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AN ASSESSMENT OF STUDENTS' USE OF ELECTRONIC LIBRARY RESOURCES: A CASE STUDY OF BOTSWANA UNIVERSITY OF AGRICULTURE AND NATURAL RESOURCES (BUAN)

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DECLARATION

I, Kabelo Baeletsi declare that; "An assessment of students use of electronic library resources: a case study of Botswana University of Agriculture and Natural Resources (BUAN)" is my own original work and has not been previously submitted for any award. All the sources that have been used or cited been correctly acknowledged.

Researcher's signature: ………………………...

Date: …………………………………………....

Supervisor's signature: ………………………...

Date: …………………………………………....

DEDICATION

This work is dedicated to my parents who believe it is never too late to learn and to my loving wife who made positive contributions to this work through her understanding, patience and encouragement.

ACKNOWLEDGEMENT

ABSTRACT

The purpose of this study was to assess the use of electronic resources among Botswana university of Agriculture and Natural Resources (BUAN) undergraduate students. The researcher was interested in finding out whether undergraduate students were using electronic resources for their academic work. This study aimed at determining whether information quality, system quality, service quality and student individual characteristics influence the use of electronic resources. The study excluded other variables such as age, gender and computer usage behaviour of electronic resources.

A quantitative research methodology was adopted and a questionnaire was used to get in depth information about use of electronic resources. The target population was one hundred and forty-five (145) level 300 and 400 library registered undergraduate students from five (5) university academic departments. These students tend to understand and use library more because of their projects for the final year. The data collected was analysed using a Statistical Package for Social Sciences (SPSS 24.0) where descriptive statistics and frequency tables were produced.

The study revealed that undergraduate students depended on electronic resources to retrieve desired and relevant information to achieve academic efficiency. Undergraduate student's level of awareness of different electronic resources was low. It was also revealed that students have average computer literacy skills and training provided by BUAN library was insufficient. When considering the conceptual framework adopted for this study the findings indicated that information quality, system quality, service quality and student individual characteristics had a strong significant influence on use of electronic resources and students' academic performance.

Adequate use and awareness of electronic resources improve academic community performance in research, teaching and learning. Electronic resources played an integral part in assisting students learning and research activities. The study made appropriate recommendations to the university, university library, university librarians and other academic libraries facing similar or related challenges.

LIST OF ACRONYMS

Abbreviation	Explanation
AEE	Agricultural Economics and Extension
AEL	Agricultural Engineering and Land Planning
ASP	Animal Science and Production
BAC	Botswana Agricultural College
BCA	Botswana College of Agriculture
BITS	Birla Institute of Technology and Science
BS	Basic Science
BUAN	Botswana University of Agriculture and Natural Resources
CD – ROM	Compact Disc Read-Only Memory
CDRI	Central Drug Research Institute
CIIT	COMSATS Institute of Information Technology
CSP	Crop Science and Production
DELSU	Delta State University
DOI	Diffusion of Innovation
EIR	Electronic Information Resource
EOU	Ease of Use
ER	Electronic Resource
FAO	Food Agricultural Organisation
FNU	Fiji National University
FST	Food Science and Technology
ICT	Information Communication Technology
IDL	Integrated Digital Library
IOU	Intention of Use
IQ	Information Quality
IS	Information System
IT	Information Technology
MITI	Meat Inspection Training Institute
MOA	Ministry of Agriculture now Ministry of Agricultural Development and Food Security
OPAC	Online Public Access Catalogue

SADC	Southern African Development Community
SCEE NUST	School of Civil and Environmental Engineering, Natural University of Science and Technology
SIC	Student Individual Characteristics
SPSS	Statistical Package of Social Sciences
SQ	System Quality
TAM	Technology Acceptance Model
TEEAL	The Essential Electronic Agricultural Library
TRA	Theory of Reasoned Action
UB	University of Botswana
UTAUT	The Unified Theory of Acceptance and Use of Technology

DEFINITION OF TERMS

Academic Library is an integral part of a university which exists to meet the needs of student, staff, researchers and other users in the community (Men and Israel, 2017).

Access is a means of approaching, entering, exiting, communicating with, or making use of in this case electronic resources (Gakibayo, *et al*., 2013).

Ease of Use is referred to as the extent to which the electronic resource is perceived to be user friendly. These include ease of navigation, training issue and feels of being in control (Adegbore, 2011).

Electronic resources are digital objects containing electronic representation of books, journals and other form of reading materials and they are converted into a digitized form in order to be read by a computer (Pawar, 2016).

Information literacy encompasses library user education, information skills training and education, and those areas of personal, transferable or 'key' skills relating to the use and manipulation of information in the context of learning, teaching and research issues in higher education (Sasikala and Dhanraju, 2011).

Information literacy skills: empower the people with the critical skills which will help them to become independent lifelong learners (Sasikala and Dhanraju, 2011).

Information technology: is the application of computers and telecommunications equipment to store, retrieve, transmit and manipulate data (Quadri, 2012).

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CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Traditional libraries in the print based environments were guided by the objective of linking users who needed information to the sources that had the information. Their task had been to collect, process, and store and disseminate information for the purpose of reading, teaching and consultation. The information, largely in print form, has been the most widely accepted format for providing information and library services to satisfy the needs of library users. Today this is being replaced by electronic or digital resources that meet the needs of researchers and information seekers (Umar, 2015).

Information and communication technology (ICT) has brought the revolutionary chances in the functioning of libraries (Gautam and Sinha, 2017). The widespread use of computers, increased reliance on computer networks, and rapid growth of the Internet has compelled libraries to adopt new means and methods for storage, retrieval and dissemination of information (Kebukwa and Mohammed, 2016). Moreover, the use of internet in the educational organizations develops an important component that promotes the use of electronic resources for an individual to meet information requirements.

At a time of ever increasing demand for information, libraries must keep abreast of developments in information technology and advanced communication to enable them provide services that today's society both expect and need (Umar, 2015). Worldwide libraries have been exploring new technologies for providing better and faster access to vast information resources and efficient information services to their users. Information Technology (IT) has offered better solutions to achieve greater level of efficiency, productivity and excellence services in libraries (Soni *et al*., 2018).

The technology that is continuously changing in today's digital age requires libraries to update and improve their present services and systems to ensure that their products or services meet the user demand for information (Kebukwa and Mohammed, 2016). Libraries have transformed into digital and virtual libraries where books, journals, and magazines have changed into e-

books, e-journals, and e-zines, leading to the use of ICT for better service and satisfying diverse user needs (Simon and Ogom, 2015). There is a tremendous growth in the number and variety of information resources available on the internet, which becomes an important source for scholarly scientific literature and also more number of information resources (Daramola, 2016).

The electronic resources available in the library play a prominent role in facilitating access to the required information to the user. Electronic Resources is one of the emerging environment in libraries and Information communication in the competitive service. The familiarity and use of electronic information resources in the libraries for rapid development is necessary and important (Priyadharshini and Janakiraman, 2015). The effective use of ICTs in libraries has enabled them to provide fast and easy access to information. The use of information technology has created advance contribution in the information technology field which has improved the services of libraries significantly. This information is circulated much more quickly over the Internet and patrons are able to access the latest versions of information resources almost as soon as they become available in remote areas (Yebowaah and Plockey, 2017).

An electronic resource is defined as a resource which requires computer access or any electronic product that delivers a collection of data, be it referring to full text bases, electronic journals, image collections, and other multimedia products (Kenchakkanavar, 2014). Therefore, many studies were found related to use of electronic resources. Among the studies is by Yebowaah and Plockey (2017).

Owolabi *et al*., (2016) conducted a survey to evaluate utilization of electronic information resources by undergraduates in the Faculties of Education and the Social Sciences at University of Ibadan. The findings revealed that the internet services, e-mail services, online databases, electronic databases and cybercafés were the available electronic information resources often used by the undergraduate students at University of Ibadan. However, challenges for not utilizing electronic resources are inadequate power supply, poor network or internet connectivity and limited access to computer workstations. In a study by Aghakhani *et al*., (2013), they observed that electronic resources have posed new challenges for library professionals to manage the electronic information resources properly.

In another study by Madondo *et al*., (2017) there was a low usage of electronic information resources by undergraduate students in the Faculty of Management and Administration at the Africa University, Mutare, Zimbabwe due to socio and technical challenges. The study further found that main uses of electronic resources were for communication, to support teaching and

learning activities, professional research, assignments and lecture requirements. Sejane (2017)'s findings showed that awareness of electronic resources was mainly through formal engagement, such as library orientation and through informal engagements such as colleagues. However, it was revealed that challenges such as budget cuts, low internet bandwidth, lack of up-to-date IT infrastructure, inadequate searching skills, and shortage of staff and high cost of subscription fees hindered access to and use of electronic resources in the institutions libraries.

A study that explored the challenges of using electronic information resources (EIRs) for academic research by postgraduate students at Delta State University (DELSU), Abraka, Nigeria by Okite-Amughoro *et al*., (2015) showed that post-graduate students' optimal use of EIRs at DELSU is hampered by limited access to some EIRs due to limited space, low bandwidth, and erratic power supply. It is, therefore, recommended that DELSU should provide adequate space and power supply and should address some of the issues deterring equitable access to EIRs.

A study by Ukachi (2015) was conducted to determine the relationship between undergraduate students' information literacy skills and their use of electronic resources (ERs) located at university libraries in Nigeria. It was revealed that ERs are not adequately utilized by undergraduate students due to lack of adequate information literacy skills necessary for optimal utilization of the libraries. Hence, these studies have influenced the focus on the electronic resources provided by the Botswana University of Agriculture and Natural Resources Library. The purpose of this study was to assess the use of electronic resources among BUAN undergraduate students.

1.2 Botswana University of Agriculture and Natural Resources (BUAN)

On the 27th August 2013, the government of Botswana approved that the then Botswana College of Agriculture (BCA) transforms into Botswana University of Agriculture and Natural Resources (BUAN) through presidential directive. The decision was in line with the college's strategic plan of 2009-2016 that had a vision to transform into an agricultural university of international repute. BUAN became a university through commencement of the Act of Parliament 12 of 2015 as a parastatal under the Ministry of Agriculture and Food Security (BUAN Strategic Plan, 2018).

The Botswana College of Agriculture (BCA) was established on 31st May 1991 through Act no. 9 of the Parliament of Botswana, where the Act abolished the then Botswana Agricultural

College (BAC) which had existed since 1967. The College was a parastatal under the Ministry of Agriculture (MOA) which now Ministry of Agricultural Development and Food Security and an associate Institution of the University of Botswana (UB). However, the College went through a period of transformation with a vision of becoming an agricultural university of international repute (Annual report, 2018).

The university evolved from being a college to a university in 2016 with the mandate to provide higher education and training in the field of agriculture, natural resources and such other allied and related subjects as can be determined by the university council from time to time. As a result of the transformation of the institution, which currently enrols around 1000 students, it is hoped it would be able to enrol up to 5000 learners annually.

In the university commitment to achieve high levels of efficiency, productivity and output; the university found it appropriate to develop a strategic plan for 2018-2024 to high level use of information communication technology (ICT) as one of the university drivers and acquired state of the art research equipment in order to ensure the quality of the programmes offered as well as increase access to education. BUAN overarching goal is to produce market-ready graduates for the agriculture and natural resource sector (BUAN Strategic Plan, 2018).

The university has two campuses; one in the capital city Gaborone (Sebele) and one in Lobatse; Meat Inspection Training Institute (MITI). The university had one faculty which was Agriculture with six (6) academic departments namely: Agricultural Economics, Education and Extension (AEE), Agricultural Engineering and Land Planning (AEL), Animal Science and Production (ASP), Basic Sciences (BS), Crop Science and Production (CSP) and Food Science and Technology (FST) which offers Higher Diploma, Degree, Masters, MPhil and PhD programmes.

1.3 Botswana University of Agriculture and Natural Resources Library (BUANL)

Botswana University of Agriculture and Natural Resources Library (BUANL) was set up in 1967 when the university was still a college. BUAN library is an academic agriculture library which maintains wide range of materials on agriculture and related fields. The mission of the university library is to support the teaching, learning, research and outreach activities of the university by making information readily accessible to users and providing a conducive environment for studying and learning; and teaching information literacy (BUAN Prospectus, 2018).

The university library is a depository for publications of the Food and Agricultural Organization (FAO) and keeps special collections materials on and about Botswana, as well as SADC publications. The Library has a study area with a sitting capacity of up to 300 patrons at any time and a late night study area for student users. BUAN library has fully computerized its operations such as the Online Public Access Catalogue (OPAC), Cataloguing, Circulation, Serials and Acquisitions using the SIERRA Integrated library system (BUAN Prospectus, 2017).

BUAN library has adapted to new technologies to facilitate the process of teaching and learning through subscribing to full-text e-journals and online bibliographic databases such as EBSCOhost, AGRICOLA, Agric Virtual Library, Free e-journals, Bio One e-journals, FAO Publications, CABI Abstracts, A-to-Z e-journals, Science Direct, Ebrary, ProQuest Central and SA ePublications. The library also has The Essential Electronic Agricultural Library (TEEAL) which is an electronic database of more than 100 e-journal titles on CD-ROMs and Institutional Repository where the university spends close to P1 million a year to subscribe to these electronic library resources. In addition, the library has more than 33,000 volumes of books and bound periodicals, and subscribes to 118 agricultural journal titles (Kgalagadi, 2017).

Information literacy training was given to all new students and staff to familiarize them with the physical layout of the library, available resources and how to use information retrieval tools and other users are assisted on as needed basis. The university library had 25 computers accessible to registered students to search the Internet and access electronic resources. The university library is divided into three sections headed by the librarian namely; Customer Services, Information Technology Services and Technical Services with one (1) secretary, three (3) Senior Assistant Librarians, seven (7) Assistant Librarians, five (6) Library Officers (four at Main Library and one in MITI) and one (1) Library Attendant.

1.4 Use of electronic resources in academic environments

The emergence of electronic resources has tremendously transformed information handling and management in academic environment. The information environment is changing at high speed throughout the world. In libraries, printed resources are being converted into digital resources. There is a shift from human dependent operations to machine dependency, stand-alone system to network computing, print resources to digital resources have compelled the present libraries to adopt new tools and techniques to satisfy the user in the digital age (Patil and Sutar, 2017).

New technologies have always been of interest for libraries both for the potential of increasing the quality of service and for improving efficiency of operations. At present libraries are overwhelmingly looking forward to adopt new technologies mostly use of electronic resources due to its potential for cost savings in operations and the management of collections (Salau and Gama, 2015). Electronic resources are digital objects containing electronic representation of books, journals and other forms of reading materials and they are converted into a digitized form in order to be read by a computer (Pawar, 2016).

Worldwide libraries have been exploring new technologies for providing better and faster access to vast information resources and efficient information services to their users. Information Technology has offered better solutions to achieve greater level of efficiency, productivity and excellence services in libraries (Das and Sahu, 2014).

Electronic resources are therefore available widely in many higher academic institutions worldwide, and can be accessed anywhere and by many people or users at the same time, which makes it very convenient to use. To satisfy the information needs of the many universities' community and to provide timely and accurate information to its users, huge amounts of monies are spent by Library management to subscribe to these electronic resources to satisfy users' information needs as well as satisfy the teaching, learning and research needs of the university (Yebowaah and Plockey, 2017).

However, it has widely been observed that access to electronic resources by the academic community in developing countries has been limited mostly due to poor information technology (IT) infrastructure and the huge cost associated with such resources (Yebowaah and Plockey, 2017). This implies that, there are problems hindering access to electronic resources and these challenges warrant an investigation for the purposes of finding solutions to allow for effective and efficient use of these resources.

1.5 Statement of the Problem

The library is considered to be the backbone of any research organization as it provides its users the literature and information through electronic sources and services in order to carry out their academic activities (Pawar, 2016). An academic library is one example that offers electronic resources to the users. Today academic libraries provide students with access to a wide range of electronic information resources. For example, large amounts of scholarly literature in the form of full text journals, books and reports are published in electronic medium

(Yebowaah and Plockey, 2017). Many of academic libraries have made a significant amount of investment on providing services through electronic information resources so that the users can gain access to information effectively. Electronic resources are significant investment in many libraries and they must ensure that the resources provide them with a good return on the investment (Ndungu, 2016).

The BUAN library has adopted new technology in its collection development to offer electronic resources support research, teaching and learning. For example, the university subscribe to several databases and electronic journals. A number of researchers have conducted a few studies pertaining to the use of electronic resources. On the use of electronic resources, it has emerged that undergraduate students may not be fully utilizing these in support of their learning. For example, the BCA Library satisfaction survey conducted by Bagai (2011) revealed that only 3% of the students used electronic databases. In another survey by Baeletsi (2014), students were asked to indicate the electronic resources they used for their academic work. The results of the study showed that students used electronic resources offered by BCA library, but they are not adequately utilizing the resources to which the college was subscribing for. Therefore, there is a need for in-depth research to assess the use of these resources among BUAN students. So far, no study has been conducted to assess the use of electronic resources among BUAN undergraduate students.

It is evident from literature that access to electronic resources has its own limitations among students such as budget cuts, (Sejane, 2017), inadequate searching skills, (Kebukwa and Mohammed, 2016; Sejane, 2017; Madondo *et al*., 2017) shortage of staff (Yebowaah and Plockey, 2017; Sejane, 2017) high cost of subscription fees posed many of the threats to access to and use of e-resources in the institutions libraries (Sejane, 2017) inadequate numbers of computers (Simon and Ogom, 2015; Anyaoku, 2015; Daramola, 2016) lack of ICT infrastructure, such as limited Internet access, inadequate Internet connectivity and frequent electric power interruptions (Umar, 2015; Sejane, 2017; Mole, 2017) level of awareness concerning electronic resources (Anyaoku, 2015; Akussah *et al*., 2015; Soni *et al*., 2018). From a theoretical perspective, these challenges could be classified under the following constructs adapted from both the IS Success Model (Delone and McLean, 1992) and TAM (Sun and Zhang, 2006): information quality, system quality, service quality and individual characteristics. This study, therefore was to examine whether information quality, system quality, service quality and student individual characteristics are determinants to use of electronic resources among BUAN undergraduate students.

1.6 Objectives of the Study

The study had the following specific objectives:

- o To determine whether information quality influences the use of electronic resources by BUAN undergraduate students.
- o To examine whether system quality influences the use of electronic resources by BUAN undergraduate students.
- o To ascertain the influences of service quality on the use of electronic resources among BUAN undergraduate students.
- o To assess the influences of individual characteristics of BUAN undergraduate students on the use of electronic resources
- o To provide appropriate recommendation regarding use of electronic resources.

1.7 Research Questions

The following research questions were asked:

- o Does information quality influence the use of electronic resources by BUAN undergraduate students?
- o How does system quality influence the use of electronic resources by BUAN undergraduate students?
- o How does service quality influence the use of electronic resources among BUAN undergraduate students?
- o How do individual characteristics of BUAN undergraduate students influence their use of electronic resources?
- o What were the recommendation regarding use of electronic resources?

1.8 Justification of the study

Understanding the use of electronic resources amongst BUAN students would assist in identifying problems encountered by users in the use of these resources. This was relevant to today's academic environment as electronic resources affect the academic community performance in research, teaching and learning. In addition, the study would help identify

viable solutions in order to increase utilization of electronic resources and prevent waste of university funds in subscribing for expensive electronic resources that are not often used.

1.9 Significance of the study

The value of the study relates to the understanding of the usage of electronic resources by BUAN undergraduate students. The study has identified the variables that play a significant role in the students' use of electronic resources. The main beneficiary of this research will be Botswana University of Agriculture and Natural Resources and other academic libraries facing similar or related challenges. The university can consider the suggested recommendations to create awareness of the electronic resources among students, provide training to improve on the use of electronic resources. Furthermore, this study will be helpful to the librarians in understanding variables that influence BUAN undergraduate students in using electronic resources. It will also serve as a future reference for researchers on the subject of electronic database usage among students

This section provides only a brief introduction of theory that underpinned the study and more detailed elaboration of the theoretical framework is provided in chapter two of this dissertation. The study was informed by the Technology Acceptance Model (TAM) and IS Success Model to enable enhanced understanding of the conceptual issues relating to electronic resources. However, other models such as Theory of Reasoned Action (TRA), Unified Theory of Acceptance and Use of Technology (UTAUT) and Diffusion of Innovation Theory (DOI) were also discussed to complement TAM and IS Success Model.

