

**INFLUENCE OF USABILITY AND QUALITY OF SERVICES ON
POSTGRADUATE STUDENT USERS' SATISFACTION WITH ELECTRONIC
RESOURCES PROVISION IN FEDERAL UNIVERSITY LIBRARIES IN
NIGERIA**

BY

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PHD/SICT/2017/922**

**DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE
FEDERAL UNIVERSITY OF TECHNOLOGY
MINNA**

JUNE 2023

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**A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL
FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA, NIGERIA
IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF
THE DEGREE OF DOCTOR OF PHILOSOPHY (PhD)
IN LIBRARY AND INFORMATION TECHNOLOGY**

ABSTRACT

In any users' service oriented organisation in which university library is not exempted, users' satisfaction is a fundamental factor that requires regular evaluation. This study investigated how usability and library services quality influenced the satisfaction of the postgraduate student users with electronic library resources provision in federal university libraries in Nigeria. To achieve the aim and twelve objectives of this study, the researcher formulated nine research questions; three hypotheses; adapted ServQual 22- item model to design a library assessment prototype for measuring services quality. A mixed methods approach was adopted; multistage sampling procedure was used to select the sample size for the study; the sample size for this study was 773 postgraduate student users and six heads of (ICT)/ System Librarians from Abdullahi Fodiyo Library Complex, Sokoto, Federal University of Technology Library, Owerri, Hezekiah Oluwasanmi Library, Ile-Ife, Ibrahim Badamasi Babangida Library, Minna, John Harris Library, Benin and Ramat Library, Maiduguri. The instruments for data collection were 3 sets of questionnaire, observation checklist, interview and focus group guides. Data were analysed with a combination of Standard Statistical Package for Social Sciences (SPSS) Version 25 for descriptive analysis while Structural Equation Modeling (SEM) of the STATA Version 16 was used to analyse the hypotheses and the causal relationship between usability, quality of services and satisfaction. Findings of the study showed that 50% of the federal university libraries provided access to 1 or 2 aggregated databases such as Science Direct; HINARI; ProQuest while open educational resources and open access journals were made available in federal university libraries in Nigeria. Level of users' satisfaction with library electronic resources had a mean score of (3.08; S.D 0.69) which showed that users were positively disconfirmed (moderately satisfied), usability was the bane of low usage library electronic resources for having a p-value of ($p > 0.493$) and ($\beta = -0.28$). Positive library service gaps existed in all ServQual dimensions, and the highest gap scores were for reliability (0.50), effectiveness (0.44); others were responsiveness (0.39) and assurance (0.30) while smaller mean gap obtained was tangible (0.26). Library service quality had beta coefficient of .66 ($\beta = 0.66^{**}$) which was a significant positive level of users' satisfaction with library electronic resources. The study therefore, concluded that the available electronic resources in the federal university libraries studied were inadequate, infrequently utilised and not usable, there is need to improve on quality service delivery by creating awareness through sensitisation programmes; using Short Messaging Services (SMS) to inform users about the available electronic resources will increase the level of utilisation of the electronic resources and close the identified ServQual gaps 3(0.03), 4(0.09), 2(0.11) and 1(0.19) in the service delivery. For better service delivery, this study recommended the need for libraries to improve on their security measures ($M = 1.87$; $SD = 0.06$); subscribe to adequate electronic journal titles; compile free e-books and e-journals for users; adopt EDT prototype for regular services evaluation. As part of contribution to the field of librarianship, the study developed web-based software for measuring users' satisfaction, which can be used to provide selective dissemination of information and developed a usability test instrument for evaluating library application using prototype modeling technique. The study, therefore, suggested that similar research should be conducted for academic staff and undergraduate students to assess their level of satisfaction with library electronic resources in all university libraries in Nigeria.

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LIST OF ACRONYMS

Acronym	Meaning	Page No.
AFLC	Abdullahi Fodiyo Library Complex	75,78,94,95
ARDI	Access to Research for Development and Innovation	78,79, 132,156,164, 166
CAS	Current Awareness Services	16, 119, 136, 158
CD	Compact Disc	36,58,78,84,101
CD-ROM	Compact Disc - Read-only Memory	8,33,3658,78,79,165
CDT	Cognitive Dissonance Theory	165
CFA	Confirmatory Factor Analysis	123
DVD	Digital Video Disc	4
DUL	Dhaka University Library	55
EIR	Electronic Information Resources	81,85,98,99,158,159,164
EDT	Expectantancy Disconfirmation Theory	10,38,46,103,105,109,118,121,142,176
FUTOL	Federal University of Technology Library, Owerri	75,78,94,95
FULs	Federal University Libraries	81,165
FUT	Federal University of Technology	65,74,78,79
GUI	Graphical User Interfaces	44
HOL	Hezekiah Oluwasanmi Library, OAU, Ile-Ife	75,78,94,95
HINARI	Health InterNetwork Access to Research Initiative	54,56,78,79,83,132,156,164,166,173,179
IBBL	Ibrahim Badamasi Babangida Library	78,94,95,150
IMF	International Monetary Fund	78,83,79,166
ICT	Information and Communication Technology	4,3,15,19,21,33-36,50,57,62-66,69-77 81-88,98-107,121,122,137,149-153,161,166-168
IEEE	Institute of Electrical Electronics Engineers	18,166
IS	Information Systems	37
ISO	International Organisation for Standardisations	26,61,72,91,107
IP	Internet Protocol	171
JHL	John Harris Library	79,94,171
JSTOR	Journal Storage	132,157
LEDUQ	Library Electronic Database Usability Questionnaire	68,96
LUSAQ	Library Users' Satisfaction Assessment Questionnaire	95,96
LRCN	Librarians Registration Council of Nigeria	16,121
MIT	Massachusetts Institute of Technology	54
NIT	National Institutes of Technology	25

Acronym	Meaning	Page No.
NLA	Nigerian Library Association	16,25
NUC	National Universities Commission	16,25
OARE	Online Access to Research in Environment	54,,165,157
OPAC	Online Public Access Catalogue	8,173,174,165
PG	Postgraduate	52,85
RATER	Reliability, Assurance, Tangibility, Empathy, Responsive	38,39
RL	Ramat Library, University of Maiduguri	78,94,95
ROM	Read-only Memory	166
RSS	Really Simple Syndication	14-16, 103
SDI	Selective Dissemination of Information	8,136
SEM	Structural Equation Modeling	73,97,123
SERVQUAL	Service Quality	10,39,127,129,132,134,136,136
SPSS	Standard Statistical Package for Social Sciences	35,141,121,180
TAM	Technology Acceptance Model	16,43,38,37
TEEAL	The Essential Electronic Agricultural Library	78,79,132,157,165
TETFund	Tertiary Education Trust Fund	5,9,142
ULIBSAQ	University Library Services' Assessment Questionnaire	4,5,9,142,143
UCONN	University of Connecticut	37
UGC	United Grand Commission	55
UNDP	United Nations Development Programme	55
UNIBEN	University of Benin	52,74
UNICAL	University of Calabar	52,74

ABSTRACT

In any users' service oriented organisation in which university library is not exempted, users' satisfaction is a fundamental factor that requires regular evaluation. This study investigated how usability and library services quality influenced the satisfaction of the postgraduate student users with electronic library resources provision in federal university libraries in Nigeria. To achieve the aim and twelve objectives of this study, the researcher formulated nine research questions; three hypotheses; adapted ServQual 22-item model to design a library assessment prototype for measuring services quality. A mixed methods approach was adopted; multistage sampling procedure was used to select the sample size for the study; the sample size for this study was 773 postgraduate student users and six heads of (ICT)/ System Librarians from Abdullahi Fodiyo Library Complex, Sokoto, Federal University of Technology Library, Owerri, Hezekiah Oluwasanmi Library, Ile-Ife, Ibrahim Badamasi Babangida Library, Minna, John Harris Library, Benin and Ramat Library, Maiduguri. The instruments for data collection were 3 sets of questionnaire, observation checklist, interview and focus group guides. Data were analysed with a combination of Standard Statistical Package for Social Sciences (SPSS) Version 25 for descriptive analysis while Structural Equation Modeling (SEM) of the STATA Version 16 was used to analyse the hypotheses and the causal relationship between usability, quality of services and satisfaction. Findings of the study showed that 50% of the federal university libraries provided access to 1 or 2 aggregated databases such as Science Direct; HINARI; ProQuest while open educational resources and open access journals were made available in federal university libraries in Nigeria. Level of users' satisfaction with library electronic resources had a mean score of (3.08; S.D 0.69) which showed that users were positively disconfirmed (moderately satisfied), usability was the bane of low usage library electronic resources for having a p- value of ($p > 0.493$) and ($\beta = -.028$). Positive library service gaps existed in all ServQual dimensions, and the highest gap scores were for reliability (0.50), effectiveness (0.44); others were responsiveness (0.39) and assurance (0.30) while smaller mean gap obtained was tangible (0.26). Library service quality had beta coefficient of .66 ($\beta = 0.66^{**}$) which was a significant positive level of users' satisfaction with library electronic resources. The study therefore, concluded that the available electronic resources in the federal university libraries studied were inadequate, infrequently utilised and not usable, there is need to improve on quality service delivery by creating awareness through sensitisation programmes; using Short Messaging Services (SMS) to inform users about the available electronic resources will increase the level of utilisation of the electronic resources and close the identified ServQual gaps 3(0.03), 4(0.09), 2(0.11) and 1(0.19) in the service delivery. For better service delivery, this study recommended the need for libraries to improve on their security measures ($M = 1.87$; $SD = 0.06$); subscribe to adequate electronic journal titles; compile free e-books and e-journals for users; adopt EDT prototype for regular services evaluation. As part of contribution to the field of librarianship, the study developed web-based software for measuring users' satisfaction, which can be used to provide selective dissemination of information and developed a usability test instrument for evaluating library application using prototype modeling technique. The study, therefore, suggested that similar research should be conducted for academic staff and undergraduate students to assess their level of satisfaction with library electronic resources in all university libraries in Nigeria.

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background to the Study

In any users' service organisations of which university libraries are not exempted, users' satisfaction is a fundamental factor that requires regular evaluation in order to determine the effectiveness and efficiency of library service delivery. Users' satisfaction according to Schiebler (2019) has been reported to have influenced users' intention to use library electronic resources or discontinued using the library as a result of word-of-mouth. Identification of the main determinant factor of users' satisfaction with library electronic service quality is thus of great importance to librarians. To that end, user' satisfaction should be assessed regularly in university libraries because it is possible to make electronic resources available but not easy to compel users to use the resources provided.

In other words, users are expected to be treated as kings and queens to avoid wasting cost of subscription to electronic resources. Users' satisfaction can be defined "as a post-use evaluation of library users' experience with library information resources which reflects the quality dimension of the services being provided by federal university libraries in Nigeria. Users' satisfaction is the pleasant feelings that users get after using library electronic resources and services of their choice. Moreover, users' satisfaction could be described as the kind of fulfilment that university library users get after using library resources and services that meet with their expectations.

Expectations here represent "users' level of pre-consumption evaluative judgments which

can be used as standard measure for using library electronic resources” (Mill, 2016). To put straight, library electronic resources and services must be provided according to users’ level of expectations for their satisfaction; a user is said to have been satisfied based on

either getting relevant materials or achieved greatly from using the university library resources and services. University library resources and services are rendered to support teaching, learning and research activities of their parent institutions. The university library being an integral part of an academic institution is saddled with the responsibility of providing print and electronic information resources to support the vision and mission of the parent institution. Nigerian academic institutions, particularly the universities running postgraduate programmes, were broadly categorised by the Nigerian Universities Commission's Website (2019) into three clusters in terms of ownership namely; federal, state and private universities.

The motive behind the establishment of these universities is no doubt connected with the needs for high level manpower development. An important need for human development is to seek for information irrespective of the format it is presented. University libraries have, therefore, gone beyond mere store houses of books but are now seen as the technology driven users' information literacy skills acquisition centres where users' information needs or dreams are turned into reality. In other words, the need for information cannot be over-emphasised.

In a similar vein, Udensi and Akor (2014) posited that information is "life" – that is, information has become an essential part of everyone's daily activities because nothing happens without information. Information provision in federal universities in Nigeria has taken a new dimension as the librarians now move from manual ways of discharging library services to digitalised methods of acquiring, processing and disseminating library resources and services. The task of university librarians has transformed from being caretakers of information to an information professionals, who manage systems of information in multiple formats.

Information can be disseminated through specifically designed services as per the users request and library's perception of users' information needs to justify the aim and objectives of establishing the library in any institution of higher learning. Therefore, the librarians must be able to acquire relevant information resources, process, preserve, store, and disseminate these resources at the right time and to the right user using different information and communication technology (ICT) tools.

The emergence of Information and Communication Technologies (ICT) has brought about a dramatic shift from the analogue method of service delivery to a digital method of handling information right from the selection stage up to the dissemination and feedback stages, meaning that libraries and information Centres use computers and telecommunication devices to carry out their day-to-day operations. Accordingly, universities and libraries are operating in a rapidly changing information environment (Feret, 2011), which shows that libraries have been retooled to serve as facilitators to wealth of information far beyond the physical collection, providing regular and instantaneous access to global information through online resources and systems and they also create their own digital contents for local and global access.

In the same way, Ajegbomogun (2015) noticed that either library service delivery in Nigeria was changing to digitalised or hybrid type where electronic devices are used to disseminate information or receive information in and outside the four walls of libraries. Staff and students' expectations are developing in line with these changes in the teaching, research and scholarly communication environment. Libraries need to play strategic role in supporting faculty or members of the faculty and students within this technologically-rich and constantly evolving context. The technology environment will be constantly and rapidly changing, with the expectations and needs of information users increasing

simultaneously, and with libraries striving to provide an excellent search and discovery experience for the users.

Users' diverse needs have necessitated the need for university libraries to provide adequate, relevant and current information resources that will support their users' teaching, learning and research activities. Research activities involve the provision of adequate peer-reviewed journals and books whether print or electronic formats. To acquire or subscribe to peer-reviewed journals or books, the university library needs regular service assessment and adequate funding.

Funding in Nigeria universities is now becoming worrisome as financial attention received by the Nigerian federal university libraries from their parent institutions is becoming insufficient which have forced the federal university libraries to rely heavily on Tertiary Education Trust Fund (TETFund) interventions for their material and human development. It is noteworthy to state that, the quality of library electronic resources and service provision are highly dependent on the availability of funds needed to provide ICT facilities, subscribe and sustain relevant electronic resources, usability or ease of access or perceived usefulness of library electronic services as well as currency and adequacy of the electronic information resources.

Electronic information resources are invaluable resources provided through fee-based subscription, open access, accompanied e-books in compact disc, digital video disc or local content server for users' access. It is evident that institutions use electronic resources to complement the available hard copies of their library materials to support teaching, learning and research activities of their various institutions. Similarly, Dean and Jager (2009) supported this view when the duo opined that libraries are no longer operating in a purely physical, but more often in a hybrid environment with print and electronic

information resources available side by side to complement each other. With the advent of Information and Communication Technology, especially the Internet and the wealth of electronic resources, large portions of libraries' materials are no longer kept on physical shelves, but are available electronically in Compact Disc-Read-Only Memory (CD-ROM), digital video disc (DVD) or the Internet. There is no doubt that the electronic resources have helped tremendously in bridging the information gap between the developing countries and their developed counterparts due to the fact that electronic information resources are made available the moment they are published.

In view of shortage of funds that were made available to Nigerian university libraries, the issues of availability, usability and quality of the electronic resources have become important areas of research that would require constant and regular evaluation to ensure best practices in the university libraries. Aina (2009), Abubakar and Akor (2017), Abu *et al.* (2017) and Anyim (2018) in their findings identified low utilisation of electronic information resources by user communities as one of the major impediments facing the provision of electronic resources in Nigerian libraries.

Inadequate funding has been reported to have had negative impact on the availability of electronic resources in Nigerian federal university libraries. This has equally hampered some university libraries from subscribing to important electronic resources which makes regular checking of library resources availability necessary. This is not far from the report of Tiemo and Ateboh (2015) which unveiled lack of funds have hindered the provision of adequate electronic resources (aggregated databases) and facilities in some university libraries in Nigeria. Similarly, the issue of inadequate funding of university libraries has made the Nigerian Library Association (NLA) to embark on advocacy and public sensitisation programmes to persuade the stake holders to improve on the funding of the university libraries through the 10 percent of the recurrent expenditure of the universities.

The former President of the Nigerian Library Association, Professor Innocent Ekoja made this call in an interactive session with journalists in Abuja during the 2019 Annual Library Week. Ekoja (2019) said that, “the TETFund intervention is just a mere intervention to complement the 10 percent budgetary provision of the universities in Nigeria not to replace the 10 percent that is supposed to be used for library development”. Ekoja explained further that the TETFund intervention is inadequate for the provision of quality library services. That shows the level of underfunding of the federal university libraries that has started having negative impact on service delivery in some university libraries in Nigeria.

Availability of electronic resources is considered as, the number of accessible electronic information resources or the number of times that a particular electronic resource comes up when it is being searched, while unavailability of the resources is viewed as the number of times a resource has refused to respond when user searches for it. It may be users’ inability to download a complete electronic book due to frustrating search functionality such as ‘non-clickable’ eBook hyperlinks. In the same way, Spacey (2017) defined availability as the “percentage of times that a service or resource is fully available for its intended use”. The author further explained that availability is the uptime of a facility, infrastructure component, machine, device, service, product, function, system, business capability or process.

As availability is important to users’ satisfaction the concept of usability is equally vital to effective library service delivery because users’ satisfaction cannot be properly measured without investigating the fact of usability. Library users expect academic libraries to cater for their diverse needs by providing access to current and relevant print and electronic information resources that will enhance their academic performance. Since

academic library users have various needs, it is the responsibility of the library staff to identify their needs and expectations and strive to meet them. Meeting the information need of users required the provision of the right information resources and services that will satisfy their needs. If users' need and expectations are met, then naturally they are most likely to be satisfied.

Satisfaction means the aftermath experience that the library users have in respect of a favourable or positive service or product. Similarly, Sahu (2008) was quoted by Naidu (2009) defined users' satisfaction as the difference between users' expectations and perceptions of electronic service performance and the reality of the electronic service. Thus, electronic services must be viewed from the users' point of view and meeting such users' expectation for electronic service becomes very important. Furthermore, Ikenwe and Idowu (2014) were of the opinion that users' satisfaction has to do with how good users' feel after visiting and using the library electronic resources and the possibility of users returning to that library when there is need for information.

Determining users' satisfaction is one of regular checks and balances that library needs to make as a routine duty to ensure an improved service delivery. In fact, it is a good practice to seek for users' views about the services they use and by doing so they can advise decision makers about what service they feel the library needs to provide based on their individual expectations. Factors such as availability of electronic or online resources; database subscription; availability of computers; networking facilities; photocopying facilities; scanning facilities; ease of access; ease of use; reliability; timeliness; adequacy; responsiveness; location; operation hours; atmosphere; e-Library space; lighting situation; proximity and security can lead to users' satisfaction or dissatisfaction depending on how good or bad the aftermath experience is. Others are staff competence, punctuality, commitment, friendliness and helpfulness.

There is no doubt that, if electronic or online resources are unavailable, computers are inadequately provided, networking facilities are inefficient, photocopying and scanning facilities are not available, atmosphere is not conducive, e-Library space is inadequate, lighting situation is not suitable for reading, the library service will be ineffective and that can lead to users' dissatisfaction. Dissatisfied users may react in different ways, for example; users who felt dissatisfied with library services can decide to express their dissatisfaction by action or may decide to take their leave without action that is known as stage one.

The second stage of the decision is whether the response is taken publicly or in private. For public action, the user seeks redress directly from the university librarian by requesting for administrative action, for private action users may decide to stop using the library. The user may decide not to use the library or library resource again and/or may decide to engage in negative word-of-mouth to discourage his or her friends from using the library services.

Library services are day to day activities offered by the university libraries to satisfy users' information needs. This can be in a direct or in an indirect way. The direct services are those offered to users through direct contact while indirect services are the behind the scene activities rendered by the library staff. Examples of library service are acquisition and processing of information; creation and management of online public access catalogue (OPAC); research support and bibliographic searching; acquisition/subscription to electronic resources; current awareness services (CAS); binding; organisation of training programmes; reference; printing; photocopying; provision of recreation materials; bibliotherapy; circulation of library materials; managements of audiovisual materials; selective dissemination of information (SDI); digitisation; mobile

library; social media; referral; CD-ROM search; maker spaces; virtual reality; data management; readers services; and artificial intelligence chat.

Assessment of university library services is considered as a vital tool for measuring strengths and weaknesses of federal university libraries for effective service delivery, which is in line with the view of Adamu (2017) who said, “assessment of university library services is an important management tool for determining library service efficiency to user communities through regular strength and weakness analysis”.

Postgraduate student users are registered members of the university community that have been using or are willing to use the library resources for personal or educational purposes. They are the focal point of library services, in an interaction with users of the university library services, users’ believe that university library should give them the best service through the quality of resources and services and above all, they require adequate support from the library staff.

The researcher has observed that most federal university libraries in Nigeria are going through turbulent times as a result of inadequate funding and low usage as raised by some University Librarians during one of their meetings held at Abuja in 2017. Recently, African Independent Television reported that the President of Nigerian Library Association organised a press conference to sensitise the Nigerian government and general public on the need to fund the Federal University Library through the university internally generated revenue as he said that the TETFund is inadequate for effective service delivery (Ekoja, 2019).

There is no doubt that, the issue of inadequate funding of federal university libraries has resulted into ineffective service delivery by some public university libraries which has forced some library users to make use of Google and Web 2.0 tools as substitute to

physical library for accessing current information resources due to its ease of access, currency, and usefulness.

This is in line with the view of Blaylock (2018) that reported use of social media technology as exceptionally valuable educational tool that has forced many youths and adults to spend more time in seeking information from different social media platforms. These increased channels have been reported by library and information professionals studied as parts of the medium of communicating research findings that are also affecting level of patronage for library subscribed electronic information resources. Corroboratively, Nkeiru and Maria (2016) attributed library low patronage to availability of alternative sources of information to library users via social media platforms.

In addition, Paris and Otike (2016) as quoted by Adamu (2017) asserted that “university libraries were facing the challenges of under utilisation of electronic resources largely because of lack of awareness, lack of time, lack of skills and inadequate collection”. In a similar view, Clifford and Obadare (2015) in a study of two universities in Osun State reported that lack of awareness of library products and services have significant influence on students’ access and utilisation of library products and services.

It was recommended that librarians should improve on service quality and user satisfaction to increase the level of utilisation of the library products and services.

This worrisome scenario needed to be empirically addressed before it would negatively affect other library services. The problem may be due to lack of or irregular evaluation of library users’ needs and satisfaction with the quality of library services provided by the federal university libraries in Nigeria. In this era of digitisation, where users have access to information through different channels, it is now imperative for librarians to develop a

long-term relationship with the library users by offering quality services, which will help in bringing the users back to the library.

Bringing back the library users rests on the ability of university librarians to engage in regular checks and balances of the services offered by the library staff as well as assessment of the employees in order to ascertain users' maximum satisfaction.

This study designed a prototype with the expectancy disconfirmation theory using all its 22-items for measurement in order to support continuous service performance evaluation and raise awareness of the library electronic resources and services in federal university libraries. To eliminate the stress of having to come up with survey questions on demand, the prototype had used the adapted ServQual 25-item instrument as predetermined questions. Programming languages such as HyperText Markup Language (HTML); Cascading Style Sheets (CSS); JavaScript; jQuery and database management system (MySQL), and a third-party application called SMS Live 24/7 were used to provide instant messaging services in the application. The SMS Live was to enable the prototype serve as a feedback mechanism for the libraries.

During the researcher's feasibility study in Ibrahim Badamasi Babangida Library, Federal University of Technology, Minna, Federal University Dutsin-ma Library, Kashim Ibrahim Library, Ahmadu Bello University, Zaria, Kaduna State University Library and University of Ilorin Library respectively, it was observed that university libraries invested a lot on the provision of electronic resources but the level of utilisation is low compared to the investment made on the resources.

In most of the Federal University Libraries in Nigeria, subscription to electronic resources is done on annual basis or it can be for a period of 2-5 years. This arrangement is usually based on the agreement between individual institution and the database providers or based

on what is being recommended by other professional librarians or what is offered by the National Universities Commission (NUC) as a consortium arrangement for institutions to fulfil part of demands for the accreditation exercise. This is a clear indication that some institutions are just trying to meet the requirements for passing the accreditation not necessarily providing the electronic resources and services to satisfy their users' information needs.

In an interaction with some librarians and users of the academic libraries, feasibility study found out that many libraries subscribed to only one or two important electronic databases to cater for all programmes run by their institutions and some did not care to involve the user faculties in the selection process before subscribing to electronic resources. In such cases, many users may be unaware of the availability of such databases that may lead to low utilisation of those databases and in the long run make users feel dissatisfied with the electronic resources provided for them.

Since these observations have not been studied empirically, the researcher decided to carry out a study on the influence of usability and quality of services on users' satisfaction with the provision of electronic resources in federal university libraries in Nigeria.

1.2 Statement of the Research Problem

Over the years, university libraries have been saddled with the responsibility of providing resources for their users and the aim of every library is to ensure that effective service delivery are provided in order to satisfy the users' information needs. Users' satisfaction is the pivot upon which all services in information centres including libraries hinged. Users' satisfaction assessment has become a great area of concern for library professionals if really libraries want to justify their existence within the universities.

Previous studies have reported that federal university libraries invest a lot on the provision of electronic resources without corresponding utilisation from the library users. There seems to be a challenge among the user communities in using the electronic resources provided by the federal university libraries covered by the study.

This challenge seem to have manifested in low utilisation of electronic resources and seeming lack of users' satisfaction with the electronic resources Kudirat *et al.* (2022) as evident from some previous studies of Okello-Obura and Magara (2008); Aina (2009); Clifford and Obadare (2015); Paris and Otike (2016); Abu *etal.* (2017); Abubakar and Akor (2017); Agbawe (2018); Anyim (2018) and Atinmo and Clifford (2018) but none of these studies addressed the empirical relationship between the independent variables (usability and service quality) and the dependent variable (users' satisfaction).

The questions that required answers are: Are the federal university libraries satisfying users' electronic information needs as expected? If the answer is 'Yes' what are those factors that lead to users' satisfaction with the electronic resources provided? If the answer is "No" then what are the factors that are responsible for users' dissatisfaction with electronic resources provision? What are the things that needed to increase users' satisfaction with electronic resources provision?

These amongst other questions are what this study seeks to answer. The study therefore investigated the influence of usability and quality of service on users' satisfaction with electronic resources in federal university libraries in Nigeria.

1.3 Aim and Objectives of the Study

The aim and objectives of the study was to investigate the influence of usability and quality of library electronic services on users' satisfaction with the electronic resources provision in federal university libraries in Nigeria.

The specific objectives of the study were to:

- i. ascertain the availability of electronic resources in federal university libraries in Nigeria.
- ii. find out the level of postgraduate student users' satisfaction with electronic resources provision in federal university libraries in Nigeria.
- iii. determine the frequency of use of the available electronic resources by postgraduate student users of federal university libraries in Nigeria.
- iv. assess the quality of library electronic services rendered by the federal university libraries in Nigeria.
- v. determine the influence of library electronic service quality on postgraduate student users' satisfaction with the provision of electronic resources in federal university libraries in Nigeria.
- vi. evaluate the usability of library electronic information resources in federal university libraries in Nigeria.
- vii. determine the influence of usability of library electronic resources on postgraduate student users' satisfaction with provision of electronic resources in federal university libraries in Nigeria.
- viii. design a prototype for assessing postgraduate student users' satisfaction with library service delivery and to provide current awareness services through short message services (SMS).
- ix. identify the challenge (s) militating against the provision of electronic information resources in federal university libraries in Nigeria.
- x. establish the significant relationship between the level of utilisation of electronic resources and postgraduate student users' satisfaction with the electronic resources provision in federal university libraries in Nigeria.

- xii. establish if there is no significant relationship between the quality of library services and postgraduate student users' satisfaction with electronic resources provision in federal university libraries in Nigeria.
- xiii. find out if the usability of electronic resources will have no significant influence on postgraduate student users' satisfaction with electronic resources in federal university libraries in Nigeria.

1.4 Research Questions

The research was guided by the following questions:

- i. What are the available electronic resources in federal university libraries in Nigeria?
- ii. What is the level of postgraduate student users' satisfaction with electronic resources provision in federal university libraries in Nigeria?
- iii. How frequently are the available electronic resources utilised by the postgraduate student users of the federal university libraries in Nigeria?
- iv. What is the quality of electronic services provided by the federal university libraries in Nigeria?
- v. What is the influence of quality of library services on postgraduate student users' satisfaction with electronic resources provision in federal university libraries in Nigeria?
- vi. How usable are the available electronic resources in federal university libraries in Nigeria?
- vii. What is the influence of usability of electronic resources on postgraduate student users' satisfaction with electronic resources in federal university libraries in Nigeria?
- viii. How can a prototype for assessing postgraduate student users' satisfaction with

the library electronic services which can be used for current awareness services be designed for sending Short Message Services (SMS) to university library users?

- ix. What are the challenges militating against the provision of electronic services in federal university libraries in Nigeria?
- x. What will be the level of relationship between the utilisation of electronic resources and postgraduate student users' satisfaction with the electronic resources provision in federal university libraries in Nigeria?
- xi. What level of influence will usability of electronic resources have on postgraduate student users' satisfaction with electronic resources in federal university libraries in Nigeria?
- xii. What level of relationship exist between the quality of library services and postgraduate student users' satisfaction with electronic resources provision in federal university libraries in Nigeria?

1.5.1 Hypotheses

The following null hypotheses were tested at 0.05 levels of significance.

H₀₁: There is no significant relationship between the utilisation of electronic resources and postgraduate student users' satisfaction with the electronic resources provision in federal university libraries in Nigeria.

H₀₂: Usability of electronic resources will have no significant influence on postgraduate student users' satisfaction with electronic resources in federal university libraries in Nigeria.

H₀₃: There is no significant relationship between the quality of library services and postgraduate student users' satisfaction with electronic resources provision in federal university libraries in Nigeria.

1.6 Significance of the Study

The findings of this study will be of great benefit to library administrators particularly university librarians, academic/professional librarians, researchers, library users, Nigerian Library Association (NLA), Librarians Registration Council of Nigeria (LRCN), National Universities Commission (NUC). The library administrators will find the findings of this study useful, as it will serve as a working tool for future development and effective decision making. For example, findings of the usability evaluation will help the librarian in taking necessary decision before subscribing to any electronic resources. The adapted technology acceptance model and theory (TAM2) has been used to determine the external variables such as usability, quality of library online and offline resources and other determinant factors that influences users' attitudes towards the use of electronic resources in federal university libraries and expectancy disconfirmation theory model was used to measure the library performance. The Library service quality assessment prototype that has been embedded with really simple syndication (RSS) can be adopted by the library and information professionals as an assessment system to measure users' satisfaction, share useful links to electronic resources and disseminate current information to users through current awareness services (CAS) platform of the system.

The regulatory and professional bodies such as the NUC, NLA and LRCN can adopt the prototype designed in this study to evaluate university library performances and users' satisfaction with the library services when they go for accreditation of the library courses. These regulatory bodies can use the same prototype to conduct a follow-up evaluation remotely in order to monitor the performances of all higher institutions in Nigeria. In addition to this, findings of this study can help the bodies to determine the level of

availability of electronic resources in every university in Nigeria before going for assessment, this if done, will inform their decision.

The academic librarians will find this work useful as a basis for further studies as it will contribute to existing literature in the field of librarianship. The academic librarians will find the adapted theories useful in teaching the library students. They can evaluate their quality of teaching; the instruments used in the study can be used as evaluation tool for measuring users' satisfaction. It will help them in formulating useful policies for effective university library services; professional librarians can use the adapted expectancy disconfirmation theory as guide for best practices. The researchers will find the work useful as a basis for their further studies and it will contribute to the existing literature in the field of librarianship.

The university library users will find it useful as it will enable them to rate the effectiveness of library services provided to them and more importantly get better services from the libraries. In other words, users will receive more attention from the university libraries through regular users' needs assessment and provision of current, adequate and relevant electronic resources, the libraries will improve their service delivery, and the researcher's institution will add this work to their local content.

1.7 Scope of the Study

The study was limited to the University of Technology Library, Owerri, Abdullahi Fodiyo Library Complex, Sokoto; Ibrahim Badamasi Babangida Library, Minna; Hezekiah Oluwasanmi Library, Ile-Ife; Ramat Library, Maiduguri and John Harris Library, Benin respectively. The respondents for this study were drawn from postgraduate diploma; master; master of philosophy and doctoral students who registered with any of the sampled six university libraries during 2018/2019 academic session.

The study identified the available resources, determined the usability and the quality of library services rendered by the federal university libraries in Nigeria. The study determined the influence of usability and quality of library services on postgraduate student users' satisfaction with library electronic resources; designed a solution that will bridge the information gap that exists between the library and users and provided solution to solve all the identified challenges. Only web-based library assessment software was prototyped in this study due to time frame; the period for data collection lasted for four months and the study completed before the period of the study elapsed.

1.8 Operational Definition of Terms

The following terms have been defined according to their usage in this study.

- 1. Electronic Resources Provision:** This is the process or act of creating, compiling, purchasing or subscribing, processing, storing or sharing the invaluable non-print information resources in text, graphics, video, audio and image formats that has provided to cater for users information needs in federal university libraries in Nigeria.
- 2. Postgraduate Student Users:** These are federal university library registered postgraduate diploma, master, master of philosophy and doctoral users.
- 3. Quality of Library Service:** This is the value or worth or standard attached to the activities rendered by the library ICT department.

This include non-print materials provided by the federal university libraries which may be physical attractiveness of the library space and ICT facilities, conduciveness of the environment and ease of use of the library electronic resources in federal university libraries in Nigeria.

4. **Quality of Service (QoS):** The post-use judgment for performance of all library electronic resources and services provided to postgraduate student users of the federal university libraries in Nigeria.
5. **Usability:** Thesis about the perception of ease of access and usefulness of the available electronic resources in the federal university libraries in Nigeria.
6. **Users' Satisfaction:** This is postgraduate student users' fulfilment derived from the library resources and services used in the federal university libraries in Nigeria.
7. **Structural Equation Modeling (SEM):** The statistical analysis tool used for measuring the structural relationship between usability, quality of service and postgraduate student users' satisfaction.
8. **Positive Disconfirmation:** the level which postgraduate student users were favourably satisfied with the electronic resources and services provided in federal university libraries in Nigeria.
9. **Negative Disconfirmation:** the level at which postgraduate student users were unfavourably satisfied with the electronic resources and services provided in federal university libraries in Nigeria.
10. **Confirmation:** the neural level that is mid-point where postgraduate student users were able tolerates quality of electronic resources and services provided in federal university libraries in Nigeria.
11. **Perception:** how people feel library resources and services are supposed to be provided based on their own opinion.
12. **Expectations:** What postgraduate student users look for or hope to get from the federal university libraries in Nigeria.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Conceptual Framework

The diagram showed in Figure 2.1 is the original constructs of the author's conceptual model.

