AWARENESS AND USE OF SEARCH ENGINES FOR INFORMATION RETRIEVALBY LECTURERS OF UNIVERSITIES IN BAUCHI STATE

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BEING A DISSERTATION SUBMITTED TO THE DEPARTMENT OF LIBRARY AND INFORMATION SCIENCES, BAYERO UNIVERSITY KANO, IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OFMASTER OF LIBRARY AND INFORMATION SCIENCE

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DECLARATION

I hereby declare that this work is the product of my own research efforts which is undertaken under the supervision of Dr. K. D. Abbas and it has not been presented and will not be presented elsewhere for the award of a degree of Master of library and Information science.

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CERTIFICATION

This is to certify that the research work for this thesis (AbdulKarimAbdullahi SPS/14/MLS/00018) was carried out under our supervision.

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TABLE OF CONTENTS

CHAPTER THREE: RESEARCH METHODOLOGY

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AMU Aligarh Muslim University

ATBU Abubakar Tafawa Balewa University

BASUG Bauchi State University Gadau

CD Compact Disc

CITS Centre for Information Technology and Systems

EOU Perceived Ease of Use

ETS Educational Testing Service

GSE General Search Engines

HSE Hybrid Search Engines

ICT Information and Communication Technology

IR Information Retrieval

IS Information system

LIS Library and Information Science

LRC Learning Resources Centre

MSE Meta Search Engines

OJOSE Online Journal Search Engine

OPAC Online Public Access Catalogue

PU Perceived Usefulness

TAM Technology Acceptance Model

UCHUniversity College Hospital Ibadan

WWWWorld Wide Web

ABSTRACT

This study is conducted toinvestigate the awareness and use of search engines for information retrieval by lecturers of universities in Bauchi state. The study uses quantitative research methodology using cross sectional survey design to collect data from the respondents. The population of the study comprises all the lecturers of universities in Bauchi State. Thus, out of this target population of one thousand three hundred and forty-six (1346) a sample size of two hundred and eighty-six is drawn from the two (2) universities in Bauchi State. Simple random samplings are used respectively. A questionnaire is used as research instrument in collecting the data. A total of two hundred and eighty-six (286) copies of questionnaires are administered, and two hundred (200) were returned and found useful for analysis. The data collected was analysed using descriptive and inferential statistics. For the inferential statistic, the first null hypothesis was tested using t-test, while the second one is tested using ANOVA and the first one reveals that there is a significant difference between awareness of availability and use of search engines and the second one reveals that gender is not significant but age and qualification were significant. And for the descriptive statistics, the findings reveal that majority of lecturers are aware of search engines and their level of awareness is moderate. And it also reveals that majority used search engines to pave them ways to access information on internet. Opera, Google scholar, Chrome and Firefox are the most used search engines among lecturers of Universities in Bauchi state. The study also reveals that lecturers are well skilled in the use of search engines because most of the respondents in the study reveals that their competence in the use of searchengines, the study also reveals that, ease accessto information, save user's time, ease of use, quick response time and access to wider range of information are factors that influence the choice of search engines. The finding also reveals that, there are sufficient ICT infrastructures to support the use of search engines in the universities, it also reveals that, problem of network failure, lack of information retrieval skills, insufficient power and low network bandwidth are problems hindering the use of search engines for information retrieval. the study recommends that lecturers should be provided with latest version ICT infrastructures that will aid the use of search engines for Research and academic purpose. Also stable power should be provided to ease the problem of power outbreak while using search engines which seriously affects most of the respondents negatively.

CHAPTER ONE
INTRODUCTION

1.1 Background to the Study

Search engineis a software system that is designed to search for information on the World Wide Web. It is an information retrieval system designed to help find information stored on computer system, such as internet, inside a corporate or proprietary network. It is a kind of information retrieval program and it has two major tasks: Searching through the billions of keywords recorded in the index to find information that match the query sent by the user and ranking retrieved records in order of importance so that the user can choose the most relevant. Search engines serve as source of information to researchers particularly lecturers in higher institutions of learning. They are the vehicles through which researchers can access past and current research publications and help to narrow and refine a search for tracing relevant information. Lecturers can also access information on various courses in the institution through these search engines. This will make them have different information resources and materials for their lectures and research work. Search engines also provide easy access to some reference materials like: gazettes, journals, conference proceeding, magazines and newspapers. Search engines provide e-print in details and other types of digital works by authors in an academic department, schools or institutions which comprise of electronic thesis and dissertations and presentations by authors of different institutions. This has improved the potential for wide banquet online search and retrieval of electronic content easily.