1.10 Limitation of the study

This study is confined to Botswana University of Agriculture and Natural Resources. It is limited to the chosen university because of easy access to respondents and the fact that the researcher is familiar with the university. To conduct this study, there were some challenges especially during data collection. Due to restriction of time and financial constraints, the study was confined and limited to BUAN undergraduate students of level 300 and 400. The sample size could have been expanded by including students from other levels. It was also difficult to locate the selected students to participate in the study since it was towards the end of the semester and students were busy preparing for their examinations. The researcher had to find respondents at their classroom and wait for the lectures to end and issue out the questionnaires.

1.11 Organization of the study

This research study is divided into 6 chapters. Chapter 1 discusses the introduction of the study, statement of the problem, research objectives and questions, justification, significance and organization of the study; while chapter 2 covers the literature review on the conceptual framework and past studies. Chapter 3 provides the discussion on the research methodology and design used in the study. The analysis and data interpretation of this research are discussed in chapter 4 while discussion of findings are presented in chapter 5. The study concludes with a detailed summary of study, summary of findings, conclusion, recommendation and areas for further research in Chapter 6.

1.12 Chapter Summary

Botswana University of Agriculture and Natural Resources Library, like most institutions, has integrated Information and Communication Technology (ICT) in all of its functions in order to improve the delivery of its services. Access to electronic resources offers students with the opportunity to obtain current literature in a secure and timely fashion. Therefore, this study examined factors that contribute to the use of electronic resources among undergraduate students. The major objectives of the study were to determine whether information quality, system quality, service quality and student individual characteristics contributes to use of electronic resources. Further, this study identified problems faced by students when using these resources and make appropriate recommendations on how such electronic resources may be effectively utilized. The next chapter presented the literature review on the theoretical framework adopted for this research study.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The purpose of this chapter was to review literature related to the present study by acquiring an understanding of students' use of electronic resources. The theoretical framework that underpins the study will be discussed. The review will be presented based on independent variables that constitute; information quality, system quality, service quality and student individual characteristics. Furthermore, the chapter reviews other research works related to the study with particular focus on the methodologies used and findings obtained.

2.2 Theoretical Framework

There have been several theoretical models developed from theories in psychology and sociology (Venkatesh *et al*., 2012), and employed to explain technology acceptance and use which were used to inform this study.

2.2.1 Theory of Reasoned Action (TRA)

One of the most commonly used models is Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975). This model originates from learning theory and assumes that behaviour toward a particular object is approximated by an intention to perform that behaviour. Intention is predicted by two factors, the individual's attitude towards the outcome of the behaviour and by the opinions of the person's social environment (Alsughayir and Albarq, 2013)

The theory (TRA) gains greater relevance and application to person or organizations considering the adoption of a particular kind of innovation like, software. Each interaction with ICT creates a certain level of user satisfaction and consequently acceptance. Increased satisfaction leads to repeated use of the ICT, which in turn, increases the user satisfaction level (Shidi and Terna, 2013).

The underlying constructs of the TRA are behavioural beliefs, normative beliefs, attitude, subject norm and intention. TRA is based on the belief that individuals are capable of making

rational decisions by constantly evaluating and calculating the relevance of their behavioural beliefs while forming attitudes towards their behaviour (Botha and Kris, 2005). The strength of TRA lies in its ability to describe the drivers of an individual's behaviour and it provides a general framework to understand behaviour that influences attitude formation in a voluntary situation (Sharma and Jyoti, 2013).

TRA according to Botha and Kris (2005) lacks the ability to describe and explain how an individual makes the decision to adopt or reject an innovation because TRA only describes the drivers of an individual's behaviour. Therefore, it will not help to sufficiently give a satisfactory understanding of the explanation behind undergraduate students use and non-use of electronic resources because it cannot give a clear description of how the decision to use or not to use electronic resources were reached. Ducey (2013) also criticised TRA for its inability to specify the specific beliefs that will be important in the context of IT adoption and with these reasons this theory was not adopted.

2.2.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

The other model is The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al*., 2003) which was developed to consolidate previous TAM related studies in UTAUT model, performance and effort expectancy were used to incorporate the constructs of perceived usefulness and ease of use in the original TAM (Marchewka *et al*., 2007) UTAUT has four key constructs: performance expectancy, effort expectancy, social influence, and facilitating conditions that influence behavioural intention to use a technology (Venkatesh *et al*. 2012).

This theory is an expansion of the TAM and it integrates the elements of eight theories to predict and explain the reason behind the adoption and use of an information technology by an individual or organization. Venkatesh *et al*., (2003) advocated the use of performance expectancy, effort expectancy, social influence and facilitating conditions to predict users' adoption of information technology. The theory also recognizes the variables of gender, age, experience and voluntariness that are assumed to mediate the impact of the four core constructs on usage intention and behaviour.

The main element of UTAUT is that actual use occurs as a result of the moderating effects of age, gender, experience and voluntariness on performance expectancy, effort expectancy and social influence, or simply put the moderating variables have effect on the strength of the

relationship that exists between constructs and behavioural intention. With the application of UTAUT, Venkatesh *et al*., (2003) were able to demonstrate that certain relationships are affected by the moderating factors of gender, age, experience and voluntariness with behavioural intention bringing about acceptance or use of technology.

The UTAUT was considered a robust model empirically tested to provide explanations for increasing variances in terms of technology use (Oye *et. al*., 2011). However, Polancic *et. al*., (2009), have criticized UTAUT on the grounds that its validity and robustness has not been tested in enough studies. According to Verdegem and De Marez (2011), a critical overview of UTAUT raises the following questions; whether it provides accurate insights into both the adoption and use decision of end-users of new technologies; whether UTAUT is helpful in exploring the different profiles of users and non-users of new technologies and lastly whether there is need to find out if the variables incorporated in the model are detailed enough to feed more accurate targeting approaches of potential adopter segments in a variety of environments as well as non-user. UTAUT was not suitable for this study since it was originally developed to understand employee acceptance of technology in an organizational setting (Venkatesh, *et. al.*, 2012).

2.2.3 Diffusion of Innovation Theory (DOI)

The last theory is Diffusion of Innovation Theory (DOI) which is concerned with the manner in which a new technological idea or technique either old or new migrates from creation to use. DOI describes the social process of communication of a new idea among the members of a community over time. The focus of the theory is not only on awareness and knowledge, but also on attitude change and the decision making process that leads to the practice or adoption of an innovation (Sahin, 2006).

The concept of DOI is one of the most popular theories for studying adoption of information technologies (IT) and understanding how IT innovations spread within and between communities (Rogers, 2003). Diffusion is defined by Rogers as "the process in which an innovation is communicated through certain channels over time among the members of a social system." The core of Rogers's theory lies on four main elements of adopting an innovation. These elements include; innovation, communication, a social system, and time. Diffusion of innovation enabled researchers to explore how, why, and at what rate new ideas and technology spread through cultures. The origins of the diffusion of innovation theory are wide-ranging and

cover multiple disciplines. It is therefore essential that innovation diffusion models are derived for various cultures.

Diffusion of Innovations seeks to explain how innovations are taken up in a population. An innovation is an idea, behaviour, or object that is perceived as new by its audience (Robinson, 2009). Wright (2011) indicated that, the Rodger's model can only be applied after adoption is complete, it has no predictive capability. Although with some modification, DOI has been applied in various instances of IT applications and has been found useful (Agarwal and Prasad, 1997). The theory was criticized because it is not exclusively concerned with information technology like TAM, and does not give an explicit explanation of users' acceptance of an innovation (Dillon and Morris, 1996) and was therefore not suitable for the present study.

2.2.4 Technology Acceptance Model (TAM)

Electronic resources can be accessed from anywhere at any time, with complete freedom. Therefore, due to the uniqueness of these resources, it is imperative to examine the acceptance of new technology by its varied users in the library. The researcher considered the Technology Acceptance Model (TAM) as one of the decision-making models in technology innovations and relevant to this study.

Technology Acceptance Model (TAM) assumes that beliefs about usefulness and ease of use are always the primary determinants of information technologies adoption in organizations. According to TAM, these two determinants serve as the basis for attitudes toward using a particular system, which in turn determines the intention to use, and then generates the actual usage behaviour. The attributes of TAM used in this study are: perceived usefulness (PU), which is defined as the extent to which a person believes that using a system would enhance his or her job performance and perceived ease of use (PEOU), which refers to the extent to which a person believes that using a system would be free of mental efforts (Ayele and Sreenivasarao, 2013).

DeLone and McLean (1992) suggested the IS Success Model in assessing the impact of information systems on organizational performance; and later in 2003, they updated the IS Success Model for measuring the complex dependent variables in information system research giving six attributes which are System Quality, Information Quality, Service Quality, Use, User Satisfaction, and Net Benefit. However, in this study only four attributes are of concern; System Quality, Information Quality, Service Quality and Student Individual Characteristics.

Information quality is an important factor for the adoption of services. System quality measures the performance characteristics of the system being investigated while Service quality is a measure of how well the service level delivered matches customer expectations. Lastly, students' individual characteristics are the importance and personal relevance that users attach to a system under study (Zaied, 2012).

In this study elements of IS Success Model (Delone and McLean, 1992) and Technology Acceptance Model (TAM) (Sun and Zhang, 2004) (Figure 2-1 below) will be adopted to examine the usage of electronic library resources in BUAN. The main reason to accept these models as research theoretical framework is due to effectiveness and simplicity of TAM and IS Success Model. The models have received empirical support for robustly predicting technology adoption in various contexts and with a variety of technologies (Zaied, 2012). Elements of IS Success Model and TAM have been applied into many context and fields of investigating user's acceptance of information technology including mobile banking (Lule *et al*., 2012), multimedia (Lau and Woods, 2008), e-learning (Ad-Adwan *et al*., 2013) and e-commerce (Johar and Awalluddin, 2011). A number of studies employed the survey research design that was also used in the present study and the approach quantitative method was underpinned by the research paradigm. TAM and IS Success Model was also adopted because the researcher found it fit and relevant to the present study for its four main constructs, namely: Information Quality, System Quality, Service Quality and Student Individual Characteristics.

Figure 2-1: Research Model: Elements of IS Success Model and Technology Acceptance Model

Independent Variables	Intervening Variables	Dependent Variables
Information Quality Accuracy Availability Reliability Relevance **System Quality** Reliability Flexibility Usability Accessibility **Service Quality** Staff availability Staff reliability Staff technical competence Staff empathy **Student Individual Characteristics** Attitude Awareness Computer skills Satisfaction	Perceived Usefulness (PU) Perceived Ease of Use (PEOU)	Intention of use _____ USE

The model (figure 2-1 above) assumes that information quality and students individual characteristics influence perceived usefulness (PU) to enhance user's performance in their academic work; while system quality, service quality and students individual characteristics affect perceived ease of use (PEOU) and these in turn affect intention of use or use (Delone and McLean, 1992; Sun and Zhang, 2004)

2.3 E-Library Resources Defined

Electronic resources have revolutionised access to up-to-date outputs. The emergence of digital library resources in the past two decades has seen a rapid increase in the types and size and collections offered to users by libraries especially at academic and research institutions (Egle *et al*., 2015). This development has had significant impact on how academic and researchers access up-to-date scholarly publication of their own research (Tripathi and Kumar, 2014)

Electronic information resources have acquired a major portion of library collections and are very useful in academic libraries. Pawar (2016) defined electronic resources as resources which are in an electronic or digital form. Shahapurmath, *et al*., (2015) also defined electronic resources as materials in digital format accessible electronically. Examples of electronic resources are electronic journals, electronic books and online databases in varied digital formats. Furthermore, use of electronic resources permits the library to save space and time of the users.

The value and use of information resources, particularly electronic resources, have increased with time. Therefore, there is a necessity to make studies on the different aspects of these resources and the issues relating to the use of electronic resources by users (Garg and Tamrakar, 2014). Elavazhagan and Udayakumar (2013) observed that university libraries have undergone major changes in terms of information collection, dissemination, conveyance, use of information and communication technology development in recent years. They also asserted that, in universities, electronic resources play an integral part in libraries by assisting in learning, teaching and research activities.

2.4 Information Quality

The attributes of information quality include perceived value of use, reliability, relevance, completeness, accuracy, currency, understand ability, timeliness and accessibility of information (Zaied, 2012). A study by Tripathi *et al*., (2016) assessed the use and impact of e-resources among 196 research scholars of Agriculture and Technology Universities in Uttar Pradesh. The study found that users were aware of electronic resources and used electronic resources for learning, study and research. Most of the scholars preferred e-journals due to ease of searching and browsing facilities. They were utilizing print as well as electronic resources

for various purpose. However, the research scholars were not satisfied with the availability of e-journals, internet connectivity and its speed.

A survey designed to measure the intent to utilize online library resources was administered to 332 randomly selected undergraduates at state university located in the United States of America. The results were analysed quantitatively using inferential statistics such as structural equation modelling, multiple regression, t-tests, ANOVA, and linear regression. The results indicate that usefulness and ease of use are important factors in use intention. The effect of "resource quality" factors, indicated by credibility, format, accessibility, currency, and coverage, suggested that all five factors positively impact use intention. Accessibility increases the likelihood of online library resource selection while familiarity with online library resources and self-reported strong search skills also positively influenced use intention (Tewell, 2015).

Shahapurmath *et al*., (2015) surveyed 165 PG students of Karnatak College Dharwad, on the subject of the usability of electronic resources. A questionnaire survey was conducted to collect the information concerning the use of electronic resources, frequency of use and purpose of using electronic resources. The study indicated the awareness and utilization of electronic resources for academic purposes and students prefer electronic resource for update current information. However most of the users faced slow server and power supply problems in library.

Despite being aware of the different types of electronic information resources available in the university library, Adeniran (2013) found out that among 256 students in 200 level and above who used the library in Redeemers University, their use rate of these resources was low. The study adopted a survey research method where data was collected using a questionnaire and analysed data using simple percentages and frequency counts. Students used electronic resources for research, assignment, current awareness and information acquisition. However, factors that influence against effective utilization of electronic resources is the large mass of irrelevant information, the need to filter the results from search, download delay, failure to find information, inadequate or lack of search skills, high cost of access, inaccessibility of some electronic resources and difficulties in navigating through electronic resource.

In a study by Elavazhagan and Udayakumar (2013), a semi structured questionnaire, observation and interview methods were adopted to collect data among the faculty and research of Birla Institute of Technology and Science (BITS), Pilani – Hyderabad Campus. The study

found that electronic resources are time saving, easy to use and handle, more informative, preferred, flexible and effective. Elavazhagan and Udayakumar (2013) urge that the use of electronic resource dominate and influence research, learning and teaching and have influenced user's academic efficiency.

Information professionals depend on electronic resources to obtain desired and relevant information to excel in their academic work. Proper infrastructure in the library and formal training on the use of electronic resources are essential for better searching skills and use of electronic resources. Awareness and accuracy of the available electronic resources are important factors to effective and efficient use of electronic resources. Literature has indicated that electronic resources user were not satisfied with the availability of these resources. However, there are barriers for effective utilization of electronic resources such as irrelevant information, download delay, failure to find information, inadequate search skills, internet bandwidth and difficulties in navigating through electronic resources.

2.5 System Quality

The system flexibility, reliability, perceived ease of use as well as system features of intuitiveness, sophistication and response time (Petter, *et al*., 2008) influence access of electronic resources. Amusa and Atinmo (2016) and Nnadozie and Nwosu (2016) all ague that limited Library infrastructure such as ICT equipment significantly reduce utilisation of electronic resources.

Owolabi *et al.,* (2016) evaluated utilization of electronic information resources by undergraduates in the Faculties of Education and the Social Sciences in University of Ibadan. They adopted a descriptive survey design with a population of 1872 undergraduates from which a sample of 200 respondents were selected from each faculty using a simple random technique. Data was analysed using the SPSS software. The findings revealed that the internet services, e-mail services, online databases, electronic databases and cybercafés were the available electronic information resources often used by the undergraduate students in University of Ibadan. However, inadequate power supply, poor network and internet connectivity and limited access to computer terminals were identified as key factors militating against the effective use of the electronic information resources.

The effectiveness of electronic resources and services in select campuses of Fiji National University Library on the basis of users' satisfaction was evaluated. A survey method was

employed to gather information related to uses of electronic resources and services. The study revealed that majority of the users of FNU libraries kept themselves abreast of developments in electronic resources, services and their proper utilisation in the field of academic and research. The result showed a growing interest in e-resources among the users and also found that slow downloading and blockage of website was the hurdle in proper utilisation of electronic resources (Sohail and Ahmad, 2017).

Ahmed (2013) conducted a survey to examine students use and satisfaction of university subscribed online resources in two specialized universities in a Bangladesh. A structured questionnaire was used to assess the use of and satisfaction with university subscribed electronic resources by the students. The survey results revealed that students were not satisfied with their university subscribed resources, identifying limited access to computers and slow downloads speed as their major problems in using electronic resources.

The primary objective of the study by Konappar (2014) was to examine the use of electronic resources in university of library of Tirupati. A survey method was adopted where a structured questionnaire was designed to collect data from the P. G. Students of Science and technology in the University of Tirupati. The study revealed that students depends on electronic resources upon availability of manpower in adequate proportion, continuously updating IT skills and determination of higher authorities in allocating appropriate recurring grants to procure, update and maintain IT infrastructure and electronic resources.

Electronic resources are an integral part of information needs among information professionals. The system flexibility allows for fast and perceived ease of use of electronic resources inadequate access to full internet connectivity, lack of skills to use electronic database properly, slow downloads speed, limited access to computers, difficulty in retrieving contents and poor designed websites are the main problem for accessing and using electronic resources. Literature has indicated that system flexibility, reliability and accessibility influence the use of electronic resources. These factors limit the usability of electronic resources.

2.6 Service Quality

The attributes of service quality include responsiveness, accuracy, reliability, technical competence and empathy of the personnel (Petter, *et al.*, 2008). Sheikh (2014) evaluated the quality of library services at COMSATS Institute of Information Technology (CIIT) Islamabad campus from its users' perspectives. The survey method was adopted for the study and a

modified SERVQUAL questionnaire was used as an instrument to collect data from the students, faculty, and staff members. Analysis of collected data revealed that there were no significant differences between the levels of users' expectations and perceptions, which signify that the CIIT library was not lacking in quality services and users were satisfied with various aspects of its service quality. Further, it was found that the study would be useful for those library professionals who wish to investigate the strengths, weaknesses and threats in their library services.

The study by Onifade *et al*., (2013) examined the use of library resources and services among postgraduate students in Babcock University Library. A questionnaire was used as the main research instrument. The study revealed that students were averagely satisfied with the library services and declared that lack of library orientation did not enable them to have knowledge while others saw the opening hours as their problem. However, it was gathered from the study that the library still need to improve upon its services in order to fully satisfy its users

Shah (2013) empirically investigated the relationship between the quality of services provided by the library and the level of user satisfaction from these services. The data was collected with self-administered questionnaires from the SCEE NUST (School of Civil and Environmental Engineering, National University of Science and Technology) library users. The study used regression analysis to analyse the data. Results showed a significant positive relationship between library services quality and user satisfaction. The findings of the study concluded that the level of user satisfaction was enhanced when library services quality was improved. However, users were not only required to be provided with essential library services but the quality of these services needed to be improved as well. Moreover, if libraries were well equipped with quality service they provide an environment for the users that was conducive for learning.

Ahmed and Al-Reyaee, (2017) conducted a study to determine students' knowledge and use of e-databases, and to identify the areas in which further training and research needed. A questionnaire approach was supplemented by an unstructured interview to collect data from 300 randomly selected undergraduate medical students. It was found that the overall low response from dental students and lack of e-resources useful to them, were very much evident from the study. The study also found that those dissatisfied with the subscribed e-resources tend to use general search engines and databases of other university in order to meet their information needs. The paper concludes that the students lacked the necessary information

literacy skills needed to meet their academic and research requirements. It was recommended that the medical librarians and faculty should come together and intensify their efforts through proper information literacy programs in order to educate students how to use these resources effectively.

The study by Akussah *et al.*, (2015) investigated the relationship between the impact of electronic resources and usage in academic libraries in Ghana. All the four contracts (satisfaction level, preferred database, time and frequency, and level of awareness) of impact of electronic resources indicated a significant positive relationship with usage among the users. The study recommended among others that the institutions in question should adopt more dynamic marketing strategies in order to inform and create awareness of the existence of the electronic resources. These could include fresh student's orientation, faculty seminars, mailing list to users, circulars, memorandums, selective dissemination of information and word of mouth

Musyoka, (2013) study was set out to determine the relationship between service quality and library user satisfaction among universities in Kenya. The results of this study reveal that about 73.9% of library user satisfaction can be attributed to service quality. It was established that reliability dimension contributed most towards achieving user satisfaction. It was imperative for the libraries management to note that the top service attributes that caught users' attention most include the libraries having modern learning and research material, the willingness and ability of library employees to help the users within the libraries, cleanliness of the library environment, and availability and accessibility of information by the users of the respective libraries.