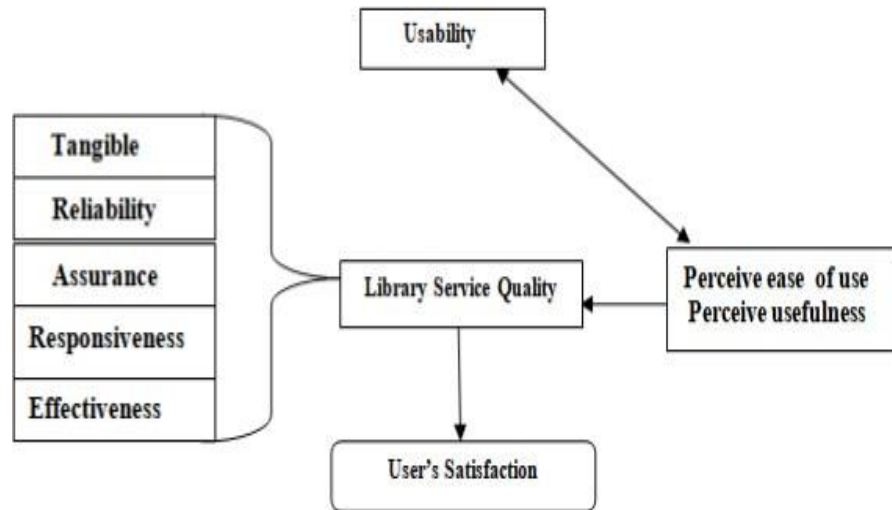


Figure 2.1 Conceptual Models of Variables

Source: Original constructs of the author

The model postulates that library service quality is at the centre of university library services assessment where other constructs for measuring users' satisfaction interconnects. It is considered as the lead service assessment, which determines how well a library is doing when it comes to performance evaluation.

Library service quality in this context has direct influence on users' satisfaction with the electronic services provision in the university libraries due to the fact that library users have been proven to be naturally satisfied when they have access to library electronic facilities, conducive environment, Internet and other communication facilities which facilitates easy access to relevant electronic resources.

Library service quality will enable users to know the level of availability and ease of access to federal university library electronic resources and was measured with five SERVQUAL dimensions (tangible, reliability, assurance, responsiveness, and effectiveness).

Tangible determined the quality of physical attractiveness of the library facilities and resources and identified the adequacy of the available ICT facilities. Reliability measured the librarians' ability to serve one or more users repeatedly without losing track of the users' data. Responsiveness ensured the library staff willingly assisted any user that needs help without delay; assurance was used to measure library staff behaviours which fostered users' trust towards library; while effectiveness measured ease of use, ease of access, regular library services and adequate provision of information and communication technology facilities.

These five dimensions are what library service quality entails. The model therefore, showed that, usability has have no direct influence on postgraduate student users' satisfaction with library electronic resources except through the library service quality, more so that the perceived ease of use and perceived usefulness have direct influence on usability the same way the usability affected the two variable. Therefore, usability was measured with the perceived ease of use and perceived usefulness of the library resources and services, the library systems and resources must perform well in these two constructs before users' satisfaction can occur.

2.1.1 Users' satisfaction

Users' satisfaction is the deep feeling of fulfillment that library users expected to get after receiving a service or utilising information resources that addressed their information needs as desired. In other word, satisfaction is the aftermath feelings that a user will have

after their experiences with the library services and resources. Several marketing researchers have defined satisfaction as a comparison of users' service expectations with their perceived service performance, that is, if perceptions exceed expectations one can say that the service is of high quality (Chua *et al.* (2004) & Kumar (2009).

Similarly, Aighavboa and Thwala (2013) explained that “the word satisfaction first appeared in English during the thirteenth century and was derived from the Latin word ‘Satis (meaning enough) and the ending – faction was derived from another Latin word “facere – to do / make)’. The word satisfaction as explained by the two authors was used at the earlier stage as a sort of release from wrong doing but at a later time it was used as a release from uncertainty”. Nowadays, the word is now broadly used to denote adequate, make pleased or contented and satiation (enough).

Therefore, satisfaction of users is connected with library effective services render towards satisfying users' information needs to be properly met. In the same study, the authors evaluated users' satisfaction with the library services at the University of Limpopo and Medunsa College (Medical University of South Africa) and found that satisfaction is generated when users make optimal utilisation of library resources.

Motianget *al.* (2014) viewed users' satisfaction as fulfilment derived from the use of library and information resources and services and their willingness to re-use it when need arise. In corroboration, Bowoet *al.* (2013) defined customer satisfaction as a post-purchase evaluation of alternatives selected where the results (outcomes) equal or exceed users' expectation; Users' expectations from the library services may be based on personal information needs, information received from their family and friends (word-of-mouth), or users past experience with library resources.

Users' satisfaction or dissatisfaction is usually determined by a number of factors which, can be identified through proper investigation as evident from the studies of Abu *et al.* (2017) observed and reported that users of Federal University of Technology, Minna and Ibrahim Badamasi University Lapai libraries expressed their dissatisfaction with the quality of information services provided by the two universities due to the following challenges; inadequate information and communication technology facilities, obsolescence, low level of electronic library services and lack of stable power supply.

In another study, Naidu (2009) reported that the Mangosuthu University of Technology (MUT) Library users' perceptions were high for certain services and low for others. Services with fairly high perceptions were staff that instills confidence in users and adequate print journal collection. Services with low perceptions were library facilities and library as place, some staff services, clear web page and the library collection, especially books, majority of users' actual experiences with the library facilities revealed that they were extremely dissatisfied with this service.

Many students complained about the inadequate book collection and mentioned that they visited other libraries in order to write their projects. Their biggest concern was lack of computers with access for research purposes and lack of printers in the library, which is likely going to affect the library patronage as the items are very essential for day to day operations of any functional library in fact, they are part of the minimum requirements for setting up a university library.

These findings were in line with the report of the Oukrich and Bouikhalene (2017) that viewed dissatisfaction among library patrons because of poor library service. Thus, users' satisfactory reports such as "the lack of expertise of the library staff at the information counter, lack of efficient reference service delivery, the need for recent periodicals and

journals, lack of photocopying services, the need for a well-organized circulation service, and the lack of functional schedules” have been identified as parts of the problems associated with users’ dissatisfaction.

Similarly, Negi (2009) conducted a study on the relevance of customer-perceived service quality in determining customer overall satisfaction in the context of mobile services (telecommunication) and he found out that the idea of linking service quality and customer satisfaction has existed for a long time. Reliability and network quality (an additional factor) were the key factors used in evaluating overall service quality but also highlighted tangibles, empathy and assurance as important factors that should not be neglected when evaluating perceived service quality and customer satisfaction.

The study recommended the identification and evaluation of the determinant factors that can lead to customer-perceived service quality and overall satisfaction in view of the fact that only a user who regards the library services as being of good quality will be positively disconfirmed by the quality of library service. Thus, satisfaction has to do with how library users valued or weighed services rendered by the library in order to ensure that their information needs are met in a positive way.

2.1.2 Availability of electronic information resources

Availability refers to the ability of any library to provide electronic resources, the number of times that users are able to retrieve any article or contents of electronic resources whenever the need arises. Availability of electronic resources should not be judged based on the subscription made by the university library but on how easy it is for user communities to find relevant information resources from the databases or its accessibility from the publisher or aggregator’s servers or its ability to come up whenever users click on it. Sometimes, the library will subscribe to electronic resources but if the interface or

access link is not properly monitored it may remain inactive for a long period of time if any action is not taken.

Subscription to electronic resources varies from one institution to another; depending on the availability of funds for running the library; number of programmes run by the institution; acquisition policy if there is any; management support and users information needs. For instance, A publication of Queen`s university (2013) revealed that the university library had 1,750 electronic databases resources; New Castle University Online Publication (2014) stated that there are 450 electronic resource databases available for teaching, learning and research work.

It could be seen that in both universities there is a high level of availability of electronic information resource databases in their library. In South Africa, a developing nation like Nigeria, James (2014) study on availability of EIR databases in three higher institutions in South Africa, showed that University of Johannesburg had 160 electronic databases, Nelson Mandela Metropolitan University had 40 and Cape Peninsula University of Technology had 100 electronic database resources in their universities. This shows that for best practices university libraries should subscribe to adequate electronic resources that will cater for all programmes being ran by the institution.

Availability of information resources has been defined by the National Instruments (2023) as the probability that a system will be available to perform its function when it`s called upon. Availability could be defined as the handiness, accessible, available or quality of being at hand when needed. Aina (2009) conducted a study under the title of “availability of electronic resources at (NIT) Libraries in India: A Study”. The objectives of the study were to investigate the availability of electronic resources at national institutes of technology (NIT) libraries across the country.

The survey found out that majority of libraries in India used 11 to 15 number of online journals databases, whereas 25 percent of the libraries have the facility for more than 16 number of online journal databases. Very few libraries (20%) indicated less than 10 online journal databases, in the south zone of the country about (75%) of the libraries to better-off in comparison with the other zones.

In another view, Umar *et al.*(2018) described provision as making something available for utilisation. According to the authors' provision is the ability of the university libraries to provide its users with the required medium for accessing and utilising the library online information resources via digital reference. Therefore, provision of electronic resources is an important aspect of service delivery in university libraries.

In addition, Gwang (2011) was of the opinion that, provision of library and information services to users is very vital; library service provision entails the availability of library and information resources in various formats in order to satisfy user's information needs through the use of digital reference service. Provision of digital reference service in the library entails installation of computers connected to the telecommunication technology, stable power supply, sufficient funding, and awareness creation to the user communities. The study of Udensi and Akor (2014) opined that inadequate funding, inadequate professional librarian's, inadequate service provision, poor power supply, constant strike, theft and disaster as part of the factor militating against the provision and use of academic library resources in Nigeria.

2.1.3 Usability

Usability is how easy it is for the library users to access, navigate, download, save or print from the library electronic resources website or portal to satisfy their information needs.

Possibly, if users get lost on the library website without any library staff to put them through, they may leave, or if they find it difficult to navigate from one document

to another, they may feel unfulfilled. Therefore, usability of library electronic resources is an important factor towards effective utilisation of electronic resources.

Availability of electronic resources in the university library does not necessitate utilisation but rather the ease of use, accessibility; users' opinion and relevance to users' area of study can aid the level of utilisation. In corroboration, International Organisation for Standardisation ISO 9241-11 as quoted by Hassan (2014) described usability as the extent to which specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use can use a product.

In a similar view, Speicher as quoted by Adepoju *et al.* (2018) defined usability as the "effectiveness, efficiency, and satisfaction that the users achieved in using electronic information resources. This can be evaluated through response time, ease of use and ease of navigating the information. In corroboration with Speicher's view Ward *et al.* (2015) said that, "library collections become irrelevant if users cannot easily access them".

Accessibility has to do with the extent to which library user can view, read, download or use library electronic resources. Libraries can subscribe to electronic resources but may not know when the link to the resources will become inactive, if not properly monitored and used as it is possible to see an active link today becoming inactive tomorrow due to system maintenance or upgrade.

Usability means more than just "ease of use". The five 'Es'— efficient, effective, engaging, error tolerant and easy to learn are the multi-faceted characteristics of usability. Interfaces are evaluated against the combination of these characteristics which best describe the user's requirements for success and satisfaction (Quesenbery, 2001).

Similarly, University of West Georgia (2022) defined usability as a reference to how easy it is for a user to accomplish what he or she wants on a website. In corroboration, Nielsen

(2019); Joo *et al* (2011); Matera *et al* (2006) modeled usability with either three, five or seven constructs which were learnability; effectiveness; efficiency; memorability; error rates and satisfaction.

Usability is the users ability of users to efficiently and effectively carry out their desired activities on a given product. That means that usability is about performing a great task within a short time using a particular electronic resource to carry out a given task successfully.

Matusiak (2012) reported in a study of perceptions of usability and usefulness of digital libraries in Midwestern University, United State of America that, staff and two hundred level geography students of Midwestern University used academic full text resources from digital libraries but later changed to open sources to access visual and multimedia resources through search engines. The idea of using open sources by the respondents was because of their negative perception towards digital libraries as most of them viewed digital images as objects that could not be accessible freely in the library.

The respondents indicated that, low usage of digital libraries was connected with the digital library systems that were not user-friendly which discouraged them from utilising the systems judiciously and secondly, academic libraries were perceived as places only where textual resources were provided and used by the faculty staff and students. These perceptions of usefulness to the respondents especially in terms of relevance of contents, coverage, and currency, had negative perception towards the use of digital libraries especially when searching for visual materials.

In that case, users were aware of the resources but perceived digital images as not being friendly when trying to download which show a gap in the library communication with the user communities by not giving them proper orientation about how the resources could

be used. In order to trace the level of utilisation, complete assessment of library activities must be put into consideration using complete and reliable measurement of use of electronic resources and print materials. Some electronic resources subscribers relied on the counter standard (that is publisher tools) but found to be inconsistent or insufficient and pointed out the need for university local tools such as web markers and deep analysis of proxy logs as alternative to publisher tools.

Apart from the two tools, there were other Electronic Resource Management Systems such as SUSHI Standards, Shibboleth Authentication, along with COUNTER standards, to improve the counting of the electronic resource use. The report concluded that counting systems developed were insufficient and its improvement will be through a simple web counting of the pages and links to the databases used in the local portal.

2.1.4. Service

Service had been defined differently by various authors among which are marketing experts and library and information professionals that viewed services as commodity or activity that cannot be transferred from one person to another after being delivered.

Corroboratively, Lovelock and Wirtz (2011) viewed service as the economic activities offered by one party to another. Similarly, Kotler and Armstrong (2012) defined service as an activity, benefit, or satisfaction offered for sale that is essentially intangible and does not result in the ownership of anything. From his definition above, service is an activity that is offered by one person to another to give a satisfaction to them. Hence, service should be defined in their own right, not in relation to goods.

Services are essentially intangible and that they were created through direct interactions with customers. In another vein, Kotler and Armstrong (2012) opined that there are four characteristics of service which include:

- i. Intangibility: that is, service cannot be seen by human naked eyes, neither can it be tasted with human tongue, nor can it be felt with our hands, so also can it be heard with auditory nerve of any human ear, or smelled by human nose before they are rendered.
- ii. Inseparability: Services are produced and consumed at the same time they cannot be separated from their providers.
- iii. Variability: The quality of services may vary greatly depending on who provides them and when, where, and how it was provided.
- iv. Perishability: Services cannot be stored for reuse or for a later sale once it is rendered.

In view of the four characteristics of service as explained by the duo, service is provided by one person to another at the time of need or in anticipation of users request but not something that can be touched, felt, transferred or stored for re-use once it's being rendered by the provider. That services are assessed or judged by the person who consumed, received or utilised it whether free or fee-based.

2.1.5 Service quality

Service quality as described by Udensi and Akor (2014) observed that “the standard in the library can best be determined by looking at library resources capability and utilisation, meaning that the effectiveness of the library services can only be judged by its collection, facilities and staff performance”. The duo were of the opinion that the services which satisfies high degree information and research needs of faculty, students and other users can contribute to the success of educational and developmental goals of the institution in an effective manner.

Duo further concluded that since the Nigerian Library Association is yet to design a common standard that could be used to judge the library service especially in tertiary institutions, quality of service delivery should be based on users' satisfaction and if users are dissatisfied then, the standard is perceived to be low.

Lovelock and Wirtz (2011) opined that service can be viewed from 5 dimensions, namely:

- i. **Tangibles:** refers to physical attractiveness, equipment and materials used by the library, as well as employee performance". Tangibility in library service has to do with the conduciveness of the library spaces such as e-library space, reading areas, collection centres. Library must be able to provide adequate facilities to enhance teaching, learning and research activities of the users.

Library building must be located at a strategic place possibly at the centre of the university since it is regarded as the heart of university, but when planning the library necessary measures must be put in place to ensure that users interest is considered in whatever facility the library will provide, it must be far away from the market areas or lecture halls to avoid noise pollution and pandemonium from distracting library users, sanitation and general neatness of the environment must be ascertained.

Information and communication facilities must be adequately deployed to avoid wasting the time of users, and for effective service delivery. Toilet facilities for normal and physically challenged people must be available and keep clean at all times. Recreation facilities such as television, satellite receivers, computer games and constant facilities must also be put in place for retention of users. Other important facilities should be made available to user.

- ii. **Reliability:** This refers to the library's ability to provide adequate service repeatedly without making any mistakes and deliver services at the right time". Users will be coming to use the library with the intention of coming back to re-use the information resources, the library staff should keep proper record of the resources consulted by users.
- iii. **Responsiveness:** with regard to the willingness and ability of the employees to help users and respond to their requests, and informs when services will be provided" and then provide such services quickly without wasting users' time.
- iv. **Assurance:** The behaviour of the library staff that fosters customer's trust towards the library and the library can create a sense of security for user. Assurance also means that library staff is always being polite and master every knowledge and skills needed to handle any questions or concerns from the users.
- v. **Empathy:** It is defined as the caring, individualized attention provided to the users by the library staff. This dimension explains empathy through personalized or individualized services that users are unique and special to the library. The focus of this dimension is on variety of services that satisfies different needs of users, individualized or personalized services etc.

In this case the service providers need to know users' personal needs or wants and preferences. It implies that the library staff understands users' problem and act in the interest of users to provide personalized attention to, and has convenient hours of operation for maximum satisfaction.

The above 5 dimensions are the highlights of what the users may likely expect as the qualities of service that can lead to effective service delivery. In the context of this study, the dimensions 1 – 4 were sustained while "empathy" which was the fifth dimension

was replaced with a new dimension named 'Effectiveness' due to the fact that dimension number one (Tangible) and number three (Responsiveness) can take care of the "Empathy" in library setting.

The idea of effectiveness in this study was to ensure that the aim and objectives of providing library services was not being neglected. Every library tries to provide good quality services to its users and if the services are not effectively delivered then the users will not feel the impact of library in their teaching, learning and research.

The dimension effectiveness will include ease of access to library resources, availability of library portal, ease of use, ease of navigating the in and outside links on library portal, regular updating of the library portal, adequate bandwidth to access the electronic resources, regular checking of the library electronic resources links, regular information literacy training for library staff and users, uninterrupted power supply, regular subscription to most used electronic resources and adequate Information and Communication Technology (ICT) infrastructural facilities to maximize the use of electronic resources.

The quality of resources provided by university libraries is very important to the effective utilisation of the resources, an electronic resource is said to be of high quality when the credentials of the author is well known, its content covers what it is expected to cover, when it is current and when it has been peer reviewed and when the content is not overlapping and has been accessed from a reputable or high impact database or website. All these contributed to the quality of a good electronic resource and were measured by using adapted "ServQual" dimensions.

Users' expectations and perception were measured with 4-point Likert scale to rate their level of agreement or disagreement (1-strongly disagree and 4- strongly agree), in which

the higher number indicates higher level of expectation or perception. Perception was based on the actual service they received in the federal university libraries in Nigeria while expectations were based on the past experiences and information received about library services. Service quality scores is the differences between the users' perception and expectation scores which is mathematically represented as $ServQual = P - E$.

2.1.6. Electronic resources

Electronic resources have been defined by different scholars in the field of library and information science as information resources created and accessed through computer, or other networked facilities such as digital resource and archives, government documents, CD-ROM databases irrespective of their digital formats. Electronic in the context of this study can be described as any information bearing sources usually provided in softcopy be it text, graphics, audio, visual, audiovisual or image format that can only be accessed with the aid of electronic devices examples are computers, laptop, audio players, audiovisual players, Ipad, tablet, kindle, phablet and other smart phone.

Electronic resources can be viewed from three basic categories, namely; online, near line and stand alone. Examples of online electronic resources are; e-journals, e-books, online databases, world wide websites and example of the near line electronic resources are information resources on the Intranet of the university library be it full-text databases or abstracts provided that can be accessed within the institution through the university IP address and the stand alone resources are those resources that are domiciled in the library and can only be accessed within the four walls of the university library where it's being installed. Example includes information resources on CD-ROMs and other portable or storage devices.

Similarly, Anyim (2018) defined Electronic Information Resources (EIRs) as materials born-digitally or printed materials that were converted (digitised) into electronic format including those with rare or unique content or institution-specific resources such as university records and grey literature. They can either be subscribed to or perpetually purchased, pay per view, donated or open sourced and preserved for retrieval at a later time.

In addition, Emeghara (2014) opined that electronic information resource is a resource which requires computer access or any electronic product that delivers a collection of data, like text, image, etc., which is commercially available for marketing. For electronic resources to be acquired, it has to be either by subscription, acquisition or perpetual model, Paying-per-viewing or Patron-driven or through free registration with any of eBook database or e-journal publishers for partnership or authentication purpose. There are two types of databases, namely; Subject specific databases and multidisciplinary databases made available by the aggregators.

Aggregators are otherwise known as electronic resource vendors. Database vendor have their own ways of managing the electronic resources licensed to all libraries that subscribed to their resources which this study found that most university libraries under this study were not doing locally due to their total reliance on the SUSHI or Counter system management.

Different components of e-resources management systems of some business and management school libraries in India were examined and analysed by Partra (2017), the methodology used in the study was convenient sampling method due to the scattered nature of institutes of management in India, questionnaire was used as the instrument for

data collection, the data collected from the librarians in charge of managing electronic resources in their libraries selected studied were analysed with SPSS software.

Simple statistical tools such as frequency counts, mean and standard deviations, cross tabulation, and advanced statistical tools like ANOVA, chi-square test and multiple regression analysis, were used to analyse the data collected. The findings of the study identified that management of e-resources was one of the most important concepts in any library, another important thing the research observed was that librarians found it difficult to manage the e-resources after automation and digitization of library resources due to their inability to follow the steps involved in managing different components of electronic management resources such as selection, evaluation, acquisition, license agreement and renewal or cancellation of e-resource which are vital to management of e-resources.

The study discovered that better management of e-resources has direct effect on library ICT infrastructures available in the library and proportion of non-professional staff to total staff. In a similar view, Johnson *et al.* (2012) defined electronic resources as the materials that require computer access, whether through a personal computer, mainframe, or handheld mobile device. Electronic resources include electronic texts, institutional local contents, full text databases, library websites' inward and outward links, e-books, e-journal collection, numeric and statistical databases, reference databases, still and moving e-images.

Furthermore, Egberongbe (2011) defined electronic resource as an invaluable research tool that complements print materials in the library. Electronic resources as discussed provide unlimited access to current and archival information that might be restricted to some library users as a result of geographical location or funds. In another sense Library of Congress (2016) defined electronic resource as any work encoded and made available

for access through the use of a computer. The advent of ICT has led to the development, collection, management and use of e-resources in libraries. These resources are provided by the libraries to complement the available print copies in the library to ensure easy access to the electronic version of the library holdings.

Electronic information resources were defined by Ekwelem *et al.* (2009) as “information resources that are available and can be accessed electronically through computer networked facilities such as online library catalogues, Internet and the World Wide Web, digital libraries and archives, government portals/ websites CD-ROM databases”.

Elaturoti *et al.* (2018) conducted a descriptive survey, using simple random sampling to study 200 students from the Lead city university. This study observed that the authors were unable to achieve their first objective which was to access the effectiveness and efficiency of the available library resources. They were unable to clearly show the total population before drawing the sample of 200.

Literature on five dimensions (tangible, reliability, responsiveness, assurance and empty) were reviewed without proper application in measuring service quality in the study, the study used only one question to measure the concept satisfaction, generalisation of the inadequate utilisation of the library without correspondent data analysis to indicate the finding, the authors emphasised more other issues of awareness creation which contradicts the entries in the Table 2 where 90.1% of the respondents were reported to have utilised the library resources on either daily, weekly or twice a week and improper referencing as the style of citation did not conform with the current edition of the APA style of referencing.

Users' attitude towards digital information systems were investigated by Lau and Woods (2008), “the study evaluated the technology acceptance model (TAM) drawn from

literature on information systems (IS) to determine how user beliefs and attitudes influence learning-object use among higher education learners. The findings showed that an individual's attitude towards the use of learning object is significantly influenced by the individual's perception of the ease of use and usefulness. Users' perception of usefulness had a stronger influence on attitudes than user's perceptions of the learning objects ease of use. Judged by its direct relationship to attitude and behavioral intention to use; perceived usefulness was found to be the most significant factors influencing the user's acceptance of learning objects".

Ward *et al.* (2015) in a book chapter analysed their experience on users' complaints on the use of eBooks in the University of Connecticut (UConn) library as follows:

"Library users expressed their frustrations over rejected interlibrary loan requests for local contents of electronic databases in the University of Connecticut (UConn) library, sometimes they received automatic response of "e-book version not being suitable for their needs, simply because the e-book does not support copying lines of text or printing even a handful of pages". For users such restrictions are barely acceptable, in cases where printing is disallowed or sternly restricted, the e-book is deemed too inconvenient to be useful. Additionally, some e-books are missing images, tables, graphs, and even sections of text, either because of formatting difficulties or because publishers lack the rights to include them; in either case, their absence diminishes the usefulness of the book. For many users, the e-books that libraries offer simply are not acceptable substitutes for print books, let alone the feature-rich, value-added improvements they have the potential to be". Pg98

The authors were of the opinion that academic librarians need to know their users' expectations for accessing information and what users do with that information; this understanding is vital to informing not only what collections to acquire, but also the access methods. The above quote denotes the importance of usability of electronic resources in the university library bearing in mind the information seeking behaviour of the users.

2.2 Theoretical Framework

This study adapted "SERVQUAL" model, Technology Acceptance Model (TAM) and Expectancy Disconfirmation Theories (EDT) to guide the conduct of this study.

i. Parasuraman, Zeithaml and Berry's ServQual Model (1985)

SERVQUAL model is also known as gap model or RATER model designed with five dimensions for measuring service quality through gap analysis of the “Tangibles, Reliability, Responsiveness, Assurance, and Empathy dimensions, respectively.

ii. Technology Acceptance Model (TAM) and Theory (1975)

Technology Acceptance Model was developed from the social psychology theory of reasoned action (Fishbein and Ajzen, 1975). TAM states that, “users’ intention to adopt an information system is determined by two beliefs, namely; perceived ease of use and perceived usefulness”.

iii. Expectancy Disconfirmation Theory (EDT) (Oliver, 1977)

Expectancy Disconfirmation Theory by Oliver (1977) states that, “users’ satisfaction level is a result of the difference between expected and perceived product performance, and expectations as predictions of future performance”.

This study adapted the above models and theories since the study aimed at determining the influence of availability, usability and service quality on the users' satisfaction. The TAM Model and theory, SERVQUAL model and expectancy disconfirmation theory are relevant to the dependent and independent variables studied.

The research questions were on availability, usability, quality of library service and how library users perceive library service and what dimension(s) of library service quality they were satisfied or dissatisfied with. Thus, the study used expectancy disconfirmation theory to discuss the variables of users’ satisfaction while SERVQUAL dimensions was used to assess the quality of library service delivered in federal university libraries in Nigeria and TAM was used to measure users’ attitude towards the use of electronic means of evaluating library performance as well as staff and users perception of using new model

to assess and disseminate information for effective service delivery. For better understanding of the service quality and users' satisfaction, analysis and findings of the previous studies on these variables were discussed.

2.2.1 ServQual gap model

The concept of service quality originated from the marketing discipline in the early 1980's, it was evident from previous study that bankers, researchers, academics and professional librarians developed different methods of assessing the quality of their services in accordance with user's need and perceptions of their service.

In a similar vein, Griadhi *et al.* (2018) reported that "ServQual" Model otherwise known as RATER's model was designed by the marketing research team of Parasuraman *et al.* in 1985 then later revised and published in Journal of Retailing in 1988, ServQual is a multi-item scale instrument for measuring service quality related to the needs of the customers' perceptions of service quality in service and retailing organisations.

Similarly, Sahu (2008) described the "GAP model" and its "ServQual" instrument as one of the most widely used approaches for discussing and measuring the quality of service. This research found that ServQual has been used by librarians for many empirical studies carried out in academic, special, research and public libraries to measure the strengths and weaknesses of the services provided to their customers.

Furthermore, Kumar (2009) reported usefulness of ServQual in his study of factors affecting banking operations and services in India. Libraries and information professionals are now using the model to evaluate their users' perception as against the expected service quality. The findings of the study identified tangibles, reliability, convenience and competence as the four critical factors in banking sector. The authors recommended that banks need to be more competent in delivering their services, must

fulfil customers' assurance and must improve on the standard of their banking services to attract more customers and give them more sense of loyalty.

In addition, Daniel and Berinyuy (2010) reported that "ServQual" model was used in Kumar study to determine the critical factors in delivering quality bank services in Malaysia. The authors modified the "ServQual" dimensions by adding one dimension to increase the five dimensions to six; tangible, reliability, responsiveness, assurance, empathy and convenience. The concept convenience was preferred because it was considered to be an important determinant of satisfaction for banking customers. Figure 2.2 showed the connection between the existing gaps in library service delivery.

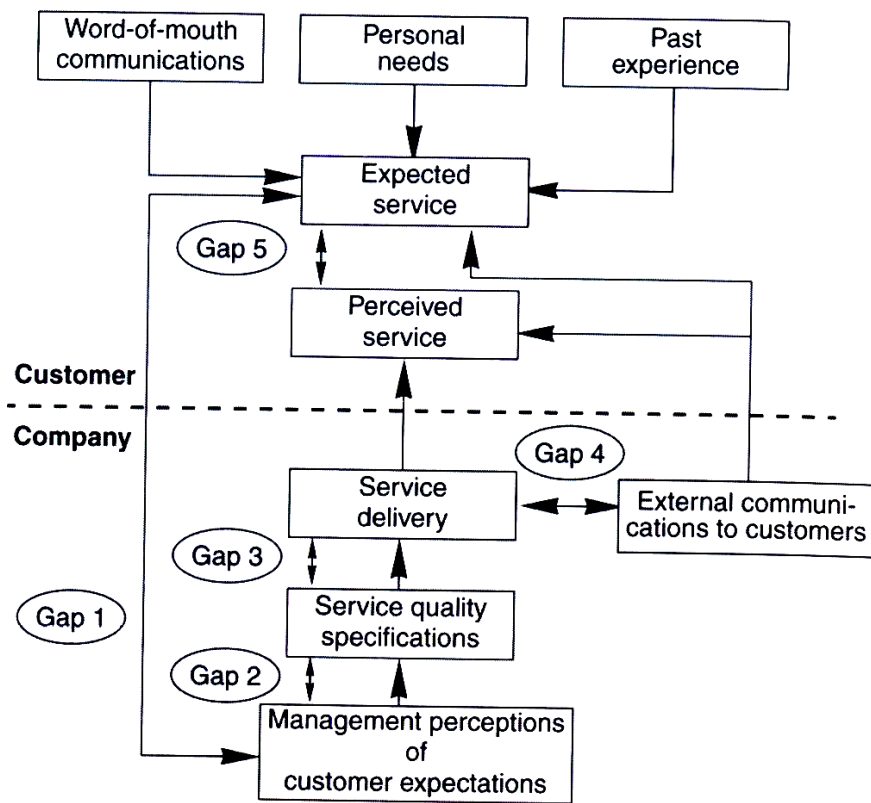
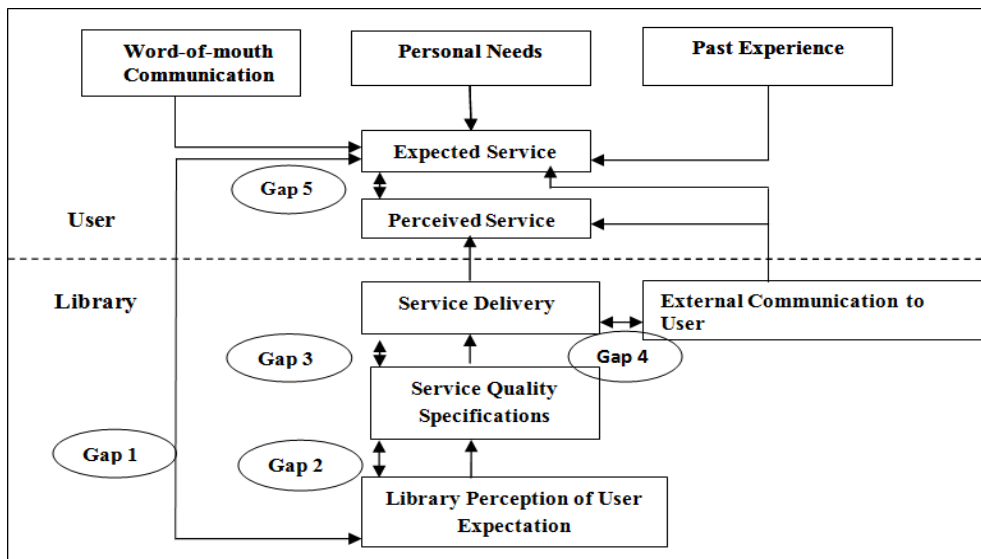


Figure 2.2 Adapted SERVQUAL Gaps



1985) ServQual Gap Model

The adapted ServQual Gap model as depicted in Figure 2.3 showed that users' perception of library service quality are being influenced by the following five gaps:

- i. **Gap 1:** This is a gap that showed the discrepancy between users' expected library service delivery and library management's perception. The gap is seen as the first determinant of the library service quality from which other gaps emanate.
- ii. **Gap 2:** This second gap is seen as the discrepancy between library management's perception of user's expectation and service quality specification. This gap may occur as a result of lack of commitment of library management and the staff to poor service provision, unavailability of adequate information resources, lack of leadership quality and lack of regular users' satisfaction assessment.
- iii. **Gap 3:** The third gap exists between service quality specification and service delivery. The third gap occurs as a result of differences in the actual library service delivery and the service specification based on the inability of library staff to perform their duties as expected. This problem may be as a result of ineffective recruitment exercises, lack of motivation, inadequate staff training, lack of commitment from the library staff or lack of managerial skills and inequality issues.
- iv. **Gap 4:** This gap occurs between service delivery and external communication. This gap may also be as a result of the exaggerated promises or ineffective communication to the library users, which raise users' expectations towards quality of library service delivery.
- v. **Gap 5:** This arises between expected service quality and the perceived service quality. The gap exists because of differences in the service expectation of users and users' library service perception.

2.2.2. Technology acceptance model and theory2 (TAM2)

The motive behind the adoption of technology acceptance model in this study is connected with prediction of users' intention to utilise library electronic resources by evaluating users' usefulness perceptions of the electronic information resources and ease of use of the fee-based database websites. Moreover, technology acceptance model proposes that the effects of external variables on usage intention are mediated by these perceptions. Therefore, by utilising technology acceptance model as a theoretical framework, the study will find the influence of external variables such as availability, usability and quality of library services, online and offline resources on users' satisfaction with library electronic services provision in federal universities in Nigeria.

The technology acceptance theory states that users' intention to adopt a particular system or an electronic information system is based on the perceived ease of use and perceived usefulness. Amongst these two beliefs, perceived ease of use described users' intention as the extent to which they believed that using an information system will be free of stress and effort while perceived usefulness is seen as the extent to which users believed that using the library electronic information system will enhance their learning and research activities.

Perceived usefulness has been confirmed to have a direct influence on library users' adoption intention because users will be more interested in using an effective information system provided it can offer the required valuable functions. In other words, perceived ease of use may influence users' adoption intention as well as perceived usefulness.

The easier it is for a user to interact with a system, the more likely they will find it useful and intend to use it. In addition, the technology acceptance model theorises that the effects of external variables such as availability of electronic resources, usability of library

databases or portal and general quality of library services on users' intention are mediated by perceived ease of use and perceived usefulness. The causal relationships among the technology acceptance model's variable are shown in Figure 2.4.

Technology Acceptance Model 2 (TAM)

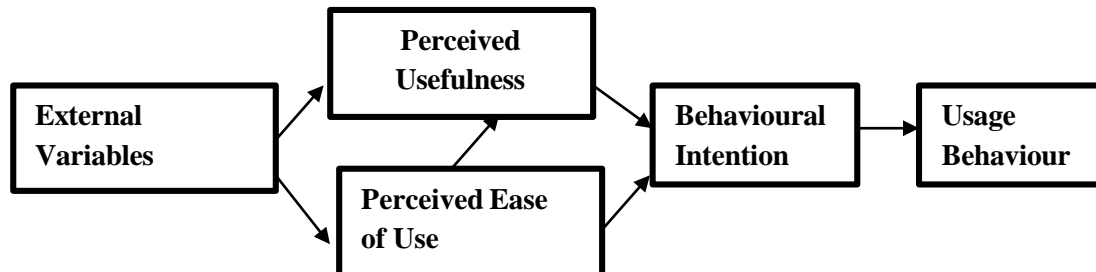


Figure 2.4 Technology Acceptance Model (TAM) Davis 1989 Adapted from Lai, P. C. (2017)

The Figure 2.4 was the final version of the Technology Acceptance Model and it was designed as a result of the findings of the perceived usefulness and perceived ease of use of the technology adoption model which was reported to have had a positive and direct influence on users' behavioural intention than the attitude, therefore the attitude construct was later eliminated from the model (Venkatesh & Davis, 1996).