Taiwo (2009), awareness means knowledge. Lack of awareness of the various search engines, among researchers in higher institution will bring to its non-usage. Doris (2012) noted that a good rule of awareness is that someone needs to be exposed to services, several times before he/she is fully aware of the service. Awareness is a necessity,for an individual or lecturers to

participate in any work or activities, awareness about the environment, how things are done and should be done is very important.

Information retrieval is a field concerned with the structure, analysis, organization,storage, searching, and retrieval of information. It is a well-established discipline in Computer Science since the 1950s. It has however recently enjoyed increased significance because of the information explosion caused by the internet WWW and its related technologies. Not only the absolute amount of information, but also new types of information formats have drawn attention to this field (Lally 2006). While IR used to be a restricted field with specialized users like librarians and information professionals, today millions of people use IR every day to search the web or search their email, resulting in the need for new user interfaces and query languages (Manning2008; Hearst 2011; Danica 2013).

According to (Omotara 2011), Information Retrieval deals with the representation, storage, organization of, and access to information items.IR is finding material (e.g. documents) of an unstructured nature (usually text) that satisfies an information need from within large collections (usually stored on computers)." The most common task in IR is informally ad hoc retrieval: a user expresses an information need by submitting a query to the system, which tries to return documents relevant to this query. Other tasks in IR include support of users in browsing or filtering document collections, text classification, text clustering, cross-language retrieval, and multimedia retrieval (Manning2008; Lew 2006; Roul and Sahay 2012).

It is therefore, in view of the above that, the need to study the awareness and use of search engines for information retrieval by lecturers in Universities in Bauchi state arise. The research is hope to measure the adequacy or otherwise of the problems associated with the awareness and use of search engines for information retrieval by lecturers in Universities in Bauchi state, which

if successfully conducted will no doubt fill in the gap in the area of research and add to the existing body of knowledge in the area of information retrieval. It is also hope that, the study will be of significant value to the researchers, more especially the lecturers,in enhancing the search engines for information retrieval and to promote their use for research and other scholarly activities.

Different types of research methodologies such as, quantitative, qualitative and mixed method research methodology were adopted in various studies in the field of information retrieval. However, looking at the nature of the research population of this studies the quantitative research methodology will be adopted, because it is assumed to be the best methodology for this study. Moreover, survey research design was used as the most appropriate and easy framework of generating data from a larger population as in the case of this study. Bebbie and Mouton (2001) posited that, one of the strength of survey research design lies on its potentials to generalize the findings in sub-group to the general population if appropriate design has been implemented in combination with standardized questionnaire. Furthermore, descriptive and inferential statistics wereused for data analysis of this study using SPSS in presenting the data.

1.2 Statement of the Problem

The need for search engines in educational system has become morerelevant.Search engines play a vital role in providing the exact or nascent digital information to the users. This is because, search engines provide a convenient technique for designing anddeveloping a course of instructions and can expose the lecturers to varieties of informationthat will equip them to face the task ahead.With the Internet search enginesinformation can be stored in one place and be made simultaneously available and accessible to all for usage.

However, observations have shown that lecturers are not utilizing these e-resources available to them; could it be that they are not aware of these search engines to use and access them? and if they are aware,why is it that usage is a herculean task.Lack of awareness hinders the use of the various search engines. Lack of awareness of the various search engines by lecturers in higher institutions may affect the usage of the system. Doris (2012) noted that a good rule of awareness is that someone needs to be exposing to services, several times before he/she is fully aware of the service. Awareness is a necessity to the usage of search engines. For an individual or lecturers to participate in any work or activities, awareness about the environment, how things are done and should be done is very important.Based on this premise, Ekenna and Ukpebor(2012) stressed that search engines have received high patronage with functional acceptance in other countries globally as against the situation in Nigeria. In the same vein, Igbeka and Okpala (2004) opined that since 1995, introduction of CD ROM literature searches into the university system, the number of users of CD ROM facility is still very small as against the number of registered library users. This they revealed might be due to lack of or inadequate awareness of e-resources. Also, studies have indicated that factors such as awareness and skill are the determining factors that may influence users' decision to use search engines(Obuh, 2009; Omotayo, 2010; Prangya&Rabindra, 2013).

Therefore, the crux of this study is to investigate the awareness and use of search engines for information retrieval by lecturers in universities in Bauchi State using the following research strands; to find out awareness level of lecturers toward search engines in universities under studies and also investigate the usage level of search engines as well as to ascertain the extent to which the lecturers are skilled in the use of search engines and to established the factors

influence the choice of search engine as information retrieval tool and finally examine the problems militating against the use of search engines by lecturers of universities under study.