Library service quality has a positive impact on teaching, learning and research among information professionals. Information Literacy training plays a crucial role in bringing awareness and equipping students with relevant skills to access and use electronic resources. Lack of library orientation hinders awareness and use of these resources.

2.7 Student Individual Characteristics

Student's individual characteristics is characterised by user's attitude, awareness, skills, satisfaction and perception to use electronic resources. The numerous resent studies that have been carried out on electronic resources are in the areas of awareness (Akpojotor, 2016; Azubuike, 2016) and usage (Amusa and Atinmo, 2016; Tripathi *et al.*, 2016). It is found in the

literature that there was a breach between awareness and usage of electronic resources. Either users are aware of the e-resources and use them, users are aware and do not use them or users are unaware of them and therefore do not use them

A research by Daramola, (2016) was carried out to assess the perception of the undergraduate students of the Federal University of Technology, Akure on the use of e-resources in the library. A structured questionnaire was used to collect data from the respondents; the data was analyzed using frequency counts, percentages, Likert type scale and means. The study revealed that the undergraduate students that visited the e-resources unit of the University were relatively young with a mean age of 22 years; male students visited the e-resources more than the female students. The major reasons for utilizing the e-resources were for assignment and research purposes. The e-resource frequently used was the e-journals, ebook and e-magazines. Although the students have positive perception of the e-resources, the most significant challenge faced by the students was insufficient computers in the e-library.

Nemati-Anaraki and Babalhavaeji (2013) carried out a research on awareness and ability of medical students in using electronic resources of the integrated digital library (IDL) portal of Iran. The survey was conducted through a structured questionnaire circulated among 300 medical students sampled from three major Iranian universities. A stratified random sampling method was adopted and descriptive statistics was used to analyse data using the Microsoft Excel software. The study found that awareness and utilization level of students in the three universities was lower than average and those who were not aware of the existence of the IDL portal used general search engines to meet their information needs. Respondents identified lack of awareness about the IDL as their most significant problem.

In a study by Ahmed (2013) it was revealed that male and female students use electronic resources for different purposes. The most common reasons among students to use electronic resources are for research, assignments, and writing of project/thesis/dissertation. The study observed that both male and female students acquire their search skills mainly through friends, colleagues and library instruction. However, gender was not a factor in determining how students acquire their skills, because students interact and exchange ideas with friends and colleagues.

Awareness encourages electronic resources users to access and use these resources. Students perceive electronic resources to be important to their research and studies. In order to use these

resources, students acquire their search skills through friends, colleagues and library instruction.

2.8 Summary of literature review

Electronic resources have been widely and rapidly accepted in academic environment since they can easily be accessed and used for academic work. In this research work, both concepts of Technology Acceptance Model (TAM) and IS success model were applied to examine the variables or factors that lead to the use of electronic resources amongst undergraduate students. In addition, the proposed model was adopted to assess critical factors affecting electronic resources usage among BUAN undergraduate students. A total of 137 participants expressed their opinions about the proposed dimensions being information quality, service quality, system quality and student individual characteristics.

A number of studies conducted on the use of electronic resources have been conducted on postgraduates, research scholars, and academic staff. Few studies have been on undergraduates. The studies seem to be silent on the sampling techniques used to select their participants. Previous studies have investigated how information professionals use electronic resources and what these resources are. However, why users select and use electronic resources, what are the factors and how they influence the selection and use of these resources remains unanswered. A number of studies have been conducted with a view to giving solutions to problems encountered when using electronic resources. These have also not answered the 'why' question.

Electronic resources have been reported as important resources as they are used to supplement printed resources and are used for research purposes, for getting information to work on assignment, for preparing teaching materials and so on. A lot of studies have conducted on the access and use of electronic resources in different institutions and different countries. However, there are insufficient studies on assessment and use of electronic resources by specific variables of IS Success model being information quality, system quality, service quality and student individual characteristics among BUAN undergraduate students. This is the gap that the study is going to help to fill the gap by determining whether these variables influence the use of electronic resources among undergraduate students of BUAN.

The elements of IS Success Model and TAM were reviewed in this study in order to enhance acceptance and increase usage of electronic resources, it is important to understand the factors that influence how users make decisions on selection and use of electronic resources. This study extended IS Success and TAM by examining the role of four aspects of electronic resource characteristics namely: information quality, system quality, service quality and student individual characteristics in predicting undergraduate students' use of electronic resources. The model's suitability for predicting general individual acceptance, especially in higher education, needs to be explored. Next is Chapter 3 which discuss the quantitative research methodology used in the study.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter outlines the methodology that was used to explore factors that influence the usage of electronic resources among undergraduate students. The chapter covers the research paradigm, research design, population of study, sampling techniques, data collection procedure, the research instrument used, how data was analysed, including the ethical consideration of the study then lastly summary of the chapter.

3.2 Research Paradigm

This study is a quantitative research; hence a positivist paradigm was adopted. This type of research paradigm was used to uncover and measure patterns of behaviour, discover the laws of cause and effects that determines the behaviour of students towards accessing electronic resources (Chapman, 2011). According to Jakobsen (2013), a positivistic approach refers to a theoretical position that emphasizes empirical data and scientific methods. Jakobsen (2013) further argues that the approach holds that the world consists of regularities, which are measurable. Therefore, the researcher can infer knowledge about the real world by observing it. This study gathered empirical data on independent variables adopted (information quality, system quality, service quality and students individual characteristics) in relation to the use of electronic resources by BUAN undergraduate students.

3.3 Research Design

This study adopted a quantitative research approach to the use of electronic resources by level 300 and 400 undergraduates' students of BUAN. According to Harwell (2011) 'quantitative research methods attempt to maximize objectively, reliability and generalizability of findings and are typically interested in prediction.' The main feature of quantitative studies is the use of test or surveys to collect data. There are different types of surveys such as longitudinal, cross sectional, prospective, retrospective and experimental surveys among others. The cross-

sectional approach was useful because it provided a quick snapshot of the use of electronic resources by BUAN undergraduate in relation to independent variables adopted for this study. A cross-sectional study is generally quick and cheap to perform and it is mostly based on a questionnaire survey (Sedgwick, 2014). Some benefits are that it is more efficient and has the ability to test research hypothesis and enables the researcher to objectively distinguish the study from the subject matter. However quantitative research may lack theoretical in depth facts (McCursker and Gunaydin, 2015).

A research design is the conceptual structure within which research is conducted and constitutes the blueprint for the collection, measurement and analysis of data (Kotari, 2014). The selection of a particular research design is dependent on how the researcher prefers the outcome of the study to be (Bryman, 2012). The study research design depends greatly on the nature of the research questions. In other words, knowing what kind of information the study should collect is the first step in determining how the study will be conducted. In this study, the researcher assesses the use of electronic resources among undergraduate students of BUAN, therefore a cross-sectional survey research design was employed to solicit responses on the use of electronic resources. A cross-sectional determine relationships and associations (May, 2011). This research method was adopted by Adrenian (2013) who conducted a study to examine the use of electronic resources among undergraduate students at the Redeemers University Library.

3.4 Location and Population of the study

The study was conducted at the Botswana University of Agriculture and Natural Resources main campus in Sebele, Gaborone. A population is defined as the group or collection that the researcher is interested in gathering information and from which they want to draw conclusions (Babbie, 2014). The target population in this study was level 300 and 400 undergraduate students of BUAN. According to the 2018/2019 updated students' academic register, there were four hundred and thirty-five (435) level 300 and 400 undergraduates' students of BUAN who were registered with the university library. The similar population was adopted by Owolabi *et al.* (2016) where their target population was level 300 and 400 students of faculties of Education and the Social Sciences of the University of Ibadan. Their main reason to adopt this population was because the students tend to understand and use library more because of their projects for the final year. Adeniran (2013) did similar study he targeted level 200 and

above students. In another study by Ekenna and Iyabo (2013) used a population of level 400 undergraduates in Federal Universities in Nigeria.

3.5 Sample and Sampling Technique

In this study, a probability sampling technique was employed to determine the sample. In particular, stratified random sampling was applied, allowing the population to be stratified according to the different groups called "strata". As suggested by Creswell (2014), it is important to use stratification before selecting a sample to ensure that there is a true representation of the population. Stratified sampling in this study ensured that all categories of students were involved in the sampling process.

3.5.1 Sample size

A sample represents a subgroup of the population. Sampling describes the tendency of the researcher to select subjects of the population that is correctly representative of the population. The sample size was calculated by using a confidence level of 95% and margin error of 5% from a population of 435 undergraduate students. A sample of size of 145 was established using a precision level of +/-7% from Israel model of sampling (Appendix 1). To ensure an equal representation of a descriptive sample in all five departments, the researcher employed proportional stratified random sampling. This was done by making sure that each stratum in the sample was proportionate to the size of the stratum in the population. The researcher used population size by department divided by population size to determine population percentage of each department. This percentage was used to calculate a proportionate sample drawn from each department.

3.5.2 Sampling Technique

Employing the right sampling method allows the researcher to reduce costs, conduct research more efficiently in terms of speed, provides greater flexibility and it ensures greater accuracy or minimises bias (Pandey and Pandey, 2015). The two main categories of sampling techniques include probability and non-probability sampling.

For this study a stratified random sampling method was employed to select participants from a population of four hundred and thirty-five (435) into different five (5) subgroups or strata (Academic departments): Animal Science and Production, Agricultural Engineering and

Landscape, Agricultural Economics and Extension, Crop Science and Production and Food Science and Technology. The BUAN 2018/2019 student list, consisting of four hundred and thirty-five (435) spread across five academic departments, was used as a sampling frame. Using an Israel model of sampling (Appendix 1), the appropriate sample size of 145 was established, representing 33.3% of the population. Firstly, students were divided according to their academic departments (See table 3-1). A sample of one hundred and forty-five (145) was drawn independently from each academic department. The library register 2017/2018 updated list consisting of 435 students of level 300 and 400 spread across five departments was used as sampling frame. The researcher administered a print based questionnaire at the end of lectures.

Table 3-1: Population and sample size per stratum by Academic Departments

Strata Academic Departments	Population Size	Population Percentage	Sample Size	Response Frequency	Response Percentage
Animal Science Production (ASP)	100	23	33	33	22.8
Agricultural Engineering and Land Planning (AEL)	104	23.9	35	33	22.8
Agricultural Economics Extension (AEE)	89	20.5	30	29	20.0
Crop Science Production (CSP)	75	17.2	25	22	15.1
Food Science and Technology (FST)	67	15.4	22	20	13.8
Total	435	100	145	137	94.5

3.6 Data Collection Instruments

Studies on electronic resources use often employ interviews and transaction log analysis. These have their strengths, but this study used a closed and open ended questionnaire and documentary reviews to capture relevant data to the study objectives and research questions. In addition, level 300 and 400 undergraduate students were recruited to have a specific sample group.

3.6.1 Questionnaires

The self-administered closed and open ended questionnaires had a total of 32 questions which were linked to the study research model. After a completion of an in-depth literature study, a closed and open ended questionnaire was designed keeping the research objectives and questions in mind. The questions were derived from the literature review and were in line with the theoretical frame work adopted. The questionnaires were adopted because they are inexpensive to administer and also permit a wide geographical coverage and thus are particularly useful when undertaking a study with a population geographically scattered (Phellas *et al*., 2011) A total of one hundred and forty-five questionnaires were distributed among undergraduate students. One hundred and thirty-seven were returned giving a response rate of 94.5%.

The questionnaire was administered personally by the researcher and was organized under five (5) main parts (see appendix 3) and how research questions are linked to the variables under study (see table 3-2 below). Section A was for capturing the respondents' demographic information while section B, C, D, E and F was for statements related to the four research questions under study being information quality, system quality, service quality and student individual characteristics.

Table 3-2: Linking variables and research questions

REQUISITION	VARIABLES	QUESTIONS	ANALYSIS
SECTION A: Background information	Gender, Age, Programme, Department and year of study	Q1, Q2, Q3, Q4 & Q5	Frequency table
SECTION B: Information Quality	Accuracy Availability Reliability Relevance	Q7, Q8, Q10, Q24, Q25, Q26 & Q 27	Frequency graphs Frequency tables
SECTION C: System Quality	Reliability Flexibility Usability Accessibility	Q6, Q9, Q28, Q29 & Q31	Frequency graphs Frequency tables
SECTION D: Service Quality	Staff availability Staff reliability Staff technical competence Staff empathy	Q20, Q21, Q22 & Q23	Frequency graphs Frequency tables
SECTION E: Student Individual Characteristics	Attitude Awareness Computer skills Satisfaction	Q11, Q12, Q13, Q15, Q16, Q17, Q18 & Q19	Frequency graphs Frequency tables

3.6.2 Documentary Reviews

Documentary review is a way of collecting data by reviewing existing documents to understand substantive and illuminate deeper meanings which are relevant to the issue under study. They provide a systematic procedure for identifying, analysing and deriving useful information from these existing documents regarding the use of electronic resources complied by the library. This includes annual reports, marketing materials, newsletters and survey reports. Reviewing existing documents provided the researcher with additional information to understand the history, philosophy and operations of the organisation under study, also formulate question in relation to the theoretical framework adopted.

3.7 Validity and Reliability of Data Collection Instruments

Validity and reliability are the two main factors that any researcher should be concerned about while designing a study, analysing results and judging the quality of data (Pickard, 2013). This allows the researcher to alter questions or to rectify any inadequacies that may appear in the questionnaire before it is administered to the respondents of the study. Sekaran and Bougie (2013, p. 158) declared that "when a questionnaire is used in a survey, it is important to pre-test the instrument to ensure that the questions are understood by the respondents." This testing can be done on a small number of respondents before administering the instrument to the larger population.

3.7.1 Validity

To ensure the validity of the instrument used to collect data in this study, the questionnaire was given to the supervisors. The focus of validation was on the clarity of the content and relevancy to the study objectives. Based on the outcome of supervisors, the questions were revised and some of the items were modified, while others were totally deleted.

3.7.2 Reliability

The researcher ensured the reliability of the items in the questionnaire by having a pre-test with students of the same characteristics as the respondents used for the study. Three questionnaires were administered to BUAN undergraduate students in the library and checked for consistency to fine tune the items in the questions. The researcher found that there were no ambiguity and

no repetition of questions which may have distracted the respondents from providing the appropriate responses to the items. The researcher also wanted to check whether the items would be understood by the respondents. The three pilot respondents were not included in the main survey.

3.8 Data Collection Procedure

Prior to data collection, a class list of participants was requested from the academic department and library student registration directory to locate students. In each class session, the tutors were informed about the study conducted and provided with permission letter to conduct a study in the university. The tutors granted permission to distribute the questionnaires, then the researcher informed participants about the nature and importance of the research study. The content of the questionnaire and data collection procedures were discussed with them together, including ethical issues. Next, the questionnaires were administered to the selected students. Participants were allowed to sign the consent form (see Appendix 2) to indicate their willingness to participate in the study, thereafter, they were allowed to complete the questionnaires at their convenience. However, the selected students who were not available during the time of data collection, were replaced by the available students.

During data collection, three (3) undergraduate students from two departments assisted with the distribution and collection of the questionnaires. The researcher trained these three undergraduate students to help in collecting the questionnaire. The students were from two departments being Animal Science and Production and Agricultural Engineering. The questionnaires were administered one-on-one to the students and their responses collected later. Students who did not return the questionnaires were reminded to return them through research assistants. The consent form included the researcher's contact number. The participants were invited to contact the researcher to clarify any misunderstanding regarding the completion of the questionnaire. One hundred and forty-five (145) questionnaires were distributed in students' classrooms, which were given to level 300 and 400 undergraduate students from the five (5) academic departments in the university.

3.9 Ethical Consideration

A letter of request to collect data from BUAN was sought and obtained from department of Library and Information University of Botswana and Botswana University of Agriculture and

Natural Resources (See Appendix 4, 5 and 6). The questionnaires were administered by the researcher with the help of three trained students of other departments at the end of lecture lessons. Participation in the study was completely voluntary and were given informed consent. All students who participated signed an informed consent form which was attached to the questionnaire. The researcher ensured that there was no harm to the research participants. Anonymity and confidentiality was ensured. Anonymity was ensured by not asking respondents for their names or other identifying information. All results are reported in aggregate format in the next chapter and no names of individuals are noted in reporting the findings.

3.10 Data Analysis

Quantitative data analysis involves the use of statistical methods to assemble, classify, analyse and summarise the data so as to derive meaning (McCuser and Gunaydin, 2015). To assess the use of electronic resources among undergraduate students, a questionnaire instrument was designed. The data collected using the questionnaires was analysed using Statistical Package for Social Sciences (SPSS 24.0). The response concerning use of electronic resources based on system quality, information quality, service quality and students' individual characteristics were compiled into frequency tables and graphs to describe the data collected.

The same method of data analysis used in this research was adopted by Emwanta and Nwalo (2013) where they used analysed data using simple descriptive statistics such as tables, percentage frequency distribution using a statistical package for social science (SPSS). In another research by Lwehabwa (2016), the data collected was scrutinized, tabulated, and processed by means of the SPSS package for cross tabulation, analysis and subsequent interpretations of results.

3.11 Dissemination of results

The results of this study will be shared with librarians and the university management to create awareness and provide training to improve the use of electronic resources. In addition, the results will help understand the challenges encountered by BUAN students when using electronic resources. The study will serve as a future reference for researchers on the subject of electronic resources usage among students.

3.12 Summary

In this research the target population for data collection was BUAN library registered undergraduate students, who were given a structured questionnaire using a stratified random sampling method. The data collected was analysed using a statistical package (SPSS 24.0). More so a descriptive research was adopted to provide a picture of a situation as it naturally happens among students when using electronic library resources and it may also use to justify current practices and make judgement to the current situation in BUAN library. The next chapter presents the analysis and interpretation of the findings.

CHAPTER 4

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter discusses the data analysis and findings from 137 questionnaires completed by BUAN undergraduate students who were registered with the university library. The purpose of the study was to assess the use of library electronic resources by BUAN undergraduate students. Questionnaires were given to third and fourth year undergraduate students from the five (5) academic departments in the university. The data from the questionnaire were statistically analysed using SPSS (24.0) program.

For this study, TAM and IS Success model variables were used to examine whether these factors influence the use of electronic resources amongst undergraduate students. The model projected the relationship and interaction between the independent variables of the study; information quality, system quality, service quality, student's individual characteristics and the dependent variable; use of libraries' electronic resources by undergraduate students. It illustrates independent variables influence the use of university library electronic resources by undergraduates.

This chapter presents the results obtained from the questionnaire survey completed by a sample population of level 300 and 400 undergraduate students of BUAN. Out of one hundred and forty-five (145) questionnaires, 137 were completed giving a return rate of 94.5%. As discussed in the preceding chapter, the data was analysed using SPSS (24.0).

4.2 Demographic characteristics

Table 4-1: Background information of respondents

Demographic Factor	Variables	Total Freq.	Total %
Gender	Male	64	46.7
	Female	73	53.3
	Total	137	100
Age	20 - 30	131	95.6
	31 - 40	6	4.4
	Total	137	100
Year of Study	Year 3 (Level 300)	62	45.3
	Year 4 (Level 400)	75	54.7
	Total	137	100

In first part of the questionnaire respondents were asked to state their gender to provide a better understanding of the population of the study. Table 4-1 shows that from 137 undergraduate students who participated in this study 73 (53.3%) were females and 64 (46.7%) were males. The respondents were asked to state their age as the literature survey showed that the age of respondents sometimes influenced electronic resources use. The overall age range of survey respondents was from 20-40 years and undergraduates that responded to the survey 131 (95.6%) were predominantly between 20-30 years old and 6 (4.4%) were 31 - 40 years of age. Table 4-1 revealed that there is an almost equal distribution of respondents between the two levels of study where 75 (54.7%) respondents were level 400 students and 62 (45.3%) were level 300 students.

4.3 Research Findings

This is the analysis of findings according to the study research questions. The study set out to establish whether information quality, system quality, service quality and student individual characteristics influence the use of electronic resources among undergraduate students.

4.3.1 Use of electronic resources

It was important for this study to know the effect of use and non-use of electronic resources among respondents since BUAN library has adapted to new technologies to facilitate the process of teaching and learning.