Perceived ease of use and perceived usefulness of library electronic resources is connected with the way library provides information resources, stores, arranges, provides access or shares link or displays the electronic resources for easy access and retrieval by the users. Library and information science researchers preferred to investigate usability of electronic library resources instead of evaluating perceived ease of use or perceived usefulness directly (Lai, 2017).

Thus, usability can be viewed as the ability of an information “system to be used easily and effectively by library users”. The basic attributes of library electronic information usability that emerged from this definition are “ease” and “effectiveness”, which corresponds with the ease of use and usefulness of information systems respectively.

However, it is not good enough to study users' satisfaction without addressing the issues of perceived ease of use and perceived usefulness of a library database system interface particularly the fee-based databases. In such case, it will not be clear to know how each feature of the electronic database system contributes to the overall database system rating. Some researchers even assess the way information appeared on screen and viewed screen design as an area of concern for usability testing. Screen design is the way information is presented on the screen of any electronic device. Previous authors have reported that the mode in which information was presented on the screen is capable of influencing users' information search strategies as well as performance (Lai, 2016).

Thus, university libraries have to be mindful of what they put on the screen and how they put it since most of their electronic resources are made available on the screen and their activities centers round the graphical user interfaces (GUI) which may enable richer interaction between the library users and the information system.

The way electronic information icon is arranged on the screen can influence the users' interaction with electronic information resources beyond the effect of the information contents. For instance, too many alignment points will make scanning difficult, while poorly depicted buttons and icons can create confusion and misunderstanding on the database homepage. No doubt, a well-organised and carefully designed homepage on the screen can help the users to scan the screen and identify the relevant information more easily. In corroboration, Joo *et al.* (2011) reported that effectiveness and efficiency have direct relationship with satisfaction meaning that the two concepts can stand for satisfaction since the two constructs depend strongly on satisfaction when measuring the usability of library electronic resources platform.

This study used only effectiveness and efficiency to test the usability of library electronic resources. Effectiveness of library electronic resources is the accuracy and completeness with which library users achieve certain goals and it can be measured by quality of electronic resources and error rates (Nielsen, 2019). Quality of electronic resources platform is usually the primary indicator for effectiveness while error rates is the ability of a system to generate little or no error while users are searching and navigating through their links. Efficiency has been defined as the ability of a system to complete a given task with high level of productivity after learning the functionality and behaviour of a system (Nielsen, 2019).

2.2.3. Expectancy disconfirmation theory (EDT)

Expectancy disconfirmation theory has been used extensively in measuring user's satisfaction particularly in banking and other customer related sectors of which library is not an exemption. The theory is one of the prominent theories used for measuring how good or bad an organisation is doing. The present study found the theory more appropriate for describing the difference between users' expectation and perception of the library services. In corroboration, Elkhani and Bakri (2013) viewed expectancy disconfirmation theory (EDT) as a result of the difference in disconfirmation of expectation or users' positive or negative desire, which means a user's perception of the performance of the quality of library service is higher than the expectations or desires, it means positive disconfirmation has occurred.

The duo reported that the EDT was built upon the basis of cognitive dissonance theory (CDT) which is viewed as a dissonance between cognition of something and its reality. In other words, perceived dissonance leads to change of a library users' idea about a specific cognition (Bhattacharjee & Premkumar, 2004). The psychological reason behind the change is that dissonance feeling between whatever a person thinks about

qualification of something and what he/she realizes from the actual performance, if the performance is unpleasant, then the user seems to have discomfort in his/her mind, thus this uncomfortable feeling encourages the user to change his/her idea about cognition.

Expectancy disconfirmation theory can measure customer's satisfaction from the difference between customer's expectation and experience in perceived products or services (Spreng *et al.*, 2003; Oliver, 1988 & Patterson and Johnson, 1997). Whenever a user's perception of the performance of library service quality is lower than what is expected or desired about the quality of library services, it means that negative disconfirmation has occurred. Positive disconfirmation leads to users' satisfaction and negative disconfirmation lead to the user's dissatisfaction.

The Figure 2.5 showed the relationship between the components of the expectancy disconfirmation theory (EDT).

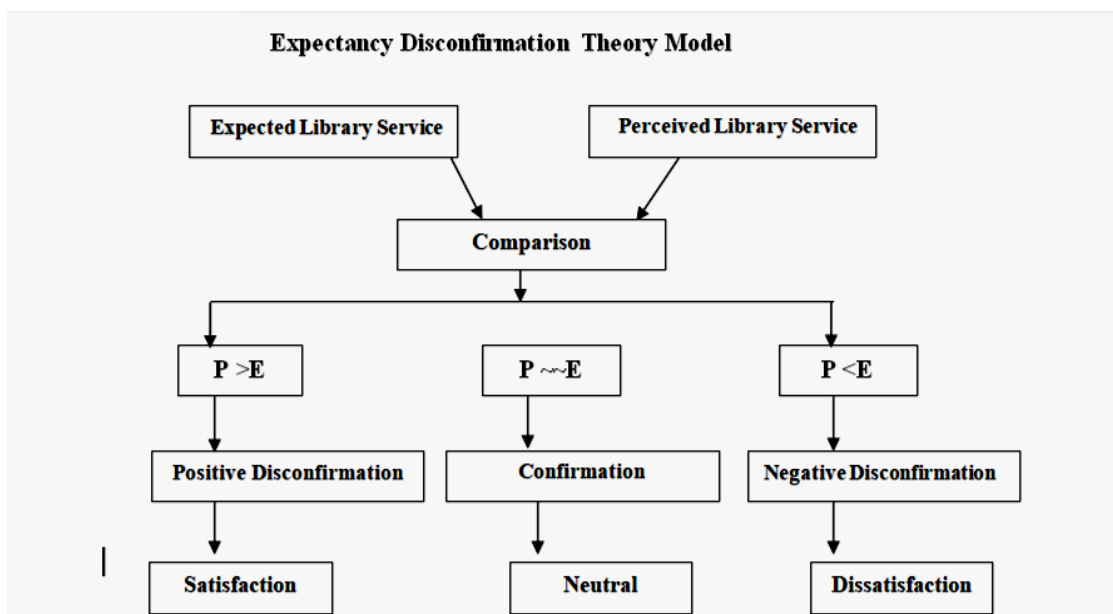


Figure 2.5 Expectancy Disconfirmation Theory Model

Source: Adapted from Oliver (1977)

Key: *P = Perception *E = Expectations > Greater Than, = Equal To
< Less Than

However, disconfirmation theory has been viewed by Mattila and O'Neill (2003) as the most popular theory for measuring customers/users' satisfaction, this theory argued that satisfaction is related to the size and direction of the disconfirmation experience that occurs as a result of comparing service performance against library users' expectations from the library service providers.

In a nut shell, satisfaction is to have occurred whenever library user's perception is greater than the expectations (i.e positive disconfirmation) and the model depicted dissatisfaction as library users' perceptions being less than the library users' expectations which is known as (negative disconfirmation). In other words, library users are assumed to be satisfied whenever their perception of library services is higher than the expectation while they are likely to be dissatisfied whenever their expectation is greater than the perception.

2.3 Review of Related Empirical Study

Academic libraries are libraries established and managed by any higher institution of learning to support in the achievement of aim and objectives of the founding institutions, these libraries are found in the universities, polytechnics and college of educations. University libraries are those libraries established by the universities to provide required support to the parent institution in the aspect of availability of current, relevant, and adequate information resources.

Considering the role of libraries in the quality of teaching, learning and research activities of the university community, it is obvious that the provision of electronic resources is quite indispensable for effective library services delivery.

Several scholars have examined the availability or use of one type of electronic resources or the other as it relates to the different institutions across the globe to either find out the challenges associated with the use or other issues as the case may be. Just recently a

survey was conducted by Austin and Nelson (2020) to determine the challenges associated with postgraduate students' awareness and use of online journals in Nigerian universities.

The study adopted descriptive survey design using 10, 775 registered postgraduate students in federal and state universities in south-south geo-political zone of Nigeria as the population of the study. Sample size was determined with Krejcie and Morgan table and 370 registered postgraduate students were recommended and chosen as the appropriate size for the study. The instrument used for data collection was questionnaire and were personally administered and retrieved by the researchers with the help of research assistants. Mean and standard deviation were used to analyse the data collected.

The duo found that the lecturers were not aware of the online journals ($\bar{X}2.94, SD=.87$); lack of knowledge of publishers of online journals ($\bar{X}2.67, SD=.98$), lack of user education on online journals from university libraries ($\bar{X}2.80, SD=.93$), inadequate computer systems in university libraries ($\bar{X}3.58, SD=.73$), frequent power outages in libraries ($\bar{X}3.48, SD=.66$), and slow connectivity in university libraries ($\bar{X}2.96, SD=.94$) among others. Post graduate students recommended several strategies that will enhance the awareness and use of online journals.

The study of the duo recommended that the cost of data bundle should be reduced by service providers, particularly for postgraduate students to enhance the use of online journals; university libraries should engage in aggressive awareness campaign for maximum utilisation of the electronic journals and their usefulness for effective research in universities and the university libraries advised to create a database of open access online journals to enable users search full text articles online from various publishers.

Based on the findings of the study of the duo, the ongoing research work will no doubt help in providing additional strategies that will close the gap between the library, lecturers and the postgraduate users in order to create an effective means of sensitising the users for maximum utilisation of the electronic resources in the university libraries in Nigeria.

In a study of Adeniran (2013), it was reported that most library users were aware of the electronic resources available in the university library but the usage was low. Same vein, Agbawe (2018) conducted a survey on the use of electronic information for academic research by postgraduate students at Delta State University, Abraka, Nigeria. The study adopted descriptive survey method and used purposive sampling technique to arrive at 150 participants out of 2,786 registered postgraduate students for the 2015/2016 academic session that completed the research questionnaire which was administered during the data gathering period.

In addition to the questionnaire, the author also interviewed ten (10) respondents among which eight (8) of them were postgraduate students and two library staff. The study found out high level of electronic information resources awareness among the postgraduate students of the University with low level of utilisation due to inadequate ICT equipment and space, irregular power supply, low bandwidth, lack of training and difficulty in downloading full-text files that formed part of the reasons that necessitated the need for carrying out this study.

Furthermore, Anyim (2018) reported in a study of 240 respondents comprising postgraduate students and academic staff of the Salem University, Lokoja; Kogi State University, Anyigba and Federal University, Lokoja that users of the university electronic libraries expressed their dissatisfaction with the e-library services, due to problems faced

in accessing the e-resources and low quality of library services which grossly affected effective research activities.

This according to the author, users of the library would be scared to patronise the electronic library and that may result into low research output and falling standard of education. The study concluded by recommending adequate financial support to the university libraries to acquire electronic library facilities, to subscribe to adequate, relevant and current electronic resources that will meet academic researchers' information needs, regular training of electronic library users on information literacy skills and above all employment of qualified digital librarians are vital to the effective digital library services.

In a similar study, Umar *et al.*(2018). Conducted a survey on the provision of digital reference resources and services in federal university libraries in Nigeria, a descriptive survey research design was adopted for the study, no sampling technique was adopted as the authors applied the enumeration technique to study the 71 professional librarians that constitute the entire population of the study.

Observation checklist, structured questionnaire and interview were instruments used for data collection in the study: The data collected was analysed and presented in simple mean, percentages, tables, charts and frequency counts. The findings revealed that University of Agriculture, Makurdi (UAM), Federal University Lafia, (FUL) and University of Abuja, Gwagwalada (UA) have digital reference resources such as ebooks, dictionaries, encyclopedias, full-text journals, audio visual files, newspapers, journals, and theses excluding online data bases and dissertations. The authors reported inadequacy of fund, erratic power supply, and high cost of subscription/packages among others as the challenges facing the three university libraries.

In a similar vein, Abubakar and Akor (2017) conducted a survey research to determine the availability and utilisation of electronic information database for research by agricultural scientists in federal universities in north-central, Nigeria. The population for the study was 415 and stratified sampling method was used to select 195 respondents to represent the entire population using questionnaire and documentary records as the instruments for data collection. The study was analysed with frequency distribution tables, percentage, mean and standard deviation. The study reported that, use of electronic resources were very common among lecturers and research scholars of the university meaning that majority of teachers and research scholars actual depend on electronic resources to get desired and relevant information.

As part of the gaps that necessitated the current study, Abubakar and Akor reported that 115 (59%) respondents agreed that slow and expensive service was the major factor inhibiting the provision of electronic information resources, 101 (72%) respondents indicated insufficient computers to access the resources and others reported power outages. Among the challenges identified in the study was that of inadequate infrastructure for accessing the resources which the researcher viewed as one of the factors that can lead to users' dissatisfaction. These challenges are part of the issues that the current study will triangulate so as sustainable solutions can be proffered.

In a survey of two university libraries in Niger State Abu *et al.* (2017) sampled 74 professionals and paraprofessional staff to obtain information about the availability of information resources in the two libraries. The instruments used were questionnaire and observation checklist for data collection and the findings of their study shows that respondents were highly dissatisfied with the availability of the following resources and

services: eBooks, e-journals; electronic library services, audiovisual and marketing services as a result of their low quality.

The respondents were of the view that inadequate and obsolete information resources in two university libraries were attributed to inadequate funding of the two university libraries. The paper concluded by recommending the needs for adequate ICT facilities and current information resources in the libraries. Obviously, recommendation is the only solution to these problems but to also find a way of having a sustainable library services so as to justify the reasons for being the nerve centre of the university.

Edem and Egbedore (2016) conducted a descriptive study on availability and utilisation of electronic resources by postgraduate (PG) students in the University of Calabar (UNICAL) Library. A sample of four hundred (400) postgraduate library users was selected using stratified random sampling method to represent the total registered postgraduate students.

Data collected from the questionnaire was analysed with Pearson Correlation Coefficient (r) to test the hypothesis at 0.05 level of significance. The university library was found to have electronic journals, electronic books and access to various important databases and services. Electronic journals were discovered to be the most often used electronic resources among the University of Calabar library electronic resources.

The result of the analysis revealed that postgraduate students were found to have utilised the online databases while lack of computer skills, slow network, power outage, ineffective services, and irrelevant electronic information resources were the problems faced by the postgraduate students while accessing and using electronic resources in University Calabar library. Based on the findings, the author recommended that adequate funding should be given to the university library for subscription to online resources and acquisition of electronic books, more relevant open access databases should be downloaded and made

accessible to users, awareness creation should be taken more seriously, power back-up systems should be made available in the electronic library and there should be regular user education training for better use of electronic resources in the university of Calabar library.

In a study conducted by Paris and Otike (2016) as quoted by Adamu, (2017) the duo reported that “university libraries are now facing the challenges of under utilisation of resources largely because of lack of awareness, lack of time, lack of skills, in adequate collection and lack of steady power supply”. Issues of low utilisation were reported by (2011) that academic libraries are experiencing dwindling usage in Nigeria as a result of so many factors which includes advances in information and communication technology and its impact on information access; handling and delivery; inadequacy of skilled librarians; conservative attitude of professionals; lack of consultancy services to faculty and students; irregular power supply and lack of physical library.

Towolawi and Appah (2015) in a survey on utilisation of library resources and services investigated the use of library resources and services among the undergraduate students of Bells University of Technology Library, Ota, Ogun state using a self-designed instrument called “resources and services utilisation assessment questionnaire (RSUAQ) for collecting data.

The data collected were analysed using multistage sampling technique to select 400 students from 510 students admitted during the 2010 / 2011 academic session, the findings reported the university library had adequate library resources and facilities for teaching, learning and research.

Among the findings were the use of library for the purpose of borrowing books 140 (36.3%), assignments 120 (31.0%) and research purpose 86 (22.3%), 108 (46%) of the respondents reported have had access to limited copies of print materials in the library

and as a result of inadequate print materials, the students recommended electronic copies to compliment the hard copies.

The review accessed library resources without determining the availability of electronic resources and concluded that the library had adequate resources and facilities despite lack of electronic materials at this digital era. The researcher viewed the conclusion as deficient because of the inability of the author to make the state of electronic in the library known to readers for clarification and future improvement.

Saikia and Gohain (2013) studied use of library resources, user's satisfaction in library resources and services and information seeking behaviors of the students and research scholars of Tezpur University. Two hundred students and research scholars of Tezpur University were sampled to collect relevant data.

The report of the study shows that 79.5% (159) library users visited University of Tezpur's Central Library everyday to borrow library books. It was found that 82.39% (131) users borrowed text books, 79.87% (127) consulted journals and 75.47% (120) read newspapers to meet their information needs. The authors were of the opinion that user guidance is necessary to help library users to meet their information needs and make users aware of the available library resources and services.

Isiakpona, and Ifijeh (2012) studied the availability of electronic resources for service provision in three university libraries in Ogun State Nigeria. The authors reported Ebscohost, HINARI, JSTOR, Oare, MIT, AGORA, ScienceDirect and IEEE as the types of available electronic resources in Babcock University, Covenant University and Federal University of Agriculture, Abeokuta.

The paper examined students' perception of e-resources in academic libraries: case study of the serial's section of 'Nimbe Adedipe Library, Federal University of Agriculture,

Abeokuta, Ogun State, Nigeria. The survey research method was adopted for this study. A structured questionnaire was designed and used to collect data for this study.

The population of the study constitutes the number of students that came to the serial's section over a period of a month which was four hundred and forty-one students (441). The method used for the selection of the population was simple random sampling. Data collection instrument was questionnaire.

The study analyzed responses from 376 undergraduate students and 65 post-graduate students. Findings revealed that both postgraduate students' and undergraduate students' perception of e-resources were on the positive side because they perceived it has been used for their research and this had high impact on usage of the resources at the Serial Section of the library.

Lucky (2012) studied the Dhaka University Library (DUL) users to determine the available electronic facilities and services and its impact on users. The study showed that the DUL started its automation project in 1998 using an in-house software (known as Interim Solutions).

The project was funded by the UNDP and the University of Grand Commission (UGC); provided access to a wide range of scholarly electronic resources of about 20,000 online journals mostly accessed by the university members based on licensing terms and conditions, the electronic collection of the DUL was reported to have been made available through INASP-PERI Consortium since 2007. The e-journals were link to the university websites and it provided very easy interface to its users. The electronic resources were utilised by the faculty members, students, research officers and staff of the Dhaka University.

The research instrument used was questionnaire, data collected was analysed with simple percentage and the findings revealed that limited access to computer, limited number of titles, slow download speed, difficult to find relevant information and limited access to back issues were the challenges faced by the DUL users. The study recommended users' needs assessment before and after subscription to electronic resources, survey on users assessment should be done at regular interval.

Library should also receive information and suggestions from the faculty members and the students, to aid the subscription process. The university libraries should organise training programme for faculty members, so that they can know about different search interface, latest changes in the journals site and develop sophisticated searching and retrieval skills or techniques; bandwidth of connection must be increased in the DU campus to boost access, users should be part of electronic acquisition process to ensure relevant subscription. The situation in DUL is similar to what is happening in university libraries in Nigeria and author's recommendations can be of help if put into use.

In a study conducted on the availability and accessibility of electronic resources in the federal universities in Nigeria by Umeozor and Emasealu (2017) the duo assessed the impact of donor agencies in interventionist programmes with special focus on the availability and accessibility of e-resources in Nigerian federal universities in Nigeria especially University of Ibadan (UI) and Obafemi Awolowo University, Ile-Ife (OAU).

An 11-item structured questionnaire was used for data collection from 480 lecturers who were the subject of analysis for the study. 240 lecturers were selected from each university, 80 respondents were selected from three faculties per institution while 20 lecturers were drawn from four departments per faculty after which the duo had a 70% response rate to be analysed using different statistical methods.

The methods of data analysis used were variance, Duncan's multiple range test, frequency counts, mean and percentages. The study found that AGORA, HINARI and JSTOR were the most used electronic resources by the lecturers of the university of Ibadan with scores 98.2%, 98.2% and 96.4% for the faculties of Agriculture, Science and Social Sciences while the three electronic resources (AGORA, HINARI, and JSTOR) has 100% responses from the three faculties in OAU.

The study reported that the three databases were more available to use than any other electronic resources, while the statistical analysis of variance indicated that there were significant differences in the level of awareness of availability of the 12 electronic resources platforms studied, while Oare, ODS, Ebrary, African Virtual University, Aluka, Obsavatory, Ebscohost and Bio-One had low scores. It was reported that the interventionist programmes have had a positive impact on the e-resources users in the federal university libraries. The study concluded that the purpose of interventionist programmes was to promote wider access to information and library development.

In the study of Walmiki and Ramakrishnegowda (2009) it was reported that the university libraries in Karnataka used ICT facilities for their day to day operations. This was found in the selected six university libraries. The duo used a structured questionnaire to obtain data from the university librarians. The data was collected on hardware infrastructure for example availability of ICT i.e. personal computers, laptops, printers, scanners etc. Software facilities for automation of housekeeping operations, digital library services were included in the survey.

Availability of campus LAN and facilities to provide access to information sources are detailed in the study. The survey revealed that most of the libraries lack sufficient hardware facilities and software with required bandwidth. University libraries need to

have workable plans, proper implementation and development of ICT infrastructure to exploit the benefits of digital information environment.

Sujathan and Mudhol (2008) examined the “use of electronic information sources (EIS) by the teachers/scientists, research scholars and postgraduate students in the college of fisheries, Mangalore”. The objective of the study to identify the constraints faced by the respondents while using the electronic information sources and the access the satisfaction level of the users with access to electronic information sources in their institution.

The questionnaire was administered using a simple random sampling technique. It is observed that majority of the respondents have rich experience in the use electronic information sources, where (71.5%) have more than three years of experience. E-mail is the most frequently used e-information source followed by web sources. Among the various fisheries information source in electronic format, subject specific information websites (79%) international/regional institution websites (75.3%), e-journals (65.5%), (CD-ROM) bibliographic database (60.5%), research project sites (56.8%) and professional association websites (54.3%) are found to be used by the majority of the respondents.

In view of the way authors assessed the level of satisfaction by users of the electronic resources in Nigerian federal university libraries, it's obvious that users were not given enough opportunity to respond to questions that would assist the researchers to identify the major determinant of their satisfaction which would have assisted, the librarians in the provision of effective service delivery and boost the user's level of satisfaction with library electronic information services.

In an attempt to measure users' satisfaction, Musyoka (2013) developed a standard questionnaire from ServQual instrument of Parasuraman *et al.* (1988) and distributed to

respondents across the universities in Kenya. Regression analysis was used to determine the relationship between the five variables of ServQual gap model. From the analysis, it was established that service quality has a statistically significant positive effect on user with a value of 73.9%. This in essence implies that service quality accounts for 73.9% of library users' satisfaction.

The findings further revealed that Reliability dimension contributes largely towards users' satisfaction while Empathy dimension contributes the least. The results also indicate that the libraries cannot afford to ignore any of these positive dimensions since they all appear to influence the users' satisfaction although to different degrees except the empathy which this current study will replace with 'Effectiveness' due to its insignificance in library service delivery.

2.4 Summary of the Reviewed Literature

The study reviewed related literature on availability of electronic resources in the federal university libraries, usability of electronic resources, library service quality, users' satisfaction, technology acceptance model and theory of expectancy disconfirmation, and "ServQual" model. The review on technology acceptance model theory, ServQual and expectancy disconfirmation theory test (the use of difference scores, direct measurement and linear analysis models) found that some theoretical and methodological issues had negatively influenced the findings of the previous research conducted on users' satisfaction.

The review showed that several authors reported low utilisation of electronic resources and users' dissatisfaction in Nigerian federal university libraries without using the appropriate statistics to test the problems before drawing conclusion.

This corroborated with the researchers' statement of problem which showed the gap in the literature that signified the necessity for carrying out this research. The university libraries according to the review are suffering from low utilisation of resources particularly low usage of electronic resources compared with the investments made in the subscription of the resources.

Previous scholar reported users' dissatisfaction with the provision of electronic library services due to their inability to access the resources and above all is the low service quality. Extensive use of "ServQual" for assessing factors affecting banking and education sectors, among which none of the studies were conducted in Nigeria, no author has conducted empirical study using ServQual instrument to determine the influence of usability and library service quality on users' satisfaction.

The technology acceptance model, expectancy disconfirmation theory and ServQual Gap Model has helped in identifying the availability, usability and quality of electronic service delivery in the federal university libraries. Users' needs assessment before and after subscription to electronic resources, users' needs assessments and usability testing were reported to have been conducted with significant impact on the use of electronic resources possible because of lack of triangulation in the previous studies reviewed.

The review of empirical studies showed that previous studies have investigated the concept of usability of library resources and library service quality with just one or two questions which have left no option for their respondents than to just tick one option which might have not really express their feelings, perceptions and expectations.

These are vital to evaluation of users' satisfaction; the review has also unveiled the inability of the previous authors to adopt ServQual instrument for measuring Nigerian library service quality in order to identify the important indicators for measuring users'

satisfaction. It was also observed that usability researchers have either used effectiveness or efficiency to measure usability of library without combining the two concepts for better understanding of the situation. Above all no author has either prototyped or modified the expectancy disconfirmation model to measure library user's satisfaction which the review has proved necessary for effective library service delivery.

In view of this, there is no doubt, the previous studies have left wide gaps in the study of usability and services quality as it affects users' satisfaction with electronic services provision in federal university libraries in Nigeria. This necessitates the conduct of the current study to facilitate the identification of the determinant of users' satisfaction for effective services delivery and resource utilisation in Nigerian federal university libraries.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Research Design

The study adopted mixed methods approach to describe the situation studied. The methods used were survey, focus group, observation and interview designs. Mixed methods approach was considered to be more appropriate for this study since it enabled the researcher to examine the influence of usability and quality of library service delivery on users' satisfaction with electronic services provision in federal university libraries in Nigeria.

The researcher saw the descriptive survey research as a design suitable for measuring a wide variety of unobservable data on usability, quality of service delivery as well as users' satisfaction and its ability to collect data remotely from a large population that is too large to be observed directly. This resulted in a better understanding of the dependent and independent variables, thus, the study used descriptive survey design to gather relevant data for effective decision making.

The researcher used focus group to interact with respondents in order to hear their view points on library electronic resources and facilities provided. The focus group gave the discussion a breadth, complexity, and variety that would not be available through surveys. In a nutshell, focus groups are an important way to learn more about user's thoughts and views on a specific library service.

The study adopted online survey and transactional logging to evaluate usability of the prototype using two constructs from the ISO 9241-11 standards (effectiveness and efficiency) to ascertain the perceived ease of use and perceived usability of the library assessment tools for measuring users' satisfaction with electronic resources. This method

gave the researcher the ability to remotely observed all the transactions that happened on the system before the 60 sampled librarians completed the survey.

S/No	Institutions	No. of Postgraduate Students	Heads of ICT Section
1	University of Ibadan, Ibadan	6,434	1
2	University of Nigeria, Nsukka	2,736	1
3	Ahmadu Bello University, Zaria	216	1
4	Obafemi Awolowo University, Ile-Ife	642	1
5	University of Lagos, Akoka	621	1
6	University of Benin, Benin – Edo State	247	1
7	Bayero University, Kano	417	1
8	University of Calabar,	NA	1
9	University of Ilorin	4,868	1
10	University of Jos	265	1
11	University of Maiduguri	41	1
12	University of Port-Harcourt	NA	1
13	Usmanu Danfodiyo University, Sokoto	258	1
14	Federal University of Technology, Owerri	259	1
15	Federal University of Technology, Akure	NA	1
16	Modibbo Adama University of Technology, Yola	NA	1
17	Federal University of Technology, Minna	30	1
18	Nigerian Defence Academy, Kaduna	834	1
19	Abubakar Tafawa Balewa University, Bauchi	1,528	1
20	University of Abuja, Gwagwalada	NA	1
21	Federal University of Agriculture, Abeokuta	NA	1
22	University of Agriculture, Markurdi	NA	1
23	University of Uyo	NA	1
24	Michael Okpara University of Agricultural Ummudike	596	1
25	Nnamdi Azikiwe University, Awka	62	1
26	National Open University of Nigeria, Lagos	3,570	1
27	Federal University, Dutsin-Ma, Katsina	20	1
28	Federal University, Kashere, Gombe State	NA	1
29	Alex Ekwueme University, Ndufu-Alike, Ebonyi State	NA	1
30	Air-Force Institute of Technology Kaduna	NA	1
	Total	23,644	30

Table 3.1 comprised the breakdown of the postgraduate users obtained from the approved postgraduate schools (NUC Website News Bulletin, 2019) sample libraries.

Table 3.1: Population of Registered Postgraduate Users of Federal University Libraries in Nigeria

Table 3.1 showed that the population of this study consisted of 23,644 postgraduate students from the NUC approved federal universities to run postgraduate programmes in Nigeria and the 30 heads of ICT division making a total population of 23, 674. Details of the stratification of the Nigerian federal universities has been listed in the Appendix I, page 158.

3.3 Sample and Sampling Techniques

The sample size for this study was 773 postgraduate users and six heads of Information and Communication Technology (ICT)/ System Librarians. This study applied multistage sampling technique to arrive at the sample size that represented the registered postgraduate users for the selected federal university libraries from the six geo-political zones of Nigeria.

Purposive sampling technique was used to select federal universities running postgraduate programmes from the 43 federal universities in Nigeria. In selecting the 6 universities that represented the 6 geo-political zones of Nigeria, stratified sampling procedure was adopted and finally simple ballot system of random selection was used to select one federal university from each geo-political zone.

This was done in accordance with Taherdoost's (2017) opinion that a random sample of sufficient size is needed to avoid sampling errors or biases in the generalization of research findings. Simply put, larger sample sizes reduce sampling error significantly, but at a decreasing pace.

**Source: NUC Website News Bulletin: Approved universities to run postgraduate programmes in Nigeria and Circulation Librarians (17th June, 2019).
www.nuc.edu.ng**

Abdullahi Fodiyo Library Complex, Usmanu Danfodiyo University, Sokoto (North-west), Ibrahim Badamasi Babangida Library, Federal University of Technology, Minna (North-central), Hezekiah Oluwasanmi Library, Obafemi Awolowo University, Ile-Ife (South-west), Ramat Library, University of Maiduguri (North-east) and John Harris Library, University of Benin, Benin City, Edo State (South-south) geo-political zones respectively. Details of how the universities that represented each of the geopolitical zones were selected could be found in the Appendix I.

The sample was drawn from the total population of all registered postgraduate library users for 2018/2019 academic session and the six heads of Information and Communication Technology (ICT) division of the selected university libraries. Table 3.2 showed the detailed information about the sample selected for the study using Raosoft online sample calculator at 95% confidence level with 5% confidence interval (2004). Raosoft sample calculator was found suitable due to its reliability in determining required minimum sample to be studied for effective representation of the population.

For 1,477 a sample of 773 registered postgraduate users from the six federal university libraries were found appropriate for the study. This is in line with the views of Zanboni (2018) who stated, “Larger sample sizes help researchers to better predict their data's average values and prevent a small number of potential samples from testing errors”. Table 3.2 gave details of the sample size of the study.

Table 3.2: Target Population and Sample Size of the Study

S/No	Name of Library/ Institutions	No. of Registered PG. Students	Sample Size
1	Ibrahim Badamasi Babangida Library (FUT), Minna	30	30
2	Ramat Library (UNIMAID), Maiduguri, Borno State	41	41
3	Abdullahi Fodiyo Library Complex (UDU), Sokoto	258	155
4	John Harris Library (UNIBEN), Benin, Edo State	247	151
5	Federal University of Technology Library, Owerri, Imo state	259	155
6	Hezekiah Oluwasanmi Library (O. A. U), Ile-Ife, Osun State	642	241
	Total	1,477	773 6 (HOD, ICT) 779

Source: Researchers' feasibility study data through Circulation Librarians (2019)

Note: Total enumeration (census) was used for the libraries with less than 100 registered postgraduate students and the six heads of the ICT in the selected federal university libraries. Therefore, there was no need for any sampling of the library staff. Thus, the sample size for the study is 779.

3.4 Instruments for Data Collection

This study used three sets of questionnaire, interview guide, focus group guide, observation checklist and usability evaluation tools as instruments for data collection.

3.4.1 Questionnaires

A questionnaire is a study tool that consists of a set of questions designed to collect data from respondents. Questionnaires are similar to written interviews in that they collect information. They can be done in person, over the phone, on the Internet, or by mail.

Three sets of structured and semi-structured questionnaire were designed for this study; one was for the Information and Communication Technology (ICT) / System Librarians and the other two were for the postgraduate students of the selected universities. The

University Library Services' Assessment Questionnaire (ULIBSAQ) was a seven page instrument designed for the heads of ICT, the questionnaire consisted of sections A, B, C and D. Section A: This section described the demographic characteristics of the heads of ICT including the name of the library/institution, sex, rank, qualification, and years of experience. Section B1. consisted of 30 items observation checklist; the researcher tried all the available fee-based databases during and after the field trip to monitor the changes in their mode of access; B2 consisted of eleven (11) statements on acquisition of electronic resources and services in the federal university libraries in Nigeria, the questions were on adapted 4 Likert scale. To determine the frequency of provision of the electronic resources; the statements were listed in respect of the peculiar issues related to the availability of electronic resources; in addition to the aforementioned question. The third question had fifteen items determining frequency of use of the library EIR; the fourth and fifth questions, each with five and four options focused on training conducted to explain how to access and use electronic resources.

Section C's goal was to Figure out how frequently the available electronic tools were being used, to confirm adequacy of the library ICT facilities, accessibility, technical and faculty roles. Section D of this questionnaire was based on quality of electronic resources comprising 5 sub-divisions namely tangible (4 items), reliability (4 items), responsiveness (5 items), assurance (4 items) and effectiveness (8 items) respectively.

The F section was to identify the challenges facing the provision of the electronic resources in the library. Fifteen challenges were listed for the respondents to express their level of satisfaction; questions 17 and 18 were open-ended questions for the respondents to predict the continuity of electronic resources and services in federal universities in Nigeria and to suggest or recommend ways of improving library services.

Library users assessment questionnaire (LUSAQ) was a nine page instrument designed for the postgraduate users to rate the library electronic resources and services. The questionnaire consisted of sections A, B, C and D. The section A described demographic characteristics of the postgraduate users, including the name of the library/institution; sex; faculty; programme of study and the degree in view.

Section B consisted of the observation checklist comprising 32 types of electronic resources and others (specify) making 33 constructs to determine the available electronic resources they use in the federal university libraries in Nigeria, The second item in this section was a 13-item question aimed at determining level of users' satisfaction with library electronic resources and services in the federal university libraries in Nigeria. The question rated the level of satisfaction with 13 items on an adapted 4 Likert scale using highly dissatisfied, dissatisfied, satisfied and highly satisfied.; the third question was on utilisation of the frequency of use of e-resources with 16 items on an adapted 4 likert scale.

Section C was designed to determine the quality of electronic resources and services with perceived and expected library services having 25 statements as against the 22 adopted ServQual instrument for measuring library performances. Item one of this section was based on the quality of electronic resources comprising 5 sub-divisions namely: tangible (4 items), reliability (4 items), responsiveness (5 items), assurance (4 items) and effectiveness (8 items) respectively; while item 2 had same number of statements to determine the users' expectations. Item 3 of the questionnaire was on the influence of library electronic service quality on users' satisfaction. The question has 10 items to determine the influence. Item 4: was designed to identify the challenges faced in using electronic resources in the library. Twenty challenges were listed for the respondents to

indicate their agreement or disagreement; questions 21 and 22 were open-ended questions for the respondents to predict the continuity of electronic resources and services in federal universities in Nigeria and to suggest or recommend ways of improving library services.

Library electronic database usability questionnaire (LEDUQ) also known as Task II was a 2-page questionnaire designed for the postgraduate students that voluntarily consented to partake in the focus group discussion and usability tests. This was part of the feedback mechanisms designed by the researcher to determine the determinants of participants' satisfaction. Library electronic databases usability questionnaire (LEDUQ) was divided into two sections; section A of the LEDUQ consisted of demographic data (name, sex, faculty/ department and degree in view); section B asked users to rate the effectiveness and efficiency of library electronic resources after completing the usability tasks and later express their satisfaction. The items measured the usability of electronic resources by adapted 4 likert scale with ix items on effectiveness and vii statements on efficiency.