1. 3**Research Questions**

The following research questions were raised to guide the study in order to realize its objectives:

1. What is the level of awareness of lecturers towards search engines in universities in Bauchi State?
2. What is the usage level of search engines by lecturers in the universities under study?
3. To what extent are the lecturers skilled in the use of search engines in the universities under study?
4. What are the factors responsible for the choice of search engines by the lecturers in the universities under study?
5. What ICT infrastructure is available to support the use of search engines for information retrieval in the universities under study?
6. What are the problems hindering the use of search engines for information retrieval in the universities?

1.4**Objectives of the Study**

The main objective of the study is to investigate the awareness and use of search engines for information retrieval by lectures of universities, Bauchi state. While the specific objectives of this research are to:

1. Find out awareness level of lecturers toward search engines in universities in Bauchi State.

2. Investigate the usage level of search engines by lecturers for information retrieval in the universities under study.
3. Ascertain the extent to which the lecturers are skilled in the use of search engines in the universities study.
4. Ascertain the factors responsible for the choice of search engines by the lecturers in the universities under study.
5. Establish the ICT infrastructure available to support the use of search engines for information retrieval in the universities study.
6. Find out problems militating against the use of search engines by lecturersof the universities.

1.5 **Research Hypotheses**

In order to find out answers to the above questions, the following hypothesis was formulated for the study as:

H01 – There is no significant difference between awareness of availability and use of search engines in the universities under study.

H02 – There is no significant difference in the demographic variables such as (gender, qualification and age) of the respondents and the skills in using search engines in the universities under study.

1.6Significance of the Study

The study will create awareness of academics on the concept, types and especially significance of search engines to teaching and research. It will also reveal the ICT skills and practices level by the lecturers in the study area. This will either confirm results of studies on low patronage to search engines by academics in Nigeria or appear to be an exceptional case.

It will further serve as a guide or challenge to our tertiary institutions to boost their ICT infrastructures. This will along the line enhance e-library, e-examinations, e-registration and online access of results as education and administrative policies. In addition, the flow of knowledge can allow for review and domestication of innovations and enhancement of global best practices for our communal and national development.

The study would also help the government to see the importance of search engines and make provision for ICT facilities that will aid the use of search engines. Policy makers will also be guided by the study to make policies that will aid the work of the academics in this area. Seminar and workshops will further be organized and conducted on the awareness and use ofsearch engines by the government. Furthermore, the theory applied by the study will also be used by other researchers in other areas having been shown how to apply it in this study.

1.7Scope and Limitations

The scope of this study comprised all lecturers in Bauchi state universities. The study is focused on the awareness and use of search engines for information retrieval by lecturers in universities in Bauchi state. The study adopted quantitative approach, using cross-sectional survey research design through questionnaire.

The limitations of the study include; first, use of search engines for information retrieval in Nigerian universities is still in its infancy stage with a paucity of information on its use at the time of the study. Thus, the greatest part of the relevant literature comes from other developed nations and may not truthfully explain the situation in Nigeria. In additionto this, there is little available literature related to this topic on Nigeria and Bauchi state in particular, this research work is therefore expected to fill the gap.

1.9Definition of Terms

Search Engine: is a software system that is designed to search for information on the World Wide Web. It is an information retrieval system designed to help find information stored on computer system, such as internet, inside a corporate or proprietary network.

***Information Retrieval*:** (IR) is the activity of obtaining information resources relevant to information needed from a collection of information resources.

***Search Techniques*:** is the method or process for efficient and effective searching of information. It is a combination of words or phrases that represent what the information seeker is seeking for; giving enough information about each document that will enable the user to retrieve the desired information when needed.

Universities in Bauchi State: this simply refers to Abubakar Tafawa Balewa University, Bauchi and Bauchi state University, Gadau.

Lecturer: this refers to any person who teaches in Universities as well as other tertiary institutions of learning.