The results from figure 4-1 show that 91 (91.9%) of respondents accessed electronic resources from library computers, 58 (58.6%) use their personal computers while 22 (22.2%) use their smart phones.
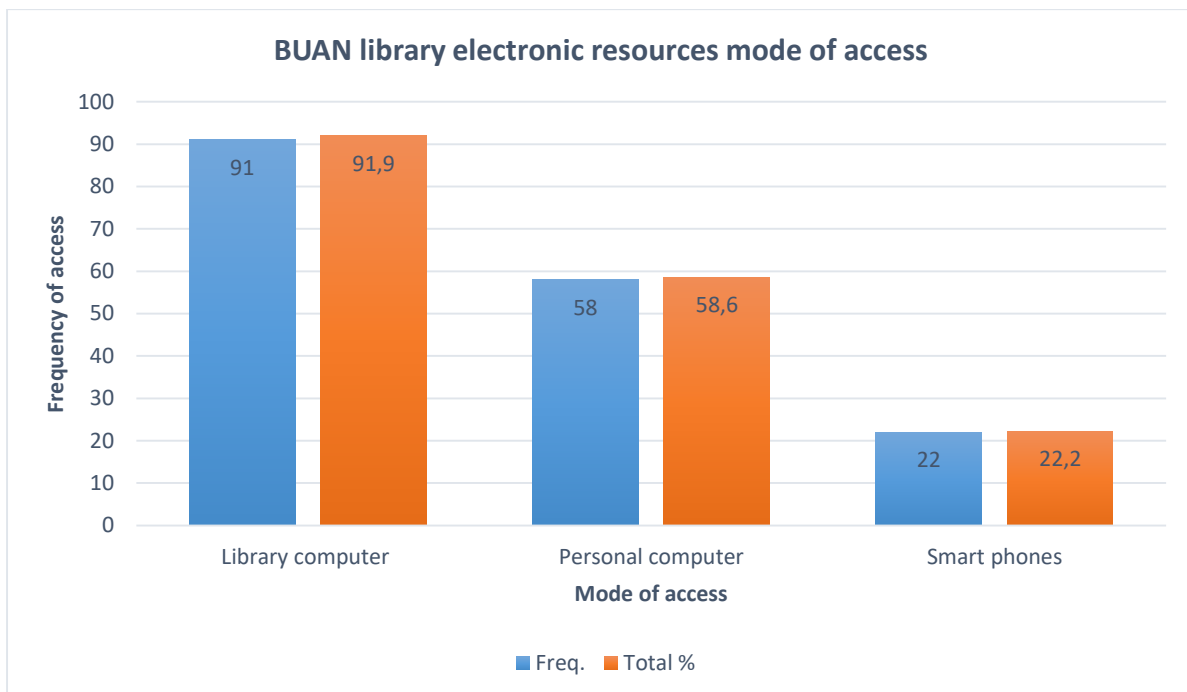
Figure 4-1: Mode of accessing BUAN library electronic resources

The university library offers access to a wide range of electronic resources to support students' research and study. These include full text e-journals, eBooks, databases, thesis and dissertations to access up-to-date literature as soon as it is published on the Internet. The BUAN library subscribes to many online subject databases to which all registered BUAN students have access. Many of these databases contain full text articles which can be viewed, downloaded and printed. The respondents were asked how frequently they use BUAN subscribed electronic resources.

Table 4-2 shows the distribution of responses with regards to the frequency of using various electronic resources. It was revealed in this table that respondents never used Ebrary (96.3%), SA Publications 126 (94.0%), ProQuest Central 123 (93.3%); while 18 (13.3%) and 16 (11.9%)

rarely used Science Direct and Free e-journals respectively. It was also revealed that respondents frequently used Institutional Repository 52 (38.8%), FAO Publications 46 (33.6%), and Free e-journals 40 (29.6%).

Table 4-2: Use of various electronic resources

Electronic Resource	Frequently		Rarely		Never	
	Freq.	%	Freq.	%	Freq.	%
EBSCO host	19	14.2	14	10.4	101	75.4
AGRICOLA	18	13.3	13	9.6	104	77.0
Agric Virtual Library	20	14.9	11	8.2	103	76.9
Free e-journals	40	29.6	16	11.9	79	58.5
Bio One e-journals	25	18.7	7	5.2	102	76.1
FAO Publications	46	33.6	12	8.8	79	57.7
CABI Abstracts	9	6.7	3	2.2	122	91.0
A-to-Z e-journals	35	26.1	12	9.0	87	64.9
Science Direct	28	20.7	18	13.3	89	65.9
Institutional Repository	52	38.8	6	4.5	76	56.7
TEEAL	38	28.1	7	5.2	90	66.7
Ebrary	3	2.2	2	1.5	129	96.3
ProQuest Central	8	6.0	1	0.7	125	93.3
SA ePublications	3	2.2	5	3.7	126	94.0
Online Catalogue (OPAC)	29	21.5	5	3.7	101	74.8

In response to the question on how often students use electronic resources, Figure 4-2 revealed that 26 (26.3%) respondents used electronic resources several times per week, 23 (23.2%) several times a month and 20 (20.2%) daily. While 19 (19.2%) used electronic resources occasionally and 11, (11.1%) used these resources once in a month. In addition, respondents were asked to indicate the last time they used electronic resources in the library, 42 (42.4%), respondents said yesterday 37, (37.4%) last week, 12 (12.1%) last month, while 5 (5.1%) and 3, (3.0%) used electronic resources two weeks ago and within the last six months respectively.
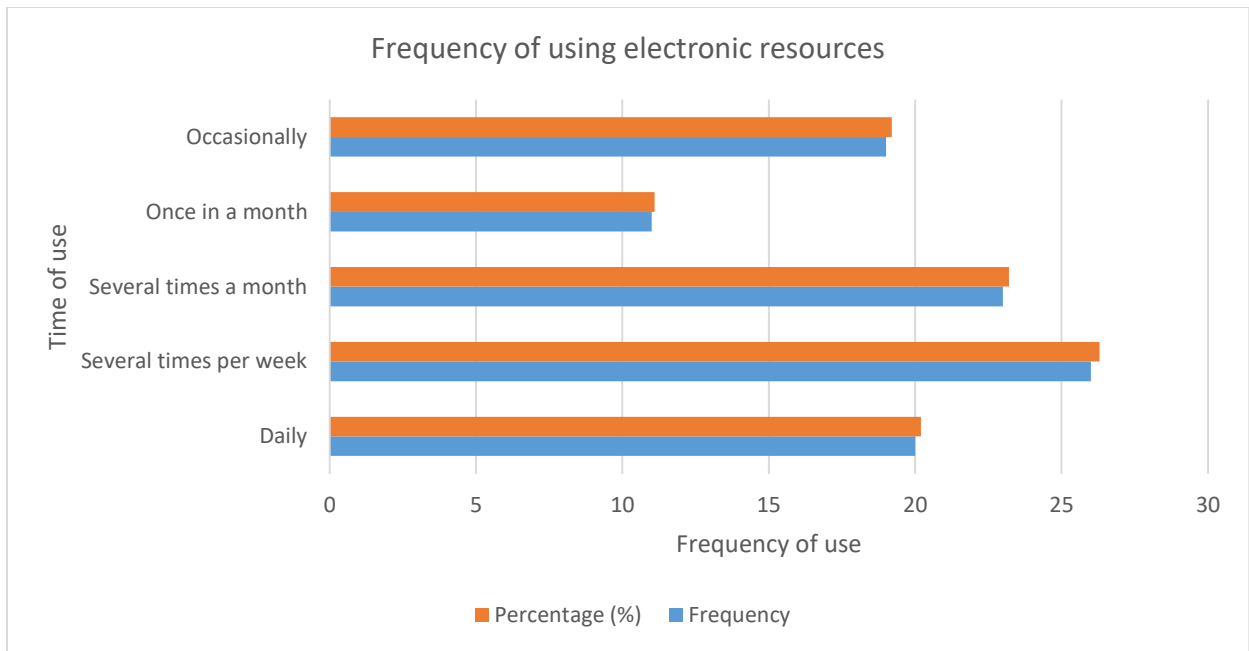
Figure 4-2: Frequency of using electronic resources

In order to acquire an understanding of why respondents selected specific electronic resources, the respondents were asked to provide an explanation of their choice. According to Figure 4-3 findings revealed that 77 (77.8%) used electronic resources to gather information on specific topics, 73 (73.7%) used them to complete assignments, 37 (37.4%) obtained answers to specific questions; while 33 (33.3%) used these resources to obtain general information. It is found that, more than half of respondents used electronic resources to gather information on specific topics.
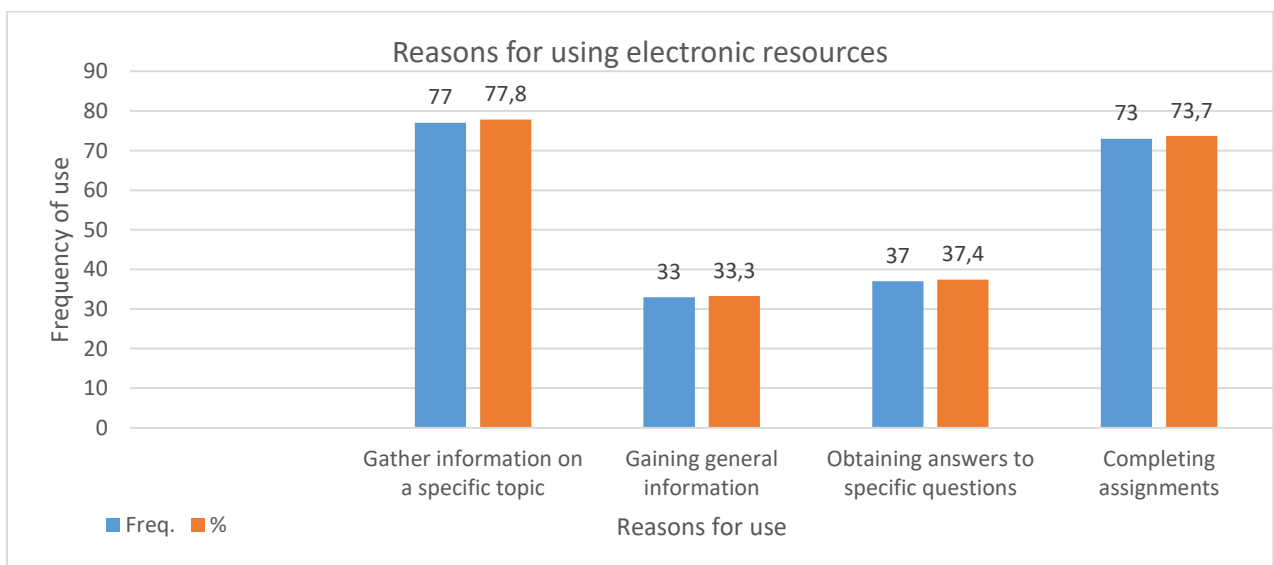
Figure 4-3: Reasons for using electronic resources

Past studies have identified different problems which most often hinder undergraduates to access and utilise the existing electronic resources in the library. In order to identify the problems respondents were asked to indicate why they do not use electronic resources. According to the survey, Figure 4.4; 68 (55.7%) indicated they did not know about these resources, 56 (45.9%) highlighted that they did not know how to use them, 24 (19.7%) said they do not know where to find electronic resources, 17 (13.9%) revealed that they did not have any interest and do not find these resources useful to their academic study. However, despite these reasons, 98 (88.3%) indicated that they were interested in using these resources if the obstacles are removed; while 13 (11.7%) indicated that they were not interested in using electronic resources.
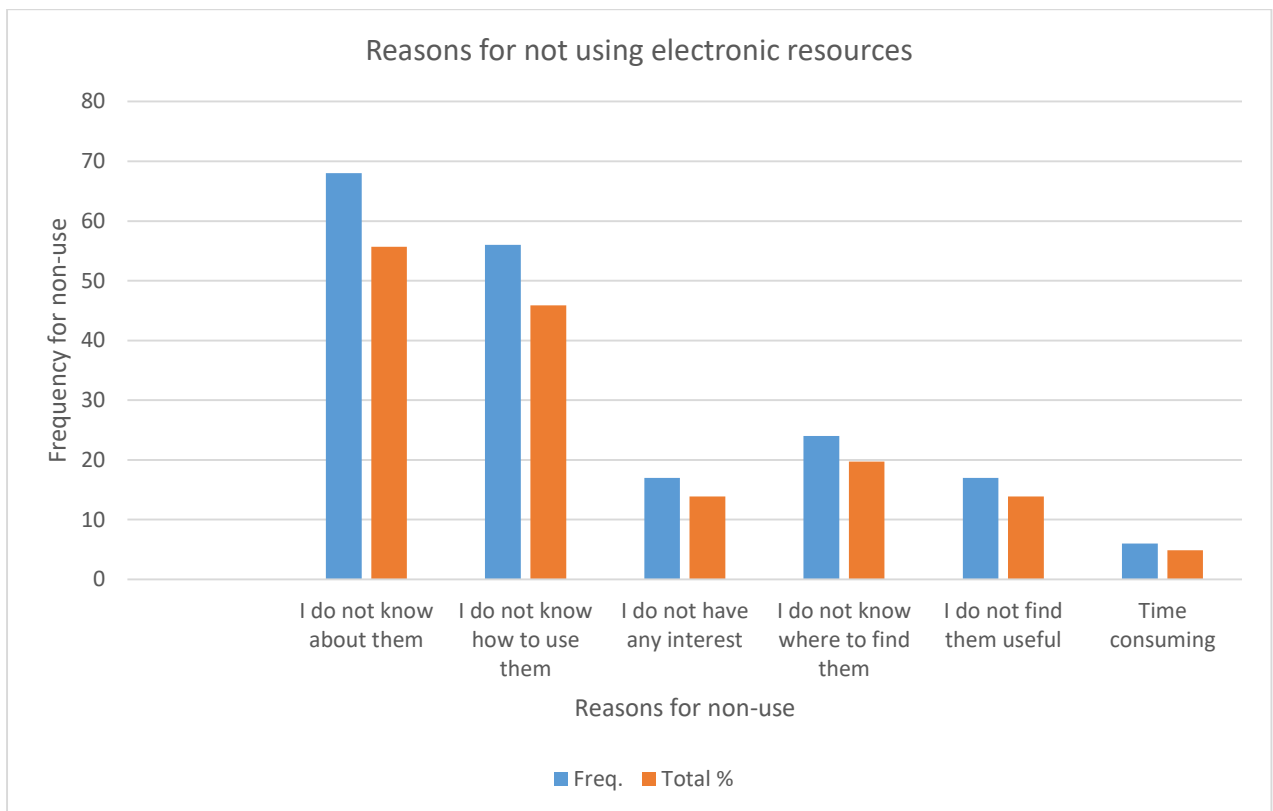
Figure 4-4: Reasons for not using electronic resources

4.3.2 Information Quality

To determine whether information quality affects the use of electronic resources, students were asked to indicate the purpose of using these resources. Respondents were presented with questions with list of possible responses considering information accuracy, availability, reliability and relevance. The main elements of information quality of concern were accuracy, availability, reliability and relevance.

The BUANL users were asked for features of electronic resources they considered to be the most important for the efficiency of their academic work. Analysing the respondents reply in Figure 4-5, it was found that most of the users prefer to use electronic resources because they provide up-to-date information than other features of electronic resources. According to the respondents, 55 (56.7%) users used electronic resources to obtain up-to-date information, 43 (44.3%) considered electronic resources since they are freely available and they provide full text searching, 31 (32.0%) link to other resources and 27 (27.8%) indicated that they are quickly retrieved.
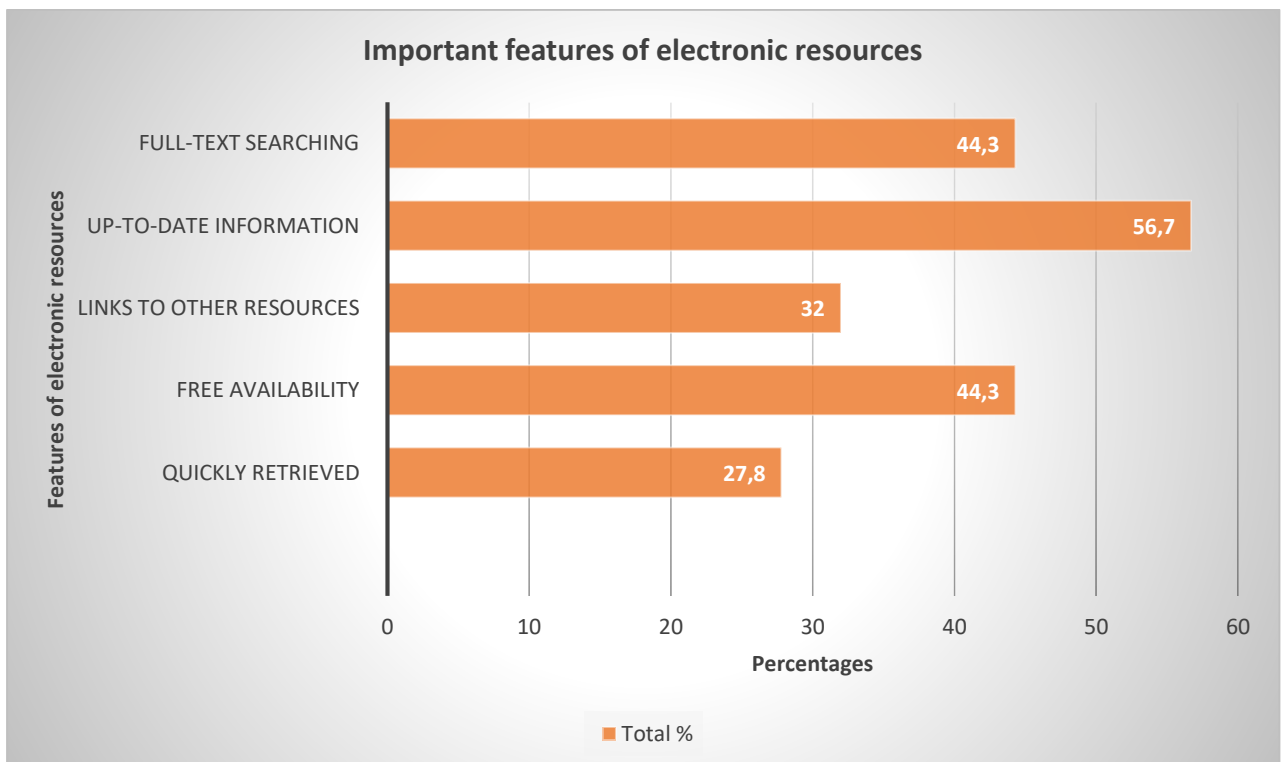
Figure 4-5: Features of electronic resources that are considered to be the most important

Table 4-3 shows that 84 (84.8%) of respondents indicated that electronic resources provided sufficient information to accomplish their tasks and provide information that is helpful to academic success, 54 (55.1%) provide accurate information provide information while other respondents indicated that electronic resources provide up-to-date information 53 (54.1%). Moreover, respondents, 40 (40.4%) revealed that electronic resources were quite useful to accomplishing their tasks, while 1 (1.0%) indicated that they are not sure and electronic resources are not useful to their academic studies.

Table 4-3: Reasons for using electronic resources

Statement	Agree		Neutral		Disagree	
	Freq.	**%**	**Freq.**	**%**	**Freq.**	**%**
Provide sufficient information to accomplish your task	84	84.8	6	6.1	9	9.1
Provide accurate information	54	55.1	43	43.9	1	1.0
Provide up-to-date information	53	54.1	36	36.7	9	9.2
Provide timely information	48	48.5	40	40.4	11	11.1
Provide information that is helpful to your academic success	84	84.8	10	10.1	5	5.1

Respondents were asked what they would perceive as the benefits of using electronic resources. In Figure 4.6, 95 (80.5%) respondents mentioned that they would use this resources because they access wider range of information, and 88 (74.6%) access up-to-date information; while 68 (57.6%) revealed that electronic resources would provide fast access to information. Respondents were asked to rate the overall importance of BUAN library electronic resources with regard to their academic work. It was observed that 52, (51.5%) of respondents indicated that electronic resources were good for their academic work, 29 (28.7%) found electronic resources acceptable and 11 (10.9%) indicated that electronic resources were excellent for their academic work.