Usability evaluation form for expectancy disconfirmation prototype was design for library and information professionals to evaluate the usability of the prototype designed to proffer solution to the communication gap between the library and users' community. The items measured the usability of electronic resources a 4-likert scale with xi items on effectiveness and vi statements on efficiency respectively.

3.4.2: Observation checklist

An observation checklist is a list of recommended electronic resources or databases for university libraries that assisted researchers in determining which electronic resources are available and identifying gaps in those resources. A structured checklist was used to conduct direct observations of the available electronic information resources in the six sampled federal university libraries. The aim was to identify the electronic resources that

were accessible and those that were not accessible after subscription, those that were accessible but responded slowly during the assessment period, and those that responded and were not relevant to the users' information needs. The checklist consisted of 30 recommended electronic databases/ resources widely used for teaching, learning and research in the academics based on their relevance to information that the researcher considered necessary and needed to be available and accessible in the six selected federal university libraries.

3.4.3: Interview guide for the heads of ICT

Interview is a formal meeting in which the Heads of ICT sections were asked whether or not they provide electronic services in the libraries. The interview guide was used to obtain additional information from the heads of ICT so as to complement the responses provided in the questionnaire. The guide was used to determine how often the library subscribed to electronic resources, the number of electronic resources that were previously available but could not be renewed because of some difficulties, how to promote electronic resources, channels of communication between the library and user community, number of training organised in a session, level of satisfaction with the use of the library and how the library monitored the use of fee-based electronic resources.

3.4.4: Focus group guide

A focus group interview is a qualitative method of gathering information from a group of people. The study used focus group guide to conduct the interactive session organised for the participants before taking the usability test. This method was used to further assessed their perception of library services, the frequency of use of library electronic resources, level of awareness, the type of electronic resources, the preferred channels of communication and their personal attitudes towards the use of library electronic resources.

3.5. Validation of the Research Instruments

The face and contents of the instruments for this study were validated by three lecturers in the field of Library and Information Science including the two supervisors; one expert in Measurement and Evaluation.

Validity of instrument is the extent to which any instrument measures what it is supposed to measure. Meaning that, an instrument is not good even if it is reliable unless it measures what it was designed to measure.

3.6 Reliability of the Instruments

The researcher designed three structured open and close ended questionnaires, interview guide for the heads of ICT and the postgraduate students of the Kashim Ibrahim Library, Ahmadu Bello University, Zaria; Kaduna State University Library, Kaduna; Ekiti State University Library and Ladoko Akintola University of Technology Library, Oyo State for pilot testing in order to ascertain the level of reliability of the instruments.

The rationale behind the selection of these four university libraries is due to the fact that they are academic libraries and the same categories of users with the federal university libraries. The data collected from the pilot test were subjected to further testing using Cronbach alpha to ascertain the reliability of the questionnaires before administration. Reliability testing of any instrument designed for collecting information is a must-do act for researchers that are interested in collecting relevant data that will measure what is intended to measure.

This no doubt, if properly carried out will help in identifying the unrelated questions from a set of item in a given instrument. In the report of Bruin (2011) in his report opined that Cronbach alpha is used for measuring the internal consistency of an instrument, in particular, to show how closely related a set of items in a given instrument are as a group.

The Cronbach alpha coefficient was used to analyse the results from the instrument's pilot study with overall values of 0.893, 0.873 & 0.831. The use of a four-point adapted likert scale was in line with the views of Pornel and Saldana's (2013) who asserted that the removal of the natural midpoint of the 5-point Likert scale as a means of reducing social desirability bias.

Furthermore, Krosnick and Alwin (1991) confirmed that there was no difference between the two groups. According to Tavokol and Dennick (2011), "if the value of the alpha coefficient is 0.9, the instrument is excellent; if it is 0.8 and 0.9, it is good; if it is 0.7 and 0.8, it is acceptable; if it is 0.6 and 0.7, it is questionable; if it is 0.5 and 0.6, it is poor if it is < 0.5 the instrument is unacceptable which is in line with the position of Bryman and Cramer (2009: 71) the instrument is inappropriate, stance that any alpha coefficient > 0.90 is very highly reliable; 0.80–0.90 is highly reliable; 0.70–0.79 is reliable; 0.60–0.69 is marginally/minimally reliable; and 0.60–0.69 is marginally/minimally reliable; so the reliability level is suggested to be 0.8; though others suggested that alpha of 0.67 or above can be accepted but any alpha that is < 0.60 is unacceptably low.

Similarly, Calaguas and Dizon (2011) and Bhatnagar *et. al.* (2014), alpha cronbach > 0.9 is outstanding, > 0.8 is fine, > 0.7 is satisfactory, > 0.6 is suspect, > 0.5 is bad, and 0.5 is unacceptable. Similarly, Metcalf (2017) preferred Cronbach alpha that is above 0.80 because higher value is better.

3.7 Methods of Data Collection

The researcher went on field trips to administer the research instruments. Two research assistants from each library visited assisted in the administration and collection of the questionnaire, while the researcher conducted usability testing to observe the demonstrable skills of ten postgraduate users from each of the university libraries studied.

The data collection exercise lasted for four months due to tight schedules of the respondents and the accreditation exercises in all the federal universities visited; postgraduate users were contacted through their class representatives, supervisors, heads of ICT, university Turn-It-In officers, circulation librarians, hostel representatives and those who could not be physically present received the electronic copies of the questionnaire.

The three sets of questionnaire were physically administered to the postgraduate users that came to use the library within the period of data collection, while electronic copies of the questionnaire were sent to the students who were not around but voluntarily promised to partake in the survey.

Interview focus group dates and times were scheduled prior to the researcher's visit to the federal university libraries, phone calls, emails, WhatsApp video calls, chats and skype were used to collect information from the respondents who were unavoidably absent during the visit; Postgraduate users were chosen at random and encouraged to volunteer for usability test and interactive sessions. Ten postgraduate users from each library voluntarily participated in the testing exercise and a total of 60 postgraduate users from the six libraries volunteered to participate in the research.

The study conducted usability test was guided by ISO 9241 standards (effectiveness and efficiency), vital issues gathered from ThinkALoud process were properly noted, recorded, reported and analysed for better understanding.

Materials used for the designing of the prototype were Html, CSS, JavaScript, JQuery, Bootstrap, Mysql and SMS Live 247. An in-built Google form was designed to collect users' feedback on the performance of the prototype during testing.

3.8. Method of Data Analysis

The analysis for this research was conducted in different stages using a combination of Standard Statistical Package for Social Sciences (SPSS) tools version 25 for descriptive analysis of the respondents' socio-demographic; individual and scale items as well as Structural Equation Modeling (SEM) of the STATA version 16 to find the influence of usability and library service quality on users' satisfaction with electronic resources and services in federal university libraries in Nigeria.

Items less than average threshold of 2.5 were interpreted to mean disagreement, while any result from 2.5 and above signified positive/ agreement. The three hypotheses formulated for the study were tested with SEM using Confirmatory Factor Analysis (CFA). In Confirmatory Factor Analysis the process of determining which factor will appear in the structural equation model is usually guided "by a rule of thumb that says any variable that has factor loading of less than $</0.7/$ would be dropped" Wan Afthanorhan, Ahmad & Mamat, (2014). The tests were not rejected at a confidence interval of $\pm 5\%$ ($p < 0.05$), descriptive data presentation used include frequency and percentage tables, pie chart and bar chart. Other data collected from focus group and interview were analysed based on their themes and sub-themes.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Response Rate

The total copies of the questionnaire distributed to users were 773 while 765 (99%) copies of the questionnaire were filled and returned. During the data cleaning process the researcher removed the questionnaire with substantially incomplete or incorrectly filled out responses, the response rate for the useful questionnaire for the postgraduate student users was 722 (93%) out of the 773 copies of the questionnaire that were administered. The heads of Information and Communication Technology (ICT) section responses to the questionnaire were duly completed and returned 100%. Table 4.1 showed the breakdown of the response rate for the postgraduate users.

Table 4.1: Response Rate for the Postgraduate Library Users

S/No.	Name of Library/ Institution	No. of Questionnaire Administered	No. Retrieved	Percent Retrieved
1	Ibrahim Badamasi Babangida Library (FUT), Minna, Niger State	30	30	100
2	Ramat Library (UNIMAID), Maiduguri, Borno State	41	41	100
3	Abdullahi Fodiyo Library Complex (UDU), Sokoto State	155	153	99
4	John Harris Library Benin, UNIBEN Edo State	151	109	72
5	Federal University of Technology Library, Owerri, Imo state	155	150	97
6	Hezekiah Oluwasanmi Library (O.A.U), Ile-Ife, Osun State	241	239	99
Total		773	722	93

Source: Fieldwork, 2019

The study collected data from the six heads of ICT section in the selected federal university libraries in Nigeria. All 30 (100%) postgraduate respondents of the Ibrahim Badamasi Babangida Library, Federal University of Technology, Minna and 41(100%) registered users from Ramat Library, University of Maiduguri returned duly completed questionnaire. In Abdullahi Fodiyo Library Complex (UDU), Sokoto 153 out of 155 (99%) copies of the questionnaire were returned; John Harris Library (UNIBEN), Benin,

Edo State returned 109 out of 151 (72%) questionnaire, Federal University Of Technology Library, Owerri, Imo State returned 150 (97%), while Hezekiah Oluwasanmi Library (O. A. U), Ile-Ife, Osun State returned 239 (99%) out of the 241 questionnaire administered to its post graduate respondents.

4.2 Demographic Data

This section of the questionnaire described the respondents by sex, rank, designation, educational qualification, years of professional experience, faculty, department, programme of study and degree in view. This section is essential for correlating the response sets between categories of library users with their demographic information.

Information about the heads of ICT section is shown in Figure 4. 1.

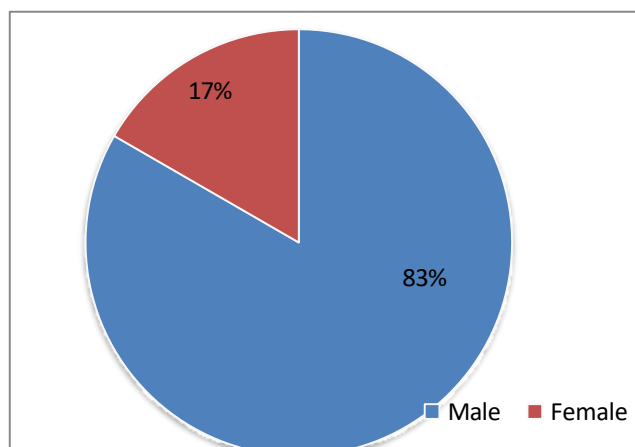


Figure 4.1: Gender of HODs of ICT
Source: Author's Original Design

The Figure 4.1 has shown that 5 (83%) out of the 6 libraries studied namely, HOL, OAU, AFLC, UDUS, JHL, UNIBEN have male heads of ICT while only FUTOL has a female (17%) staff as head of ICT.

4.2.2 Distribution of the postgraduate users by gender

The postgraduate respondents were categorised by gender as represented in the Figure 4.2

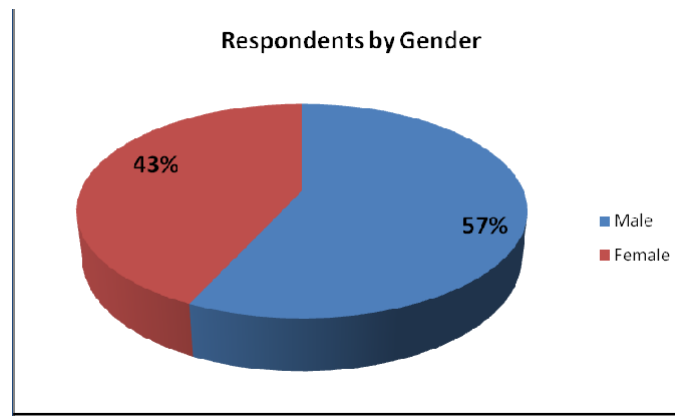


Figure 4.2: Distribution of Postgraduate Users by Gender
Source: Author's Original Chart

Figure 4.2 depicted that there were more male respondents than the female. The number of male respondents was 411 (57%) and the female were 311 (43%).

4.2.3. Distribution of respondents by level of education

The distribution of the registered postgraduate users of the federal university libraries shown in the bar chart labeled Figure 4.3.

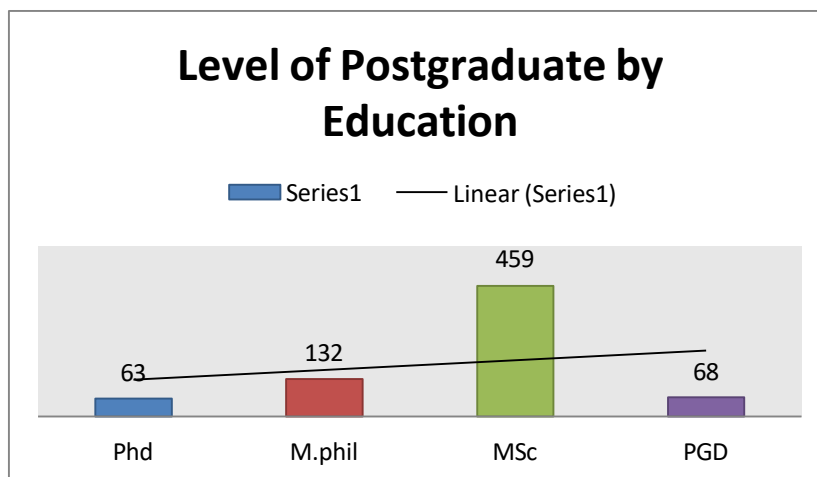


Figure 4.3: Distribution of Respondents by Level of Education

Figure 4.3 showed that 459 (64%) of participants were master students, followed by 132 (18%) master of philosophy students. Postgraduate diploma (PGD) students had the least

number of respondents, with 68 (9%) and doctoral students having 63 (9%) of the total number of respondents. Figure 4.3 depicted that masters and M.Phil students were using the ICT section more than other postgraduate student users. Table 4.2 gave the breakdown of the years of experiences of the heads of ICT in federal university libraries.

Table 4.2: Distribution of the Heads of ICT Section by Years of Experience

	Frequency	Percent
Less than a year	0	0.0
1-5yrs	2	33
6-10yrs	4	67
Total	6	100

Table 4.2 showed the distribution of respondents' years of experience, more than half 4(67%) of the respondents had 6-10years library experience while respondents with 1-5 years were 2(33%). This shows that only two out of the six heads of the ICT in the selected university libraries have minimum year of experiences in their respective offices. In view of the length of their experience, it is hoped that whatever response received from them would guide the researcher in identifying the causes of low utilisation of electronic resources in federal university libraries in Nigeria. This will pave way for further investigation on other issues such as usability of the available electronic resources, library services quality and users' satisfaction with the library electronic resources.

4.3 Research Question 1:What are the available electronic resources in federal university libraries in Nigeria?

The researcher requested for login details of all the available aggregated databases in addition to the open access resources that were accessible in the libraries studied. This exercise was deemed necessary in order to ascertain the availability of the electronic resources in federal university libraries in Nigeria. Table 4.3 showed details of the

available library electronic resources in AFLC, IBBL, RL, JHL, HOL and FUTOL respectively.

Table 4.3: Observation Checklist for Available Electronic Resources in Federal University Libraries in Nigeria

Electronic Resources	AFLC	IBBL	RL	JHL	HOL	FUTO	Total
HINARI		√		√	√		3
Open Access Journals/ Books	√	√	√	√	√	√	6
Elsevier ScienceDirect	√	√		√	√		4
CABDirect	√						1
JSTOR	√				√		2
OPAC	√	√	√	√	√	√	6
Open Educational Resources (OERs)	√	√	√	√	√	√	6
Law Pavilion					√		1
ProQuest		√				√	2
EbscoHost		√		√	√		3
TEEAL	√		√	√	√		4
ARDI		√		√	√		3
OARE		√		√	√		3
AGORA		√		√	√		3
Lexis Nexis				√	√		2
Hein Online					√		1
World Bank Database					√		1
Ebrary						√	1
Scopus					√		1
CD-ROM (Collection)	√	√	√		√		4
Legalpedia					√		1
IMF Elibrary					√		1
Others: EIFL.net					√		1

Source: Field work (2019)

Keys:

AV - Available and accessible (√) AFLC - Abdullahi Fodiyo Library Complex, UDU, Sokoto
 HOL - Hezekiah Oluwasanmi Library IBBL - Ibrahim Badamasi Babangida Library, FUTMinna
 RL – Ramat Library FUTO – Federal University of Technology, Owerri Library, JHL = John Harris Library, University of Benin.

Table 4.3 showed that the most available library electronic information resources in federal university libraries studied were open access journals and open educational resources. Online Public Access Catalogue (OPAC) resources were available in all the libraries studied except the Ibrahim Badamasi Babangida Library, FUT, Minna and John Harris Library, University of Benin). 50% of the university libraries had access to

Ebscohost (Hezekiah Oluwasanmi Library, Ibrahim Badamasi Babangida Library, FUT, Minna and John Harris Library, University of Benin). Orange access were provided to Reseach4Life resources (HINARI, Agora, Teeal, ARDI, Oare) and Science Direct in all the libraries studied except for Ramat Library and Federal University of Technology, Owerri Library.

Abdullahi Fodiyo Library Complex and Hezekiah Oluwasanmi Library subscribed to JSTOR. The only library that subscribed to Law pavilion was Hezekiah Oluwasanmi. It was found that the Legalpedia; IMF Library; EIFL and ProQuest were available in Ibrahim Badamasi Babangida Library, FUT, Minna and Federal University of Technology, Owerri; Lexis Nexis database was available at John Harris Library; University of Benin and Hezekiah Oluwasanmi Library. Hein Online, Worldbank Database and Scopus were available at Hezekiah Oluwasanmi Library; CD-ROMs were available in all the libraries studied except FUTOI and JHL.

Similar to this, was the finding of Umeozor and Emasealu (2017) who reported AGORA, HINARI and JSTOR as the most used electronic resources in Nigeria federal university libraries particularly University of Ibadan, Oyo State and Obafemi Awolowo University, Ile-Ife, Osun State. The number of available electronic resources in the federal university libraries in Nigeria was too small in comparison with what was reported by the Queen`s university as at the year 2013 (1,750) databases. The New Castle University (2014) had reported the subscription of 450 aggregated databases; James (2014), reported that the University of Johannesburg subscribed to 160 databases; the University of Pretoria provided access to 421 databases; Nelson Mandela Metropolitan University subscribed to 40 databases and Cape Peninsula University of Technology provided access to 100 aggregated databases while majority of India libraries had between 11 to 15 subscribed databases. A very few libraries (20%) in India provided less than 10 online journal

databases; in the South Zone of the India about (75%) of the libraries were better-off in comparison with the other Zones. This showed that federal university libraries in Nigeria were lacking behind in the provision of adequate electronic resources for their users.

4.4. Research Question 2: What is the level of postgraduate student users' satisfaction with provision of electronic resources in federal university libraries in Nigeria?

To determine the level of users' satisfaction with the provision of electronic resources in the federal university libraries in Nigeria, eleven questions were asked on a four adapted likert scale for users to choose the applicable option that better described their post-use judgment for the electronic services provided in their respective federal university libraries. Details of these responses were shown in Table 4.4

Table 4.4: Level of Postgraduate Student Users' Satisfaction with Provision of Electronic Resources in FULs in Nigeria

S/N	Items Provision of (EIR)	<u>HD =1</u>	<u>D =2</u>	<u>S=3</u>	<u>HS =4</u>	N	FX	M	SD	Remark
		Freq (%)	Freq. (%)	Freq. (%)	Freq. (%)					
1	How satisfied are you with the available electronic resources?	54 (7.5)	132 (18.3)	459 (63.6)	77 (10.7)	722	2003	2.78	0.73	Satisfied
2	How satisfied are you with the adequacy of electronic resources in the library?	38 (5.3)	179 (24.8)	426 (59)	79 (10.9)	722	1990	2.76	0.71	Satisfied
3	How satisfied are you with reliability of the links to electronic resources?	43 (6)	195 (27)	391 (54.2)	93 (12.9)	722	1978	2.74	0.75	Satisfied
4	How satisfied are you with the ease of access to library electronic resources?	24 (3.3)	188 (26)	393 (54.4)	117 (16.2)	722	2047	2.84	0.72	Highly Satisfied
5	How friendly are the designs of the library electronic resources portal or databases?	31 (4.3)	184 (25.5)	412 (57.1)	95 (13.2)	722	2015	2.80	0.71	Satisfied
6	How satisfied are you with the conduciveness of library environment/ atmosphere?	27 (3.7)	67 (9.3)	449 (62.2)	179 (24.8)	722	2224	3.08	0.69	Satisfied
7	How satisfied are you with the quality of Library ICT facilities?	33 (4.6)	183 (25.3)	404 (56)	102 (14.1)	722	2019	2.80	0.73	Satisfied
8	How satisfied are you with the library e-resources awareness services?	51 (7.1)	255 (35.3)	287 (39.8)	129 (17.9)	722	1938	2.69	0.84	Satisfied
9	How satisfied are you with the library security measures?	562 (78)	102 (14)	40 (6)	18 (2)	722	958	1.33	0.02	Dissatisfied
10	How satisfied are you with the attitude of some library staff (friendliness).	52 (7.2)	176 (24.4)	391 (54.2)	103 (14.3)	722	1989	2.76	0.78	Satisfied
11	How satisfied are you with the overall quality of staff services and competence	42 (5.8)	126 (17.5)	454 (62.9)	100 (13.9)	722	2056	2.85	0.72	Satisfied

Source: Author's Original Construct

Table 4.4 presented the statistical analysis for users' satisfaction with the provision of electronic resources. These responses ranged from (M = 1.33; S.D 0.02) ("Users inability to use the library because of inadequate security measures put in place") to M = (3.08; S.D 0.69) ("Conduciveness of library Environment/ atmosphere"). Thus, most of the results can be described interpreted to mean moderately satisfied for all the items used in measuring the level of users' satisfaction with the provision of electronic resources. However, users' responses collected during the focus group discussion gave a clearer view

of some of respondents that have agreed based on the fact that the libraries provided conducive environment for reading and research and some useful library facilities which contributed to their reasons for visiting the library but not that they were highly satisfied with the electronic library service delivery as they experienced some challenges such as lack of power back up, inadequate computer systems and lack of retrieval skills. This is similar to the findings of Adeniran (2013) and Haliso (2020) who reported users' dissatisfaction with library services due to lack of adequate electronic resources, ineffective service delivery and slow network.

Library security measure with the lowest mean score is a clear indication of the respondents' high level of dissatisfaction with the libraries inability to provide adequate security for users' properties. A large number of the respondents during focus group discussion reported cases of theft of personal belongings and the library management's inability to recover their stolen items which was among the factors that were responsible for low utilisation of the fee-based (Internet Protocol (IP)) electronic resources because users must be on the university network before accessing them, and some of these resources have login parameters that can only be provided by a delegated library staff.

4.5 Research Question 3: How frequently are the available electronic resources used by the postgraduate student users?

The postgraduate respondents were asked to express their opinions on how frequently they use library electronic resources and other issues that affected the utilisation of the library electronic resources in federal university libraries in Nigeria. Sixteen statements were itemised on a 4 adapted likert scale for them to indicate the appropriate options that best described their frequency of use of the e-resources. Details of the responses have been presented in Table 4.5.1

Table 4.5.1: Responses on frequency of use of library electronic resources by postgraduate student users

S/No.	Items	Occas.	Monthly	Weekly	Daily	N	FX	M	SD	Remarks
		Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)					
1	How frequently do you use library open access resources?	71 (9.8)	100 (13.9)	395 (54.7)	156 (21.6)	722	2080	cz	0.86	Frequently
2	How frequently do you use Open educational ?	88 (12.2)	110 (15.2)	369 (51.1)	155 (21.5)	722	2035	2.82	0.91	Frequently
3	How frequently do you use Ebscohost?	140(19.4)	255 (35.3)	263 (36.4)	64 (8.9)	722	1695	2.35	0.89	Infrequently
4	How frequently do you use Science Direct?	141(19.5)	294 (40.7)	228 (31.6)	59 (8.2)	722	1649	2.28	0.87	Infrequently
5	How frequently do you use ProQuest?	92 (12.7)	208 (28.8)	307 (42.5)	115 (15.9)	722	1889	2.62	0.90	Frequently
6	How frequently do you use eLibrary without fear of security threat?	375(51.9)	158 (21.9)	100 (13.9)	89 (12.3)	722	1347	1.87	0.06	V. Infrequently
7	How frequently do you use Lexis Nexis?.	270(37.4)	225 (31.2)	115 (15.9)	112 (15.5)	722	1513	2.10	0.90	Infrequently
8	How frequently do you use Ajol?	142(19.7)	250 (34.6)	241 (33.4)	89 (12.3)	722	1721	2.38	0.94	Infrequently
9	Law Pavilion?	119(16.5)	251 (34.8)	250 (34.6)	102 (14.1)	722	1779	2.51	0.93	Frequently
10	How frequently do you use Research4Life (HINARI, AGORA, OARE, ARDI)?	116(16.1)	230 (31.9)	294 (40.7)	82 (11.4)	722	1786	2.51	0.90	Frequently
11	How frequently do you use Emerald?	84 (11.6)	134 (18.6)	400 (55.4)	104 (14.4)	722	1968	2.73	0.85	Frequently
12	How frequently do you use IMF ELibrary?	180(24.9)	228 (31.6)	220 (30.5)	94 (13)	722	1672	2.32	0.92	Infrequently
13	How frequently do you use Springer?	450(62.3)	200 (27.7)	50 (6.9)	22 (3.1)	722	1088	1.51	0.89	V.infrequently
14	How frequently do you use IEEE?	139(19.3)	123 (17)	313 (43.4)	147 (20.4)	722	1912	2.65	1.01	Frequently
15	How frequently do you use Hein Online?	130 (18)	250 (34.6)	256 (35.5)	86 (11.9)	722	1742	2.41	0.92	Infrequently
16	How frequently do you use Oxford University Press?	131(18.1)	239 (33.1)	292 (40.4)	60 (8.3)	722	1725	2.39	0.88	Infrequently

Source: Author's Fieldwork, 2019; Item with weighted mean value < 2.5 signifies Disagreement

Table 4.5.1 presented the descriptive statistics for the frequency of utilisation of electronic resources. These responses ranged from $M = 1.8$ (“How frequently do you use e-library without fear of security threat”) to $M = 2.88$ (“How frequently do you use library open access resources?”). Consequently, the results revealed that only seven constructs out of the sixteen used to measure the frequency of utilisation were on the positive side while others reported that they used electronic resources occasionally. These findings have been supported by the findings of the focus group discussion and the responses of the ICT librarians.

However, there were discrepancies with some items, as majority of the respondents revealed that, they encountered error whenever they use electronic resources and cannot manage error within a short time; some respondents said that Proquest were not satisfying their information needs while some said lack of awareness and adequate time allocation contributed to their inability to use the available resources. Adeniran (2013) and Towolawi (2015) have earlier reported that inadequate facilities, poor power supply and difficulty in downloading were some of the factors responsible for low utilisation of electronic.

Some students claimed that their lecturers were not giving them assignment from the electronic resources databases did not allow them to know the relevant database to be used. This issue was extensively deliberated upon during one of the focus group discussions, when some users claimed that they were in their final year but visiting the library for the first time. To further confirm the responses given by the users, the researcher also obtained additional information about the level of utilisation of the e-resources from the heads of ICT. Details were reported in the Table 4.5.2.

Table 4.5.2: Responses on utilisation of library electronic information resources (EIR) by the heads of ICT

Statements	SD 1	D 2	A 3	S.A 4	N	FX	\bar{X}	S.D	Remarks
1 Few students use library EIR daily	0 (0)	2 (33.3)	3 (50)	1 (16.7)	6	17	2.83	0.753	Agreed
2 A good number of PG students use library EIR twice a week	0 (0)	2 (33.3)	2 (33.3)	2 (33.3)	6	18	3.00	0.894	Agreed
3 A good number of PG students use library EIR weekly	0 (0)	2 (33.3)	2 (33.3)	2 (33.3)	6	18	3.00	0.894	Agreed
4 A good number of PG students use library EIR twice a month	2 (33.3)	4 (66.7)	0 (0)	0 (0)	6	10	1.67	0.516	Disagreed
5 A good number of PG students use library EIR once a month	0 (0)	2 (33.3)	2 (33.3)	2 (33.3)	6	18	3.00	0.894	Agreed
6 A good number of PG students never used library EIR	0 (0)	0 (0)	4 (66.7)	2 (33.3)	6	20	3.33	0.516	Agreed
7 Library provides adequate computers for staff to access EIR	0 (0)	2 (33.3)	0 (0)	4 (66.7)	6	20	3.33	1.033	Agreed
8 Library provides adequate computers for students to access EIR.	1 (16.7)	5 (83.3)	0 (0)	0 (0)	6	11	1.83	0.408	Disagreed
9 Library provides adequate laptops for staff access EIR	3 (50)	3 (50)	0 (0)	0 (0)	6	9	1.50	0.548	Disagreed
10 Library provides adequate laptops for students to access EIR	2 (33.3)	2 (0 (0)	2 (33.3)	6	16	2.67	1.366	Agreed
11 Library provides usernames and passwords to access EIR	0 (0)	0 (0)	2 (33.3)	4 (66.7)	6	22	3.67	0.516	Agreed
12 Library website/portal for EIR is easy for one to navigate	0 (0)	0 (0)	2 (33.3)	4 (66.7)	6	22	3.67	0.516	Agreed
13 Library has power back up for cafe systems.	0 (0)	2 (33.3)	3 (50)	1 (16.7)	6	17	2.83	0.753	Agreed
14 Library has technical staff that assists users in fixing EIR error(s).	0 (0)	4 (66.7)	2 (33.3)	0 (0)	6	14	2.33	0.516	Disagreed
15 Lecturers give students assignment from the available Library EIR	0 (0)	0 (0)	4 (66.7)	2 (33.3)	6	20	3.33	0.516	Agreed
16 Library users request for access to EIR on regular basis	0 (0)	0 (0)	4 (66.7)	2 (33.3)	6	20	3.33	0.516	Agreed
17 Library users can access EIR on their own	0 (0)	0 (0)	2 (33.3)	4 (66.7)	6	22	3.67	0.516	Agreed
18 Library users make effective use of the EIR	0 (0)	2 (33.3)	2 (33.3)	2 (33.3)	6	18	3.00	0.894	Agreed
19 Users recommend relevant EIR to the library	0 (0)	2 (33.3)	2 (33.3)	2 (33.3)	6	18	3.00	0.894	Agreed

Source: Author's Original Construct

Table 4.5.2 showed the descriptive statistics for utilisation of electronic resources. These responses range from $M = 1.50$ ("library provides adequate laptops for staff access") to $M = 3.67$ ("library users can access e-resources on their own"). Generally, the result showed that out of the nineteen constructs used to determine the utilisation of electronic resources in the

six libraries, fourteen have their mean scores greater than 2.5 which is interpreted to be positive reaction to the statements while on the other hand, majority of the respondents disagreed with five statements that says some students come to use the library electronic resources library provides adequate computers and laptops for staff and students access and library has technical staff that assist users in fixing electronic resources errors.

4.6. Research Question 4: What is the quality of electronic services rendered by the federal university libraries in Nigeria?

4.6.1. Users' perception of library electronic service quality

Postgraduate student users' perception of the library electronic services' quality was measured with the ServQual 5 dimensions instrument. Table 4.6.1 showed the breakdown of the responses from the users of electronic resources. (See Appendix ii page 158).

Table 4.6.1 presented the descriptive statistics for the responses on perception of library electronic service quality by the users of federal university electronic resources in Nigeria. These responses range from $M = 2.65$ ("library should have sympathy for defaulters") to $M = 3.41$ ("library environment is conducive"). In general, among all items listed to show the quality of electronic services, all the items have mean score greater than 2.5, the items include: on-campus access to electronic resources should be easy, library electronic resources should be remotely accessible, library's portal/website should require less effort and library environment should be conducive.

The library should send mobile alert to users, library network should be dependable, library should be opened promptly, library should not close before official time, library staff should be punctual, library staff are approachable, library staff should provide professional guidance, library operating hours during weekends should be long, library should provide

wheel chair services for physically challenged students, library should provide literacy training programme when they promised to do so, library should provide support meant for people with disabilities, library should provide adequate security measures for me and my personal belongings; library should have sympathy for defaulters, library should provide adequate ICT facilities, library should update their electronic resources regularly, library should update their electronic number of e-journals titles, library should update their electronic number of eBooks, the waiting time for library cafe should suitably short, library should provide adequate bandwidth to access electronic resources, library should provide adequate computer systems for users to access electronic resources, library should provide adequate.

4.6.2 Users' expectations of the library electronic services quality

Responses from the users' expectations of the library electronic quality are shown in Table 4.6.2 (Appendix III, page 161).

Table 4.6.2 presented the descriptive statistics of the expected library electronic services quality. These responses range from $M = 2.53$ (“library staff have sympathy for defaulters”) to $M = 3.38$ (“library does not close before time”). In general, among all the twenty-five items listed to show the expectations of library service users, all items have mean scores greater than 2.5 threshold, the items include: library provides easy on-campus access to electronic resources, e-resources are accessed remotely, using the library's portal/website requires less effort, library environment is conducive, library network is dependable, library provides adequate security measures, library does not close before time, library staff are punctual, library staff keeps users valuables safe, library staff provide professional guidance, library opening hours during weekend is okay, library provides literacy training program when they

promise to do so, library provides support meant for people with disabilities, library subscribes to electronic resources when they promise to do so.

Among other things were. library staff showed sympathy for defaulters;/library provides adequate ICT facilities; library update their electronic resources regularly; library provides adequate number of electronic journals; library provides adequate eBooks; the waiting time for library cafe system is suitably short; library provides adequate bandwidth to access electronic resources; library provides adequate computer system for users to access electronic resource; library provides adequate user training on electronic resources; library sends mobile alerts to users and library has wheel chair services for physically challenged users.

4.7. Research Question 5: What is/are the influence(s) of quality of library electronic services on postgraduate student users' satisfaction with electronic resources provision in federal university libraries in Nigeria?

To determine the influence of library electronic service quality on users' satisfaction, the study designed a 10-item 4 likert scale to collect the users opinion on how library electronic services has influenced their academic activities. The likert instrument consisted of relevant questions that were perceived as importance to their studentship as shown in Table 4.7.

