers [    ]
- vii. Closed Circuit Television [    ]
- viii. Magnifiers [    ]    ix. Braille embossers [    ]
- x. Video Conference facility [    ]    xi. Book theft security system [    ]
- xii. Telephones [    ]    xiii. Digital recorders [    ]
- xiii. CCTV security cameras [    ]    xiv. Multi-media facility [    ]
- xv. Other (specify) .....

5. The following software facilities are available for library users:  
    **(Select as [ ✓ ] many as applicable)**

- i. Internet [    ]    ii. Reference Management Software [    ]
- iii. Electronic Databases [    ]    iv. Library website [    ]
- v. Online Public Access Catalogue (OPAC) [    ]
- vi. Institutional Repository (IR) [    ]    vii. Off-campus access to Databases [    ]

- viii. Electronic Theses [  ]    ix. Electronic Past Examination Questions [  ]
- x. JAWS for Windows [  ]    xi. Web-braille [  ]
- xii. Other (Specify).....

**SECTION C: Access and Use of IT facilities in the library**

Please rate the level of accessibility and how you use IT facilities in the library. Answer by ticking [ ✓ ] where appropriate.

- 6. How accessible are IT facilities in the library?
  - i. Very accessible [  ]    ii. Accessible **ONLY** within library [  ]
  - iii. Not sure [  ]    iv. Not accessible [  ]
  
- 7. How often do you use IT facilities provided by the library?
  - i. Daily [  ]    ii. Weekly [  ]    iii. Monthly [  ]
  
- 8. For what purpose do you use the IT facilities?
  - i. To support my research/course of study [  ]
  - ii. For leisure [  ]
  - iv. Other (specify).....
  
- 9. Do you have access to IT facilities elsewhere apart from the library?
  - i. Yes [  ]    ii. No [  ]
  
- 10. If Yes, please indicate the source:  
 (Select as [ ✓ ] many as applicable)
  - i. Home [  ]    ii. Work [  ]    iii. Cybercafe [  ]
  - iv. Other (specify).....

**SECTION E: Skills, knowledge and competencies of library users and staff**

Rate the level of your expertise in the use of IT facilities.

11. What is your skill level on the use of IT in the library?

- i. Very Good [ ]    ii. Good [ ]    iii. Average [ ]    iv. Poor [ ]

12. Have you received any form of training from the library on the use of IT?

- i. Yes [ ]    ii. No [ ]

13. If Yes, indicate the form of training received:

- i. User Orientation [ ]    ii. Workshop [ ]  
iii. Information Literacy Programme [ ]  
  
iv. Other (specify).....

14. Many of the library staff are skilful and helpful in IT:

- i. Strongly Agree [ ]    ii. Agree [ ]    iii. Not sure [ ]  
iv. Disagree [ ]    v. Strongly Disagree [ ]

15. Staff of the library can help solve IT related problems:

- i. Strongly Agree [ ]    ii. Agree [ ]    iii. Not sure [ ]  
iv. Disagree [ ]    v. Strongly Disagree [ ]

**SECTION F: Impact of IT facilities in the Library;**

16. How important are IT facilities to you personally in the library?

- i. Very Important [ ]    ii. Important [ ]    iii. Don't Know [ ]  
iv. Not important [ ]

17. Select the statement that reflects your view:

- IT facilities in the library are;  
i. Essential services [ ]    ii. Liability to the library [ ]  
iii. Supplementary service to other library services [ ]

18. IT facilities make learning and research easier.  
 i. Strongly Agree [ ] ii. Agree [ ] iii. Not sure [ ]  
 iv. Disagree [ ] v. Strongly Disagree [ ]

19. IT facilities promote collaboration and teamwork among library users:  
 i. Strongly Agree [ ] ii. Agree [ ] iii. Not sure [ ]  
 iv. Disagree [ ] v. Strongly Disagree [ ]

20. Do you find IT facilities in the library useful?

- i. Yes [ ] ii. No [ ]

Please provide reasons for your answer;

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**SECTION G: Attitudes and Preferences of Library users toward IT;**

21. Which hardware IT facilities do you prefer to use at the library?  
 (Select as [ ✓ ] many as applicable)

- i. Computers [ ] ii. Printers [ ] iii. Internet [ ]  
 iv. CD-ROMs [ ] v. Scanners [ ] vi. Projectors [ ]  
 vii. Photocopiers [ ] viii. Closed Circuit Television [ ]  
 ix. Magnifiers [ ] x. Braille embossers [ ]  
 xi. Video Conference facility [ ] xii. Telephones [ ]  
 xiii. Digital recorders [ ]  
 xiv. Other (specify).....

22. Which software facilities do you prefer to use at the library?

(Select [ ✓ ] as many as applicable)

- i. Internet [   ]    ii. Reference Management Software [   ]
- iii. Electronic Databases [   ]    iv. Library website [   ]
- v. Online Public Access Catalogue (OPAC) [   ]
- vi. Institutional Repository (IR) [   ]    vii. Chat with a Librarian [   ]
- viii. Electronic Theses [   ]    ix. Electronic Past Examination Questions [   ]
- x. JAWS for Windows [   ]    xi. Web-braille [   ]
- xii. Other (Specify).....

23. Will you recommend the use of IT facilities provided by the library to your colleagues?

- i. Yes [   ]    ii. No [   ]

Provide reasons for your answer;

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**SECTION H: Challenges associated with the use of IT facilities in the library;**

24. Please select among the following, the challenges you face in your quest to use IT facilities in or out of the library.

(Tick [ ✓ ] as many as applicable)

- i. Inadequate IT infrastructure [   ]
- ii. Lack of IT skills [   ]
- iii. Lack of training and support from the library [   ]
- iv. Negative attitude of library staff to users [   ]
- v. Slow internet connectivity [   ]

- vi. Unstable power supply [    ]
- vii. Non-user-friendly IT facilities [    ]
- viii. Frequent downtimes of server resources [    ]
- ix. Poor IT skills and knowledge of library staff [    ]
  
- x. Other (Specify).....

25. Please suggest ways to improve or alleviate the challenges indicated above;

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Thank you for your time and participation in this study. Cheers!!