Perceived benefits of using electronic resources

- Access to wider range of information
- Access to up-to-date information
- Fast access to information

68, 57,6%   95, 80,5%   88, 74,6%
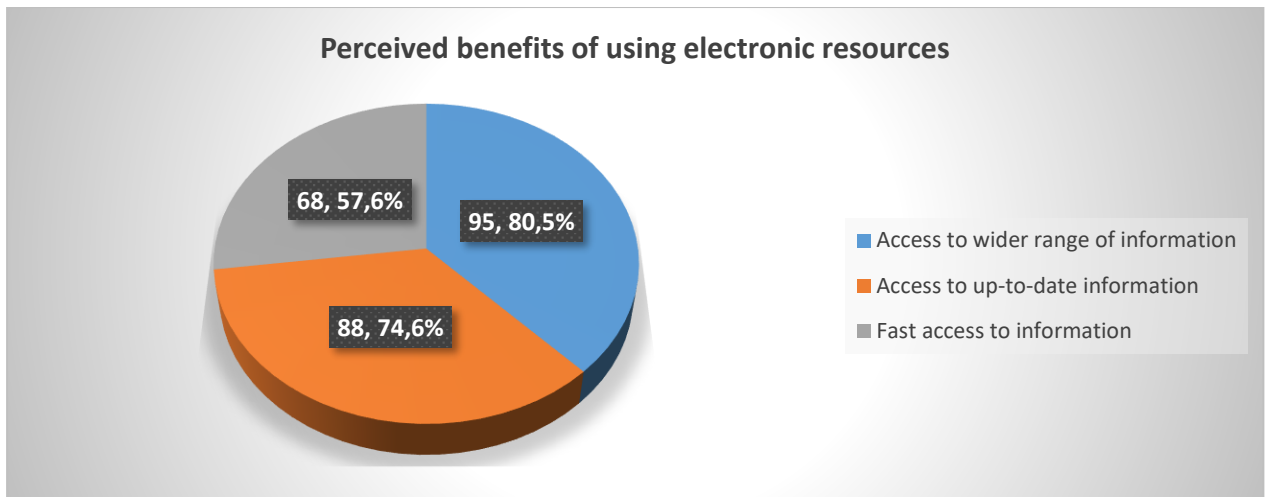
Figure 4-6: Perceived benefits that would be derived from using electronic resources by undergraduates

4.3.3 System Quality

In order to assess the use of electronic resources among undergraduate students, respondents were asked to indicate features of system quality which influenced them to use these resources. In this study, the measures of system quality of concern were reliability, flexibility, usability and accessibility. In view of the importance of the internet as a vital tool to access electronic resources the respondents were asked to indicate where they access electronic resources other than university library. It is observed from Figure 4-7 that 22, (53.7%) of the respondents used a computer at home, 13 (31.7%) from public technology access venues like internet café's while 8, (19.5%) accessed through public libraries.

Location for accessing electronic resources
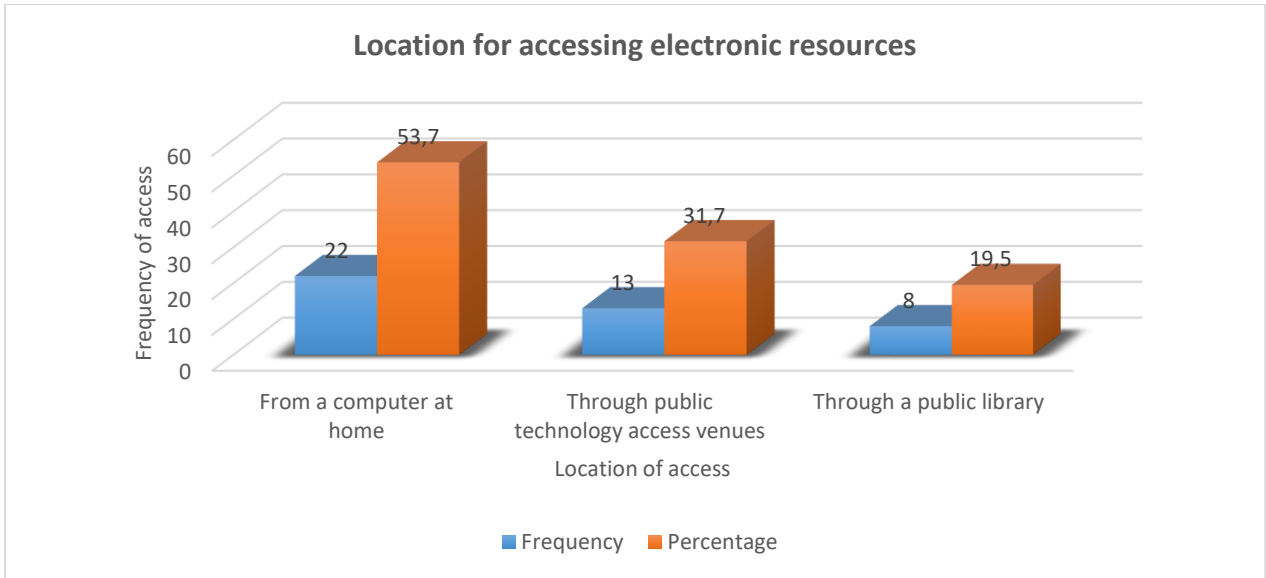
Figure 4-7: Location for accessing electronic resources apart from the college library

Users choose to use electronic resources for various reasons. Figure 4-8 shows that 65 (74.7%) of respondents consider electronic resources because they save time, 49 (56.3%) there is availability of search tools while 17 (19.5%) considered these resources because they are abundant and they are without limited physical space 8 (9.2%).

Reasons for using electronic resources
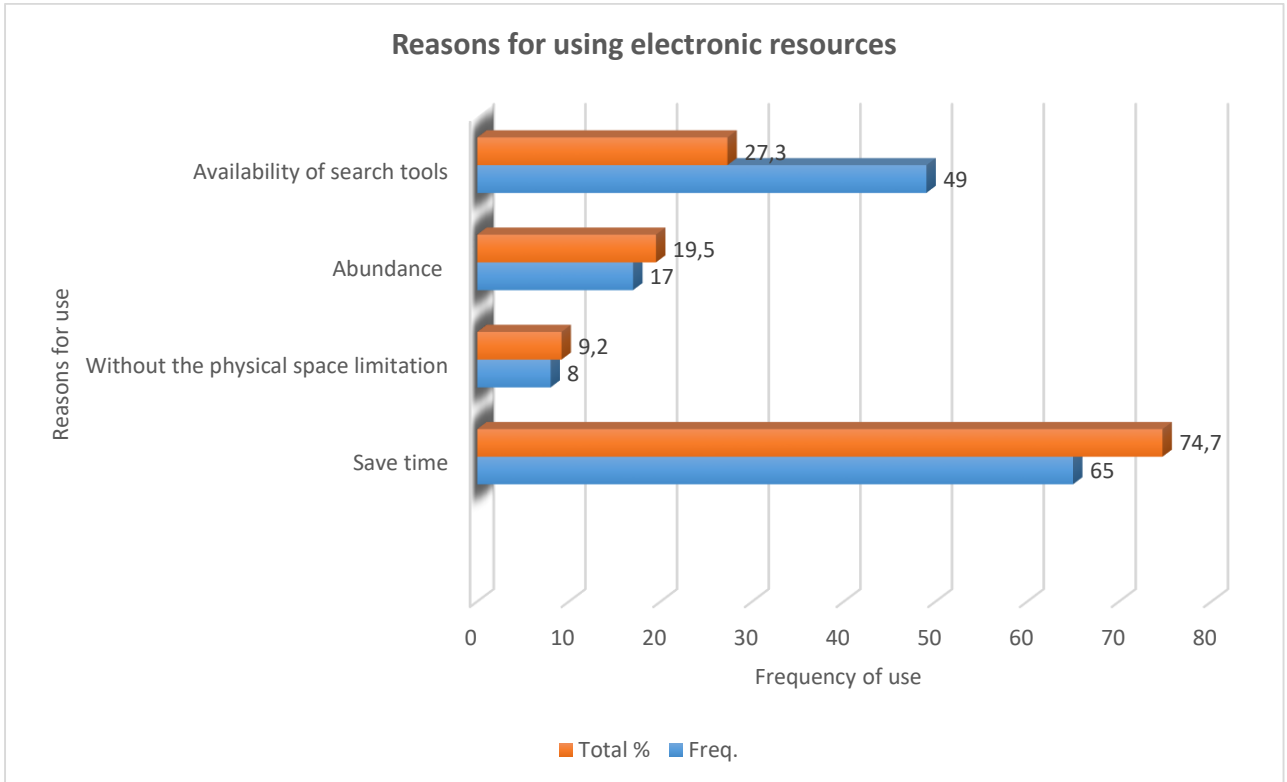
Figure 4-8: Reasons for using electronic resources

In Table 4-4, 72 (72.7%) of respondents have indicated lack of supporting equipment limits the use of electronic resources, 65 (67.7%) electronic resources are not easy to use and 65 (66.3%) of respondents highlighted that electronic resources are not easy to access. However, respondents 65 (65.7%) have indicated that what they find from electronic resources is what they need to accomplish their academic activities while 55 (55.6%) have revealed that bandwidth is not adequate to access electronic resources.

Table 4-4: Characteristics of system quality

Statement	Agree		Neutral		Disagree	
	Freq.	%	Freq.	%	Freq.	%
What I find from electronic resources is not what I need	15	15.2	19	19.2	65	65.7
There are too much electronic resources	16	16.2	49	49.5	34	34.3
Electronic resources are not updated	26	26.3	40	40.4	33	33.3
It takes too much time to find the relevant electronic resources	37	37.4	35	35.4	27	27.3
Lack of supporting equipment's like a printer limits the use of electronic resources	72	72.7	18	18.2	9	9.1
Electronic resources are not always accessible	39	40.2	30	30.9	28	28.9
Electronic resources cover my subject area	64	64.6	23	23.2	12	12.1
Electronic resources are not easy to access	65	66.3	25	25.5	8	8.2
Electronic resources are not easy to use	65	67.7	23	24.0	8	8.3
There is adequate bandwidth to access electronic resources	18	18.2	26	26.3	55	55.6
Easy navigation to electronic resources from library website	49	49.5	43	43.4	7	7.1

4.3.4 Service Quality

To find out whether service quality affected the use of electronic resources, respondents were asked to indicate the availability, reliability, technical competence, and empathy of the library

personnel. In Table 4-5, 62 (62.0%) respondents indicated that training provided by the library on how to use electronic resources was not enough, however 56 (56.6%) respondents revealed that librarians are always willing to help students in accessing electronic resources and 52 (52.5%) respondents revealed that when they have difficulties in accessing electronic resources, the library staff showed sincere interest in helping them.

Table 4-5: Services provided by the college library

Statement	Agree		Neutral		Disagree	
	Freq.	%	Freq.	%	Freq.	%
Librarians inform students about available electronic resources	44	44.0	20	20.0	36	36.0
When students have difficulties in accessing electronic resources the library staff show sincere interest in helping	52	52.5	23	23.2	24	24.2
Librarians are always willing to help students in accessing electronic resources	56	56.6	31	31.3	12	12.1
Librarians are never busy to help students	43	43.4	36	36.4	20	20.2
Training provided by the library on how to use electronic resources is enough	13	13.0	25	25.0	62	62.0

4.3.5 Student Individual Characteristics

In order to assess the use of electronic resources among undergraduate students, respondents were asked to indicate their user's attitude, awareness, computer skills and satisfaction towards these resources to determine whether student's individual characteristics influenced the use of electronic resources. Out of the respondents, 62 (56.4%) were somewhat well aware of the electronic resources and 29 (26.4%) were unaware while 19 (17.3%) were aware of the availability of electronic resources. The results implied that there was low level of awareness regarding electronic resources available.

Respondents were asked to indicate how they became aware of the electronic resources at BUAN library. From figure 4-9, it is apparent that respondents got aware of the existence of the electronic resources through; library website 59 (66.3%), from friends and colleagues 49

(55.1%), subject librarian 8 (9.0%), through course tutors 6 (6.7%), posters/brochure 4 (4.5%) and other means such as trial and error 2 (2.2%).
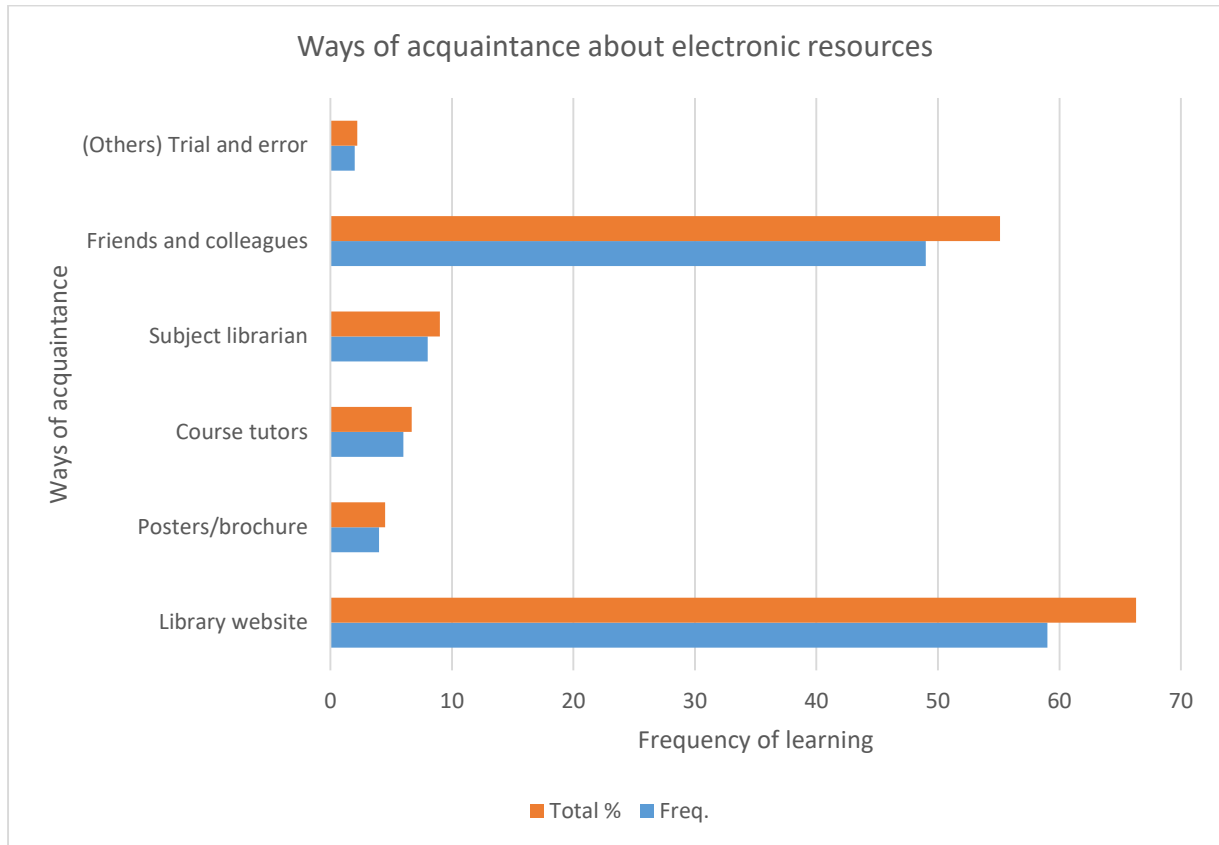
Figure 4-9: Ways of acquaintance about library electronic resources

It is important that all students should possess an adequate level of information literacy skills to utilise library resources effectively including electronic resources. They need to know how to construct a good search technique for researching online databases. In this regard, respondents were asked to indicate how they acquaint themselves with how to use electronic resources. The findings in figure 4-10 reveal that respondents acquire skills in accessing electronic resources through help of a friend 60 (65.2%), 52 (56.5%) by asking a librarian; while 8 (8.7%) attended library induction courses. Therefore, students preferred to ask friends and librarians for help regarding the use of electronic resources.
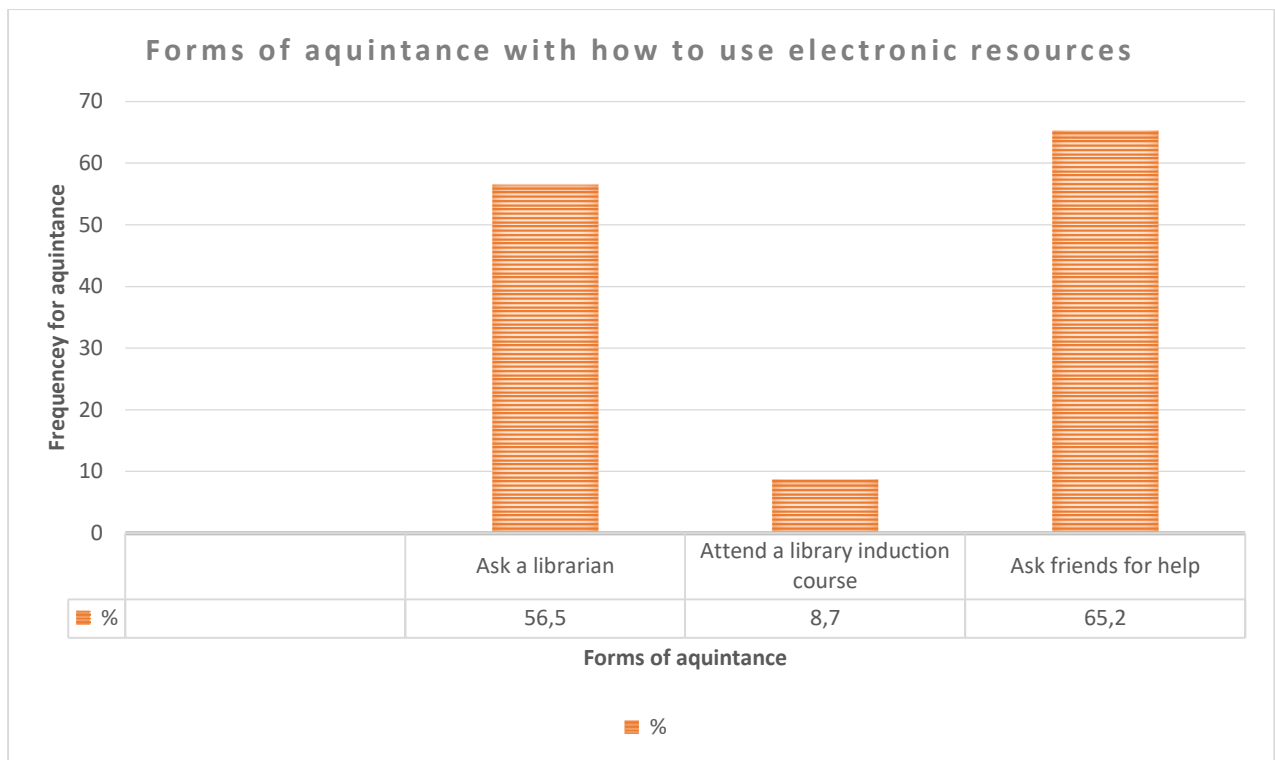
Figure 4-10: Forms of acquaintance with how to use electronic resources

The survey revealed that 79 (76.0%) had good searching abilities; while 24 (23.0%) and 1 (1.0%) possessed fair and poor searching abilities respectively. The respondents had good searching abilities which eased their use of electronic resources. The study revealed that 75 (67.0%) of the respondents had not taken training regarding access of electronic resources. Respondents indicated that they had average computer literacy skills, 60 (57.7%) while 23 (22.1%) revealed having excellent skills and 21 (20.2%) respondents had basic skills (Figure 4.11). Despite having good searching abilities, the respondents indicated having average computer literacy skills. The findings imply that there is a gap in computer literacy skills among undergraduate which could influence or cause the ineffective and inefficient usage of electronic resources.
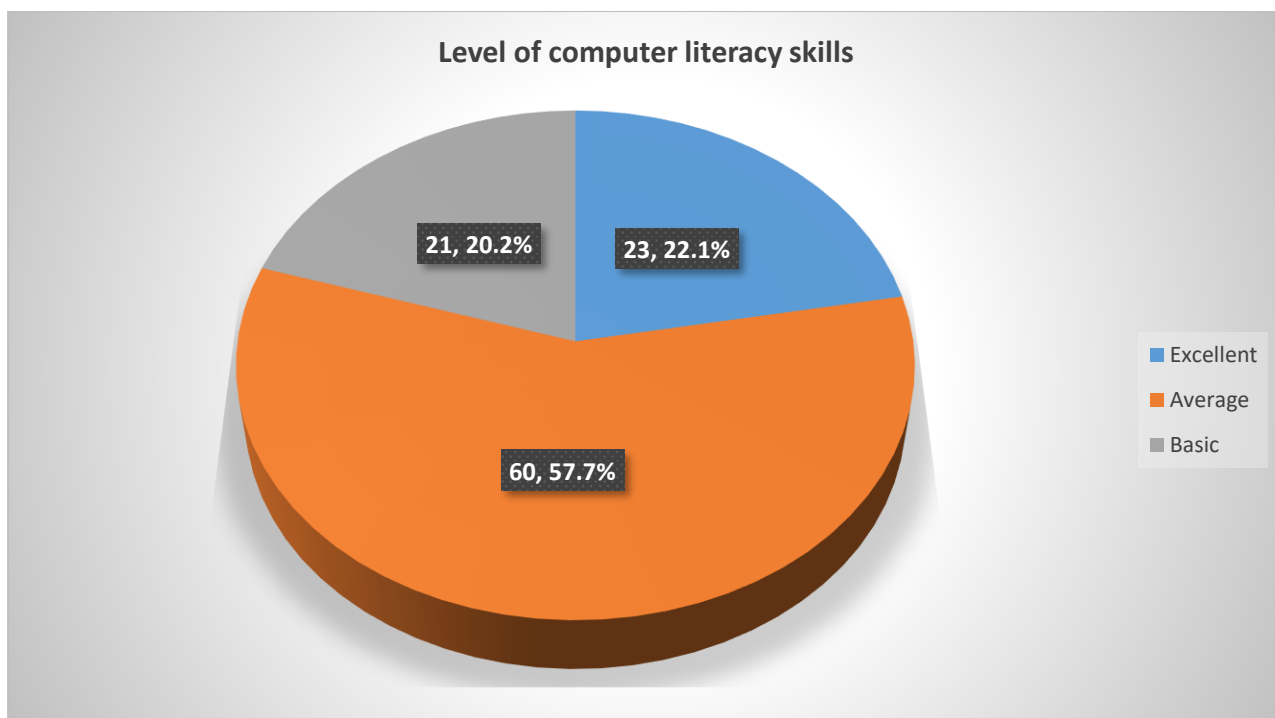
Figure 4-11: Rating the level of computer literacy skills when accessing electronic resources

Table 4-6 shows the satisfaction level of respondents with BUAN Library electronic resources. The table indicates that 50.5% of respondents were satisfied with free e-journals, 50.0% with Institutional repository and FAO Publications 49.0%, whilst 80.2%, 78.1% and 76.3% had no opinion regarding their level of satisfaction with Ebrary, followed by SA Publications and ProQuest Central respectively. Table 4.5 further shows that respondents were dissatisfied with A-to-Z e-journals, CABI Abstracts, Online Catalogue (OPAC) 17.5%, 15.6%, and 15.5% in that order.