Table 4.7.: Respondents’ opinion on the influence of library electronic service quality on postgraduate student users’ satisfaction with electronic resources in the federal university libraries in Nigeria

Influences	SD=1	D=2	A=3	SA=4	N	FX	Mean	S.D	Remark
	Freq. (%)	Freq. (%)	Freq. (%)	Freq (%)					
With the use of library electronic services:									
1 “I find it easy to locate materials online”.	48 (6.7)	128 (17.7)	398 (55.1)	148 (20.5)	722	2090	2.89	0.80	Agree
2 “I find it easier to update my research work”.	41 (5.7)	130 (18)	410 (56.8)	141 (19.5)	722	2095	2.90	0.77	Agree
3 “I find it easier to identify high quality resources”.	48 (6.7)	138 (19)	430 (59.6)	106 (14.7)	722	2038	2.82	0.75	Agree
4 “I can download full-text resources completely”.	60(8)	144 (20)	374 (52)	144 (20)	722	2046	2.83	0.84	Agree
5 “I find new ideas in electronic resources”.	21 (2.9)	115 (15.9)	441 (61.1)	145 (20.1)	722	2154	2.98	0.69	Agree
6 “I have adequate electronic resources for my research work”.	32 (4.4)	169 (23.4)	420 (58.2)	101 (14)	722	2034	2.82	0.72	Agree
7 “I access electronic resources regularly from the library”.	64 (8.9)	200 (27.7)	354 (49.0)	104 (14.4)	722	1942	2.69	0.82	Agree
7 “I now save cost of photocopying library materials”.	74 (10.2)	145 (20.1)	393 (54.4)	110 (15.2)	722	1983	2.75	0.83	Agree
9 “I now have improved search skills.	52 (7.2)	86 (11.9)	441 (61.1)	143 (19.8)	722	2119	2.94	0.77	Agree
10 I can finish my research work within the stipulated time”.	63 (8.7)	111 (15.4)	401 (55.5)	147 (20.4)	722	2076	2.88	0.83	Agree

Source: Fieldwork, 2019, Item with mean value < 2.5 signifies Disagreement

Table 4.7. showed the descriptive statistics for the influence of service quality on users’ research work. These responses ranged from M = 2.98 (“I found new ideas in electronic resources”) to M = 2.69 (“I access electronic resources regularly from the library”). In general, all the ten items listed to show the influence of service quality on users’ satisfaction have mean scores greater than 2.5 thresholds. These findings revealed that majority of the library users agreed that library services provided had influences their search skill; reduced their cost of printing materials; facilitated access to current electronic resources and can make them finish the programme within the stipulated time. This revealed a positive influence on users’ satisfaction with library electronic provision in Federal University Libraries in Nigeria and it is in line with the findings of Musyoka (2013) who asserted that there is positive effect

of service quality on users' satisfaction with electronic service delivery in universities in Kenya.

4.8. Research Question 6: How usable are the available electronic resources in federal universities libraries in Nigerian?

Usability tests have been included as part of the evaluation process for the library users to practically demonstrate how they used the available electronic resources, express their experiences and observation on the library electronic databases provided and made accessible by the university libraries. The purpose of the assessment was to explore how easily the postgraduate users can access the library electronic resources and how they have been handling any usability issues encountered when using the fee-based databases and to investigate their level of satisfaction with the electronic resources available to them.

Specific tasks were set to test the demonstrable skills of the users on how they use features of the library electronic databases; users were asked to use the OPAC and any other database provided by the federal university libraries in Nigeria. In the usability test, users were asked to locate library hours for Fridays, locate one current e-book/ e-journal articles on (OPAC) and check for the item status. Participants located open educational resources (OERs) to download, save on the desktop and print. In addition, users were asked to login to any aggregated (fee-based/ vendor) databases, sign in with institution's username and password, search for any article of interest, then filter by clicking on relevance/ date to rearrange the search result, download, save and print.

The time allotted to all the assigned tasks and the nature of the exercises performed by the participants are shown in Table 4.8.1.

Table 4.8.1: Time allocation table for test tasks

S/No	Task No.	Allotted Time in Minute (50)	Assignment
1	Task 1	15	Information Retrieval (OPAC)
	Exercise 1	2 minutes	Launch a browser to Search for library portal/ OPAC and operating hour for Fridays
	Exercise 2	7 minutes	Login with the institutional login detail to find a book/ journal
	Exercise 3	6 minutes	View the status of the identified book, download the bibliographic information and save
2	Task 2	15	Information Retrieval (OERs)
	Exercise 1	2 minutes	Launch a browser
	Exercise 2	5 minutes	Search through OER communities
	Exercise 3	6 minutes	download a current book/journal article of your interest
	Exercise 4	2 minutes	save and make attempt to print
3	Task 3	20	Testing the Effectiveness and Efficiency of Fee-based Database(s)
	Exercise 1	2 minutes	Launch a browser to search for any available database
	Exercise 2	6 minutes	Search for a relevant journal or book article
	Exercise 3	8 minutes	Filter the search results by relevance/ date
	Exercise 4	3 minutes	Download the most current & relevant article
	Exercise 5	1 minutes	Save on the desktop and make attempt to print.

Source: Author's Original (2020)

4.8.2 Results of the usability tests conducted in federal university libraries

The researcher conducted usability tests for 60 registered postgraduate students of the six university libraries studied; the participants were divided into six groups according to their zones. The tests were conducted separately due to distance and locations of the libraries and on different days.

The purpose of the test was to observe the demonstrable skills of the participants on how or ways the users access and utilise the available electronic resources in order to determine the perceived ease of use and usefulness of the invaluable resources in a controlled and familiar environment. Thus, the exercises were conducted within federal university library cafes using

the International Organisation for Standardisation, ISO 9241-11 to determine the effectiveness and efficiency of the available library electronic information resources and the users' post-use satisfaction of the invaluable resources based on the principle of ThinkAloud protocol. ThinkAloud is a process in which the researcher encourages the participants to share their thoughts while working with the system. It helps the researcher to see the actions participant takes and hear the reason why such actions were taken. ThinkAloud protocol was used to observe the behaviour and attitude of the participants while interacting with the available electronic resources and systems.

4.8.2.1 *User's performance with the assigned tasks*

The performance for individual tasks has been summarised in Tables 4.8.2, 4.8.3. 4.8.4. In addition to assessing users' demonstrable skills, the researcher sought users' perspectives about the task completed using a ThinkAloud method of gathering data. Generally, about 42.8% percent of the participants were able to complete all the assigned tasks while 57.2 percent needed special assistance and additional time to complete each of the tasks assigned to them.

4.8.2.2 *Observations from the usability tests*

During the process of testing the usability of the library electronic resources, one of the research assistants was assigned to observe the expression and complaints of the participants through ThinkAloud process. The researcher observed both kinds of positive and negative comments from the participants. Some participants expressed their happiness for having access to the library resources while some expressed their dissatisfaction with provision of electronic resources in the library particularly when users were expected to retrieve local

contents from the aggregated databases but got something else. These and some other observations were reported in Tables 4.8.2, 4.8.3 and 4.8.4.

4.8.2.3 Exercise 1: Finding the library operation hour for Fridays

To complete the first exercise, participants were asked to launch a browser by double-clicking the browser icon to search for the university library online public access catalogue (OPAC) or library portal. At the beginning of the exercise, about half of the 67 percent of the participants that completed the assigned task could not directly locate the library opening hour for Fridays on the screen within the first two minutes. Those affected participants complained that they had difficulties in figuring out where to begin or identify the right option to select for the library OPAC. In some libraries, those who attempted to search were frustrated due to poor Internet connection and inability of the library management software (LMS) to load in good time and two university libraries OPAC resources were only accessible on the server while end users access were denied based on networking and other technical hitches.

4.8.2.4 Exercise 2: Finding a book/ journal article from open educational resources (OERs)

To complete the second exercise, participants were asked to locate open educational resources (OERs) on the university websites. Subsequently, they were to search using a specific subject area and click on the community where the information was uploaded. To achieve this, the participants were asked to launch a browser, type the search term for open educational resources on the institutional website or library portal and find any article of their choice, download, save and attempt sending to printer. Based on this task, it was observed that 62% of the 60 participants were unable to complete the assigned tasks.

4.8.2.5. Exercise 3: Testing the effectiveness and efficiency of the library fee-based electronic resources

The participants were asked to launch a browser, type the database uniform resource locator (url), type the index word/ search term in the search box and browse the database for relevant articles, the users were instructed to do an advance search by using relevance and date or apply the inbuilt Boolean logics as designed by the vendors of the database, download the most current and relevant article, save on the desktop and make attempt to print the full article. Among the 60 participants, only 23% were able to complete the exercises within the stipulated time while 77% of the participants could not be able to complete the assigned exercises within the time frame. Table 4.8.2 showed details of the completion rate and the time spent on the assigned tasks.

Table 4.8.2: Time structure for the usability tasks performed by the consented postgraduate student users of federal university libraries in Nigeria

IBBL				FUTOL				HOL			
Time	T1	T2	T3	Time	T1	T2	T3	Time	T1	T2	T3
47	12 c	15ic	20ic	47	14c	15ic	18c	40	12ic	15c	13ic
48	15c	15ic	18c	48	13c	15c	20c	39	15c	10ic	14ic
43	10ic	13ic	20c	45	10ic	15ic	20ic	46	15c	12ic	19ic
49	14c	15ic	20ic	49	14ic	15ic	20ic	47	13c	14ic	20c
45	15c	16ic	14ic	50	15c	15c	20c	46	15c	14c	17ic
49	15ic	14ic	20c	43	14c	15ic	14ic	42	15c	13c	14ic
43	10ic	15ic	18c	48	15c	15c	18ic	40	11c	9c	20ic
38	5c	14ic	19ic	44	15c	11ic	18ic	46	15c	15c	16ic
42	15c	12ic	15ic	46	15c	15ic	16ic	13	5ic	5c	3ic
48	15ic	14ic	19ic	45	15c	15ic	15ic	13	5ic	5 c	3ic
JHL				RL				AFLC			
Time	T1	T2	T3	Time	T1	T2	T3	Time	T1	T2	T3
49	14ic	15ic	20ic	50	15c	15ic	20c	36	10c	8c	18ic
50	15c	15ic	20ic	42	13c	14c	15c	47	15c	14c	18ic
45	15c	10ic	20ic	39	10ic	14ic	15ic	50	15ic	15c	20ic
49	15c	14ic	20ic	43	12c	13ic	18c	39	15ic	13c	11c
48	13ic	15ic	20ic	45	15c	13ic	17ic	41	9c	12c	20ic
46	14ic	14ic	18ic	41	12ic	10c	19ic	50	15c	15ic	20c
45	12c	15ic	18ic	46	13c	15ic	18ic	38	15c	14c	9ic
45	15ic	10ic	20ic	47	14c	14ic	19ic	41	10c	14c	17c
48	15ic	13ic	20ic	41	12c	9ic	20ic	41	14c	13c	14ic
45	14ic	13ic	18ic	36	15c	10c	11c	13	11ic	14c	15ic

Keys: c= completed ic= incomplete time = time taken to complete a specific task
T1 = Task 1 T2 = Task2 T3 = Task 3
IBBL = Ibrahim Badamasi Babangida Library, Federal University of Technology, Minna
FUTOL = University of Technology Library, Owerri
AFLC = Abdullahi Fodiyo Library Complex, Usmanu Danfodiyo University, Sokoto
HOL = Hezekiah Oluwasanmi Library, OAU, Ile-Ife,
RL = Ramat Library, University of Maiduguri
JHL = John Harris Library, University of Benin

Summary of the table 4.8.2 have been reported in table 4.8.3.

Table 4.8.3: Summary of the Table 4.8.2

	IBBL			FUTOL			HOL		
	T1	T2	T3	T1	T2	T3	T1	T2	T3
	c=6	c=0	c=3	c=8	c=3	c=3	c=7	c=7	c=1
Task 1	ic=4	ic=10	ic=7	ic=2	ic=7	ic=7	ic=3	ic=3	ic=9
				6+8+7+4			43+6+2+3		= 20
Task 2	JHL			RL			AFLC		
	T1	T2	T3	T1	T2	T3	T1	T2	T3
	c=4	c=0	c=0	c=8	c=4	c=3	c=4	c=7	c=9
Task 3				0+3+7+0			10+7+3+10+6+1		= 37
				+4+9=23			7+7+9+10+6+7		= 46
Sub-total	ic=6	ic=10	ic=10	ic=2	ic=3	ic=14	ic=6	ic=3	ic=1
				77			103		(57.2%)
				(42.8%)					

Table 4.8.4: Summary of Table 4.8.3

Total number of the Assigned Tasks: 180

Task 1	6+8+7+4	43+6+2+3	= 20
	+8+7=40		
Task 2	0+3+7+0	10+7+3+10+6+1	= 37
	+4+9=23		
Task 3	3+3+1+0	7+7+9+10+6+7	= 46
	+4+3=14		
Sub-total	77	103	(57.2%)
	(42.8%)		

Total number of the Assigned Tasks: 180

Satisfaction was measured by a 4 likert rating scale with satisfaction questions as contained

in the LUSAQ instrument. To obtain more data from the participants, the researcher

administered 60 copies of questionnaire on the usability tests conducted and found only 50

useful for analysis and has been reported in Tables 4.8.4, 4.8.5 and 4.8.6

Task 1	6+8+7+4	43+6+2+3	= 20
	+8+7=40		
Task 2	0+3+7+0	10+7+3+10+6+1	= 37
	+4+9=23		
Task 3	3+3+1+0	7+7+9+10+6+7	= 46
	+4+3=14		
Sub-total	77	103	(57.2%)
	(42.8%)		

Total number of the Assigned Tasks: 180

x

Task 1	101	6+8+7+4	43+6+2+3	= 20
		+8+7=40		
Task 2		0+3+7+0	10+7+3+10+6+1	= 37
		+4+9=23		
Task 3		3+3+1+0	7+7+9+10+6+7	= 46
		+4+3=14		

Table: 4. 8.5 Analysis of the usability assessment questionnaire for postgraduate student users of federal university libraries

Usability constructs for fee-based electronic resources	Questions Related to Usability Factor	S.D	D	A	SA	FX	M	S.D	Decision
Effectiveness: Simplicity/ ease of use, ease of access, user friendliness, reliability, learnability & suitability, error tolerance	LEDUQ 1- 9	18 (36%)	16(32 %)	10 (20%)	6(12 %)	50	2.08	1.02	DA
Efficiency: Comprehensiveness, Usefulness, Comfort, Time saving, Currency, Printable	LEDUQ 1 – 7	14(28 %)	19(38 %)	8(16%)	9(18 %)	50	2.24	1.06	DA
Satisfaction:		HD	D	S	HS				
Adequacy, reliability friendliness, usefulness productivity, successful, fulfillment	LUSAQ -C4 – 2,3,4,5	9(18%)	23(46 %)	15 (30%)	3(6%)	50	2.24	0.82	DA

Source: Author’s Original Construct(2020)

Reports from Tables 4.8.2, 4.8.3 and 4.8.4 have shown that 57 percent of the participants failed to complete the assigned tasks within the allotted time. This was because of the participants’ inability to locate the assigned task on their desktops. Those who could locate the right page encountered technical issues such as power fluctuation in the library, slow booting and downloading from the system due to poor internet connection and those without technical issues experienced difficult errors in the process of navigating through the pages.

Based on the aforementioned issues and the observations gathered from the ThinkAloud protocol, the problem of low utilisation of the electronic resources in the federal university libraries was connected with the users’ inability to search independently due to lack of

relevant skills to access the electronic resources, their attitudes towards system error and behaviour towards ineffective electronic systems and services.

Most participants were interested in having all icons of the fee-based databases displayed on the library desktops, some preferred to see all works published or supervised by their lecturers in the subscribed databases. More importantly, contents of subscribed databases tested were not really useful to some engineering, medical, art and humanities, management and education students particularly the participants from the specialised universities due to the peculiarity of their programmes of study which shows that the availability of only one electronic database was inadequate to satisfy the information needs of all library users.

4.9 Research Question 7:

Question: What is the influence of usability on postgraduate student users' satisfaction with electronic resources provision in federal university libraries in Nigeria?

In view of the findings of this study as shown in Tables 4.8.2, 4.8.3 and 4.8.4 usability of library electronic resources is no doubt the major indicator for users' dissatisfaction. This is simply because of the fact that every library user were timed when using the library computer desktop or library café and failure to conduct their research or assignment within the stipulated time led to ineffectiveness and inefficiency of the library electronic services. The diagram shown in Figure 4.4 depicted the existing relationship between the usability of electronic resources and library users' satisfaction.

Structural Equation Modeling (SEM) Diagram for Structural Relationship between Usability and Postgraduate Student Users' Satisfaction

The diagram in Figure 4.4 showed the structural relationship that exists between the variables usability and postgraduate student users' satisfaction. From the left is the constructs in the

squares labeled sDn4q1-11 and Sec Bi-Cxiii were the observed variables that were manipulated to produce the influence of latent variables usability on users' satisfaction.

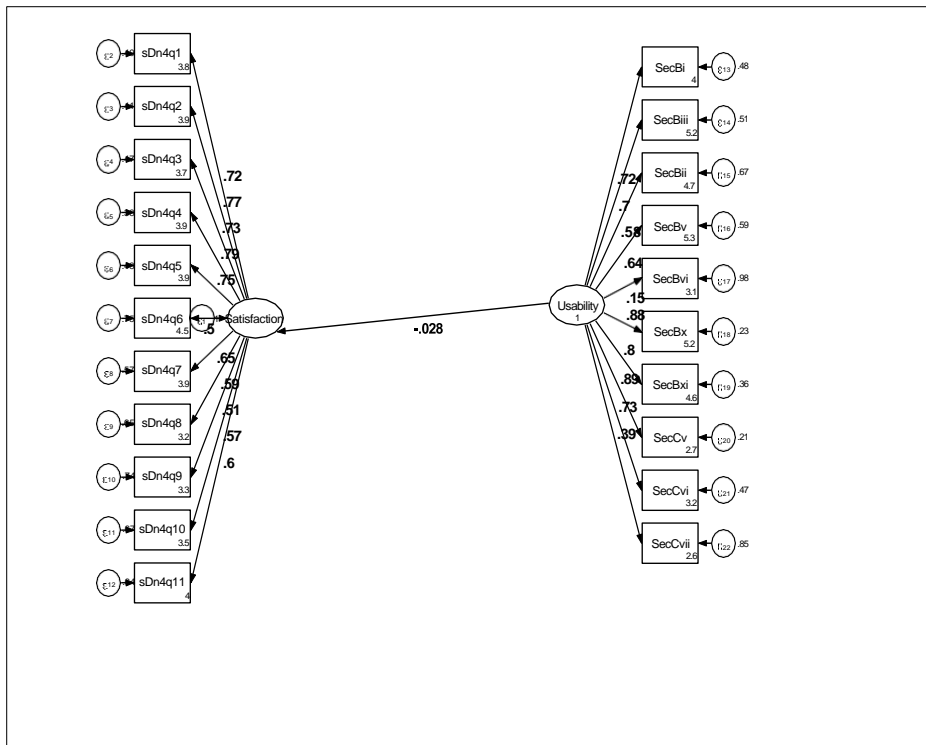


Figure 4.4: Structural Equation Model of the Relationship Between User's Satisfaction and Usability of the EIR

Source: Author's Original Construct (2021)

The report obtained from the test of hypothesis of relationship between usability and users' satisfaction with electronic resources, showed that a standardised path coefficient ($\beta = -.028$) would give a negative relationship between usability and users' satisfaction, and having a p-value of ($p > 0.493$) showed an insignificant relationship between the usability of library electronic resources and the users' satisfaction. Thus, the null hypothesis three was not rejected. This can be interpreted to mean that usability of library electronic resources has influenced user satisfaction negatively for being on the negative disconfirmation side and a very strong indicator of users' dissatisfaction that university librarians must give necessary attention to; if really, the story must change.

4.9. Qualitative Analysis

Thematic approach was adopted for analysing the transcribed data gathered from the interview conducted for the heads of ICT section and the postgraduate library users respectively. Thematic analysis according to Maguire and Delahunt (2017) is the process of identifying patterns or themes within qualitative data. Fifteen minutes interaction was organised for the heads of ICT in each university library and the responses were recorded, coded and tabulated in line with the objectives of this research as shown in the Table 4.9.1 and 4.9.2 respectively.

Table 4.9.1: Some quotes from the heads of ICT section’s interviews

Theme:	Usability of Electronic Resources	No.
		6
Sub-Theme: Access to Library Electronic Resources		
	“Our library provides access to electronic resources”.	
	“Our connection is not always good”.	2
	“Many of our users come to use the electronic resources very well”	3
	“Some of our databases download slowly”.	4
	“Sometimes you will see users queuing up to use our library café systems”.	4
Sub-Theme: Statistics of Use:		
	“My library does not have an in-house means of monitoring the level of downloads on the fee-based electronic databases”.	6
	“We use statistics of visitors stored on the library portal to monitor the level of utilisation”.	1
	“Sometimes we request for statistics of use from the database vendors for decision making”.	3
	“We log in from back end to know the number of people who accessed the resources”.	1
	“Our library has no way of monitoring the number of users that downloaded the resources. “We only know those that logged in but not what they did”.	5
	“We use attendance records to determine the level of utilisation of the e-resources”.	2
Subtheme: Restriction of Access		
	“My library gives username and password to only registered users”.	5
	“Our library makes use of the intranet to provide access to the electronic resources locally”.	4
	“Library cannot identify any body using the EIR outside the institution”.	6
	“Library provides general access to EIR through the university website”.	1
	“Login information is displayed within the library”.	2
		2
Sensitisation/ Awareness		

“My library uses social media tools”.	
“This library uses internal memos to inform the user communities”.	5
“We use electronic bill board to disseminate information”.	1
“Our library uses students’ orientation programme to sensitise users of the available resources”.	5
“We do not use text message for disseminating information to our library users”.	0

4.9.2 Summary of the quotes from the heads of ICT interviews

The quotes extracted from the Table 4.9.1 were about the usability, statistics of use, accessibility and awareness/ sensitisation of users about the electronic resources. The findings from these quotes indicated that most libraries have network issues which prevented the resources from downloading very fast; it was reported that there used to be a long waiting period for users due to inadequate ICT facilities for access; some do not even have any mechanism put in place for monitoring those who use the resources remotely apart from the report generated by the vendors; some librarians said that the passwords were given to only those who have registered with the libraries and testified that they have never used short messaging services as a means of sensitising the users.

4.9.2 Thematic Analysis of the focus group discussion

The focus group with users lasted for 60 minutes in every session conducted. The discussion looked at how participants felt about the level of use of library electronic resources, the availability of library fee-based databases, and the quality of library services rendered. Users' use of the library, the types of electronic resources they use, their perceptions of the library, and services they have used or obtained from the federal university libraries were all discussed. The data extracted from the focus group discussion were transcribed verbatim excluding the irrelevant expressions and side talks. The focus group was ethically conducted

as the respondents voluntarily consented to the conduct of the discussion and permitted the researcher to use the responses for research purpose. See Table 4.9.2

Table 4.9.2.1: *Thematic analysis of the focus group discussion with postgraduate student users*

See page 163.

Focus group unveiled issues relating to the usability, awareness creation, accessibility, library service quality, users' determinant of satisfaction with the general library services. It was found that, many participants were moderately satisfied because they still have one thing or the other to complain about. Worth noticing are the issues raised under the determinants of satisfaction. A number of users requested for the use of text message services for awareness creation and increase in library operation hours so that they can judiciously utilise the library services.

4.10: Research Question 8: How can a prototype for assessing users' satisfaction with an embedded really simple syndication (RSS) for sending short message services (SMS) to library users be designed?

This prototype has been designed to measure library services quality through an adapted SERVQUAL instrument (25 survey questions), the questions were formed based on the peculiarities of the library operations and services. The SERVQUAL instrument consisted of 5 dimensions which are Tangible, Reliability, Responsive, Assurance and Effectiveness and Expectancy-Disconfirmation Theory (EDT). To design the prototype, the study made a systematic diagram known as flowchart to describe the sequence of operation for the system. Details of this can be found in Figure 4.5.

Flow Chart of the Expectancy Disconfirmation Model

The flow charts presented in Figure 4.5 and 4.6 showed the sequence of tasks that the study

Figure: 4.5 Flow Chart of the Expectancy Disconfirmation Model

Source: Author's Construct (2019)

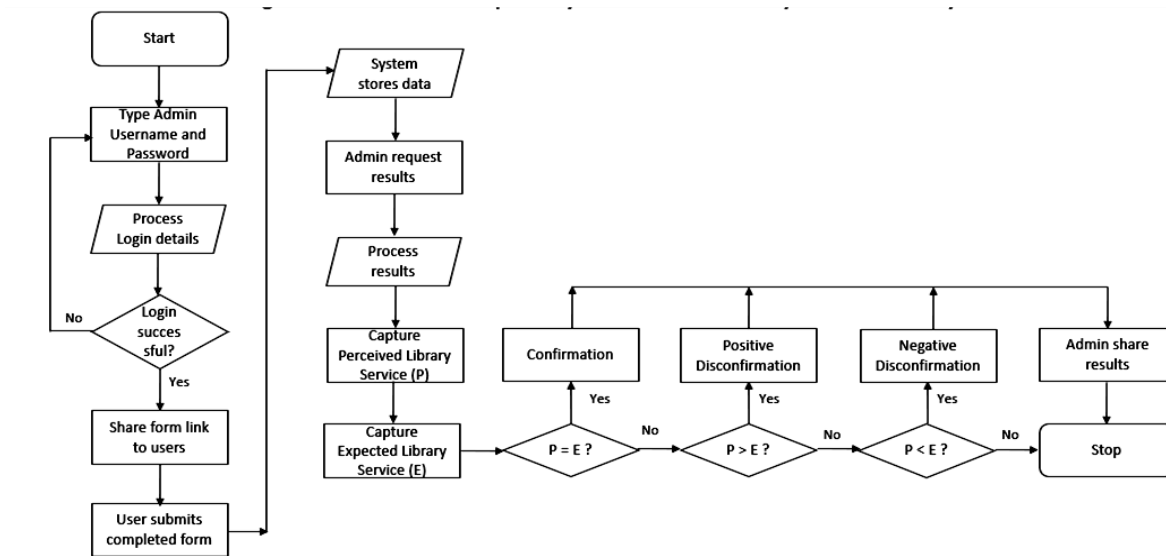


Figure 4.5: Chart of the Expectancy Disconfirmation Model

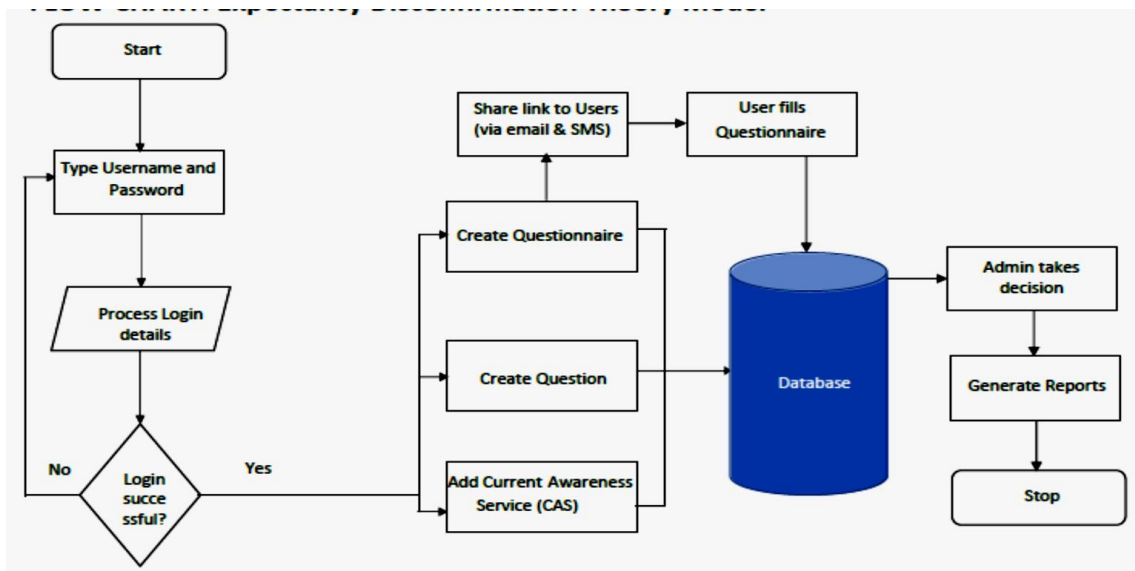


Figure 4.6: Modified Flow Chart of the Expectancy Disconfirmation Model
Source: Author's Construct (2019)

Keys: P=perception E= Expectation
Expectancy Disconfirmation Theory (EDT) Process Flow

1. Administrator logs into the system
2. Administrator creates questions
3. Administrator creates questionnaire
4. Administrator creates news/ current events
5. Administrator shares the question link to online data capturing instrument
(questionnaire) using Google form
6. User visits the link
7. User fills and submit the form*
8. Librarian processes the form
9. System stores the data
10. Administrator requests a report summary
11. System searches the database
12. Administrator saves or prints the results
13. Administrator navigates to share the results through short message services.

Use Case Diagram for the Prototype

The prototype recognised two categories of users for its operation; these users are administrative users and public users. Figure 4.7 has shown the role played by the two actors.

Use Case Diagram for the Prototype

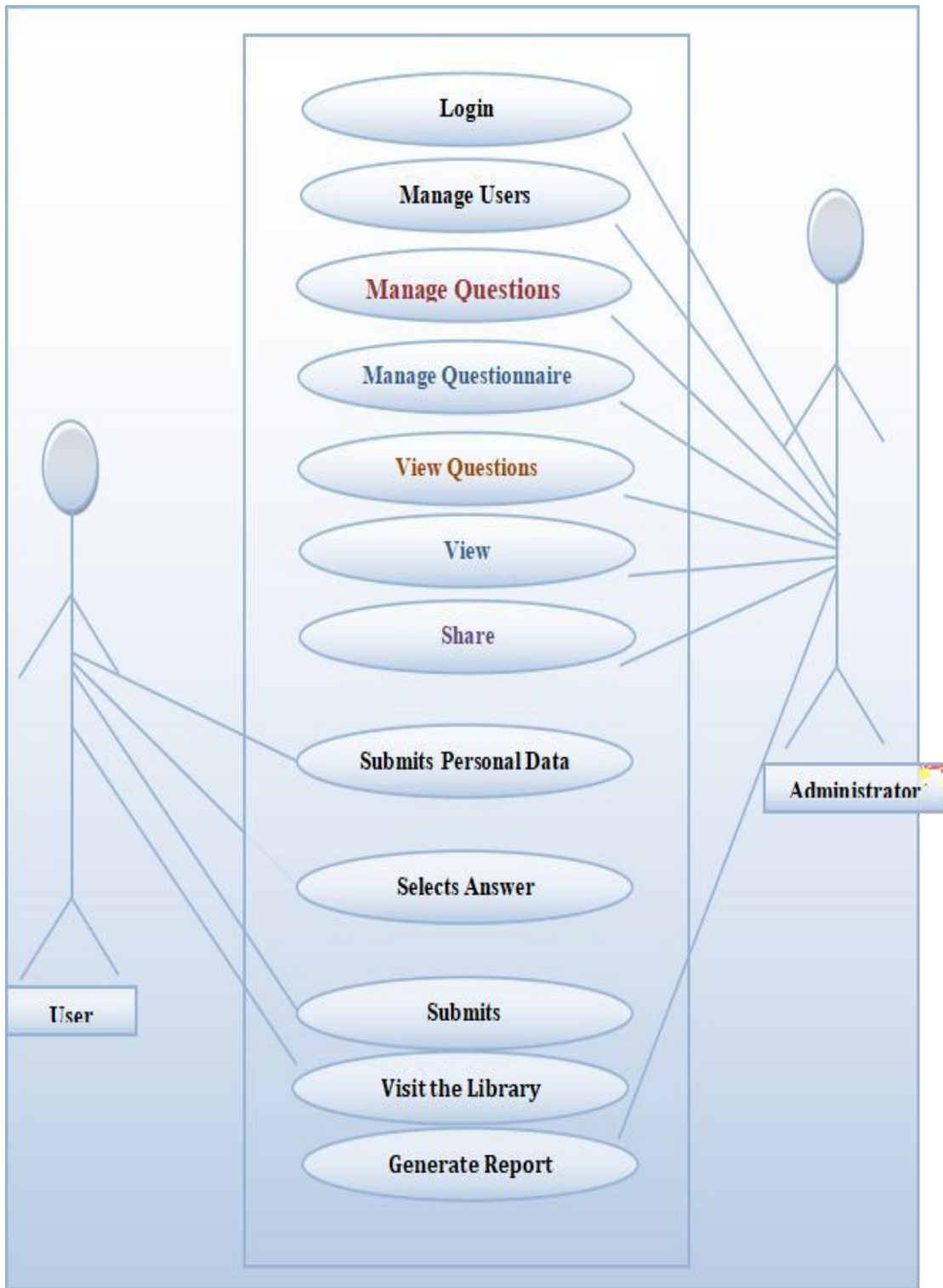


Figure 4.7:
Source:

Use Case
Author's Construct (2019)

4.10.1 Development of the expectancy disconfirmation model prototype

In the process of developing this prototype, paper model was used to design the architectural sketches of the graphical user interface and other functionalities before the real design. This was done to provide users with the opportunity of making necessary input before the development of the full system. Having completed the pre-design stage, the researcher purchased a domain (www.kalitech.com.ng) to host the prototype for remote access and participation. The survey designed an evaluation form to obtain information from the system users; twenty librarians who have ICT skills were purposively recruited across the six geo-political zones in Nigeria. These participants were enrolled on the system to test the system based on the ISO 9241-11 standard.

4.10.2 How the prototype works

This prototype provided features and functionalities with which a user can be created to access the prototype. This user can login and perform series of tasks. These tasks included but not limited to creation of more users within his/her domain; creation of questions; creation of questionnaire and generation of reports. Such users created are also administrators on the platform who can create streams of questions based on their service categories (Expected and Perceived services).

With these questions created, there was a provision for creating a questionnaire title after which questions can be picked from the pre-defined questions and finally a questionnaire generated. Users, questions and questionnaires could be viewed and managed as desired. It is worth knowing that for any questionnaire created, there were two options made for instant

sharing that is email and text message in-links. Users would then follow the links shared to share information to users and for users to fill in their demographic information and submit.

4.10.3: Users process

There are two major types of users recognised by this prototype: these are administrative users and public users. They are however, called the actors of the system and the tasks they perform are referred to as use case.

Administrator: is an authorised user who creates public users and share questionnaire to the recipients. This user can be a librarian, administrative officer or lecturer who wants to evaluate services or staff or course performance. See Plate I

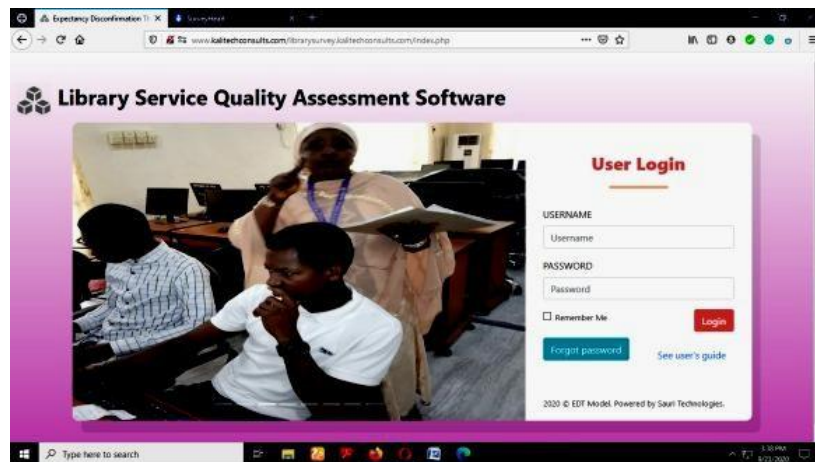


Plate I: Log in page

- i. Administrator logs in to the system with a pre-defined username and password created by the super administrator.

- ii. Administrator will land on dashboard, menu options and their sub-menus as follows:

Dashboard for the expectancy disconfirmation theory (EDT)

This provides the summary of the activities performed on the system at a glance as per the system activities. Information on the dashboard included the total number of the available questions, questionnaires created of to be create, administrative users and list of respondents. See Plate II for more details.