CHAPTER TWO
REVIEW OF RELATED LITERATURE

2.1 Introduction

The main purpose of this literature review was to find previous studies conducted onawareness and use of search engines for information retrieval in universities. This was done inorder to refine the research area, research questions and objectives.In locating the relevant information to this topic, several different sources wereconsulted. These include general andbibliographical tools, book of abstracts, theses,dissertations and online catalogues of library holdings. Electronic resources, such as theInternet, Education Research Information Centre (ERIC) indexes, Wilson Web, andEmerald sources were also examined to obtain current information on the topic. Currentlibrary science periodicals and monographic literature were also consulted. Theseperiodicals included Library Review,Information Science, and Journal ofAcademic Librarianship, Research Strategies,Reference Librarian, International Journal of Information Managementand other related journals. The review was structured under the following sub-headings:

2.2 Concept and Significance of Search Engines

2.3 Awareness of Search Enginesin Institutions of Higher Learning

2.4 Use of Search Engines for Information Retrieval in Institutions of Higher Learning

2.5 ICTs Skills of Lecturers for Information Searching

2.6 ICT Infrastructure to Support the Use of Search Engines in Institution of Higher Learning

2.7 Types of Search Engines for Information Retrieval and their Evaluation

2.8 Factors that Influenced the Choice of Search Engines

2.9 Challenges Associated with Awareness and Use of Search Engines

2.10 Theoretical and Conceptual Frame Work

2.11 Summary of the Review and Uniqueness of the Study

2.2Concept and Significanceof Search Engines

Louis (2012), search engine is software of a computer that has the capability of searching through large volumes of text or other data for specified keywords, and then returning a list of files where the keywords are found. Search engine helps users track down online information on a wide variety of topics that are valuable. It is a software program that searches a database and gathers reports on information that contains or is related to specified terms. There are different search engines available (Duke, 2010). Bare (2008) noted that search engines are defined as online tools for searching websites, so as to have access to current information as well as numerous information.

Moreover, Kimmon (2012) defines a search engine as a website that connects and organize contents from all over the Internet. He explained further that those wishing to locate something would enter a query about what they like to find and the engine provides links to content that matches what they want. In the light of these definitions, search engines can be described as user's assistant to find and retrieve information. Like any other assistant, the degree to which they are able to help depends on the degree to which the users are able to tell them what they want. Therefore, communicating with search engines is a critical part of the search process. It is a database, because it gathers and stores information. It has a search tool which users search through the database by typing a keyword describing the information desired.

In view of this, Chowdhury (1999) stated that, search engine is a kind of information retrieval program and it has two major tasks: Searching through the billions of keywords recorded in the index to find that match the query sent by the user and ranking retrieved records in order of importance so that the user can choose most relevant. Search engines play a vital role in providing the exact or nascent digital information to the users. With the passage of time, several techniques and technologies have emerged for handling the information more speedily and effectively.

Keeping in view the concept of search engines, the present study has been conducted to know the awareness of search engines as well as the use of search engines for information retrieval by academics in universities in Bauchi State.

2.3 Awareness of Search Engines in Institution of Higher Learning

An important factor in the use of search engines is awareness. According to Taiwo (2009), awareness means knowledge. Lack of awareness of the various search engines, among researchers in higher institution will bring to its non-usage (Taiwo, 2009). Doris (2012) noted that a good rule of awareness is that someone needs to be exposing to services, several times before he/she is fully aware of the service. Awareness is a necessity to the usage of search engines. For an individual or academic to participate in any work or activities, awareness about the environment, how things are done and should be done is very important.

Adams (2010) noted that level of awareness of various search engines to researchers in higher institution is very low. Adams (2010) further explained that academics have very confused understanding of various search engines and its concept. More so, many researchers are not yet involved with various search engines. Shearer (2012) noted also that the use of the various search engines is very low. At the most basic level researchers lack the existence of the various search

engines, many of the researchers according to Shearer are not familiar with the concept of various search engines.

In addition, the lack of knowledge or awareness of search engine is a common factor among academics as well as researchers; in fact, this is the situation in most developing countries. In line with the above, Gabriel (2011) asserted that most of the researchers claimed that they got various search engines awareness from their internet debate and workshops level of awareness of search engines issues are varied. The use of the search engines for research underscores the increasing affinity for digital information. The socio-technological environment of universities that began emerging in the late 1990s has led to increasing dependence on the e-resource, which has only grown as many academics enjoy free access 24 hours a day on Internet.

Hsu (2008), carried out a survey on consumer behaviour in online game communities in order to access the search engine users use for online games in ABC university, USA, using questionnaire as an instrument for data collection, Hsu found out that among 15 search engines listed and ranked 1st to 5th Bing was the most used and ranked first, with 39 users and they were very highly willing. Ask ranked second with 34 users that were highly willing, while Lycos ranked third with 30 users, that were moderately willing, excite fourth with 18 users that were undecided and Yahoo ranked fifth with 4 users that were moderately unwilling. The findings above show that the users in United States are aware of other search engines apart from Google and Yahoo and made effective use of them.