Table 4-6: Level of satisfaction with BUAN Library electronic resources

Electronic Resource	Satisfied		No Opinion		Dissatisfied	
	Freq.	%	Freq.	%	Freq.	%
EBSCO host	31	31.6	60	61.2	7	7.1
AGRICOLA	21	22.1	64	67.4	10	10.5
Agric Virtual Library	21	21.4	65	66.3	12	12.2
Free e-journals	49	50.5	42	43.3	6	6.2
Bio One e-journals	26	26.8	60	61.9	11	11.3
FAO Publications	48	49.0	39	39.8	11	11.2
CABI Abstracts	20	20.8	61	63.5	15	15.6
A-to-Z e-journals	26	27.1	53	55.2	17	17.7
Science Direct	29	29.6	57	58.2	12	12.2
Institutional Repository	49	50.0	40	40.8	9	9.2
TEEAL	38	38.8	45	45.9	15	15.3
Ebrary	9	9.4	77	80.2	10	10.4
ProQuest Central	10	10.3	74	76.3	13	13.4
SA ePublications	9	9.4	75	78.1	12	12.5
Online Catalogue (OPAC)	27	27.8	55	56.7	15	15.5

Respondents were asked whether they had attended any training course/tutorial/guide on how to use electronic resources. The study revealed that 37 (33.0%) respondents had taken training regarding access of electronic resources, while 75, (67.0%) had not receive any training regarding the use of electronic resources. Despite this reason, Figure 4-12 shows that 59 (59.0%) of respondents preferred face-to-face instruction, 58 (58.0%) peer teaching by colleagues, while 34 (34.0%) indicated that they preferred library training/workshop.
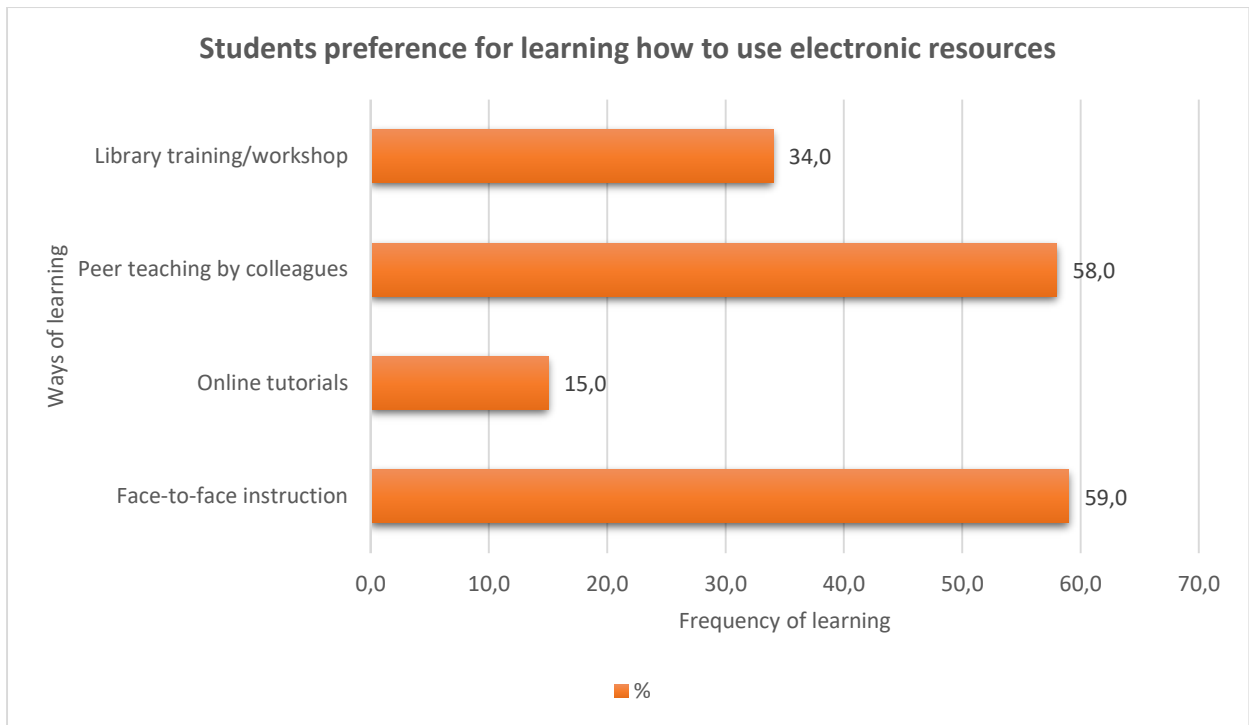
Figure 4-12: Students preference for learning how to use electronic resources

The respondents were asked to indicate the type (s) of instruction they received on how to use electronic resources. Figure 4-13 indicated that 62 (69.7%) respondents revealed that they received informal training from other students or colleagues, 35 (39.3%) by a librarian in a classroom regarding use of electronic resources, 20 (22.2%) received one-on-one instruction with the librarian at a reference desk. It is also evident from Figure 4.13 that 4 (4.5%) respondents received instruction online.
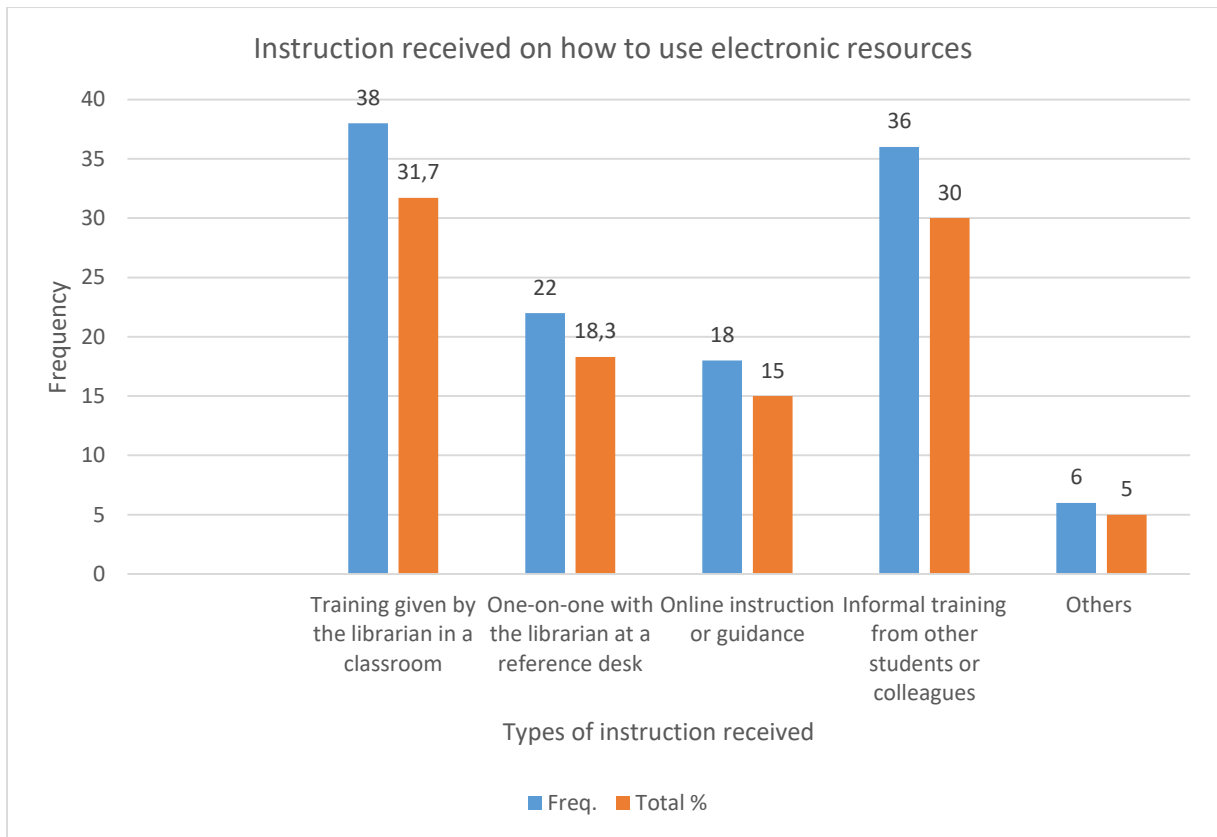
Figure 4-13: Type (s) of instruction received on how to use electronic resources

Figure 4-14 presents the different suggestions raised by the respondents on the improvements to electronic resources utilization in BUAN library. Some of the suggestions raised included: increase number of computers in the library 14 (58.3%), repair computers and improve internet access 6 (25%), avail printer 4 (16.7%) and training on how to use electronic resources by electronic resource librarian.
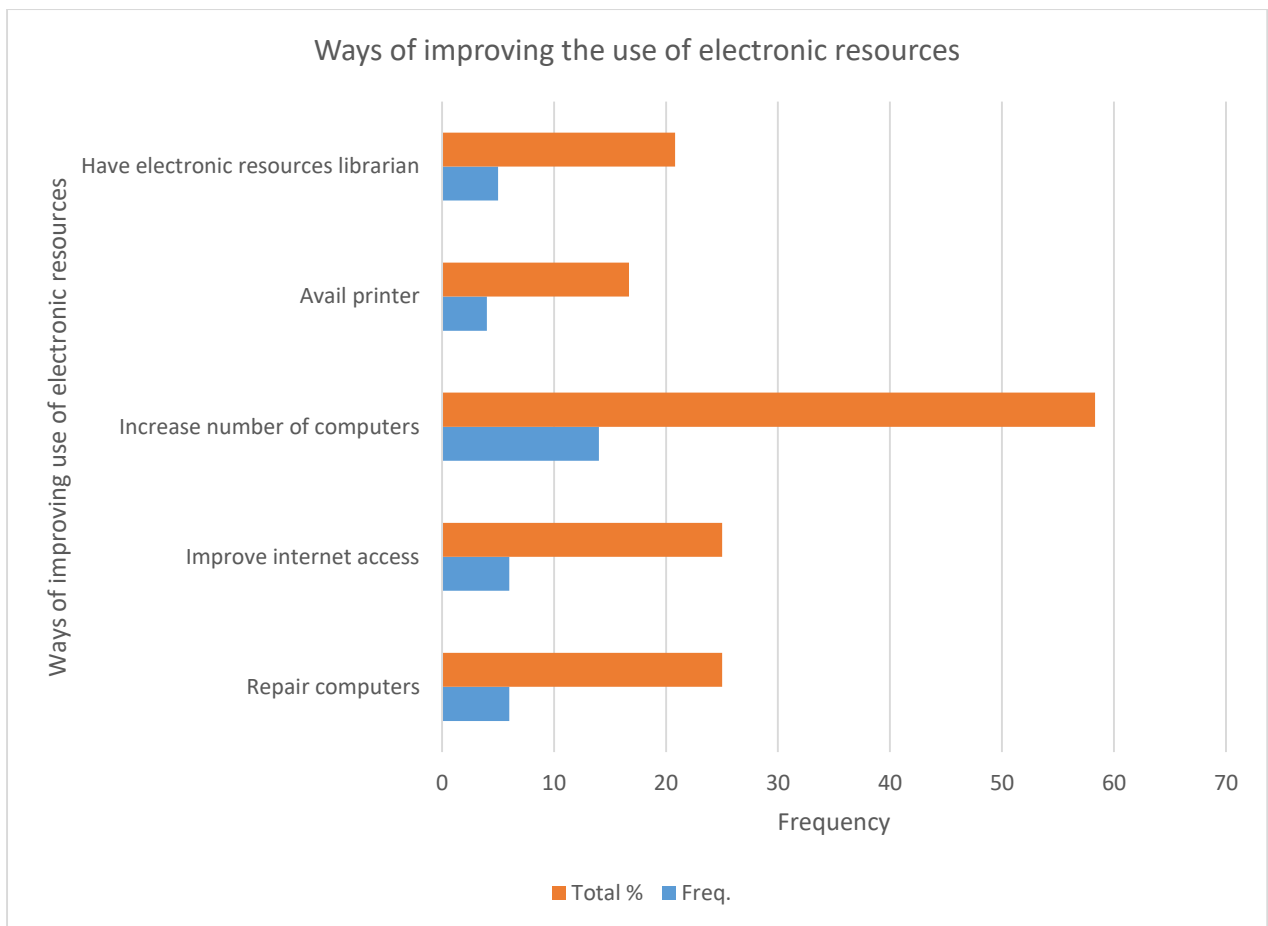
Figure 4-14: Ways of improving the use of electronic resources among undergraduate students

The results of the study revealed that undergraduates who used electronic resources were somewhat well aware of these resources provided by the university library. Students preferred to ask a friend and librarian for help to acquaint themselves with the use of electronic resources. In this study, students have shown to have good searching ability while having average computer literacy skills. The majority of students indicated that they did not receive any training regarding use of electronic resources. Despite not having any training, undergraduates indicated that they preferred face-to-face instruction and training given in classroom by the librarian. Respondents indicated their dissatisfaction with most of the electronic resources, especially to which the ones the college library subscribes.

4.4 Chapter Summary

Out of one hundred and forty-five (145) questionnaires, 137 were returned with a response rate of 94.5% and were used for data analysis. From one hundred and thirty-seven (137) undergraduate students, 47.4% were males and 52.6% were females; while the age bracket of 20 - 30 years was the majority age span of the student population in the college. It is increasingly an important function of academic libraries today to provide information in electronic formats. Findings revealed that some of the respondents indicated that they used electronic resources in the library; while some did not use them. This is an indication that some students did not use electronic resources. This calls for another enquiry to find out what other alternatives students use in completing their academic work.

The study revealed that the use of electronic resources was very common among undergraduate students. Furthermore, a majority of the students were dependent on electronic resources to obtain the desired and relevant information. However, practical use of electronic resources was not up-to the worth in comparison to investments made in acquiring these resources, electronic infrastructure and training programs should also be revised. It was observed that the availability of electronic resources in the college library was almost sufficient for all of the existing disciplines. The infrastructure to use these resources was not adequate and may hinder the ability to meet the requirements of users. Respondents identified lack of knowledge about electronic resources as the main reason for non-use of these resources.

CHAPTER 5

DISCUSSION OF FINDINGS

5.1 Introduction

This chapter discusses the findings of the questionnaire survey of undergraduate students at BUAN library as presented in the previous chapter. When discussing the results, the research questions were looked at again together with the previous studies which were mentioned in the literature review of this study. While the findings relating to the undergraduate students use of electronic resources were presented separately in Chapter four, they will be discussed together in this chapter. This was to help assess whether four variables in question being information quality, service quality, system quality and student individual characteristics influence the use of electronic resources among BUAN undergraduate students. It was imperative to interpret the information from the results to ensure that the research questions of this study were answered. The four variables mentioned above will provide the basis for the discussion.

5.2 Information Quality

The electronic resources like CD-ROM, databases, online journals, online books, OPAC and internet are slowly replacing the importance and usage of print media. It is imperative that one should be familiar with the use and exploration of electronic resources for their quick and effective usage for promotion of academic excellence and research (Bhatia, 2011). Information quality is an important factor for the adoption of services (Zaied, 2012). The selected information quality elements in this study were accuracy, availability, reliability and relevance. These elements were used to determine whether information quality affect the use of electronic resources by BUAN undergraduate students.

There are plenty of electronic resources available in the library in different types and forms, the respondents preferred to some specific types of these resources. The study sought to identify the availability of those types of electronic resources. It was revealed in this study that undergraduate students frequently use Institutional Repository 52 (38.8%) and FAO Publications 46 (33.6%) while Ebrary 129 (96.3%), SA Publications 125 (94.0%), ProQuest Central (93.3%) were the least consulted electronic resources. The findings imply that

respondents used few electronic resources provided by the university library though the listed resources do receive patronage; the utilization rate is still low. This indicates that lack of awareness and computer literacy skills were the major reason behind less access of electronic resources. This finding concurs with Adeniran (2013) results on the use of electronic information resources by undergraduate students, where lack of awareness of the availability of resources and limited search kills were the main factors reducing the effective use of scholarly electronic journals.

When looking at the usage pattern of electronic resources available, results from undergraduate students indicated that they used electronic resources available in the library several times per week 26 (26.3%), 23 (23.2%) several times a month while 20 (20.2%) mentioned daily. If use of electronic resources daily and several times per week are pooled together to represent frequent used, below half of respondents 46 (43.4%) were undergraduate students using electronic resources. However, considering the importance of electronic resources to students (43.4%) of those using electronic resources frequently was low. In addition, respondents were asked when was the last time they used electronic resources in the library, 42 (42.4%), respondents said yesterday.

Given the above, one may have expected that frequency of use and extent of utilization of electronic resources in present study will level up with the level of awareness reported. In a study by Akinola *et al*., (2018) and Bankole *et al*., (2016) postgraduate used electronic resources occasionally. The study found out that undergraduate students had access to library electronic resources even though there was low frequency of usage.

The study opted to find out the purpose of using electronic resources. It was revealed that students used electronic resources to gather information on specific topics 77 (77.8%) and complete assignments 73 (73.7%) because these resources were applicable to their subject areas. This finding corroborates the result by Bankole *et al*., (2016), they found that 72.4% were using electronic information resources to complete assignments and 60.6% were using them to obtain course related information or study materials. Students' use of electronic resources mainly for assignments has been pointed out by previous authors (Shetty *et al*., 2015; Owolabi *et al*., 2016). Adeniran (2013) complimented these results and found that students used electronic resources for research, assignments, and to obtain up-to date information.

The BUAN students preferred to use electronic resources because they obtain up-to-date information 55 (56.7%) and 43 (44.3%) considered electronic resources because they are freely

available. This implied that undergraduate students relied on electronic resources and they are relevant to their academic work. This study was in contrast with Habiba and Chowdhury (2012) study where 56.0% used electronic resources for up-to-date information. Undergraduate students of BUAN opined that electronic resources are accurate, reliable and accurate to their academic activities. It was derived from this study that 84 (84.8%) of respondents indicated that electronic resources provided sufficient information to accomplish their tasks and provide information that is helpful to academic success, 54 (55.1%) provide accurate information provide information and other respondents indicated that electronic resources provide up-to-date information 53 (54.1%). In this study undergraduate students used electronic resources to accomplish their academic activities due to the provision of sufficient information. They considered the resources very helpful to their academic success. Elavazhagand and Udayakumar (2013) concluded that electronic resources influenced student's academic performance.