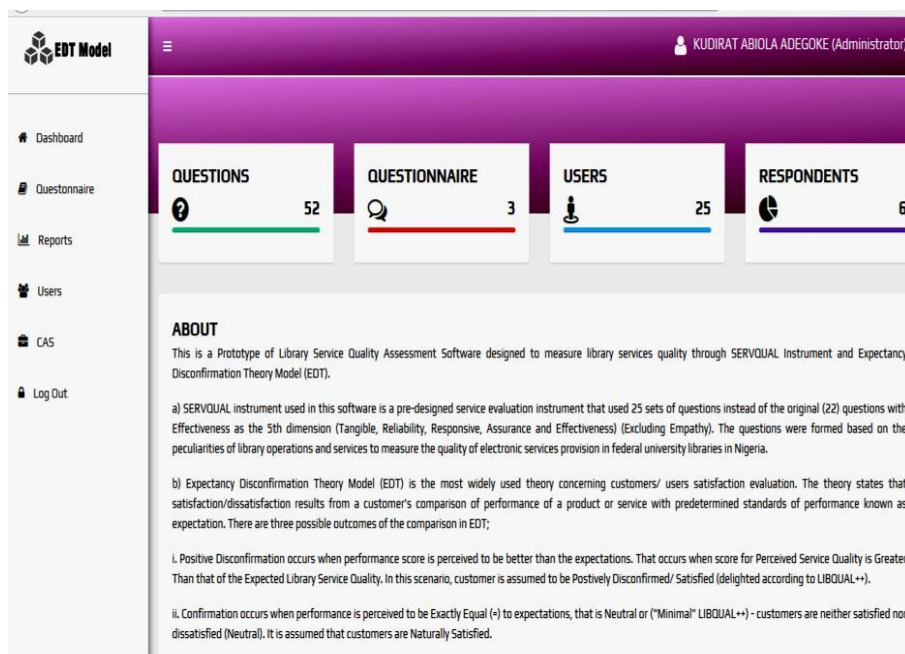


Plate II: Dashboard

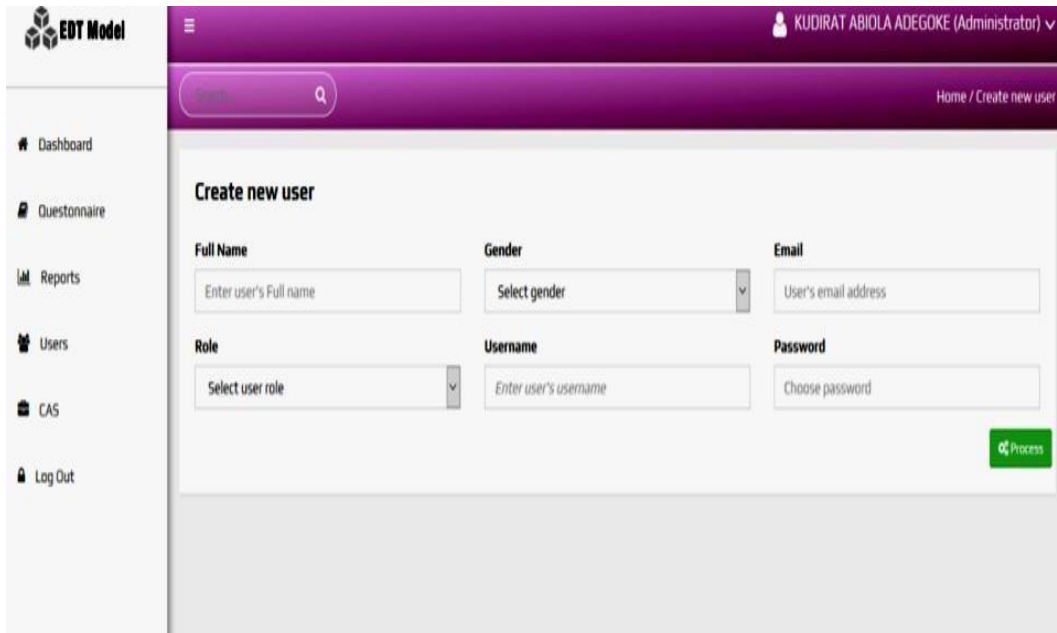
This dashboard platform serves as the landing page for the prototype. It serves a place where users can explore the functionalities of the software through the icons displayed as quick links to all available menus.

Users' Management View

This menu enables the administrator to create, edit, view or manage users properly. The platform gives the user the opportunity to add, edit and delete users. The beauty of this menu is that it marginalises every user, which means user A will not see what user B is doing in his/her own end except the Super Administrator.

Create users view: this menu is used for creating and viewing the list of other administrators who are users of the system. See Plate III.

Users Account Creation View



The screenshot displays the 'Create new user' form within a web application. The interface features a purple header with the user's name 'KUDIRAT ABIOLA ADEGOKE (Administrator)' and a search bar. A left sidebar contains navigation options: Dashboard, Questionnaire, Reports, Users, CAS, and Log Out. The main content area is titled 'Create new user' and includes the following fields:

- Full Name:** A text input field with the placeholder 'Enter user's Full name'.
- Gender:** A dropdown menu with the placeholder 'Select gender'.
- Email:** A text input field with the placeholder 'User's email address'.
- Role:** A dropdown menu with the placeholder 'Select user role'.
- Username:** A text input field with the placeholder 'Enter user's username'.
- Password:** A text input field with the placeholder 'Choose password'.

A green 'Process' button is positioned at the bottom right of the form area.

Plate III: Users Account Creation Platform

Users account creation platform is used to create new user who can be given different roles based on their area of interest. Users can be assigned the role of administrator, librarians or viewer.

Process of Creating User

1. Administrator logs in to the prototype
2. Administrator goes to 'users' main menu to 'create user'
3. Administrator fills the form with the new user information and click process

User Information

The software will request for the following information when creating user, this is what the database stores for future correspondences. This is very important for library current awareness services because without users' data, the current awareness service platform will not function effectively.

- i. Full name
- ii. Gender
- iii. Email address
- iv. Role (Librarian, Lecturer, Human resource manager)

Users Display View:

Displays the list of available users on the system. The administrator can create, update or delete users' record as well. See Plate IV

Dashboard

Questionnaire

Reports

Users

CAS

Log Out

System Users



<input type="checkbox"/>	#	Full Name	Gender	Email Address	Role	Action
<input type="checkbox"/>	1	Kudirat Abiola Adegoke	Female	ismriskat@yahoo.com	Librarian	
<input type="checkbox"/>	2	Jumoke Olaniyani	Female	olanianijumoke803@gmail.com	Researcher	
<input type="checkbox"/>	3	Samuel Odeyemi	Male	samodeyemi@gmail.com	Administrator	
<input type="checkbox"/>	4	Abduldayan Fatimah	Female	nnafatimah@gmail.com	Administrator	
<input type="checkbox"/>	5	Adeniyi Adegile	Male	adegbileroidowu@gmail.com	Librarian	
<input type="checkbox"/>	6	Adigun Ganiyu	Male	adiganfol@yahoo.com	Administrator	
<input type="checkbox"/>	7	Rachel Fischer	Female	rachel.fischer@up.ac.za	Administrator	
<input type="checkbox"/>	8	Frittelli Claudia	Female	DAR@carnegie.org	Administrator	
<input type="checkbox"/>	9	Wilson Adriko	Male	wilsonadriko@gmail.com	Administrator	
<input type="checkbox"/>	10	Boris Dinko	Female	borisdinko@yahoo.co.uk	Administrator	

Plate IV: List of System Users

4.11: Questionnaire Creation and Management View

This is where questions and questionnaires are created, listed and shared.

Create question: Allows administrator to create questions. Plate IV .

Question Management View

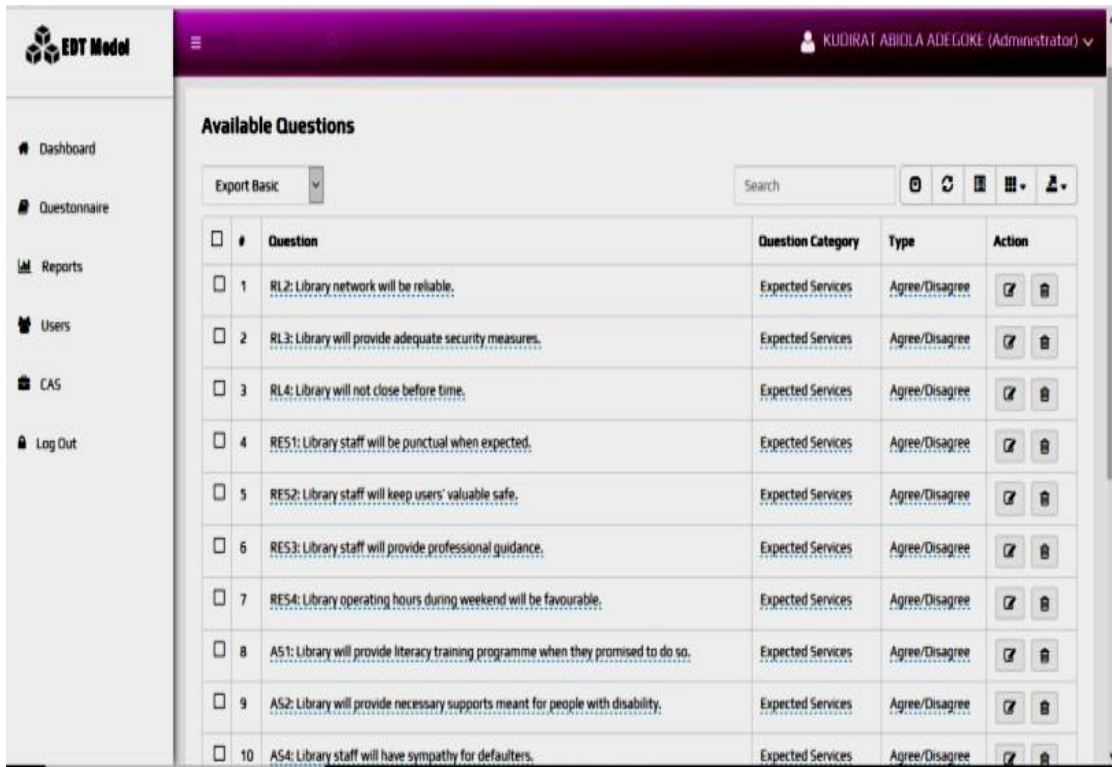
The screenshot shows a web browser window with the URL www.kalitechconsults.com/librarysurvey/kalitechconsults.com/create_question.php. The page title is "EDT Model" and the user is logged in as "KUDIRAT ABIOLA ADEGOKE (Administrator)". The navigation menu on the left includes: Dashboard, Questionnaire, Reports, Users, CAS, and Log Out. The main content area is titled "Create new question" and contains three input fields: "Question" (with placeholder text "Type new question"), "Question Category" (a dropdown menu with options: "Choose questionnaire category", "Expected Services", and "Perceived Services"), and "Answer Option Type" (a dropdown menu with placeholder text "Select answer option"). A green "Create" button is located to the right of the "Answer Option Type" field. The footer of the page reads "2020 © EDT Model. Powered by Sauri Technologies."

Plate V: Create Question Platform

View Questions Page:

Lists all questions created by the administrator. This page also permits the administrator to edit or delete question. Plate V.

Question Display View

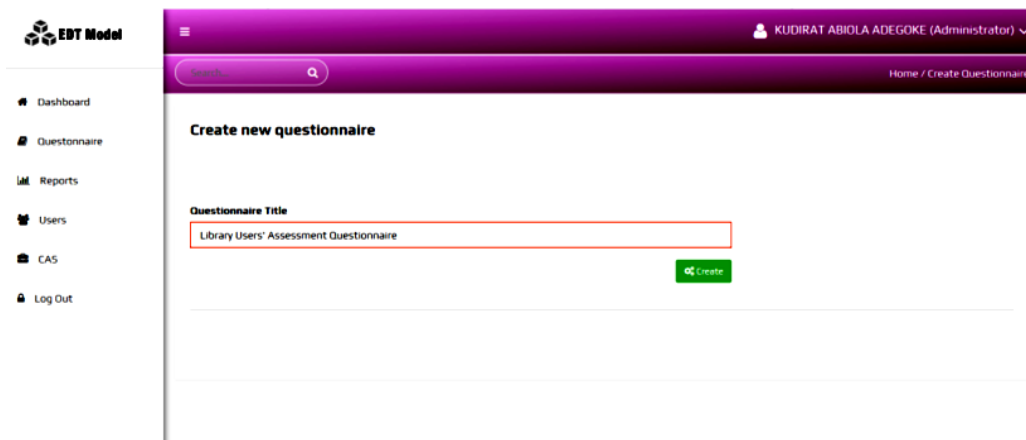


<input type="checkbox"/>	#	Question	Question Category	Type	Action
<input type="checkbox"/>	1	RL2: Library network will be reliable.	Expected Services	Agree/Disagree	
<input type="checkbox"/>	2	RL3: Library will provide adequate security measures.	Expected Services	Agree/Disagree	
<input type="checkbox"/>	3	RL4: Library will not close before time.	Expected Services	Agree/Disagree	
<input type="checkbox"/>	4	RES1: Library staff will be punctual when expected.	Expected Services	Agree/Disagree	
<input type="checkbox"/>	5	RES2: Library staff will keep users' valuable safe.	Expected Services	Agree/Disagree	
<input type="checkbox"/>	6	RES3: Library staff will provide professional guidance.	Expected Services	Agree/Disagree	
<input type="checkbox"/>	7	RES4: Library operating hours during weekend will be favourable.	Expected Services	Agree/Disagree	
<input type="checkbox"/>	8	AS1: Library will provide literacy training programme when they promised to do so.	Expected Services	Agree/Disagree	
<input type="checkbox"/>	9	AS2: Library will provide necessary supports meant for people with disability.	Expected Services	Agree/Disagree	
<input type="checkbox"/>	10	AS4: Library staff will have sympathy for defaulters.	Expected Services	Agree/Disagree	

Plate VI: List of Questions

Create Questionnaire View

The create questionnaire allows the creation of a new questionnaire. Plate VII



Create new questionnaire

Questionnaire Title

Library Users' Assessment Questionnaire

Plate VII: Questionnaire Creation Platform

List Questionnaire View

List all existing questionnaire created by the administrator. Through this menu, a questionnaire record can be updated or deleted. See Plate VIII.

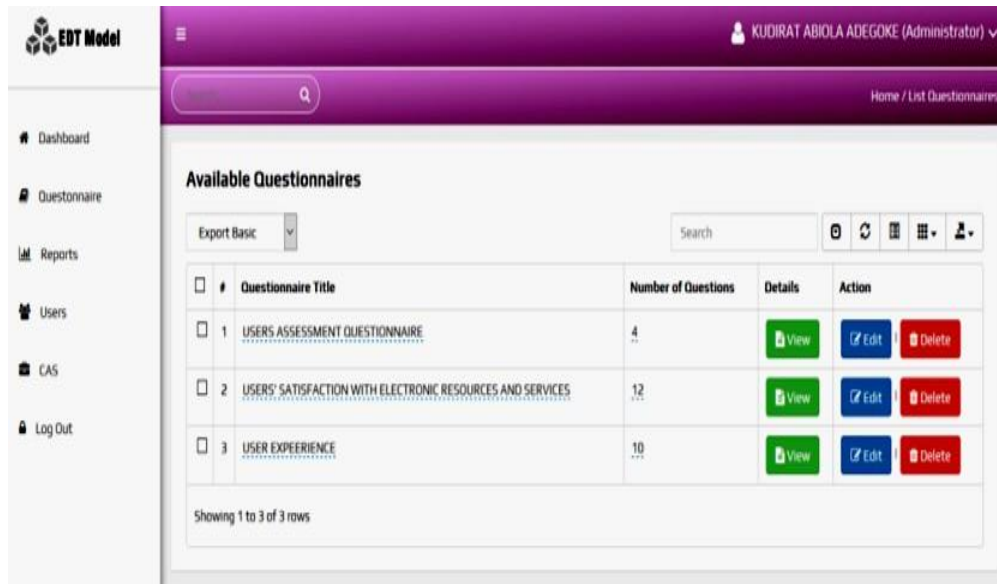


Plate VIII: Questionnaire Display Platform

Share Questionnaire View:

This platform enables administrator to share questionnaire link to public users through email or text messages. See PlateIX.

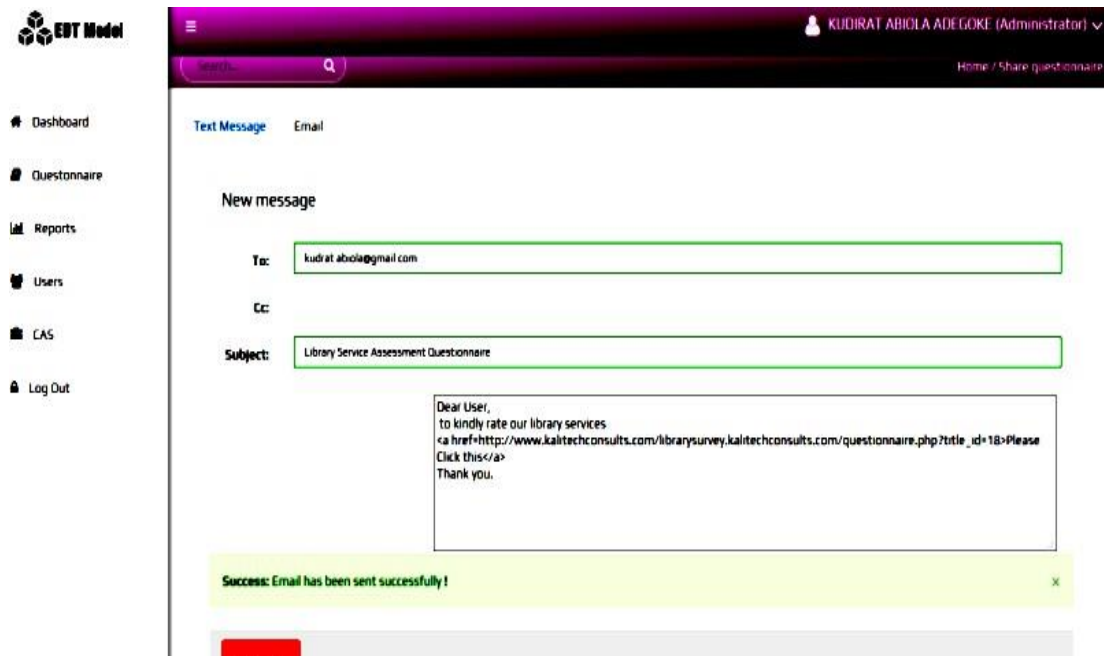


Plate IX: Questionnaire Sharing Platform

Report View

There is a platform provided for administrator to generate report from the user responses so as to gather the scores obtained for a particular questionnaire shared on a particular date. To generate this report, the admin need to select the questionnaire title, the date it was shared, service category and users' gender. This prototype provides a comprehensive report in tabular form and allow for the results to be exported in CSV or MS-Excel formats. See Plate X

Report Generation View

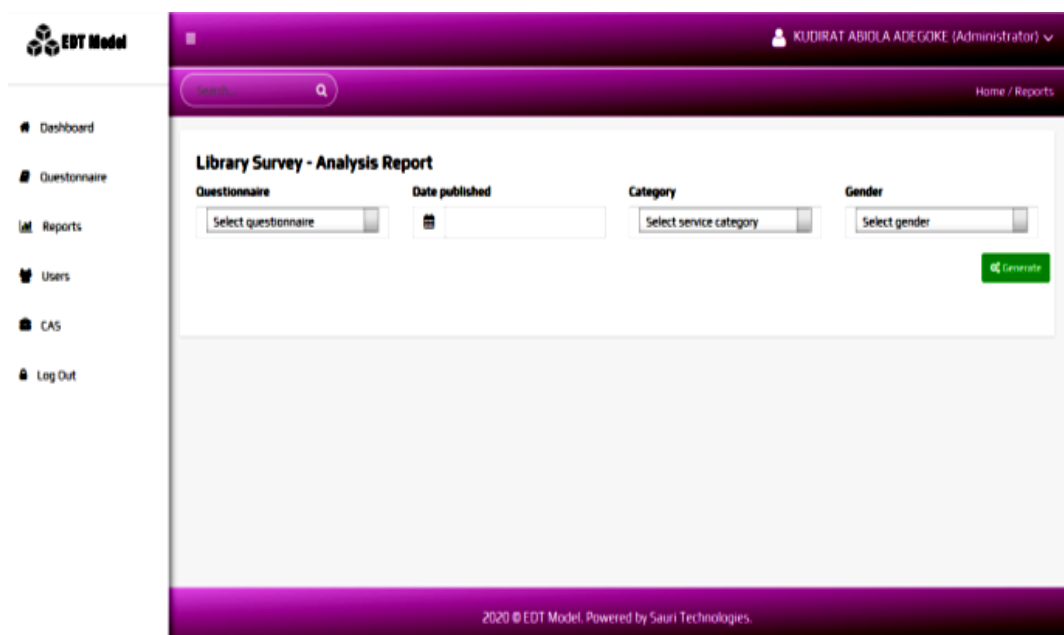


Plate X: Questionnaire sharing platform

Current Awareness Services View

The current awareness services platform enables the administrators to share current news, events, resources and services of the library with the registered users for effective utilisation of library resources. See XI

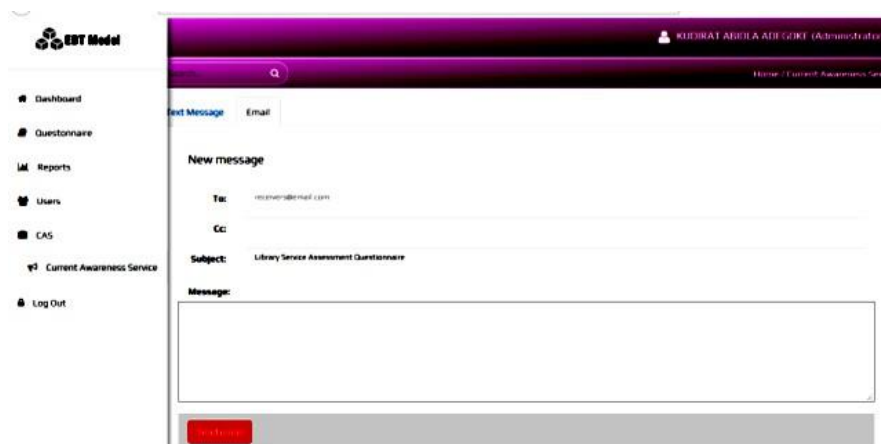


Plate XI: Current Information Sharing View

4.10.4: System implementation

The library service quality assessment design is being actualised. The system components were developed and tested using testing mode, usability and technology acceptance test to ascertain its functionality.

Technology used

EDT prototype application is a web-based system developed for flexibility and accessibility anywhere and anytime provided there is Internet connectivity. The system was developed with multiple technologies to support its different sections called the Front-end and Back-end.

1. Front-end:

- a) This is the part through which users interact with the system and the following software has been used to develop the application.
- b) HTML – This is the Hypertext Markup Language which can be referred to as the building block of the web page of the system, it provides the overall design and functionality of the assessment tool.
- c) CSS – is the Cascading-Style Sheet used for beautifying the looks of the web pages.
- d) Javascript with JQuery - For interactivity of the web pages.
- e) Bootstrap Template – For responsiveness of the interfaces such that users with different devices – Mobile phones, tablets and personal computers can comfortably use the system.

- 2. Back-end:** This is where the coordination between the front-end and the database is implemented. The technology used is:

Database

MYSQL Database management system was used to manage the data collection, processing and storage of the information by the prototype.

Third party application used

SMS live 247 was the SMS provider used to support the short instant messaging service functionality used by the system to share questionnaire links and other vital information – the CAS (Current Awareness Services) to the registered users of the library from their emails to their mobile phones for effective dissemination of information. This was implemented by using the API provided by the service providers.

4.10.5 : System requirements

For the system to work, the following are some requirements that must be in place, namely;

- i. A Personal computer (PC), tablet or mobile phone (Android, Iphone, Techno, Samsung or Ipad
- ii. A browser to be installed on any of the these devices to launch the application through a shared link
- iii. An Internet connectivity which may be wired or wireless for access and sharing.

4.10.6: Usability report for the prototyped expectancy disconfirmation theory

Sequel to the development of the prototype, the researcher purchased a domain to host the system. The study created the twenty recruited librarians as administrators to test the effectiveness and efficiency of the system. The participants were asked to complete questionnaire after the usability task and the details of the exercise are shown in Table 4.9.3

Table 4.9.3: Subscales and corresponding measurement items for usability test for EDT Prototype

See Appendix IV Page 159

Table 4.9.3 showed that all constructs used in testing the usability of the library services quality assessment have passed the implementation stage since the mean scores were above 2.5 minimum scores and therefore ready to be developed into a full fledged software for use in the libraries.

4.10.6 Technology acceptance model testing

The prototyped expectancy disconfirmation theory was subjected to test using technology acceptance model II. The need to know the perceived ease of use, perceived usefulness and satisfaction with the software necessitated the testing exercise. This was to ascertain what works and what did not work in the design of the system; as well as getting feedback from the end users in order to modify the system design in anticipation of perfect expectancy disconfirmation theory EDT software development. The testing was done remotely using number of submitters shown on the system. An adapted questionnaire used for usability testing was replicated in Google form and shared with the selected ICT librarians, lecturers in the Department of Library Information Science, Minna, University Librarians, software developers in Usmanu Danfodiyo University, Sokoto, LRCN official and NUC staff. The responses of the survey was analyzed with Microsoft excel and the data were exported to SPSS.

Implication of Technology Acceptance Theory (TAM2) on the study

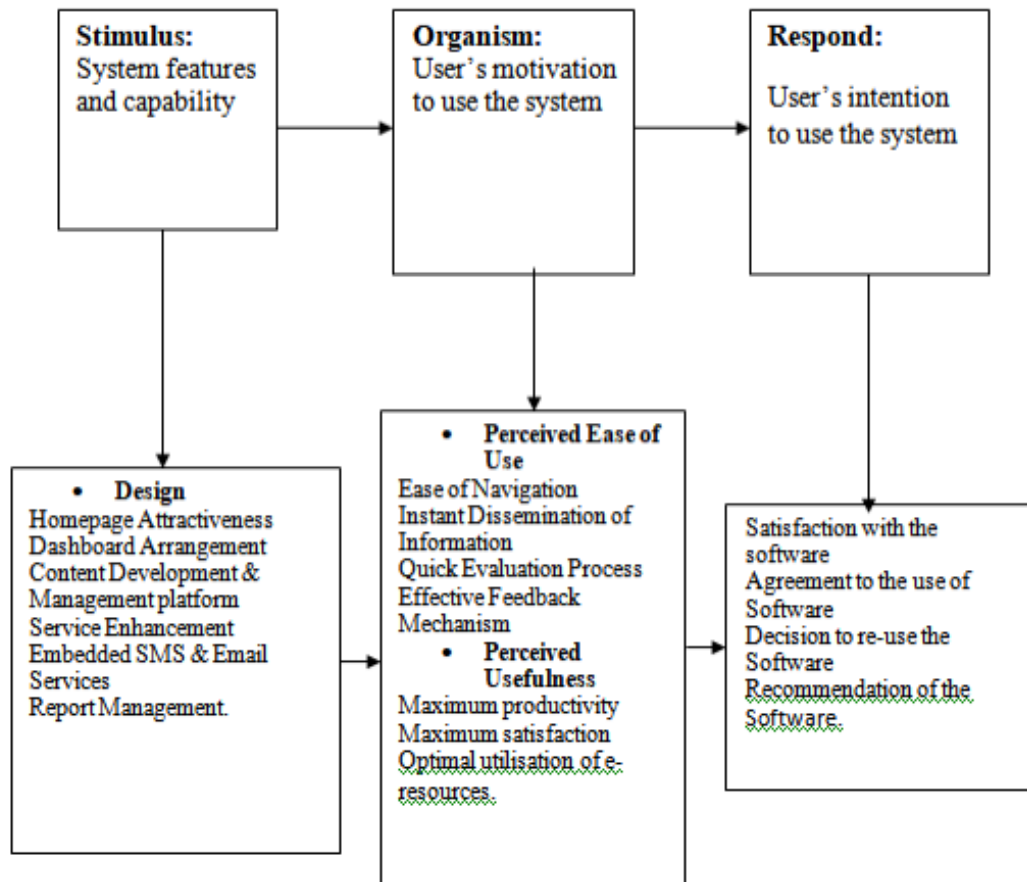


Figure 4.8: Implication of Technology Acceptance Model 2

Source: Adapted from Stimulus and Theoretical Framework (Lai, 2016)

4.11 Research question 9: What are the challenge(s) militating against the provision of electronic resources in federal university libraries in Nigeria?

To identify the challenges facing the provision of electronic information resources in the federal university libraries in Nigeria, the study identified fifteen problems that could militate against the effective service delivery and requested the heads of ICT to respond based on their experience. Table 4.9.4 reported the types of challenges facing the provision of the electronic resources in the federal university libraries in Nigeria. See Appendix VI (Page 168).

Table 4.9.4 presented the descriptive statistics for challenges facing the provision of electronic resources. These responses range from $M = 1.83$ (“limited access to back issue, slow download speed, inadequate bandwidth to maintain steady connection and inadequate users information literacy training organized”), to $M = 3.33$ (“lack of permanent technical staff to maintain the system and lack of online registration facilities”). The result showed that out of the fifteen items listed to determine the challenges facing the provision of electronic resources in the library; seven have mean scores greater than 2.5 average thresholds which indicate agreements to the challenges listed within the range. Contrarily, eight of the items have mean scores lower than 2.5 which were considered to be disagreement. This can be interpreted to mean that all those items with less than 2.5 were not part of the constraints facing the provision of electronic services in the federal university libraries in Nigeria but those with more than 2.5 thresholds hindered effective service delivery in the libraries studied.

4.12 Analysis of Structural Equation Modeling and Hypotheses Testing

Sequel to the completion of data cleaning and the establishment of the reliability and confirmatory factor analysis (CFA) for collected questionnaires, the next step is to test the relationships between the exogenous and endogenous latent variables which can be done during the structural model stage (Arbuckle, 2009; Hair *et al.*, 2010). Unlike the confirmatory factor analysis, there is a need to distinguish between dependent and independent variables. SEM assumes the covariance between the independent variables, which is represented by two-headed arrows, whereas the causal relationship from an independent variable to a dependent variable is represented by one-arrow. Therefore, the relationship between constructs is specified after the transition from the measurement model to the structural model. The results of the analysis of the structural model is presented in 4.12.1.

4.12.1 Testing of Hypotheses

The following null hypotheses were tested at 0.05 levels of significance.

H₀₁: There is no significant relationship between the utilisation of electronic resources and users' satisfaction with the electronic resources provision in federal university libraries in Nigeria.

Table 4.9.5 showed the relationship between utilisation and users' satisfaction with electronic resources in federal university libraries in Nigeria.

Table 4.9.5: Hypothesis testing for utilisation and users' satisfaction

Causality Direction	Standardised Pathcoefficient	P. value	S.E	Decision
Utilisation → Users' Satisfaction	.41	0.000**	.0418051	Hypothesis was Rejected

Source: Author's calculation by using STATA; ** sig at 5%; S.E = Standard Error

Thus, the study examined the hypothesised relationship between the utilisation and users' satisfaction with electronic resources in federal universities in Nigeria. Table 4.9.5 depicted the path coefficients for the hypothesised relationships within the proposed research model. As it was shown in Table 4.9.5, a direct hypothesis was supported in the model.

Thus utilisation ($\beta=0.41^{**}$) have a significant positive influence on user's satisfaction with electronic resources, supporting H₁. Hence the null hypothesis one was rejected since $p<0.05$. The results of the squared multiple correlations (SMC), which provides information about the extent to which the model explains variance in the dataset, indicated that utilisation account for 99.7% ($R^2 = 0.997$) of the variance of user satisfaction with the electronic resources.

Structural Equation Modeling (SEM) for utilisation and postgraduate student users' satisfaction

The diagram in Figure 4.9 showed the structural relationship that exists between the variables utilisation and postgraduate student users' satisfaction. From the left is the constructs in the squares labeled sDn4q1-11 and SBn2qi-Cxiii were the observed variables that were manipulated to produce the influence of the two latent variables (utilisation and postgraduate student users' satisfaction).

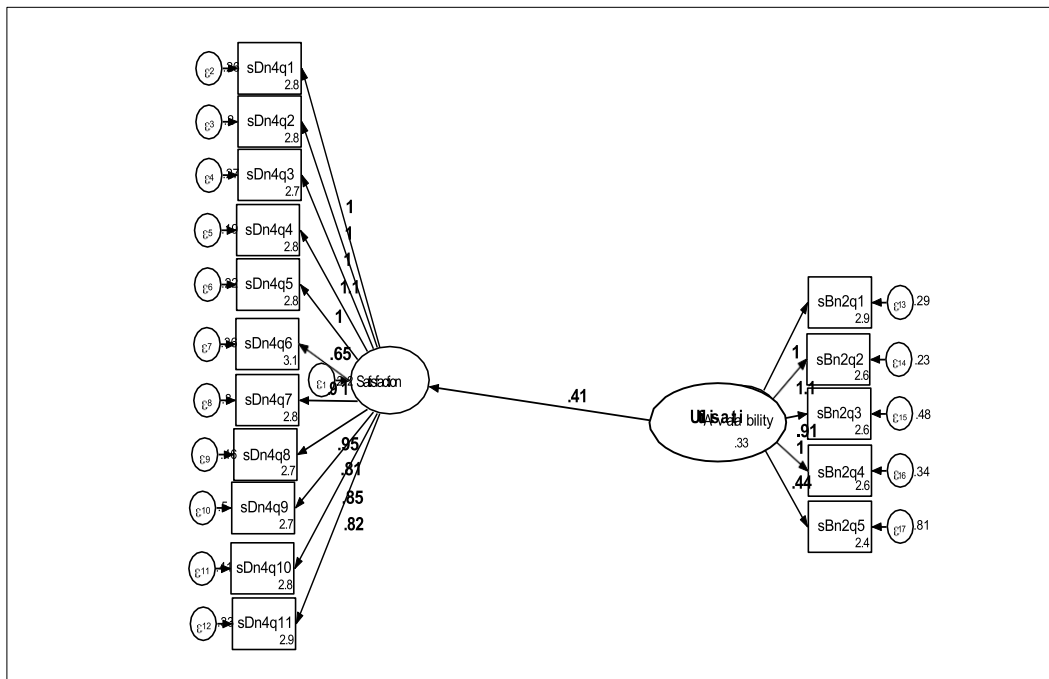


Figure 4.9: Structural equation model of the relationship between the utilisation of electronic resources and user's satisfaction.

H₀₂: Usability of electronic resources will have no significant influence on library users' satisfaction with electronic resources in federal university libraries in Nigeria.

Table 4.9.6: Test of Hypothesis for Usability

Causality Direction	Standardised Path coefficient	P. value	S.E	Decision
Usability → User's Satisfaction	-.028	0.493	.043653	Hypothesis Not Rejected

Source: Author's calculation by using STATA; ** sig at 5%; S.E = Standard Error

Result from Table 4.9.6 showed the test of hypothesis of relationship between usability and users' satisfaction with electronic resources, as a standardised path coefficient ($\beta = -.028$) which indicated that there was a negative relationship between usability and users' satisfaction, and having a p-value of ($p > 0.493$) means that the null hypothesis three stated in this study must not be rejected. This can be interpreted to mean that usability of library electronic resources has influenced user' satisfaction negatively for being on the negative disconfirmation side and this is a very strong indicator of users' dissatisfaction that the librarians must give necessary attention to if really the story must change.

The diagram in Figure 4.10 showed the structural relationship that exists between the variables usability and postgraduate student users' satisfaction. From the left is the constructs in the squares labeled sDn4q1-11 and Sec Bi-Bxi, Cvii were the observed variables that were manipulated to show the influence of the two latent variables (usability and postgraduate student users' satisfaction).