Ozoemelem (2008) conducted a survey study on perception and use of search engines as a search tool amongst researchers, to access the researcher's usage of the search engine in South Africa using questionnaire for data collection. He found out that from a sample of eighty (80) researchers, seventy-five (75) completed the survey showing high response rate. Out of 75

respondents, 10 (11.44%) made use of Google and Yahoo for their journal articles and they use Google and Yahoo regularly, while 65 (74.70%) of the respondents reported that they lack knowledge of other search engines like Google Scholar, Bing, Ask and WebCrawler and never made use of them. From the findings of this study the researchers were only aware of Yahoo and Google and used them, but could not really get all needed information with them. Internet and the various search engines have brought information explosion, which means that there is large scale, rapid and spectacular expansion of information. This information explosion may confuse users and other researchers on the information to use, Thus the need to create awareness of the importance of search engines for scholarly articles.

Awareness is knowledge about something that exists or understanding of a situation or subject atthe present time based on information or experience (Ani &Ahiauzu, 2008). It can also be seen as knowledge or perception of a situation, fact, consciousness, recognition, realization, grasp and acknowledgement concern about and well-informed interest or familiarity in a particular situation or development. Ojo and Akande (2005) opined that researchers' level of access, usage and awareness of search engines at the University College Hospital (UCH) Ibadan, Nigeria is not high and that the major problem however identified in their study is lack of information retrieval skills for exploiting electronic resources, thus making the level of usage of resources by medical researchers very low. Ajuwon (2003) study on ICTs by health science students at the University College Hospital (UCH) Ibadan, revealed that students studied could not use a computer, and that the use of the database was poor, due to lack of awareness, lack of access to computers, insufficient training and high cost of provision of electronic information resources subscription. Awareness and use of search engines is very important so as to keep academics alert of the available media through which they can access needed information. It is apparent that the use of

these search engines require special skills in information and communication technologies (ICTs) that will help researchers navigate the maze of resources at their disposal via internet (Balogun, 2008). It is also imperative to understand the purpose of using search engines by academics of universities.

Choo (2011), carried out a survey study on faculties to access awareness and attitudes towards search engines in City University, London. Using email as instrument of data collection, he found out that, out of 131 respondents, 69.5% of the researchers know about the existence of Yahoo and Google as well as other search engines, and the subject discipline of the academics who are aware of other search engines are those in library science, computer science, physics and mathematics. From the findings of this study, it shows that academics in London have high awareness of other search engines, and make use of them.

Colley (2011), conducted a survey on awareness of Internet banking in University of Ibadan Nigeria, to access the search engine researchers use to have access to the Internet, using the questionnaire as an instrument for data collection. Colley found out that, majority of the researchers (64.1%) of 58 respondents have not heard about other search engines. The most common search engines to them were Google and Yahoo. Searching session length also differed, with Web searchers usually using two queries per session and typically viewing no more than ten documents from the results list, OPAC searchers using two to five queries and viewing fewer than fifty documents, and IR searchers using seven to sixteen queries and viewing ten documents per session. In addition, while 37 percent of IR searchers use Boolean operators, only 8 percent of Web searchers and 1 percent of OPAC searchers use more advanced searches.

Griffiths and Brophy studystudents searching behaviour, 541 other observations of the average Web searcher (Spink, Wilson, Ellis, and Ford, 1998; Ellis, Ford, and Furner, 1998) point out that

ineffective use may be caused by a lack of understanding of how a search engine interprets a query. Few users are aware of whether or not a search service defaults to “and” or “or” and expect a search engine to automatically discriminate between single terms and phrases. Also, devices such as relevance feedback work well if the user ranks ten or more items, when in reality users will only rank one or two items for feedback (Croft, 1995). Koll (1993) found that users provide few clues as to what they want, approaching a search with an attitude of “I’ll know it when I see it,” which creates difficulties in formulation of a query statement. Larsen (1997) is of the opinion that Internet search systems will evolve to meet the behaviour of the average Web searcher.

Thus it can be seen that there has been a shift toward the introduction of search features that appear to respond to the ways in which users actually search these systems, for example, search assistance, query formulation, query modification, and navigation. The notion that improved interaction may be key to improving results is attractive in principle but not necessarily true in reality. Nick Lethaby of Verity Incorporated, paraphrased in Andrews (1996), pointed out that users do not want to interact with a system beyond entering in a few keywords.According to Brown, Murphy and Nanny (2003), it is questionable whether information seekers in general are able to effectively select through the large quantities found to successfully recognize misleading, irrelevant, or incorrect information. Evidently, what are lacking from the modern information literate most of the information seekers are information technology skills but solid information skills, which are an essential part of information literacy.