Moreover, respondents, 40 (40.4%) revealed that electronic resources were quite useful to accomplishing their tasks. A study by Ananda *et al*., (2017), around 69.13% students opined that electronic information resources are very useful for academic activities. Also in a study by Bankole *et al*., (2015) respondents rated electronic resources very good to their academic activities. However, the students who had not utilized electronic resources, they indicated that they would use these resources to access wider range of information 95 (80.5%), 88 (74.6%) access up-to-date information and 68 (57.6%) provide fast access to information. This implies that undergraduate perceived electronic resources to be important to achieve their academic efficiency. The findings of this study was complimented by Das and Sahu (2014) who concluded that research scholars used electronic resources to get relevant information, search up-to-date knowledge, quick access and database search.

Respondents were asked to rate the overall importance of BUAN library electronic resources with regard to their academic work, 52 (51.5%) of respondents indicated that electronic resources were good for their academic work. This study is consistent with literature that 69.13% students opined that electronic resources are every useful for academic activities (Elavazhagand and Udayakumar, 2013).

It was revealed in this study that information quality influences the use of electronic resources among BUAN undergraduate students. Students rely on electronic resources to retrieve desired and relevant information to achieve their academic efficiency. This result is expected

considering the fact that electronic resources enables one to gain access to more information that is current, up-to-date, easily and timely accessed. When considering the conceptual framework adopted for this study, the results indicated that information quality had a strong significant influence on students' academic performances.

5.3 System Quality

Measures of system quality typically focused on performance characteristics of the system under study. Some researchers explored resource utilization and investment utilization, reliability, response time, aggregation of details, human factors, and system trust and accuracy (Zaied, 2012). In this study, to examine whether system quality influenced the use of electronic resources among BUAN undergraduate students, the selected elements were reliability, usability, accessibility and flexibility of the system under study.

The study found that 91 (91.9%) of respondents' access electronic resources from library computers and 58 (58.6%) use their personal computers. This implies that electronic resources are easily accessed. In a study by Bankole *et al*., (2015), students used their laptops to access electronic resources followed by the use of desktop computers. This study revealed that the system under study was flexible, as students were able to access electronic resources in other places such from a computer at home (22; 53.7%) as opposed to visiting the university library. The results were in collaboration with the findings of Velmurugan (2013) who found that students made use of the computer lab and internet cafés to gain access to electronic resources.

It was found from this study that students prefer to use electronic resources because they save time 65 (74.7%). In addition, 65 (65.7%) have indicated that what they find from electronic resources is what they need to accomplish their academic activities. The results imply that undergraduate students prefer and rely on electronic resources for their academic activities. This result concurs with Dolo-Ndlwana (2013) who found that respondents choose electronic resources on account of ease of access, they save time and valued the fact that there is no need to go to the library because they can access electronic resources at home or from their offices.

However, students have highlighted 72 (72.7%) lack of a printer limits the use of electronic resources, 65 (67.7%) indicated that electronic resources are not easy to use, 65 (66.3%) of respondents highlighted that electronic resources are not easy to access and 55 (55.6%) have revealed that bandwidth is not adequate to access electronic resources. It was revealed in this study that electronic resources are unusable; there was no adequate bandwidth to access

electronic resources. The study also indicated that the number of computers in the library should be increased 14 (58.3%), repair available computers and improve internet connectivity. In a study by Umar (2015) it was found that insufficient computer and slow internet connectivity were the challenges faced when using electronic information resources by undergraduate students of library science on access of electronic information resources in Ahmadu Bello University libraries.

5.4 Service Quality

Service quality is a measure of how well the service level delivered matches customer expectations (Zaied, 2012). In this study, students were asked to indicate elements of service quality such as availability, reliability, technical competence and empathy of the library personnel to ascertain whether these elements affected use of electronic resources among undergraduate students. Library service quality has a positive impact on teaching, learning and research among information professionals (Shah, 2013).

A variety of electronic resources are available on the BUAN Library webpage and students need to be trained on how to access these electronic resources optimally. In keeping with the mission of the library, BUAN Library staff provides training to library users to ensure that they can conduct their research using the various electronic resources both efficiently and effectively. It was thus considered important to establish whether respondents were making use of the training offered by the library and for those who were, whether it was satisfactory or not.

However, 62 (62.0%) respondents indicated that training provided by the library on how to use electronic resources was not enough. The reasons for the low usage of some electronic resources could be attributed to the lack of training on how to utilize them. This was also noted by Nemati-Anaraki and Babalhavaeji (2013) in their study which investigated the awareness and ability of medical students in using electronic resources of the integrated digital library portal of Iran. These researchers found that users faced obstacles when using electronic resources due to insufficient information on these electronic resources and the lack of training. Onifade *et al*., (2013) also found that, lack of library orientation hindered the awareness and use of these resources.

In this study, respondents indicated that they had average computer literacy skills, and 75 (67.0%) of the respondents had not taken training regarding access of electronic resources. Irrespective of not taking training, 62 (69.7%) respondents revealed that they received informal

training from other students or colleagues. However, computer literacy skills greatly influenced use of electronic resources (Emwanta and Nwalo, 2013). This implies that training should be provided to undergraduate students on how to acquire the skills of accessing electronic resources. Despite not having any training, 59 (59.0%) undergraduates indicated that they preferred face-to-face instruction and 58 (58.0%) peer teaching by colleagues, to compliment these results

The study revealed that 56 (56.6%) respondents revealed that librarians are always willing to help students in accessing electronic resources and 52 (52.5%) respondents indicated that the library personnel were very helpful, and assisted them when having difficulties in accessing and using electronic resources. The study also revealed that the librarian always informed students about the availability of these resources. This study compliments that by Adam (2017) wherein 48.8% of respondents indicated that the library staff are approachable and are always ready to answer their questions. The library provides user education or orientation exercises that enable them make effective use of library resources and services. On training, results showed that lack of training in using electronic resources can hinder library users from using available electronic resources. Nemati-Anaraki and Babalhavaeji (2013) opined that academic libraries should organise orientation classes and training programs in accessing, searching and downloading of electronic resources. Training is necessary to bridge the gap in using electronic resources in academic libraries.

The respondents indicated that the library personnel were willing to help them when they had difficulties in accessing and using electronic resources. They also indicated that they are always informed about the availability of these resources. However, the respondents indicated that training provided by the library regarding the use of electronic resources was not enough. Furthermore, there was a lack of supporting equipment like printer limits in the use of electronic resources. Therefore, service quality had a positive impact on the use of electronic resources.

5.5 Student Individual Characteristics

Individual characteristics involved the importance and personal relevance that users attached to regarding use of electronic resources (Zaied, 2012). In this study, elements used to measure students' individual characteristics were attitude, awareness, computer literacy skills and satisfaction with the available electronic resources. It was found that these elements influenced the use of electronic resources among BUAN students.

Msagati (2014) concluded that awareness of electronic resources plays an important role in influencing the use of electronic resources and also added further that awareness for these resources was an indication of greater use of the resources. As noted in the literature review, levels of awareness differ considerably across different schools, colleges and academic libraries across the globe. However, due to the fact that no studies have previously been conducted at BUAN it was important to investigate the awareness and use of electronic resources among undergraduate students. This research question therefore captures the main purpose of the study.

The results revealed that some of undergraduate students did not utilize electronic resources. It was observed that some of their main reasons for not using electronic resources included lack of awareness 68 (55.7%) and 56 (45.9%) highlighted that they did not know how to use them. However, despite these reasons, the majority of the non-users 98 (88.3%) indicated that they were interested in using these resources if the obstacles are removed. The findings substantiate the results of Igbo and Imo (2014) who examined the use of electronic resources sharing and networking among university libraries in Nigeria and found out that a major challenge of non-use of electronic resources was due to lack of awareness.

However, the results of the study revealed that 62 (56.4%) of the respondents were well aware of electronic resources in the library and 29 respondents who constitute 26.4% indicated that they were unaware of electronic resources in the Library. These findings corroborated with the results of Yebowaah and Plockey (2017) study which showed that 52 (65%) of respondents were aware of electronic resources in the library and 28 (35%) were not aware of electronic resources. A study by Gond *et al*., (2019) showed that 88 (76%) were aware with electronic resources and 28 (24%) users were not aware about electronic resources available in BBAU Central Library. This result also complimented the findings of Khan and Khursheed (2013) who identified that most of the scientists of CSIR-CDRI were aware of the availability of digital resources and frequently used them for their research work and paper writing and improvement of quality of research work.

Further analysis of the survey data revealed the sources of awareness of electronic resources in the library. Undergraduate students got aware of the existence of the electronic resources through; Library website 59 (66.3%) and from friends and colleagues 49 (55.1%). This study was in contrary with the study by Akinola *et al*., (2018) where most of the respondents became aware of electronic databases by surfing the internet 51.1% and a sizeable number of

postgraduate students 47.3% were made aware of electronic databases through there course colleagues and friends.

When using electronic resources, an array of skills are required form undergraduate students to access electronic resources effectively. In this regard, it was important to establish whether or not respondents had sufficient skills to access electronic resources. The survey revealed that 79 (76.0%) had good searching abilities. Despite having good searching abilities, the respondents indicated having average computer literacy skills. The findings implied that there was a gap in computer literacy skills among undergraduate which could influence or cause the ineffective and inefficient usage of electronic resources. However, computer literacy skills greatly influenced use of electronic resources (Emwanta and Nwalo, 2013). This implies that more training should be provide to undergraduate students on how to acquire the skills of accessing electronic resources.

According to Mbabu *et al*., (2013) students learn about library electronic resources through a variety of sources, for example, through professors and teaching assistants, library-user classes, librarians, friends and even looking it up by themselves. Respondents were asked to mention their sources of knowledge about the electronic resources. In this study, respondents acquainted themselves with the availability and use of electronic resources through the help of a friend 60 (65.2%) and 52 (56.5%) by asking a librarian. Mbabu *et al*., (2013) revealed that the majority of students indicated library staff 120 (77.2%) as their primary sources of awareness and knowledge about the availability of electronic resources, followed by lectures 84 (54.5%). Kwadzo (2015) and Ahmed and Al-Reyaee, (2017) mentioned library staff and lectures as sources of awareness for the availability of electronic resources. In another study by Soni *et al*., (2018), they indicated that 9 (41 %) of students mentioned they got aware of electronic resources through mail from library staff. Past research has indicated that lecturers have greater influence over the students and should spearhead the awareness creation and recommendation of use of electronic resources and with greater librarian collaboration (Ahmed and Al-Reyaee, 2017).

To assess the acceptance and satisfaction level of these electronic resources by students they were asked to indicate how suitable the databases were to them, how satisfied they were with the electronic resources. Respondents have shown that they are satisfied with free e-journals (50.5%), Institutional repository (50.0%) and FAO Publications (49.0%) while some respondents were dissatisfied with A-to-Z e-journals, CABI Abstracts, Online Catalogue

(OPAC) 17 (17.5%), 15 (15.6%), and 15 (15.5%) in that order. This implies that there was lack of awareness and training on the use of electronic resources or they may be having difficulties in accessing the resources. In a study by Das and Sahu (2014) they showed that research scholars were not satisfied with the Digital library, Web-OPAC, networked based information and CD-ROM services and other scholars were partially satisfied with CD-ROM Database, E-Books, E-Journals and Online databases

The study revealed that some of undergraduate students did not utilized electronic resources because they lacked awareness of these resources. For those undergraduate students who were aware of electronic resources got aware through library website and from friends and colleagues. Computer literacy skills greatly influenced use of electronic resources. Undergraduate students indicated that they were not satisfied with most of the electronic resources offered in the BUAN library. Therefore, the result suggests that student individual characteristics have a positive influence on the use of electronic resources to improve their academic efficiency.

5.6 Chapter Summary

It is increasingly an important function of academic libraries today to provide information in electronic formats. Findings revealed that some of the respondents indicated that they used electronic resources in the library; while some did not use them. This is an indication that some students did not use electronic resources. This calls for another enquiry to find out what other alternatives students use in completing their academic work.

The study revealed that the use of electronic resources was very common among undergraduate students. Furthermore, a majority of the students were dependent on electronic resources to obtain the desired and relevant information. However, practical use of electronic resources was not up-to the worth in comparison to investments made in acquiring these resources, electronic infrastructure and training programs should also be revised. It was observed that the availability of electronic resources in the college library was almost sufficient for all of the existing disciplines. The infrastructure to use these resources was not adequate and may hinder the ability to meet the requirements of users. Respondents identified lack of knowledge about electronic resources as the main reason for non-use of these resources.

CHAPTER 6

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This chapter presents summary of the study, conclusions and recommendations based on the findings discussed in the previous chapter. The first section of the chapter will summarise the study then draw conclusions and make recommendations that will serve as a guideline to assist the university library to improve the utilization of electronic resources the university is subscribing for.

6.2 Summary of the study

The study was undertaken to assess the use of electronic resources among Botswana University of Agriculture and Natural Resources (BUAN) undergraduate students by determining whether information quality, system quality, service quality and student individual characteristics affect the use of electronic resources. Five research questions were raised based on the above stated variables and a descriptive survey method was adopted for this study. In addition, provide appropriate recommendation regarding the use of electronic resources because a huge amount is invested by the library for the subscription of these electronic resources.

A stratified random sampling was used to select one hundred and forty-five (145) level 300 and 400 library registered undergraduate students from five (5) university academic departments. Data collection was conducted by use of document reviews and questionnaires. One hundred and thirty-seven (137) dully filled questionnaires were retrieved and used for data analysis using a Statistical Package for Social Sciences (SPSS 24.0) where descriptive statistics and frequency tables were produced. Academic libraries are committed to provide access to electronic resources, to support the teaching, learning and research of the institution, through innovative services as well as excellent facilities and resources as expressed in their mission statements. Library users are no longer obliged to visit the library at regular open hours to meet all their information needs as they may use electronic resources at their own time and their spaces.

The objectives of the study were achieved since it was established that undergraduate students of BUAN used and valued electronic resources. The aim was to consider the various factors of electronic resources such as information quality, system quality, service quality and student individual characteristics and to make recommendations for the improvement of library services. It was found that the study has succeeded in answering its research questions as reflected in the results presented in chapter four and discussed in chapter five. This study showed that using the various electronic resources was very common among undergraduates of BUAN.

6.2.1 Information Quality

The selected information quality elements in this study were accuracy, availability, reliability and relevance. These elements were used to determine whether information quality affect the use of electronic resources by BUAN undergraduate students. It further revealed that respondents from the study were aware of electronic resources available in the university library. However, there were other were some respondents that did not make use of electronic resources due to lack of knowledge about the available resources and insufficient training on their use. However, despite these reasons, most of the non-users have indicated that they were interested in using these resources.

For this study, it could be inferred that the listed resources do receive patronage but the utilization rate was low. The study found out that undergraduate students had access to library electronic resources even though there was low frequency of usage. Undergraduate students relied on electronic resources and they were relevant to their academic work. They considered the resources very helpful to their academic success. This non regular use of these resources indicates that the undergraduate students lack the necessary skills needed for the optimal utilization of this resources or might also have negative attitudes towards the use of the resources.

The study further showed that undergraduate students made use of electronic resources for various purposes and these included gathering information on specific topics and complete assignments because these resources were applicable to their subject areas. This study also revealed that the undergraduate students prefer to use electronic resources because they provide up to date information than any other features of electronic resources. However, the most common reason was to retrieve information for academic purposes. They considered the resources very helpful to their academic success.

It was revealed in this study that information quality affected the use of electronic resources among BUAN undergraduate students. They depended on electronic resources to retrieve desired and relevant information to achieve their academic efficiency. When considering the conceptual framework adopted for this study, the results indicated that information quality had a strong significant influence on students' academic performances. In this study, it was found that system quality influenced the use of electronic resources among BUAN undergraduate students, the selected elements were reliability, usability, accessibility and flexibility of the system under study.

6.2.2 System Quality

The study has revealed that the system under study was flexible, as students were able to access electronic resources from library computers, their personal computers and other places such as a computer at home as opposed of visiting the university library. It was found from this study that students find what they need from electronic resources to accomplish their academic activities. However, students have highlighted lack of supporting equipment's like a printer limits their use of electronic resources. It was revealed in this study that electronic resources are not easy to use, they are not easy to access and the bandwidth is no adequate to access electronic resources. The study has identified that electronic resources played a crucial role in academic activities among students. Therefore, this study revealed that reliability, usability, accessibility and flexibility of the system influenced use of electronic resources among BUAN undergraduate students.

6.2.3 Service Quality

Undergraduate students were asked to indicate elements of service quality such as availability, reliability, technical competence and empathy of the library personnel to ascertain whether these elements affected use of electronic resources among undergraduate students. Library service quality has a positive impact on teaching, learning and research among information professionals. Therefore, in this study, students have indicated that the library personnel were very helpful, and assisted them when having difficulties in accessing and using electronic resources. The study also revealed that the librarian always informed students about the availability of these resources. However, the respondents indicated that training provided by the library regarding the use of electronic resources was not enough. The students preferred to

as a friend and librarian for help to acquaint themselves with the availability and use of electronic resources.

6.2.4 Students Individual Characteristics

In this study, elements used to measure students' individual characteristics were attitude, awareness, computer literacy skills and satisfaction with the available electronic resources. It was found that these elements influenced the use of electronic resources among BUAN students. In this study, students have shown to have good searching ability while having average computer literacy skills. However, students have indicated that they did not receive enough training regarding use of electronic resources. Despite not having enough training, undergraduates indicated that they preferred face-to-face instruction and peer teaching by colleagues. The results have revealed that undergraduates' students used electronic resources because they were aware of the availability of these resources provided by the university library to get desired and relevant information for their academic work. In this study, students preferred to ask a friend and librarian for help to acquaint themselves with the availability and use of electronic resources.

Electronic resources have a crucial role in the information retrieval process. Electronic resources have rapidly changed the way of seeking and disseminating information. It was clear that from this study that use, information quality, system quality, service quality and student individual characteristics of electronic resources is important to undergraduates of BUAN. This study should help librarians to understand the importance of electronic resources in the academic environment. The use and value of electronic resources were highly regarded among undergraduates and they demonstrated the positive impact of the electronic resources in teaching, learning and research work.

6.3 Conclusion

The conclusion is drawn from the findings of the study with reference to the research questions as outlined in chapter one. This study has succeeded in answering its research questions, as reflected in this chapter. In conclusion therefore, this study found that the library electronic resources are used extensively among undergraduates at BUAN. Electronic resources played an integral part in assisting learning, teaching and research activities. The study has discovered that the use of electronic resources was very common among undergraduates in the university,

as they are dependent on these resources to retrieve desired and relevant information. However, proper infrastructure and training programs were needed to fully utilize these resources.

It further found that undergraduates preferred to use electronic resources for their capability to provide sufficient information to accomplish their academic work. They also used electronic resources to gather information on specific topics and complete assignments. In addition, students revealed that access to a wide range of information and up-to-date information was perceived as benefits of using electronic resources. This implied that students relied on electronic resources to accomplish their academic work. The study also established that undergraduate students encountered a few problems in their use of electronic resources mentioning lack of awareness, lack of computer skills, difficulty in navigating electronic resources on the website and insufficient training as the main problem.

6.4 Implication of the findings

From the literature review, it is evident that studies on the use of electronic resources by undergraduate's students are many. This study aims to assess the use of electronic resources among BUAN undergraduate students. The literatures reviewed covered studies carried out on universities from developing and developed countries within the context of electronic resources use. IS Success model and TAM was used to underpin the study; this was used to assess the reasons to the use of electronic resources among undergraduate students.

6.4.1 Implication of the study for practice

The findings of this research indicate that despite efforts by the university to avail electronic resources, there is low utilization. The major attributor according to data analysis is the lack of awareness and lack of computer literacy skills. Electronic sources are becoming a daily basic need for undergraduate students to accomplish their academic efficiency. In order to increase the awareness of electronic resources the BUAN library should list in print the electronic resources that are available at BUAN as part of the first year student's orientation package. The library can publicize their services by including brochure about library services in the orientation packets or course materials that each student receives before beginning their studies. Moreover, the BUAN library should work with the IT department to have alerts on the student portal that pops up when they log onto their portals. The pop- ups should provide information about electronic resources available on the university library website. In addition, the BUAN

library webpage should provide an online guide to electronic resources and various search options to electronic resources as proposed by (Anaraki and Babalhavaeji, 2013).