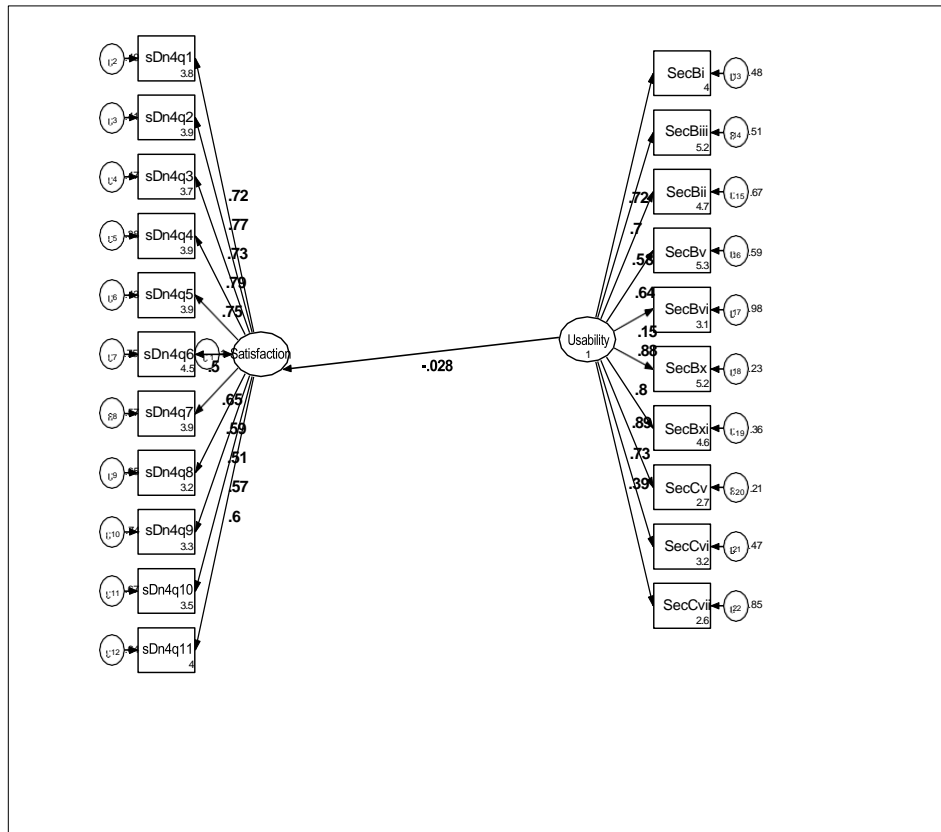


Figure 4.10: Relationship between usability and users’ satisfaction

H₀₃: There is no significant relationship between the quality of library services and users’ satisfaction with electronic resources provision in federal university libraries in Nigeria.

Table 4.9.7.: Gap analysis of users’ perception and expectation of library services quality

Dimension	Perceived	Expected	Gap Score	Weights	Weighted Average
Tangible	3.12	2.86	0.26	16.25	0.04
Reliability	3.20	2.70	0.50	16.08	0.08
Responsiveness	3.11	2.72	0.39	19.83	0.08
Assurance	2.94	2.64	0.30	15.18	0.05
Effectiveness	3.22	2.78	0.44	32.66	0.14

Note: Overall average weighted SERVQUAL score = 0.39

Source: Author’s Original Construct

Table 4.9.7 showed that all responses were positive and an overall weighted SERVQUAL score of 0.39 was recorded, indicating users’ satisfaction with the library service quality based on the fact that users’ expectations were found to be lower than the perception

across all service areas and dimensions. The summary scores for each dimension has been reported in the Table 4.9.7 with the weighted average score per dimension being totaled to achieve the overall SERVQUAL score. Table 4.9.7 showed that the highest gap scores were for reliability and effectiveness; dimensions that reported larger mean gaps were reliability (0.50), effectiveness (0.44) responsiveness (0.39) and assurance (0.30) while smaller mean gap obtained was tangible (0.26). Since all gap scores were positive and less than one. These values showed that the perception of users on electronic resources in federal university libraries in Nigeria is relatively greater than the expected service quality.

To buttress these findings, the structural equation model report showed that library services quality has a beta coefficient of .66 ($\beta=0.66^{**}$) and for being statistically significant it has a significant positive influence on users satisfaction with electronic resources because for every 1 unit increase in the service quality the users' satisfaction will increase by .66. It can be concluded from the test of hypothesis that library service quality was high and therefore has significant positive influence on users' satisfaction with the electronic resources and services provision in the federal university libraries.

Table4.9.8: Relationship between service quality and users' satisfaction

Causality Direction	Standardised Path Coefficient	P. value	S.E	Decision
Service Quality \rightarrow User's Satisfaction	.66	0.000**	.025313	Sig. H0₃ Rejected

Source: Author's Original Construct, 2019

Thus, the study examined the hypothesised relationships within the model. Table 4.9.8 depicted the path coefficients for the hypothesised relationships within the proposed research model. As shown in Table 4.9.8 null hypotheses III in the model must be rejected since the service quality ($\beta=0.66^{**}$), was found to have a significant positive influence on users satisfaction with electronic resources, thus, Table 4.9.8 depicted summary of the hypothesis of the proposed model (Figure 4.11). It was apparent from the statistics test that the standardised path coefficients was significant having P-Value <0.05 . The service quality of electronic resources has significant positive influences on users' satisfaction with electronic resources and services provision in federal university libraries in Nigeria.

The diagram in Figure 4.11 showed the structural relationship that exists between the variables service quality and postgraduate student users' satisfaction. From the left is the constructs in the squares labeled sDn4q1-11 and SDn3q1-9 were the observed variables that were manipulated to show the influence of the two latent variables (service quality and postgraduate student users' satisfaction). Table 4.9.8 showed the existing gap in library service delivery.

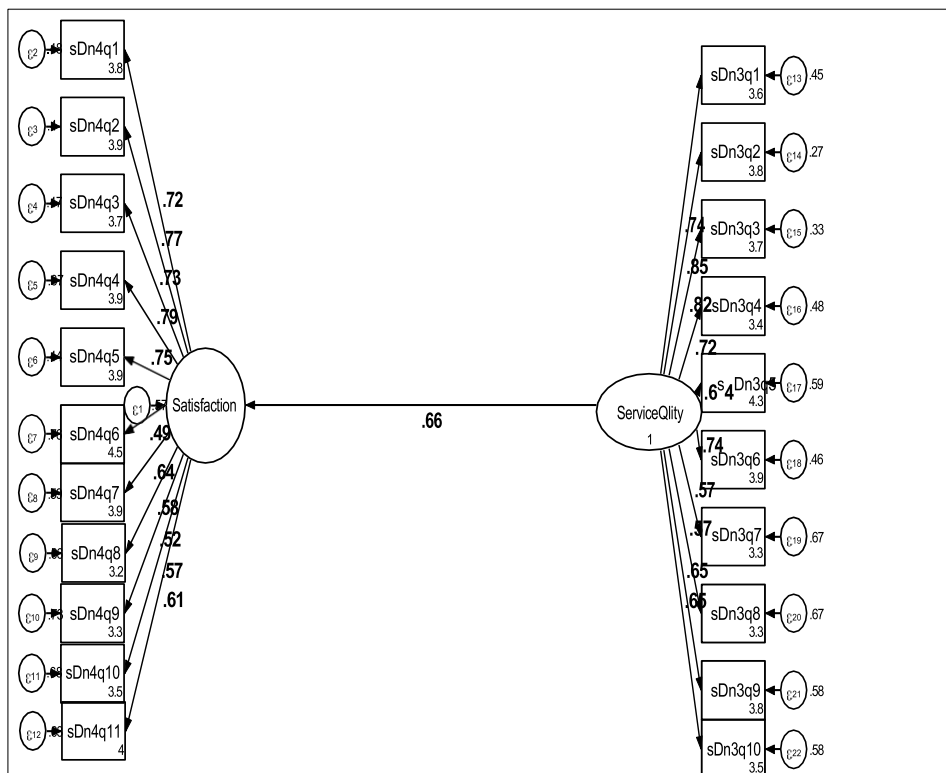


Figure 4.11: Structural Equation Model of the relationship between postgraduate student user's satisfaction and Service Quality

Table 4.9.9: Assessment of library gap score of librarian’s perception and user’s expectation of services

Dimension	Perceived	Expected	Gap Score	Weights	Weighted Average	Rank
Tangible	3.54	2.86	0.68	16.25	0.11	1 st
Reliability	2.46	2.7	-0.24	16.08	-0.04	5 th
Responsiveness	3.33	2.72	0.61	19.83	0.12	2 nd
Assurance	3.08	2.64	0.44	15.18	0.07	3 rd
Effectiveness	2.57	2.78	-0.21	32.66	-0.07	4 th

Note: Overall average weighted SERVQUAL score = 0.19

Source: Author’s Original Construct(2021)

Table 4.9.9 showed an overview of the variations of user expectations and librarian’s perception of different library service quality dimensions. With a mean gap score of 0.68, tangible had the highest gap, followed by responsiveness (0.61) and assurance with a mean gap score of 2.64. (0.44).

In terms of tangibility, responsiveness, and assurance, the positive gap score showed that participants were satisfied with the quality of library electronic services offered to their users. Dimensions such as reliability and effectiveness, on the other hand, have mean scores of (-0.24 and -0.21), suggesting that librarian need to pay attention to those dimensions to close the gaps. Overall the gap score obtained was (0.19) gap and it was a positive gap.

Figure 4.12 depicted the overall estimated proposed Researcher's Modified Parasuraman, Zeithaml, and Berry's ServQual Model (1985). Thus, the gap score analysis was estimated using descriptive statistics, with summarized means for each variable in the users' and librarians' questionnaire. In order to identify service quality differences, the analysis measured perception minus expectation scores for each item and dimension, as well as the deviation of mean score for the other dimension in a similar pattern. In order words, the overall results demonstrated that all gap scores were positive, meaning that the library just need to improve more in terms of reliability and effectiveness.

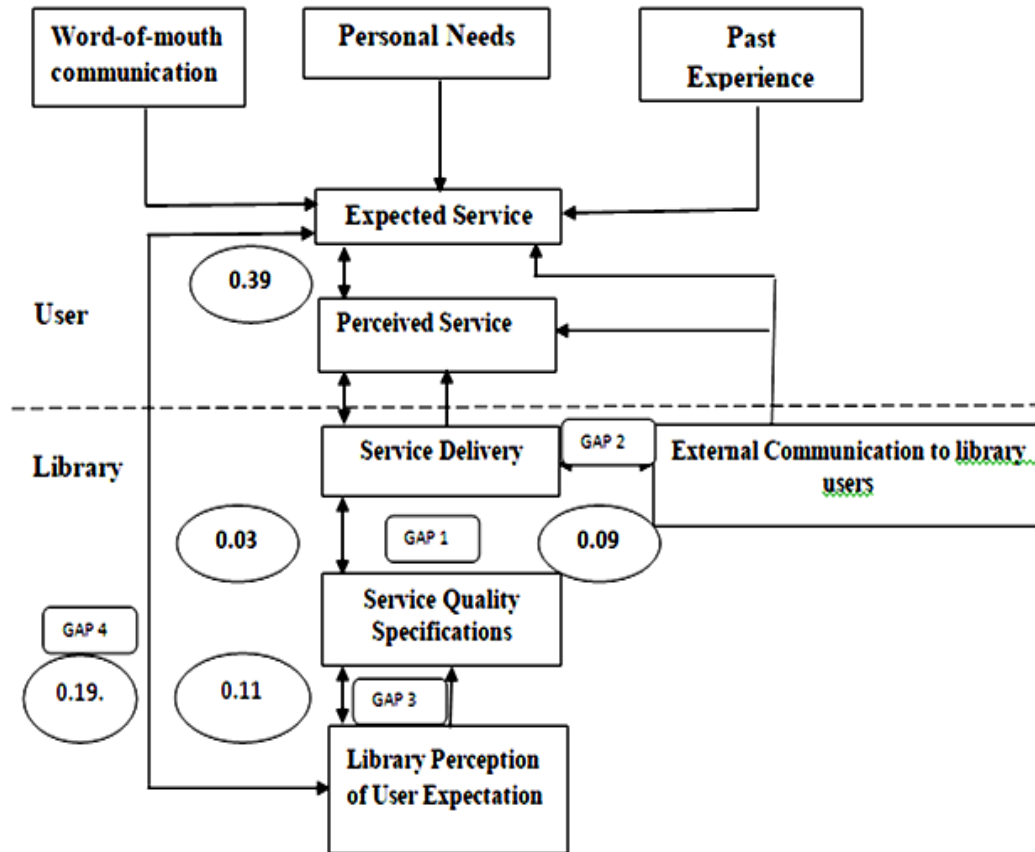


Figure 4.12: Identified Gaps in Library Services

Figure 4.12 depicted that the gaps 3(0.03), 2(0.11), 4(0.09) and 1(0.19) were the identified gaps in library service delivery. The fact that these gaps 2, 3 and 4 were so closed to users' perception of library service quality which libraries must expedite action to close.

- i. **Gap 3:** was found to be the first gap instead of third that exists between service quality specification and service delivery. This gap occurred as a result of differences in the actual library service delivery and the service specification based on the inability of library staff to perform their duties as expected. This problem has to do with ineffective recruitment exercises, lack of motivation, inadequate staff training, lack of commitment from the library staff or lack of managerial skills and inequality issues.
- ii. **Gap 4:** This gap was the 2nd critical in library service delivery as far as the federal university libraries in Nigeria are concern. The gap occurred as a result of

discrepancies between service delivery and external communication to library users. This gap can be as a result of exaggerated promises or ineffective communication to the library users, which raised users' expectations towards quality of library service delivery.

- iii. **Gap 2:** This gap was found to be the 3rd gap that occurred as a result of the discrepancy between library management's perception of user's expectation and service quality specification. This gap happened as a result of lack of commitment on the part of library management and the staff to poor service provision, unavailability of adequate information resources, lack of leadership quality and lack of regular users' satisfaction assessment.
- iv. **Gap 1:** This was the 4th gap that showed the discrepancy between users' expected library service delivery and library management's perception. The gap was seen as the first determinant of the library service quality from which other gaps emanate but the reverse is now the case because it was not too close as it used to be in other sectors.

The implications of these gaps on library service delivery is that university librarians must get the service quality specification right before providing services for users and must disseminate same information to their users because the gaps showed ineffective external communication from the library management side. Library management's perception of user's expectation, service quality specification and users' expected library service delivery were all responsible for low utilisation of library electronic resources.

4.13 Summary of the Findings

The following are the summary of findings from the study:

1. The available resources found in the federal university libraries studied were open access resources; open educational resources and Reseach4Life resources

(HINARI, Agora, Teal, ARDI, Oare) While JSTOR, ProQuest and Ebscohost were available in three out of six (50%) university libraries studied.

2. The level of postgraduate student users' satisfaction with electronic resources provision was moderate.
3. The available electronic resources in the university libraries were infrequently utilised.
4. The quality of library electronic services provided by federal university libraries in Nigeria was moderate.
5. There was positive influence between the library electronic service quality and postgraduate student users' satisfaction with provision of electronic resources in federal university libraries in Nigeria.
6. The available electronic resources in the library failed usability test, therefore the resources were not usable.
7. Usability had a negative influence on postgraduate users' satisfaction with library electronic resources.
8. An expectancy disconfirmation theory and 25-item ServQual instruments were used to design a prototype for evaluating library services performance, users' satisfaction and current awareness services for information sharing between the library and postgraduate users using a third party application for effective library electronic service delivery.
9. Challenges such as poor security measures, low utilisation of electronic resources, inadequate resources and facilities, incessant power failure and lack of awareness were the major challenges facing the provision of electronic resources in federal universities in Nigeria.

10. There was a significant relationship between the level of utilisation of electronic resources and postgraduate student users' satisfaction with library electronic resources.
11. Usability of electronic resources had no significant influence on postgraduate student users' satisfaction with library electronic resources.
12. There was a significant relationship between the quality of library services and postgraduate student users' satisfaction with the library electronic resources.

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

Users' satisfaction is the pivot upon which every university library stands, because to provide effective library services, users' information needs must be profiled and attended to at the right time. Thus, users' perception of electronic services quality was found to be greater than the expectations in this study which means users were positively disconfirmed with the provision of library electronic resources in federal university libraries in Nigeria.

Although, a large number of the postgraduate student users expressed their dissatisfaction with the adequacy of electronic resources, ineffective security measures put in place by the university libraries and other challenges such as awareness; perceived ease of use and perceived usefulness were found to be the factors militating against the provision and use of electronic resources in federal university libraries in Nigeria.

Library services were found to have positive relationship with postgraduate student users' satisfaction which is connected with services such as Internet, conduciveness of the environments and findings of the focus group where 50 (83.3%) out of 60 participants expressed satisfaction with the facilities and services provided by the libraries but not the electronic resources.

Library service quality was found to have had significant positive influence on postgraduate student users' satisfaction with electronic resources. This was linked with some essential services and facilities provided to support the use of the electronic resources as reported during the focus group discussion. In the context of this study Tangible (0.26) was found to be the only ServQual dimension with the lowest gap score

among the five dimensions of the ServQual model. This implication is that libraries should ensure that attention is given to the first dimension of the ServQual, the gaps 3 4, 2, and 1 (Library management's perception of user's expectation, service quality specification and users' expected library service delivery were all responsible for low utilisation of library electronic resources). Determinants of postgraduate student users' satisfaction were unveiled to be extension of elibrary/ café opening hours; strong Internet connection, specialised databases; remote access to library electronic resources; provision of adequate security measure; desktop display of icons of open access resources; laptop loan services; regular sensitisation programme and uninterrupted power supply. Thus, regular evaluation of library service quality is essential to university community for attainment of their goals; it helps in maintaining the best-practices and meet the changing users' expectations more effective and efficient. Usability evaluation of databases will definitely help the librarians in cutting cost; increase users' satisfaction; boost staff morale; increase users' retention and loyalty.

5.2 Recommendations

The study recommended the following for effective library service delivery that will foster users' maximum users' satisfaction.

1. University libraries should subscribe to adequate electronic journals, ebooks and compile open resources to complement the available electronic resources. This is to ensure that users have access to numerous sources, apart from the fee-based electronic resources that requires regular renewal.
2. To improve the level of postgraduate student users' satisfaction with university library electronic resources, university librarians must conduct community profiling to identify users' determinant of satisfaction such as adequacy of electronic resources, conduciveness of library environment, adequate security

measures and epileptic power supply must be properly addressed. That is they must get the service quality specification right before providing services for users.

3. University libraries are encouraged to adopt the expectancy disconfirmation theory prototype design in this study to evaluate users' satisfaction on a regular basis for them to improve on their service delivery and keep users abreast of the new arrivals or current subscriptions in their libraries. This is because the prototype has a platform for sharing information using SMS and e-mail services. No doubt, if the libraries organise regular stake-holder meetings, it will help them in curbing the problem of low utilisation. Librarians should ensure that users are provided with login details for on-campus and remote access to electronic resources. ServQual gaps 3,4,2 and 1 showed ineffective external communication from the library management side. Therefore, library must share current information with their users.
4. Libraries should improve on the quality of library services rendered to postgraduate student users in order to strengthen the existing relationship between them. Services such as current awareness services (CAS), selective dissemination of information (SDI) and Internet searching should be provided by the university libraries.
5. University libraries should improve on the quality of electronic resources rendered to users' community. This is to ensure that current and relevant electronic resources are provided to satisfy users' information needs.
6. University libraries should ensure that only databases or electronic resources that are tested and passed the users' evaluation tests are purchased for library users to avoid wasting money on any information resource that will not be

accessed by the user. Hands-on training on how to search and use the resources should be conducted.

7. Regular usability evaluation and users' literacy training should be conducted for electronic resources and library users. This is necessary because majority of the respondents failed the evaluation given to them due to lack of ICT literacy skills to navigate through the databases and those available databases were insufficient to satisfy all users of the university libraries that subscribed to them.
8. Since the prototype designed for this study is a web-based application, there is need to try a desktop version of the library assessment software which can be used via the university Local Area Network (LAN) using Internet Protocol (IP) to disseminate current information within the university community in case there is need to send sensitive information from the libraries to only registered university community members.
9. Government and university managements should provide adequate funds to: deploy effective digital security systems such as self-monitor RFID security doors and close circuit cameras and recorders; subscribed to adequate and ICT facilities; establish solar farm that will serve as alternative source of power to the library and it's environ; organise training and sensitization programmes for staff and users.
10. To boost the level of utilisation of electronic resources, libraries need to strategize by organising regular training/sensitization programme for both academic staff and postgraduate users; subscribe to current and relevant electronic resources; provide users with login details, provide on campus and remote access to the available resources. Strong Internet connection will help

to reduce the cost of downloading with personal data and it should be provided for users' optimal satisfaction. Provision of access and training will help in strengthening their existing relationship.

11. Regular users' evaluation and electronic resources assessment will solve the existing negative relationship between library postgraduate student users and the electronic resources in federal university libraries.

12. Since libraries and library service quality have a strong relationship, users' will be loyal if libraries pay attention to those five dimensions of ServQual instrument. This, if done, will make libraries to retain their users.

Contribution to Knowledge

This study made the following contributions to the field of librarianship.

1. Development of an evaluation instrument for measuring library service quality (LIBSERVQUAL);
2. Development of a web-based Library Services Assessment Software for measuring users' satisfaction and current awareness services
3. Development of a usability test instrument for evaluating library application using prototype modeling technique.
4. Identification of gaps 3 (service delivery and service quality), gap 4 (service delivery and external communication to users), gap 2 (service quality specifications and library perception of user expectations as critical gaps to be closed by the librarians).

Suggestions for Further Studies

1. The study should be extended to academic staff of the university to determine their level of satisfaction with library service quality.
2. Similar research should be conducted for undergraduate students to assess their level of satisfaction with electronic library resources in all university libraries in Nigeria.
3. More studies are required on users' satisfaction with library services quality in academic libraries in Nigeria with special attention on state and private owned institutions in Nigeria.
4. Regular library performance evaluation should be conducted using the Library service assessment software developed in this study.
5. There is need for in-depth exploration of the influence of library service quality on research productivity of the academic staff of the federal universities in Nigeria.
6. More theoretical and methodological approaches are required evaluating the influence of usability of electronic resources on library service quality in academic libraries in Nigeria.

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APPENDIX I

Table: 3.2 Stratification of the Federal Universities according to Six Geo-political Zones

S/No.	Federal Universities	Geo-political States	Representatives
South South-(6 States)			
1	University of Uyo, Uyo	Akwa Ibom	
2	University of Port Harcourt , Port Harcourt	Rivers	
3	University of Benin, Benin City	Edo	
4	Nigeria Maritime University, Okerenkoko,		University of Benin, Edo State
5	Federal University of Petroleum Resources, Effurun	Delta	
6	Federal University, Otuoke	Bayelsa	
7	University of Calabar, Calabar	Cross River	
South East – (5 States)			
8	University of Technology, Owerri	Imo	University of Technology, Owerri
9	Federal University, Nudufu Alike	Ebonyi	
10	University of Nigeria, Nsukka	Enugu	
11	Nnamdi Azikiwe University, Awka	Anambra	
12	Michael Opara University of Agriculture, Umudike	Abia	
South West (6 States)			
13	Federal. University of Agriculture, Abeokuta	Ogun	Obafemi Awolowo, University, Ile-Ife
14	National Open University of Nigeria, Lagos	Lagos	
15	University of Lagos, Akoka		
16	Federal University, Oye-Ekiti	Ekiti	
17	Federal University of Technology, Akure	Ondo	
18	University of Ibadan, Ibadan	Oyo	
19	Obafemi Awolowo University, Ile-Ife	Osun	
North Central (7States)			
20	University of Ilorin, Ilorin	Kwara	Federal University of Technology, Minna
21	Federal University, Lokoja	Kogi	
22	University of Abuja, Gwagwalada	Abuja	
23	University of Agriculture, Markudi	Benue	
24	University of Jos, Jos	Plateau	
25	Federal University, Lafia	Nassarawa	
26	Federal University of Technology, Minna	Niger	
North West (7 States)			
27	Ahmadu Bello University, Zaria	Kaduna	Usmanu Danfodiyo University, Sokoto
28	Nigeria Defense Academy, Kaduna		
29	Federal University, Dutsin-ma	Katsina	
30	Bayero University, Kano	Kano	
31	Nigeria Police Academy Wudil, Kano		
32	Federal University Birnin Kebbi,	Kebbi	
33	Federal University, Kashere	Jigawa	
34	Usmanu Danfodiyo University, Sokoto	Sokoto	
35	Federal University, Gusau	Zamfara	
North East (6 States)			
36	University of Maiduguri, Maiduguri	Borno	University of Maiduguri, Maiduguri
37	Nigerian Army University, Biu	Borno	
38	Federal University, Kashere,	Gombe	
39	Federal University, Wukari, Taraba	Taraba	
40	Federal University, Gashua,	Yobe	
41	Modibbo Adama University of Technology, Yola	Adamawa	
42	Abubakar Tafawa Balewa University, Bauchi	Bauchi	

Appendix II

Table 4.8: Users' Responses on Perception of library service quality by HOD, ICT

Statements		SD=1	D=2	A=3	SA=4	N	FX	Mean	S.D	Remark
		Freq. (%)	Freq. (%)	Freq. (%)	Freq. (%)					
A Tangible (TA): Accessibility										
1	On-campus access to electronic resources is very easy.	60 (8.3)	92 (12.7)	324 (44.9)	246 (34.1)	722	2200	3.05	0.89	Agree
2	Library electronic resources are remotely accessible.	63 (8.7)	101 (14)	344 (47.6)	214 (29.6)	722	2153	2.98	0.89	Agree
3	Library's portal/website requires less effort.	67 (9.3)	76 (10.5)	324 (44.9)	255 (35.3)	722	2211	3.06	1.82	Agree
4	Library environment is conducive.	37 (5.1)	32 (4.4)	254 (35.2)	399 (55.3)	722	2459	3.41	0.80	Agree
B Reliability (REL)										
5	Library sends mobile alert to users.	99 (13.7)	119 (16.5)	264 (36.6)	240 (33.2)	722	2089	2.89	1.02	Agree
6	Library network is reliable.	43 (6)	98 (13.6)	257 (35.6)	324 (44.9)	722	2306	3.19	0.88	Agree
7	Library provides adequate security measures.	27 (3.7)	66 (9.1)	262 (36.3)	367 (50.8)	722	2413	3.34	0.78	Agree
8	Library does not close before official time.	38 (5.3)	48 (6.6)	238 (33)	398 (55.1)	722	2440	3.38	0.83	Agree
C Responsiveness (RES)										
9	Library staff are punctual when needed.	43 (6)	70 (9.7)	239 (33.1)	370 (51.2)	722	2380	3.30	0.85	Agree
10	Library staff are always approachable.	40 (5.5)	113 (15.7)	283 (39.2)	286 (39.6)	722	2259	3.13	0.87	Agree
11	Library staff provides professional guidance.	34 (4.7)	76 (10.5)	306 (42.4)	306 (42.4)	722	2328	3.22	0.82	Agree
12	Library operating hours during weekend is not favourable.	81 (11.2)	112 (15.5)	269 (37.3)	260 (36)	722	2152	2.98	0.98	Agree
13	Library provides wheel chair services to physically challenged students.	109 (15.1)	104 (14.4)	262 (36.3)	247 (34.2)	722	2091	2.90	1.03	Agree
D Assurance (AS)										
14	Library provides literacy training programme when they promised to do so.	83 (11.5)	77 (10.7)	297 (41.1)	265 (36.7)	722	2188	3.03	0.96	Agree
15	Library provides necessary support meant for people with disability.	61 (8.4)	127 (17.6)	245 (33.9)	289 (40)	722	2206	3.06	0.95	Agree
16	Library will subscribe to electronic resources when they promised to do so.	62 (8.6)	109 (15.1)	245 (33.9)	306 (42.4)	722	2239	3.10	0.95	Agree
17	Library has sympathy for defaulters.	119 (16.5)	226 (31.3)	229 (31.7)	148 (20.5)	722	1850	2.56	0.99	Agree
E Effectiveness (EF)										
18	Library provides adequate ICT facilities.	49 (6.8)	76 (10.5)	250 (34.6)	347 (48.1)	722	2339	3.24	0.89	Agree
19	Library updates their electronic resources regularly.	45 (6.2)	84 (11.6)	222 (30.7)	371 (51.4)	722	2363	3.27	0.89	Agree

20	Library provides adequate number of e-journal titles.	43 (6)	96 (13.3)	213 (29.5)	370 (51.2)	722	2354	3.26	0.89	Agree
21	Library provides adequate number of ebooks.	47 (6.5)	84 (11.6)	245 (33.9)	346 (47.9)	722	2334	3.23	0.89	Agree
22	The waiting time for library café system is suitably short.	54 (7.5)	75 (10.4)	337 (46.7)	256 (35.5)	722	2239	3.10	0.89	Agree
23	Library provides adequate bandwidth to access electronic resources.	38 (5.3)	89 (12.3)	266 (36.8)	329 (45.6)	722	2330	3.23	1.82	Agree
24	Library provides adequate computer systems for users to access electronic resources.	60 (8.3)	79 (10.9)	227 (31.4)	356 (49.3)	722	2323	3.22	0.80	Agree
25	Library provides adequate user trainings on electronic resources.	45 (6.2)	101 (14)	227 (31.4)	349 (48.3)	722	2324	3.22	1.02	Agree

Appendix III

Table 4.9: Users' Responses on Expectation of library service quality by HOD ICT

SN		SD=		SA=		N	FX	M	S.D	Remark
		1	D=2	A=3	4					
		Freq.	Freq.	Freq.	Fre					
		. (%)	(%)	(%)	q.					
		(%)	(%)	(%)	(%)					
A Tangible/ Accessibility (TA)										
1	library provides easy on-campus access to electronic resources.	63 (8.7)	146 (20.2)	365 (50.6)	148 (20.5)	722	2042	2.83	0.85	Agree
2	e-resources are accessed remotely	73 (10.1)	245 (33.9)	303 (42)	101 (14)	722	1876	2.60	0.85	Agree
3	using the library's portal/website requires less effort to use	52 (7.2)	171 (23.7)	372 (51.5)	127 (17.6)	722	2018	2.80	0.81	Agree
4	library environment is conducive			387 (53.6)	243 (33.7)	722	2281	3.16	0.75	Agree
B Reliability (REL)										
5	library sends mobile alerts to users	159 (22)	235 (32.5)	217 (30.1)	111 (15.4)	722	1724	2.39	1.00	Agree
6	library network is dependable	84 (11.6)	203 (28.1)	307 (42.5)	128 (17.7)	722	1923	2.66	0.90	Agree
7	library provides adequate security measures	51 (7.1)	181 (25.1)	332 (46)	158 (21.9)	722	2041	2.83	0.85	Agree
8	library does not close before time	62 (8.6)	104 (14.4)	376 (52.1)	180 (24.9)	722	2118	2.93	0.84	Agree
C Responsiveness (RES)										
9	library staff are punctual	42 (5.8)	112 (15.5)	414 (57.3)	154 (21.3)	722	2124	2.94	0.76	Agree
10	library staff keeps users valuables safe		157 (21.7)	356 (49.3)	151 (20.9)	722	2044	2.83	0.85	Agree
11	library staff provide professional guidance	34 (4.7)	135 (18.7)	407 (56.4)	146 (20.2)	722	2109	2.92	0.74	Agree
12	library opening hours during weekend is okay	96 (13.3)	201 (27.8)	278 (38.5)	147 (20.4)	722	1920	2.66	0.94	Agree
13	library has wheel chair services for physically challenged users	63 (8.7)	200 (27.7)	354 (49.1)	104 (14.4)	722	1941	2.69	0.82	Agree
D Assurance (AS)										
14	library provides literacy training programme when they promise	88 (12.2)	200 (27.7)	306 (42.4)	128 (17.7)	722	1918	2.66	0.44	Agree
15	library provides support meant for people with disabilities	103 (14.3)	259 (35.9)	233 (32.3)	127 (17.6)	722	1828	2.53	0.94	Agree
16	library subscribes to electronic resources when they promise		178 (24.7)	355 (49.2)	124 (17.2)	722	1982	2.75	0.84	Agree
17	library staff have sympathy for defaulters	79 (10.9)	237 (32.8)	283 (39.2)	123 (17)	722	1894	2.62	0.89	Agree
E Effectiveness (EF)										
18	library provides adequate ICT facilities	49 (6.8)	178 (24.7)	343 (47.5)	152 (21.1)	722	2042	2.83	0.84	Agree
19	library update their electronic resources regularly	38 (5.3)	172 (23.8)	376 (52.1)	136 (18.8)	722	2054	2.84	0.78	Agree
20	library provides adequate number of e-journal	49 (6.8)	193 (26.7)	317 (43.9)	163 (22.6)	722	2038	2.82	0.86	Agree
21	library provides adequate eBooks	84 (11.6)	185 (25.6)	310 (42.9)	143 (19.8)	722	1956	2.71	0.92	Agree
22	the waiting time for library cafe system is suitably short	71 (9.8)	154 (21.3)	372 (51.5)	125 (17.3)	722	1995	2.76	0.90	Agree

23	library provides adequate bandwidth to access e-resources	74 (10.2)	177 (24.5)	355 (49.2)	116 (16.1)	722	1957	2.71	0.86	Agree
24	Provides adequate computer for users to access e-resource	70 (9.7)	199 (27.6)	284 (39.3)	169 (23.4)	722	1996	2.76	0.92	Agree
25	<u>library provides adequate user training on electronic resources</u>	<u>81 (11.2)</u>	<u>180 (24.9)</u>	<u>276 (38.2)</u>	<u>185 (25.6)</u>	<u>722</u>	<u>2009</u>	<u>2.78</u>	<u>0.96</u>	<u>Agree</u>

Appendix IV

Table 4.9.2: Thematic analysis of the focus group discussion with postgraduate student users

S/No.	THEME: Usability of Electronic Resources	No	THEME: Satisfaction	No
1	Sub-Theme: Availability of Electronic Resources		Sub-Theme: Library Electronic Services	
	“Library subscribed to relevant databases”.	10	“I am partially satisfied with the contents of library e-resources because most of time I used Google to get my resources”.	24
	“Library has no subscription to any electronic database”.	50	“I am satisfied with the library facilities not electronic resources”.	50
	“Library fee-based e-resources are not meeting my desired information”.	55	“I am satisfied with my professional database”.	5
	“Library fee-based e-resources are not adequate to answer my search queries”.	45	“I am partially satisfied with some observations”.	5
	“Library has numerous electronic resources and a few paid databases”.	55	“I can say I am satisfied but with complaints”.	3
	“Library does not give me access to ebooks on CDs because they are plug and play”.	45	“I am not satisfied with library electronic services at all”.	6
	2.Sub-Theme: Awareness		“Library electronic services have not been effective”.	10
	“I am not aware of the newly subscribed electronic resources”.	33	“Library service is fairly rated due to adequacy of library resources”.	6
	I am aware of the electronic resources.	27		
	“Many users queue up to use the library café and before it reaches one the light is already off”.	33	“I am dissatisfied with the time allocation for the use of Library café systems”.	28
	“Library should organise more sensitisation programme”.		“I am dissatisfied with the use of e-Library due to restriction on the use of laptops and other mobile devices”.	44
	“Library did not organise orientation for postgraduate users”.	5	“Library electronic resources can not be effectively utilised unless there are adequate facilities for access”.	35
	Library disallowed Laptop in the library and their computer systems are not adequate for users of the library.	12	“Library users were not given enough time to access the electronic library resources”.	43
2.	“Majority of users are not aware of the library electronic services”.	60	“I used the electronic databases once and I didn't get what I wanted”.	27
	“I am aware of the resources but don't know how to access it”.	45		
	“Some links to electronic resources are inactive”.	58	2. Sub-Theme: General Library Service	
			“Satisfied because library provides basic facilities”.	56

	“Some databases regulate the way we download.”	40	“Somewhat satisfied because library has conducive space for users”.	3
	“Library electronic resources have many overlapping titles from different publishers”.	20	“Not satisfied with security measures”.	49
	“Always using my data to download in the library”.	15	”Dissatisfied with toilet facilities”.	
	Downloading of free e-resources is not free to me because I use my data”.	21	”Dissatisfied with power supply in the library”.	28
		12	“Dissatisfied with rules and regulations guiding the use of the library”.	17
	Sub-Theme: Access to Library Electronic Resources.		“Dissatisfied with the inadequacy of the ICT facilities in the library”.	10
	Library electronic resources can only be accessed within the library”.	43	“Dissatisfied with the sensitisation strategy”	55
	“Library’s connection is fluctuating”.	15	Sub-Theme: Determinants of Users Satisfaction	
3.	“Many users line up to use the library café and before it reaches one the light is already off”.	9	“I need quiet library environment”.	15
	“Some links to electronic resources are not active”.	6	“I want good Internet connectivity”.	54
	“Some databases regulate the way we download”.	48	“I want extension of library café opening hours”.	23
	“Library electronic resources have many overlapping title from different publishers”.	3	“Let there be adequate systems with good connection”.	12
	“Always using my data to download in the library”.	41	“I need specialised databases and good Internet connectivity”.	37
	“Downloading of free e-resources is not free to me because I use my data”.	38	“I need remote access to library electronic resources”.	40
	“Library disallowed Laptop in the library and their computer systems are not adequate for users”	38	“I like strong Internet connectivity”.	13
			“I will like the library to provide adequate security measures”.	56
			“I want open access resources to be on the desktops”.	5
			“I want the library to permit Laptop use in the library”.	51
			“I want the library to create more awareness”.	38
			“I need conducive environment”	19