6.4.2 Implication of study for theory

In an attempt to better understand the underlying drivers of student use of electronic resources, this study incorporated constructs (information quality, system quality, service quality and student individual characteristics) to improve TAM's predictive capabilities. The IS Success Model variables are not present in TAM, but were shown to be important determinants of undergraduates' intention towards the use of electronic resources in this study. Moreover, perceived ease of use (PEOU) and perceived usefulness (PU) were found to be key factors which influenced the undergraduate's behavioural intentions to use electronic resources.

6.4.3 Implication of the study for profession

BUAN Library staff provides training to library users to ensure that they can conduct their research using the various electronic resources both efficiently and effectively. Respondents indicated that training provided by the library on how to use electronic resources was not enough. This is an indication that training should be provided to undergraduate students on how to acquire the skills of accessing electronic resources. The library provides user education or orientation exercises that enable them make effective use of library resources and services. Training is necessary to bridge the gap in using electronic resources in academic libraries.

The effective use of electronic resources lies on computer literacy skills training of students. This study found that most of those competency requirements were lacking in undergraduate students, hence the problem of low usage of electronic resources. In the absence of skills development many undergraduates at BUAN library were unable to effectively use electronic resources. Therefore, undergraduates assumed a passive role in using electronic resources and relied on peers and library staff for help.

6.4.4 Summary of the implications

In order to increase the awareness of electronic resources the BUAN library should list in print the electronic resources that are available at BUAN as part of the first year student's orientation package. The IS Success Model variables are not present in TAM, but were shown to be important determinants of undergraduates intention towards the use of electronic resources in

this study. Respondents indicated that training provided by the library on how to use electronic resources was not enough. This implies that training should be provided to undergraduate students on how to acquire the skills of accessing electronic resources. Training is necessary to bridge the gap in using electronic resources in academic libraries. This study found that most of those competency requirements were lacking in undergraduate students, hence the problem of low usage of electronic resources.

6.5 Contribution of the study

Evidently, apart from this current study which sought to assess the use of electronic resources by undergraduate students of BUAN, there has been no other research conducted in the same institution. This study therefore, being the first of its kind to be conducted, aimed to assess the use of electronic resources as a valuable tool for learning by undergraduate students. Overall, the study has provided insight and deeper understanding of the level of use of electronic resources at BUAN. The study contributes towards an understanding of the critical factors that promote the use of electronic resources by undergraduate students in a developing country context such as Botswana. Moreover, the study adds to the significant body of work that considers the relationship between PEOU and PU. The findings of the study have meaningful implications for policymakers as well as librarians who have the responsibility to ensure library users make use of electronic resources to get value for money invested in electronic resources and to enhance their academic performances. This study on the BUAN Library was of great importance as it will give the Library an insight on the use of electronic resources by learners and help shape investment and policy decisions in this area. Furthermore, the findings will help the Library to re-focus and re-engineer its services to better suit the needs of the distance learners. These findings would help the main campus as well as the centres to build systems that are user friendly, and would make the students meet their information needs.

6.6 Recommendations

The findings of this research indicate that despite efforts by the university to avail electronic resources, there is low utilization. The major attributor according to data analysis is the lack of awareness, lack of computer literacy skills and limited ICT infrastructure. Based on the major findings and conclusion of this study, the following recommendations are made towards effective use of electronic resources at BUAN library.

6.6.1 Recommendations for short term

The study found that most of the undergraduate students who participated in this study had average computer skills required to make full use of electronic resources. It is therefore recommended that: a computing skills fundamentals course offered by the Department of Basic Sciences (BS) incorporate use of electronic resources in the curriculum to provide students with the requisite skills for electronic use. This will create opportunities for students to acquire these skills and give them the experience upon which the decision to use electronic resources will then be based on.

The library should put in place support and outreach program such as awareness campaigns and training sessions to showcase the library electronic resources. The use of e-mail alert system, text messages and prizes for those who use a lot of electronic resources should be considered by the university library as methods of promotion. Phone short message services should be integrated into library electronic resources services provision for awareness services for electronic resources. These will go a long way to influence clients to use the available electronic resources. However, librarians should ensure that all the electronic resources are readily and easily accessible. It was revealed in this study that most of the undergraduates who use electronic resources were aware of these resources. However, those undergraduate students who had not used these resources mentioned lack of knowledge about the availability of electronic resources as the main reason for not utilising the resources provided by the BUAN library.

6.6.2 Recommendations for long term

The university library is fairly well-equipped with electronic resources. It is therefore the responsibilities of the library managements to create avenues that will prompt the maximum and effective use of these resources. Library management provide academic library staff with in-service training to capacitate them to provide better support on the use electronic resources to library users.

Low bandwidth was hindrance to electronic resources utilization as cited by undergraduate students. The university should ensure that they subscribe to appropriate bandwidth packages which are in commensurate with the number of students enrolled at the institution. The students have indicated that the library should increase the number of computers, repair computers and

improve internet access. In addition, there is a need to provide supporting equipment's like printers to improve the use of electronic resources.

6.7 Areas for further Research

The current study mainly focused on level 300 and 400 undergraduate students of BUAN. It is therefore suggested that similar research be conducted on other groups of patrons of the library such as other levels of undergraduate students, postgraduate students, academic staff and most importantly the top university management staff as they are the decision makers of the university. This will help in establishing the general trend on the examined variables to improve use of electronic resources in the university.

This present study examined whether information quality, system quality, service quality and student individual characteristics are determinants to use of electronic resources among BUAN undergraduate students. Further research could be conducted to determine whether age, gender, programme of study and computer usage behaviour influence the use of electronic resources. Another future study can concentrate on determining whether undergraduate students who had positive perception were the same students who had prior experience on how to use electronic resources.

The same study can be done with the use of qualitative approaches to gain much deeper understanding of using electronic resources by undergraduate students. Another future study should assess the BUAN library staff level of information and computer literacy and their perceptions on the changing roles brought about by the availability of electronic resources. This will assist the library management to identify the areas in which staff need to be trained and help library patrons to acquire necessary skills to access and use electronic resources.

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APPENDICES

Appendix 1: Statistical Table for Sample Size

Sample size for ±3%, ±5%, ±7% and ±10% Precision Levels Where Confidence Level is 95% and P=.5.

Size of	Sample Size (n) for Precision (e) of:			
Population	±3%	±5%	±7%	±10%
500	A	222	145	83
600	A	240	152	86
700	A	255	158	88
800	A	267	163	89
900	A	277	166	90
1,000	A	286	169	91
2,000	714	333	185	95
3,000	811	353	191	97
4,000	870	364	194	98
5,000	909	370	196	98
6,000	938	375	197	98
7,000	959	378	198	99
8,000	976	381	199	99
9,000	989	383	200	99
10,000	1,000	385	200	99
15,000	1,034	390	201	99
20,000	1,053	392	204	100
25,000	1,064	394	204	100
50,000	1,087	397	204	100
100,000	1,099	398	204	100
>100,000	1,111	400	204	100

a = Assumption of normal population is poor (Yamane, 1967). The entire population should be sampled.

Source: http://www.PEOD6-PD006 Determining Sample Size.htm

Appendix 2: Consent Form

To Respondents

You are invited to participate in a research study titled "*AN ASSESSMENT OF STUDENTS USE OF ELECTRONIC LIBRARY RESOURCES: A CASE STUDY OF BOTSWANA UNIVERSITY OF AGRICULTURE AND NATURAL RESOURCES (BUAN)*" which is conducted by KABELO BAELETSI. The purpose of this study is to assess the use of electronic resources among BUAN undergraduate students.

In this study, you will be asked to complete a questionnaire and your participation is voluntary; you are free to withdraw your participation from this study at any time. The survey should take only 10 - 15 minutes to complete.

This survey has been approved by the *DEPARTMENT OF LIBRARY AND INFORMATION STUDIES at UNIVERSITY OF BOTSWANA*. There are no risks associated with participating in this study. You are assured of complete confidentiality. The survey collects no identifying information of any respondent; therefore, all of the response in the survey will be recorded anonymous.

If you have any questions regarding the survey or this research project in general, please contact *KABELO BAELETSI* at kbaeletsi@yahoo.com or 71501942. By completing this survey, you are indicating your consent to participate in the study. Your participation will be highly appreciated.

_____   _____

Participant signature   Date

_____   _____

Researcher Signature   Date

Appendix 3: Research Instrument – Questionnaire

SECTION A: BACKGROUND INFORMATION

Please answer the following questions by ticking (✓) the relevant answer or writing down your answer in the space provided.

1. What is your gender?

(1) Male   (2) Female

2. What is your age group?

(1) Under 20   (2) 20 – 30   (3) 31 – 40   (4) 41 – 50   (5) 51 – 60   (6) Above 60

3. What is your programme of study? _____

4. In which Department are you enrolled?

(1) ASP   (2) AEL   (3) AEE   (4) CSP   (5) FST

5. What is your year of study?

(1) Year 1   (2) Year 2   (3) Year 3   (4) Year 4

SECTION B: USE OF ELECTRONIC RESOURCES

Please answer the following questions by ticking (✓) the relevant answer or writing down your answer in the space provided.

6. How do you access BUAN library electronic resources? (Tick all that apply)

6.1. Library computer
6.2. Personal computer
6.3. Smart phones
6.4. Personal hand held devices

7. How often do you use electronic resources?

(1) Daily   (2) Several times per week   (3) Several times a month
(4) Once in a month   (5) Occasionally

8. When was the last time you used electronic resources in the library?

(1) Yesterday   (2) Last week   (3) Two weeks ago   (4) Last month
(5) Last six months   (6) More than six months ago

9. Apart from visiting the university library how do you access BUAN's electronic resources? (Tick all that apply)

9.1. from a computer at home
9.2. through public technology access venues (Internet Café's, Kitsong centres)
9.3. through a public library
9.4. others, please specify_____

10. Which of the following electronic resources do you frequently use? (Tick all that apply)
Note: MF: Most Frequently, F: Frequently; SF: Somewhat Frequently; R: Rarely, N: Never

Electronic Resource	MF	F	SF	R	N
10.1. EBSCOhost					
10.2. AGRICOLA					
10.3. Agric Virtual Library					
10.4. Free e-journals					
10.5. Bio One e-journals					
10.6. FAO Publications					
10.7. CABI Abstracts					
10.8. A-to-Z e-journals					
10.9. Science Direct					
10.10. Institutional Repository					
10.11. TEEAL					
10.12. Ebrary					
10.13. ProQuest Central					
10.14. SA ePublications					
10.15. Online Catalogue (OPAC)					

11. If you are not using electronic resources, please indicate the reasons for not using these services (Tick all that apply).

11.1. I do not know about them
11.2. I do not know how to use them
11.3 I do not have any interest
11.4. I do not know where to find them
11.5. I do not find them useful
11.6. Time consuming
11.7. Other, please specify_____

12. Will you use electronic resources if the above obstacles are removed?

(1) Yes   (2) No

13. What do you perceive as benefits you would derive from using these electronic resources? (Tick all that apply)

13.1. Access to wider range of information
13.2. Access to up-to-date information
13.3. Fast access to information
13.4. Others, please specify_____

SECTION C: STUDENT INDIVIDUAL CHARACTERISTICS

14. How did you learn about library electronic resources? (Tick all that apply)

14.1. Library website
14.2. posters/brochure
14.3. Course tutors
14.4. Subject librarian
14.5. Friends and colleagues
14.6. Others; _____

15. How well are you acquainted with the electronic resources in BUAN Library?

(1) Aware   (2) Somewhat well   (5) Unaware

16. When you want to acquaint yourself with how to use electronic resources, do you: (Tick all that apply)

16.1. Ask a librarian
16.2. Attend a library induction course
16.3. Attend an online workshop
16.4. Ask friends for help
16.5. Others, please specify_____

17. How would you rate your searching ability with regard to electronic resources?

(1) Excellent   (2) Very good   (3) Good   (4) Fair   (5) Poor

18. How would you rate your level of computer literacy skills?

(1) Excellent   (2) Average   (3) Basic

19. Indicate your level of satisfaction with BUAN Library electronic resources (tick all that apply)

Note: VS: Very Satisfied; FS: Fairly Satisfied; NO: No Opinion; FD: Fairly Dissatisfied; VD: Very Dissatisfied

Electronic Resource	VS	FS	NO	FD	VD
19.1. EBSCOhost					
19.2. AGRICOLA					
19.3. Agric Virtual Library					
19.4. Free e-journals					
19.5. Bio One e-journals					
19.6. FAO Publications					
19.7. CABI Abstracts					
19.8. A-to-Z e-journals					
19.9. Science Direct					

Statement					
19.10. Institutional Repository					
19.11. TEEAL					
19.12. Ebrary					
19.13. ProQuest Central					
19.14. SA ePublications					
19.15. Online Catalogue					

SECTION D: SERVICE QUALITY

20. Have you ever attended any training course/tutorial/guide on how to use electronic resources?

(1) Yes   (2) No

21. What type (s) of instruction did you receive on how to use electronic resources? (Tick all that apply)

21.1. Training given by the librarian in a classroom
21.2. One-on-one with the librarian at a reference desk
21.3. Online instruction or guidance
21.4. Informal training from other students or colleagues
21.5. Other _____

22. What is your preference for learning how to use electronic resources? (tick all that apply)

22.1. Face-to-face instruction
22.2. Online tutorials
22.3. peer teaching by colleagues
22.4. Library training/workshop
22.5. Others, please specify_____

23. Describe the role of library staff when using electronic resources. (Tick all that apply)

Note: SA: Strongly Agree; A: Agree; N: Neutral; SD: Strongly Disagree; D: Disagree

Statement	SA	A	N	SD	D
23.1. Librarians inform students about available electronic resources					
23.2. When students have difficulties in accessing electronic resources the library staff show sincere interest in helping					
23.3. Librarians are always willing to help students in accessing electronic resources					
23.4. Librarians are never busy to help students					
23.5 Training provided by the library on how to use electronic resources is enough					

SECTION E: INFORMATION QUALITY

24. What are your reasons for using electronic resources? (Tick all that apply)

24.1. Gather information on a specific topic
24.2. Gaining general information
24.3. Obtaining answers to specific questions
24.4. Completing assignments
24.5. Others, please specify_____

25. Which features of electronic resources do you consider to be the most important for the efficient conduct of searches related to your coursework assignments? (Tick all that apply)

25.1. Quickly retrieved
25.2. Freely availability
25.3. Links to other resources
25.4. Up-to-date information
25.5. Full-text searching
25.6) others, please specify_____

26. Do you agree with the following statements about electronic resources? (Tick all that apply)

Note: SA: Strongly Agree; A: Agree; N: Neutral; SD: Strongly Disagree; D: Disagree

Statement	SA	A	N	SD	D
26.1. Provide sufficient information to accomplish your task					
26.2. Provide accurate information					
26.3. Provide up-to-date information					
26.4. Provide timely information					
26.5. Provide information that is helpful to your academic success					

27. How useful are electronic resources in helping you accomplish your task

(1) Extremely useful   (2) Quite useful   (3) Useful   (4) Not sure   (5) Not useful

SECTION F: SYSTEM QUALITY

28. Why do you choose to use electronic resources? (Tick all that apply)

28.1. Ease of access
28.2. Save time
28.3. Without the physical space limitation
28.4. Abundance
28.5. Availability of search tools
28.6. Others, please specify_____

29. Do you agree with the following statements? (Tick all that apply)

Note: SA: Strongly Agree; A: Agree; N: Neutral; SD: Strongly Disagree; D: Disagree

Statement	SA	A	N	SD	D
29.1. What I find from electronic resources is not what I need					
29.2. There are too much electronic resources					
29.3. Electronic resources are not updated					
29.4. It takes too much time to find the relevant electronic resources					
29.5. Lack of supporting equipment's like a printer limits the use of electronic resources					
29.6. Electronic resources are not always accessible					
29.7. Electronic resources cover my subject area					
29.8. Electronic resources are easy to access					
29.9 Electronic resources are easy to use					
29.10. There is adequate bandwidth to access electronic resources					
29.11. Easy navigation to electronic resources from library website					

30. Please rate the overall importance of BUAN Library electronic resources to your academic work

(1) Excellent   (2) Good   (3) Acceptable   (4) Poor

31. Suggest ways on how to improve the use of electronic resources, please write below;
_____
_____
_____

32. Indicate additional electronic resources your library should subscribe to, please write below;
_____
_____
_____

THANK YOU FOR YOUR TIME AND PARTICIPATION

Appendix 4: Request letter to conduct research letter

Faculty of Humanities

Department of Library and Information Studies

Corner of Notwane and Mobuto Road, Gaborone, Botswana	Pvt Bag 00703 Gaborone, Botswana	Tel: [267] 355 2617 Fax: [267] 318 5098

UNIVERSITY of BOTSWANA

19 March 2018

TO WHOM IT MAY CONCERN

Dear Sir/Madam;

This letter serves to confirm that Mr Kabelo Baeletsi is a student in the Department of Library and Information Studies. Mr Baeletsi is currently registered for a research course and he is expected to carry out an empirical study as part of the requirements to graduate in the Masters in Library and Information Studies (MLIS) programme. His proposed study is titled, "**AN ASSESSMENT OF STUDENTS' USE OF ELECTRONIC LIBRARY RESOURCES: A CASE STUDY OF BOTSWANA UNIVERSITY OF AGRICULTURE AND NATURAL RESOURCES (BUAN)**". It is in this regard that he would like you to assist him with information that would enable him to complete the research. The student is expected to use the information he obtains from you for academic purposes only. That being the case, the project should be viewed as a purely academic exercise which will respect your company's code of information sharing and management. Besides, the anonymity of respondents will be respected in accordance with accepted ethical considerations governing research.

It is my hope that you will take a few minutes from your busy schedule to assist Mr Baeletsi with information and permissions that will allow him to complete his project. Should you have any issues you would need clarified do not hesitate to contact me using either the email and office numbers provided below.
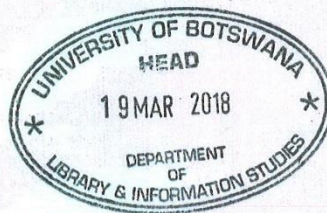
Yours sincerely,

Balulwami Grand, PhD.
Project Supervisor
Department of Library and Information Studies
Tel: 3552662 (Office), 355-2617 [Departmental Secretary], 71799389 (Mobile); e-Mail: grandb@mopipi.ub.bw; grandb@ub.ac.bw

www.ub.bw

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Appendix 5: Request letter to conduct research at BUAN

Private Bag 0027
Gaborone

27/03/2018

Manager Corporate Services
Botswana University of Agriculture and Natural Resources
Private Bag 0027
Gaborone

Ufs: Librarian— P. Ntolwae 27/3/18 *The research will help the library to evaluate if the resources are fully utilized*

Dear Madam

RE: PERMISSION TO CONDUCT RESEARCH STUDY

I am writing to request permission to conduct a research study at your institution. I am currently enrolled at University of Botswana studying Masters in Library and Information Studies and I am in the process of writing my Master's thesis titled **"An assessment of students' use of e-library resources: a case study of Botswana University of Agriculture and Natural Resources (BUAN)".**

I hope that the university administration will allow me to recruit students to anonymously complete questionnaires. Interested students, who volunteer to participate, will be given a consent form to be signed and returned to the researcher at the beginning of the survey process. If approval is granted, all information provided will be treated strictly as confidential and purely for academic purpose.

Your approval to conduct this study will be greatly appreciated. I have enclosed a supporting letter from University of Botswana and a questionnaire to be completed by the students.

Yours sincerely

Kabelo Baeletsi
kbaeletsi@buan.ac.bw/kbaeletsi@yahoo.com
71501942/72683719

Appendix 6: Permission to conduct research study at BUAN

BUAN
—— BOTSWANA UNIVERSITY OF ——
AGRICULTURE AND NATURAL RESOURCES

Ref: BUAN PF/610

28 March 2018

Mr Kabelo Baeletsi
BUAN

Dear Sir

PERMISSION TO CONDUCT RESEARCH STUDY

Your letter dated 27 March 2018, on the above subject matter refers.

Permission is granted for you to conduct research with BUAN Students titled "**An assessment of students"use of e- library resources: a case study of Botswana University of Agriculture and Natural Resources (BUAN)".**You are to ensure that the research is used for academic purposes only and does not disrupt student studies.

You are also required to avail Management with a copy of your research findings.

I thank you.

S.K. Mazwiduma
Manager, Corporate Services

Private Bag 0027, Gaborone, Botswana
Content Farm, Sebele. Gaborone.
Tel: +267 3650100 - Fax: +267 3928753 - www.buan.ac.bw