“Create more awareness”.	10
“I need discussion room”.	7
“Library should improve security measure”.	40
“Library should provide more computers”.	19
“I need literacy training”.	11
“Library should increase hours allocation for every user”.	45
“I need remote access to library electronic resources”.	42

Appendix V

Table 4.9.3: Subscales and corresponding measurement items for usability test for EDT Prototype

Subscale	Code	Statement	S.D	D	A	SA	N	F X	\bar{X}	Remark
Effectiveness	eft 1	I can easily use the features of the EDT system.	2 (10%)	2(10%)	7(35%)	9 (45%)	20	63	3.15	Agreed
	eft 2	I found the EDT system easy to navigate.	0(0%)	1(5%)	10(53%)	8(42%)	19	63	3.31	Agreed
	eft 3	I can say that the graphical interface of the EDT system was well organised to find what I want.	1(5%)	2(11%)	16(84%)	0(0%)	20	53	2.65	Agreed
	eft 4	It is easy to perform evaluation tasks on the EDT system.	0(0%)	0(0%)	10(50%)	10(50%)	20	70	3.5	Agreed
	Eft 5	The EDT system offers easy-to-understand menus.	1(6%)	8(44%)	9(50%)	0(0%)	18	47	2.61	Agreed
	Eft 6	Overall, the EDT system is good for measuring users satisfaction	0(0%)	1(5%)	6(32%)	12(63%)	19	67	3.5	Agreed
Efficiency	efy 1	Using the EDT system to collect users' feedback will increase the level of users' satisfaction with the library electronic services.	0(0%)	1(5%)	10(50%)	9(45%)	20	68	3.4	Agreed
	efy 2	It is easy to perform searches on the EDT system.	2(10%)	2(10%)	9(45%)	7(35%)	20	61	3.05	Agreed
	efy 3	Using the EDT system makes	1(5%)	2(11%)	16(84%)	0(0%)	20	53	2.65	Agreed

	library services evaluation easier for me									
Efy 4	Using the EDT system to sensitize users will increase the level of users' satisfaction with the library electronic services.	1(6%)	8(44%)	9(50%)	0(0%)	18	53	2.94	Agreed	
Efy 5	Using the EDT system will increase the level of use of library electronics resources.	0(0%)	1(6%)	8(44%)	9(50%)	18	62	3.4	Agreed	
Efy 6	I intend to recommend this prototype to my colleagues.	0(0%)	0(0%)	11(55%)	9(45%)	20	69	3.4	Agreed	

Satisfaction

		HD	D	S	HS	N	FX	M	
Sat 1	Satisfaction with the prototype	0(0%)	0(0%)	10(50%)	10(50%)	20	70	3.5	Satisfied
Sat 2	I wish to recommend this prototype to my fellow students	0(0%)	1(5%)	10(50%)	9(45%)	20	68	3.4	Satisfied
Sat 3	I wish to continue using this prototype.	0(0%)	0(0%)	11(55%)	9(45%)	20	69	3.45	Satisfied

Appendix VI

Table 4.9.4 Challenges militating against the provision of electronic resources in federal university libraries in Nigeria

	Challenges	NC	M C	C	SC	N	FX	\bar{X}	S.D	Remark
		1	2	3	4	6	18	3.17	0.408	
1	How challenging has the funding been to your provision of electronic resources?	0 (0)	0 (0)	5 (83.3)	1 (16.7)	6	19	3.17	0.408	Challenging
2	How challenging has the Internet connection been to your service delivery?	0 (0)	2 (33.3)	2 (33.3)	2 (33.3)	6	18	3.00	0.894	Challenging
3	How challenging has the lack of permanent technical staff been towards effective maintenance of the library systems?	0 (0)	0 (0)	4 (66.7)	2 (33.3)	6	20	3.33	0.516	Challenging
4	How challenging has the limited number of electronic journal titles been to your services?	1 (16.7)	4 (66.7)	1 (16.7)	0 (0)	6	12	2.00	0.632	Moderately Challenging
5	How challenging has the limited access to back issues of specialised electronic resources been to your services?	1 (16.7)	5 (83.3)	0 (0)	0 (0)	6	11	1.83	0.408	Moderately Challenging
6	How challenging has the download speed of database been to effective utilisation of your resources?	1 (16.7)	5 (83.3)	0 (0)	0 (0)	6	11	1.83	0.408	Moderately Challenging
7	How challenging has the bandwidth for maintaining steady connection been to your services provision?	1 (16.7)	5 (83.3)	0 (0)	0 (0)	6	11	1.83	0.408	Moderately Challenging
8	How challenging has the users' information literacy training been to the use of electronic resources in the library?	0 (0)	2 (33.3)	2 (33.3)	2 (33.3)	6	18	3.00	0.894	Challenging
9	How challenging has the number of cooling systems been to your services?	0 (0)	2 (33.3)	2 (33.3)	2 (33.3)	6	18	3.00	0.894	Challenging
10	How challenging has the lack of online registration facilities being to your job?	0 (0)	2 (33.3)	0 (0)	4 (66.7)	6	20	3.33	1.033	Seriously Challenging
11	How challenging has the power back up system being to your service delivery?	1 (16.7)	4 (66.7)	1 (16.7)	0 (0)	6	12	2.00	0.632	Moderately Challenging
12	How challenging has the lack of dedicated server been to your library?	3 (50)	2 (33.3)	0 (0)	1 (16.7)	6	11	1.83	1.169	Not Challenging

13	How challenging has the training for e-library staff being to your service delivery?	1 (16.7)	1(16.7)	2 (33.3)	2 (33.3)	6	15	2.50	1.049	Challenging
14	How challenging has the security issues been to your services?	1 (16.7)	4 (66.7)	0 (0)	1 (16.7)	6	13	2.17	0.983	Moderately
15	How challenging has the support from the management been to your electronic services provision?	1 (16.7)	4 (66.7)	1 (16.7)	0 (0)	6	13	2.17	0.983	Moderately Challenging

Appendix VII

Department of Library and Information Technology
School of Information and Communication Technology
Federal University of Technology, Minna
Niger State.

10th October, 2019.

Dear Respondents,

I am a PhD student conducting a research on “The Influence of Availability, Usability and Library Service Quality on Users’ Satisfaction with Electronic Information Resources Provision in Federal University Libraries in Nigeria”.

I, hereby solicit for your cooperation to kindly respond honestly to the questions. The questionnaire is meant for research purpose. Hence, all information given will be treated with utmost confidentiality.

Thank you for your cooperation.

Yours sincerely,

AAdekamio
Adegoke, Kudirat Abiola (Mrs)
PhD/SICT/2017/9221

UNIVERSITY LIBRARY RESOURCES AND SERVICES ASSESSMENT QUESTIONNAIRE (ULIRSAQ)

ICT Librarian/ Electronic Librarian

Section A: Demographic Data:

Please tick (✓) appropriately and fill in the space where necessary

1. Name of the Library.....
2. Please indicate your sex
 - (a) Male
 - (b) Female
3. Designation.....Rank.....
4. Highest educational qualification.....
5. Years of professional experience in the capacity of ICT Librarian
 - Less than 1 year
 - 1 – 5 years
 - 6 -10 years
 - More than 10 years

Section B: Availability of Electronic Resources

1. Observation Checklist

Please tick (✓) for availability or mark (X) for unavailability of electronic resources in your library.

S/No.	Electronic Resources	Available	Not Available
1.	HINARI		
2.	Open Access Journals		
3.	Elsevier ScienceDirect		
4.	CABDirect		
5.	JSTOR		
6.	OPAC (Abstracts, Synopsis)		
7.	Open Educational Resources (OERs)		
8.	Law Pavilion		
9.	ProQuest		
10.	EbscoHost		
11.	TEEAL		
12.	ARDI		
13.	OARE		
14.	AGORA		
15.	Lexis Nexis		
16.	Hein Online		
17.	Oxford University Press		
18.	EduDonor		
19.	Hepseu		
20.	Oakleaf Books		
21.	Baobab		
22.	Egranary		
23.	AJOL		
24.	World Bank Database		
25.	West Law		

26	Ebrary		
27	Scopus		
28	IEEE		
29	Emerald		
30	Other(s) (Please specify)		

2. Provision of Electronic Resources in Federal University Libraries in Nigeria

Please tick (✓) the most applicable option for each row.

S/No	Statement	Very Infrequently	Infrequently	Frequently	Vfrequently
Provision of Electronic Services					
1.	How frequently does library constitute committee to select electronic resources for users?				
2.	How frequently does library use collection development policy to guide the acquisition of electronic resources?				
3.	How frequently does library subscribe to subject based databases?				
4.	How frequently does library budget for electronic databases?				
5.	How frequently does library use allotted money for electronic resources to subscribe or renew the resources?				
		Rarely	Sometimes	Very often	Frequently
6.	How often do you subscribe to electronic resources for all university programmes?				
7.	How frequently do you inform users' community about the selected electronic resources before subscription?				
8.	How frequently do you create awareness for the electronic resources?				
9.	How often do you monitors the electronic resource links?				
10.	How frequently does the library provide strong Internet for downloading library electronic resources?				
11.	How often do you experience support for provision of electronic resources from the university management?				

S/No.	Communication to Users	Rarely	Sometimes	Very often	Frequently
1	How frequently do you use university mailing list /email to inform postgraduate students about electronic resources?				
2	How frequently do you use internal memo to communicate to postgraduate students.				
3	How often do you organise sensitisation, workshop/ training programmes for postgraduate students?				
4	How often do you use fresher's orientation programme to educate postgraduate students?				
5	How frequently does library use general study course (Use of Library) to educate postgraduate students?				
6	How often do you use promotional materials to sensitise postgraduate students?				
7	How frequently Library use website/ portal to promote e-resources for easy retrieval by postgraduate students?				
8	How often do you interact with postgraduate students one on one to discuss about library electronic resources?				
9	How often do use library notice boards inform postgraduate students about the newly available electronic resources in the Library?				
10	How often do you use electronic bill board to display the available resources?				
11	How frequently does library use database provider's websites to promote the EIR?				
12	How frequently does library use social platforms to disseminate information to postgraduate students?				
13	How frequently do you send SMS alert to the registered postgraduate students?				
14	How often does the library use university news bulletin to inform users about library new subscription?				
15	Others (Please specify)				

Section C: Use of Electronic Resources

Please indicate by ticking (√) the appropriate option for each row.

S/No	Statement	Occasionally	Monthly	Weekly	Daily
1	Frequency of use of electronic resources				
2	How frequently do postgraduate students use library Electronic Resource?				

3	How frequently do postgraduate students use library Internet for accessing electronic resources?				
4	How frequently do postgraduate students use library café for a research?				
5	How frequently do postgraduate students use electronic journals?				
6	How frequently do postgraduate students use library electronic books?				
7	How often do postgraduate students request for username and password to electronic resources?				

	Very Infrequently	Infrequently	Frequently	Very frequently
Library provides adequate computers for staff access.				
Library provides adequate computers for students to access electronic resources.				
Library provides adequate laptops for staff access.				
Library provides adequate laptops for students to access electronic resources.				
Library provides usernames and passwords to access electronic resources.				
Library website/ portal is easy to navigate.				
Library has power back up for café systems.				
Library has technical staff that assists users in fixing electronic resources errors.				
Lecturers give students assignment from the electronic resources.				
Library's student's request for access to electronic resources on regular basis.				
Library users can access EIR on their own.				
Library users make effective use of library e-Resources.				
Users recommend relevant e-Resources to the library.				

Section D: Quality of Electronic Services

A. Perceived Library Service Quality

Please express your level of agreements with the following statements by ticking (✓) the most applicable option from each row.

S/N	Statement	Strongly Disagree	Disagree	Agree	Strong Agree
a.	Tangible: Accessibility				

1	Library provides easy on-campus access to electronic resources and services.				
2	Library provides remote access to electronic resources.				
3	Using the libraryportal/website requires less effort				
4	Library environment is conducive for learning and research.				
b.	Reliability				
5	Library always send mobile alert to users.				
6	Library network is always reliable.				
7	Library always provide adequate security measures				
8	Library does not close before time				
c.	Responsiveness				
9	Library café/ eLibrary staff are always punctual.				
10	Library café/ eLibrary staff are approachable.				
11	Library café/ eLibrary staff are always ready to provide professional guidance to users.				
12	Library electronic links are always active.				
13	Library has wheel chair services for physically challenged people.				
d.	Assurance				
14	Library provides literacy training programme when they promised to do so.				
15	Library provides support for people with disability.				
16	Library subscribes to electronic resources when they promise users' community to do so.				
17	Library staff have sympathy for defaulters.				
e.	Effectiveness				
18	Library provides adequate networking facilities.				
19	Library update their electronic resources regularly.				
20	Library provides adequate number of e-journal titles.				
21	Library provides adequate ebooks.				
22	The waiting time for library café system is suitably short.				
23	Library provides adequate bandwidth to access electronic resources.				
24	Library provides adequate computer systems for users to access electronic resources.				
25	Library provides adequate user trainings on electronic resources.				

B. Satisfaction with Library Electronic Service Quality

Kindly indicate your extent of satisfaction with the following statements about the library services provision. Put a cross(X) on your choice of answer.

S/No.	Statement	Highly Dissatisfied	Dissatisfied	Satisfied	Highly Satisfied
1	How satisfied are you with the effectiveness of electronic services provided to the users?				
2	How satisfied are you with the number of available electronic resources in your library?				
3	How satisfied are you with the adequacy of ICT facilities in your division?				
4	How satisfied are you with the Internet connection accessible to users?				
5	How satisfied are you with the eLibrary resources?				
6	How satisfied are you with the conduciveness of the library cafe environment to users?				
7	How satisfied are you with the number of users that access electronic resources?				
8	How satisfied are you with the quantity of library ICT facilities provided by the university management.				
9	How satisfied are you with the quality of library ICT facilities deployed to the library?				
10	How satisfied are you with the awareness services rendered by the library?				
11	How satisfied are you with the level of patronage by postgraduate users?				
12	How satisfied are you with the relevancy of the library electronic resources to users reference queries?				
13	How satisfied are you with the attitude of your eLibrary staff to the users?.				
14	How satisfied are you with the library security measures provided for users valuables?				
15	Attitude of some postgraduate users towards use of electronic resources in the library?				
16.	Others (Please specify)				

Challenges facing the provision of electronic resources

Please tick appropriate option.

S/No	Problem	Not Challenging	Moderately Challenging	Challenging	Seriously Challenging
------	---------	-----------------	------------------------	-------------	-----------------------

1	How challenging has the funding been to the provision of electronic resources?				
2	How challenging has the Internet connection been to your service delivery?				
3	How challenging has the lack of permanent technical staff been towards effective maintenance of the library systems?				
4	How challenging has the limited number of electronic journal titles been to your services?				
5	How challenging has the limited access to back issues of specialised electronic resources been to your services?				
6	How challenging has the download speed of database been to effective utilisation of your resources?				
7	How challenging has the bandwidth for maintaining steady connection been to your service provision?				
8	How challenging has the users' information literacy training been to the use of electronic resources in the library?				
9	How challenging has the number of cooling systems been to your services?				
10	How challenging has the lack of online registration facilities been to your services?				
11	How challenging has the power back up system been to your service delivery?				
12	How challenging has the lack of dedicated server been to your services?				
13	How challenging has the training for e-library staff been to your service delivery?				
14	How challenging has the security issues been to your services?				
15	How challenging has the support from the management been to your electronic services provision?				
16	Other (s) Please specify.				

Appendix VIII

Department of Library and Information Technology
School of Information and Communication Technology
Federal University of Technology, Minna
Niger State.

10th October, 2019.

Dear Respondents,

I am a Ph.D student conducting a research on “Influence of Availability, Usability and Service Quality on Users’ Satisfaction with Electronic Information Resource Provision in Federal University Libraries in Nigeria”.

I, hereby solicit for your cooperation to kindly respond honestly to the questions. The questionnaire is meant for research purpose. Hence, all information given will be treated with utmost confidentiality.

Thank you for your cooperation.

Yours sincerely,

AAdekamio
Adegoke, Kudirat Abiola (Mrs)
PhD/SICT/2017/9221

LIBRARY USERS' ASSESSMENT QUESTIONNAIRE (LUSAQ)

POSTGRADUATE STUDENT

Section A: Demographic Data

Please tick (√) appropriately and fill in the blank space where necessary.

1. Name of the institution.....
2. Please indicate your sex
 - (b) Male
 - (b) Female
3. Faculty.....Department
4. Programme of Study
5. Degree in view
 - Doctor of Philosophy (PhD)
 - Master of Philosophy (MPhil)
 - Master's Degree
 - Postgraduate Diploma (PGD)

Section B: Availability of Electronic Resources in Federal University Libraries in Nigeria

I. Please tick (√) appropriately.

S/No.	Types of Library Electronic Information Resources (EIR)	Available	Not Available
1	HINARI		
2	Open Access Journals (On-site Access)		
3	Elsevier ScienceDirect		
4	CABDirect		
5	JSTOR		
6	OPAC		
7	Open Educational Resources (OERs)		
8	Law Pavilion		
9	ProQuest		
10	EbscoHost		
11	TEEAL		
12	ARDI		
13	OARE		
14	AGORA		
15	Lexis Nexis		
17	Hein Online		
18	Oxford University Press		
19	EduDonor		
20	Hepseu		
21	Oakleaf Books		

22	Baobab		
23	Egranary		
24	AJOL		
25	World Bank Database		
26	West Law		
27	Ebrary		
28	Scopus		
29	IEEE		
30	Emerald		
31	CD-ROM (Collection)		
32	Educational Module Contents (eLearning Platform)		
33	Others (Please Specify)		

. II. Users' Satisfaction with Provision of Electronic Resource in FULs in Nigeria

Based on your assessment of library electronic resources, please indicate your level of satisfaction by selection the most appropriate option for every statement.

S/N	Statement	Highly Dissatisfied	Dissatisfied	Satisfied	Highly Satisfied
1	How satisfied are you with the available electronic resources?				
2	How satisfied are you with the adequacy of electronic resources in the library?				
3	How satisfied are you with reliability of the links to electronic resources?				
4	How satisfied are you with the ease of access to library electronic resources?				
5	How friendly are the designs of the library electronic resources portal or databases?				
6	How satisfied are you with the conduciveness of library environment/ atmosphere?				
7	How satisfied are you with the quality of Library ICT facilities?				
8	How satisfied are you with the library e-resources awareness services?				
9	How satisfied are you with the library security measures?				
10	How satisfied are you with the attitude of library staff (friendliness).				
11	How satisfied are you with the overall quality of staff services and competence				

12	How satisfied are you with the available electronic resources?				
13	How satisfied are you with the adequacy of electronic resources in the library?				

III. Frequency of Use of Library Electronic Resources

Frequency		Very Infrequently	Infrequently	Frequently	Vfrequently
1.	How frequently do you use library open access resources?				
2.	How frequently do you use Open educational ?				
3.	How frequently do you use Ebscohost?				
4.	How frequently do you use Science Direct?				
5.	How frequently do you use ProQuest?				
6.	How frequently do you use elibrary without fear of security threat?				
7.	How frequently do you use Lexis Nexis?.				
8.	How frequently do you use Ajol?				
9.	Law Pavilion?				
10.	How frequently do you use Research4Life (HINARI, AGORA, OARE, ARDI)?				
11.	How frequently do you use Emerald?				
12.	How frequently do you use IMF ELibrary?				
13.	How frequently do you use Springer?				
14.	How frequently do you use IEEE?				
15.	How frequently do you use Hein Online?				
16.	How frequently do you use Oxford University Press?				

IV. Quality of Library Electronic Services in Federal University Libraries in Nigeria

1. **Perceived Library Service Quality:** Kindly, indicate your extent of agreement with the following statements based on your perception of library electronic services. Put a cross(X) on your choice of answer.

S/N	Statement	Strongly Disagree	Disagree	Agree	Strong Agree
A	Tangible (TA): Accessibility				
1	On-campus access to electronic resources is very easy.				
2	Library electronic resources are remotely accessible.				
3	Library's portal/website requires less effort.				
4	Library environment is conducive.				
B	Reliability (REL)				
5	Library sends mobile alert to users.				
6	Library network is reliable.				
7	Library provides adequate security measures.				

8	Library does not close before official time.				
C	Responsiveness (RES)				
9	Library staff are punctual when needed.				
10	Library staff are always approachable.				
11	Library staff provides professional guidance.				
12	Library operating hours during weekend is not favourable.				
13	Library provides wheel chair services to physically challenged students.				
D	Assurance (AS)				
14	Library provides literacy training programme when they promised to do so.				
15	Library provides necessary support meant for people with disability.				
16	Library will subscribe to electronic resources when they promised to do so.				
17	Library has sympathy for defaulters.				
E	Effectiveness (EF)				
18	Library provides adequate ICT facilities.				
19	Library updates their electronic resources regularly.				
20	Library provides adequate number of e-journal titles.				
21	Library provides adequate number of ebooks.				
22	The waiting time for library café system is suitably short.				
23	Library provides adequate bandwidth to access electronic resources.				
24	Library provides adequate computer systems for users to access electronic resources.				
25	Library provides adequate user trainings on electronic resources.				

2. Expectations: Kindly, indicate your extent of agreement with the following statements based on your expectations from the library electronic services. Put a cross(**X**) on your choice of answer.

A	Tangible/ Accessibility (TA)	Strongly Disagree	Disagree	Agree	Strong Agree
1	library provides easy on-campus access to electronic resources.				
2	e-resources are accessed remotely				
3	using the library's portal/website requires less effort to use				
4	library environment is conducive				
B	Reliability (REL)				
5	library sends mobile alerts to users				
6	library network is dependable				
7	library provides adequate security measures				
8	library does not close before time				
C	Responsiveness (RES)				
9	library staff are punctual				
10	library staff keeps users valuables safe				
11	library staff provide professional guidance				
12	library opening hours during weekend is okay				
13	library has wheel chair services for physically challenged users				
D	Assurance (AS)				
14	library provides literacy training programme when they promise				
15	library provides support meant for people with disabilities				
16	library subscribes to electronic resources when they promise				
17	library staff have sympathy for defaulters				
E	Effectiveness (EF)				
18	library provides adequate ICT facilities				
19	library update their electronic resources regularly				

20	library provides adequate number of e-journal				
21	library provides adequate eBooks				
22	the waiting time for library cafe system is suitably short				
23	library provides adequate bandwidth to access e-resources				
24	Provides adequate computer for users to access e-resource				
25	library provides adequate user training on electronic resources				

V. Influence of Library Electronic Service Quality on Users' Satisfaction

Based on your experience, kindly tick the most appropriate option to indicate whether any of the following statements will influence your satisfaction with library electronic resources

S/N	Statement	Strongly Disagree	Disagree	Agree	Strongly Agree
	Influences				
1	With the use of library electronic services: "I find it easy to locate materials online".				
2	"I find it easier to update my research work".				
3	"I find it easier to identify high quality resources".				
4	"I can download full-text resources completely".				
5	"I find new ideas in electronic resources".				
6	"I have adequate electronic resources for my research work".				
7	"I access electronic resources regularly from the library".				
8	"I now save cost of photocopying library materials".				
9	"I now have improved search skills.				
10	I can finish my research work within the stipulated time".				

5. Challenges facing the provision/use of electronic resources

Please respond to the following challenges by putting a cross(X) on your choice of answer.

S/N	Problem	Very Challenging	Challenging	Moderately Challenging	Not Challenging
1.	How challenging is literacy skills to your use of library electronic resources?				
2.	How challenging is poor Internet connection to your access to electronic resources?				
3.	How challenging is lack of technical staff is to your use of electronic resources?				

4.	How challenging is inadequate ebook titles to you?				
5.	How challenging is inadequate e-journal title to you?				
6.	How challenging is techno-stress to your use of elibrary resources?				
7.	How challenging is slow download speed of electronic resources to you?				
8.	How challenging is anxiety (Technophobia) to you?				
9.	How challenging is lack of Internet connection across the faculties/ schools to you?				
10.	How challenging is irregular users' information literacy training to you?				
11.	How challenging is in adequate cooling systems is to your use of library café space?				
12.	How challenging is lack of online registration facilities is to your school registration?				
13.	How Challenging is epileptic power supply to your library electronic use?				
14.	How challenging is lack of power backup is to the systems you use in the library?				
15.	How challenging is the titles of the library electronic resources (Databases) is to the adequacy of the electronic resources used?				
16.	How challenging is the awareness is to you utilisation of the electronic resources.				
17.	How challenging is the inadequate security measures to your use of the IP based electronic resources?				
18.	How challenging is the inadequate computers to access the resources?				
19.	How challenging is the insufficient café time allocation is to your use of EIR?				
20.	How challenging is the attitude of some library staff to you?.				

Appendix IX

CONSENT FORM FOR PARTICIPATION IN AN INTERVIEW/ FOCUS GROUP STUDY

Name of Researcher: Kudirat Abiola Adegoke (Mrs)

Title of the Study:Influence of Usability and Quality of Services on Users' Satisfaction with Electronic Information Resources Provision in Federal University Libraries in Nigeria

Purpose of the Study: You are being asked to participate in this study investigating the Influence of Usability and Quality of Service on Users' Satisfaction with Electronic Information Resources Provision in Federal University Libraries in Nigeria. If you decide to participate in the survey, you will answer some interview questions, perform some hands-on tasks and complete a few short questionnaire about your satisfaction with library electronic resources.

The Procedures

Please read through the following information about your rights as a research participant. If you agree to take the survey, please tick the Agree box following this consent form.

Potential Risk

There are no direct foreseeable risks anticipated other than those normally encountered in your daily activities.

Potential Benefits

There are no foreseeable direct benefits anticipated. Indirect benefits may include an increase in the support for the library development, better service delivery to library users and an improvement in the overall quality of library resources and services provision.

Compensation

All participants will be served with light refreshments.

Confidentiality

The results of this study may be published and the pictures can be included in the report or presentation. All findings will be coded, analysed and reported anonymously if you consent to it.

Participant's Rights

Your participation in this study is voluntary. If you choose to participate, you may decide to quit the survey at any time without negative consequences. You can also choose not to answer any question that you do not wish to answer. If you choose not to participate in this study or quit part way through the study, it will not affect your use of library resources and services provided by the university library.

Agreement to participate: Please select from the choices below. If you tick Agree, it indicates you have read and understood the information above about the research, your rights as a participant, that you are 18 years or older, and give your voluntary consent. Thank you.

Agree, I consent

Disagree, I do not consent

Appendix X

Usability Test Instructions

Your observer will read the following instructions to you.

During the test, you will be asked to perform some exercise under three tasks, the task will start with the use of OPAC and end with information retrieval from any available database of your choice to do some tasks and will be observed while you do the activities. As you perform the assigned tasks, please do them the way you have been searching before, try as much as possible to ThinkAloud while you're performing the task then try to tell the observer whatever is going through your mind. Please know that I am not testing your intelligence so there is no such thing as a wrong answer; all your answers are useful to the researcher. Your participation helps me to understand what works and what does not work with the university library electronic resources, services, the need for future subscription and the need for librarians to maintain or improve on their service delivery to ensure your satisfaction.

Please be honest in your responses to some of the questions that you will be answering in TASK 4. I want to know exactly what you think, not what you think I want to hear.

The whole session will last for 50 minutes. So feel free to perform the activities, I am sure you will enjoy your participation.

Here is how the sessions will work:

- I will place the list of tasks that I want you to do on the table in front of you.
- You will do the tasks one at a time. Please don't look ahead at the others and don't skip any tasks.
- When directed, pick up the appropriate task sheet and read the **TaskAloud**. When you are ready to start, say "**I am ready to start.**"

- Start working on the task only once I have said, '**Please Begin**'. I will start recording time as soon as you touch the keyboard or the mouse-so don't touch either one until you're ready to start the task.
- When you have completed the task, say aloud "I am done" and return to the database homepage.

THANK YOU FOR YOUR TIME.

Appendix XI

USABILITY TEST

TASK 1

- Launch a browser, go to library **OPAC**,
- Find library hours for Fridays during "**Semester and During Vacation**".
- Search for any current book/ article on your field of study through **Library Online Public Access Catalogue (OPAC)**,
- Check for the **item status**, write down the location of the item in the Library copy and paste.

TASK 2

- Launch a browser, search through **OERs/ Dspace** communities filter by using limiters, download, save on the desktop.

TASK 3

- Log in to any database (**JSTOR, EbscoHost, ProQuest, HINARI/AGORA etc**)

Sign in with your institution **Username and Password**. Then Search for any article of your interest, **filter** by clicking on relevance/ date to rearrange the search result, **download, save and send to printer**.

You can now start the Task 4.

Thank you for your participation!

Appendix XII

Library Electronic Database Usability Questionnaire (LEDUQ)

Postgraduate Student

Instruction: Please tick (✓) appropriately for the options and fill the blank space where necessary.

1. Name of the institution.....
2. Please indicate your sex
 - (c) Male
 - (b) Female
3. Faculty.....Department
4. Degree in view
 - Doctor of Philosophy (Ph.D)
 - Master of Philosophy (M.Phil)
 - Master’s Degree
 - Postgraduate Diploma (PGD)

Section B: Usability of Electronic Resources and Service in the Library

The following statements consist of constructs for evaluating usability of library electronic resources in accordance with the two important usability indicators adopted by this study. Users are required to judge the database of their choice based on the 4 likert scale.

TASK 4

Usability Indicator	Statements	Strongly Disagree	Disagree	Agree	Strongly Agree
Effectiveness					
i.	I can access the contents of this database easily.				
ii.	I can easily navigate from one link to another.				
iii.	I always find these electronic resources accessible.				
iv.	I always get updated resources from this database.				
v.	I can easily understand how to search for resources on this database.				

vi.	I find the database suitable for my research activities.				
v.	I can copy from this database easily.				
vi.	I can search without getting error response.				
vii.	I find the database user-friendly to me.				
viii.	I wish to continue using this database.				
ix.	I can recommend this database to my friends.				
Efficiency					
i.	I can easily complete any task with the content of electronic resources in this database.				
ii.	I always achieve my desired objectives using this database.				
iii.	I achieve success in using this database.				
iv.	All available databases on the library portal are useful to me.				
V	I can print complete full-text document from this database.				
vi.	I feel fulfilled using the content of this database.				
vii.	I achieve greatly using this database.				

Appendix XIII

SECTION B: USABILITY OF THE PROTOTYPE

Usability Evaluation Form for Library Assessment Prototype

Instruction: Please tick (√) appropriately for the options and fill the blank space where necessary.

The following statements consist of variables for evaluating usability of the EDT theory in accordance with the two important usability indications adopted by this study. Librarians are requested to evaluate the system based on the 4 Likert scale.

Subscales	Statements	S.D	D	A	SA
Effectiveness	I can easily use the features of the EDT system.				
	I find the EDT system easy to navigate.				
	I can say that the graphical interface of the EDT system was well organised to find what I want.				
	It is easy to perform evaluation tasks on the EDT system.				
	The EDT system offers easy-to-understand menus.				
	Overall, the EDT system is good for measuring users' satisfaction.				
Efficiency	Using the EDT system to collect users' feedback will increase the level of users' satisfaction with the library electronic services.				
	It is easy to perform searches on the EDT system.				
	Using the EDT system makes library services evaluation easier for me.				
	Using the EDT system to sensitise users will increase the level of users' satisfaction with the library electronic services.				
	Using the EDT system will increase the level of use of library electronics resources.				
	I intend to recommend this prototype to my colleagues.				

Appendix XIV

Interview Guide for HOD of ICT Section

1. How often do you subscribe to electronic resources?
2. How do you promote the library electronic resources?
3. Security threat is a serious issue, how do you handle it in your library?
4. How do you monitor the level of utilisation of your fee-based electronic resources?
5. How do you evaluate your service performance to know if users are satisfied?

Thank you for your time.

Appendix XV

Focus Group Interview Guide

1. How frequently do you use library electronic resources?
2. How do you know the electronic resources that library has on your subject areas?
3. What is/ are your preferred channel (s) of communication?
4. What do you think library can do to satisfy your information needs?
5. What advice do you have for the library that can boost the utilisation of electronic resources?

Thank you for your time.

Appendix XVI

Pilot Study Reliability Results on Influence of Usability and Service Quality on Users' Satisfaction with Electronic Information Resources Provision in Federal University Libraries in Nigeria

According to Shaughnessy et al. (2012), the reliability of a measurement is indicated by its consistency. Where the reliability is defined as the consistency of the assessment and is frequently evaluated using the test-retest reliability technique and by accumulation of similar items on a measure, like testing a diverse example of individuals and utilizing uniform testing actions, the legitimacy can be uplifted. Any items, when the measurement was assessed, that showed low rates of reliability were eliminated. Based on internal consistency, Cronbach's alpha is a commonly used pointer of reliability that provides the standard of all feasible split-half reliability co-efficient Cronbach's alpha was used to evaluate the reliability of the research instrument items. The acceptable value required for Cronbach's alpha subsisted on a trustworthy degree between 0.7 and 0.8. Where Alpha Cronbach >0.9 can be interpreted as excellent, >0.8as good, >0.7as acceptable, >0.6as questionable, >0.5as poor, and <0.5as unacceptable.

Table 1: Reliability test

Constructs	Item	Cronbach's Alpha	Remark
Library electronic database usability evaluation instruments I	16	.893	Reliable
Usability Test for Prototype	12	8.57	Reliable
Constructs for Library Users			
Services in the library	5	.789	Reliable
Usability	16	.809	Reliable
Frequency of use	14	.812	Reliable
Quality of electronic services	25	.840	Reliable
Perceived and expectations	25	.798	Reliable
Influence of service quality on users' satisfaction	10	.831	Reliable
User's satisfaction	11	.845	Reliable
Challenges	21	.873	Reliable
University Library Resources and Services Assessment (Construct for Librarian)			
Availability	11	.821	Reliable

Communication with users	20	.735	Reliable
Quality of electronic resources	25	.847	Reliable
User's satisfaction	16	.798	Reliable
Challenges	16	.836	Reliable
Interview guide for ICT Librarians	5	.820	Reliable
Focus group guide	5	.847	Reliable

Source: Field work (2019)

Reliability is focused on the consistent recorded responses by the respondents and any specific outcomes must be intrinsically. According to reliability, the results should be accurate and consistent. If compiled result is accurate to the total participants it can be considered reliable. The research instrument is understood to be reliable if the research results are replicated after repetition with same methodology and consistency of results is evident, while the Reliability is the accuracy of results produced on total population. In this research, all items were analyzed in detail and checked thoroughly. The test of reliability to estimate the measurement's internal consistencies was carried out in the pilot study. For every construct of items of each group the internal consistency was assessed via Cronbach's alpha. The use of IBM SPSS Statistics 23 for calculation of Cronbach's alpha is the evidence of internal consistency reliability. Many researchers have articulated that 0.7 is an accepted value. The details of Cronbach Alpha are shown in Table 1 in this section, thus the finding revealed that all the constructs used were reliable and consistent, since all the Cronbach's alpha value are greater than 0.6. The results suggest that the constructs had adequate reliability, with a score ranging from 0.735 for communication in the instrument used for the librarian to .893 for Library Electronic database usability evaluation instrument. This means that the items related to each construct used in the proposed model were positively correlated to one another.

Mr. Abdulfatai Lawal
Department of Mathematics & Statistics
Kaduna Polytechnic, Kaduna state


18/2/2019.