Shafi and Rather (2005) investigated precision and relative recall of search engines altavista.com, google.com, hotbot.com, scirus.com and bioweb.co.uk. These search engines were examined to see which of the first ten records retrieved could be judged “scholarly information”

in the field of biotechnology. The results showed that scirus.com is the most comprehensive followed by google.com and hotbot.com. Furthermore, the results revealed that those specific search engines achieved better recall and precision rates in structured queries (when used in phrase searching and Boolean operators) and that precision is inversely proportional to relative recall.

Web search engines and Google in particular, have created a generation of searchers who are choosing the simplicity of search engines on the open free web over the perceived complexity of library services. Libraries can no longer cater for "people who want fast, easy access to unlimited, full-text content using interfaces that require no critical thought or evaluation" (Bell, 2004). Fast and Campbell (2004) found that students "admired the organisation of (an) OPAC, but preferred to use the web in spite of its disorganized state". It is, of course, inevitable that convenient access to information which, while it may not be comprehensive or of the highest quality, is good enough will be alluring. This is a natural human impulse, codified by Zipf into his principle of least effort (Sole and Cancho, 2003) and by Simon in his concept of "satisficing" (Tennant, 2001; Agusto, 2002), not to mention the complaint of some in the library/information area that we live in a society "fuelled by a culture of instant gratification" (Stoffle, 1996, p. 219).

Bell (2004), "Google has become the symbol of competition to the academic library". He uses the term "infobesity" to compare the way students now search for information with the modern consumption of fast food. Originally coined by James Morris, the Dean of the School of Computer Science at Carnegie MellonUniversity, "infobesity" refers to the belief that searching Google for information provides a junk information diet. Bell believes that students often want to find something quickly and that they are generally not concerned about the quality. It is clear from a review of the numerous articles published on this subject, that there is a general belief in

the library community that more “nutritious” information can be retrieved by using the specialized databases available in an academic library.

There are debates as to the amount of information available through systems such as Google compared to the “hidden web” of library databases (Tenopir, 2004; Herring, 2001; Devine and Egger Sider, 2004), as well as of concerns about the quality of material retrieved (perhaps uncritically) from a search engine (Herring, 2001; Tennant, 2001). Although there have been numerous comparative evaluations of databases, librarysystems, and web search engines (for reviews of these studies see Brophy, 2004; Xie,2004) relatively few have attempted this sort of direct comparison of two kinds ofservice.One example is that of Xie (2004), who compared online database systems (Dialog and Factiva) with three different types of web search tool (search engine,directory and a meta-search engine). Students were asked to search the same twotopics on each system and then required to give relevance scores, with precisionof each system calculated on the total retrieved relevant documents (to amaximum of 20). Another is that of Fast and Campbell (2004), who examinedthe perceptions of students searching Google and a university library OPAC,using interviews, verbal reports and observations and the one is that of Griffithsand Brophy (2005), who report two studies of the use of Google of variousacademic information resources, finding a predominant use of internet searchengines. These examples illustrate the various tools which may be used toinvestigate a complex situation.

Based on the above findings, it is palpable that, no similar study was conducted from the area of the research; therefore, the gap has established which this research work intends to cover using research questions number one andtwo.

2.4 Use ofSearch Engines for Information Retrieval in Institutions of Higher Learning

The use of internet search engines in educational settings, as a catalyst for change in this domain. Search engines by their very nature are software applications that encourage and support independent teaching and research. Lecturers using search engines for teaching and research purposes become engrossed in the process of teaching and research as more and more academics use computers as information sources and cognitive tools (Reeves &Jonassen, 1996), the influence of the internet search engines on supporting how academics come up with journals articles, conference proceedings and text books will continue to increase. Internet search engines increases the flexibility of delivery of education so that learners can access knowledge anytime and from anywhere. This in turn would better prepare the academics for lifelong research as well as to improve the quality of teaching. One of the most vital contributions of Internet search engines in the field of education is- Easy Access to Learning. With the help of search engines, academics can now browse through e-books, e-journals etc. and can also have an easy access to research resources all over the world.

The incursion of the internet search engines into the educational sector, according toBada, Adewole&Olaleka (2009) provides the possibilities to solve teaching and learning problems even more rapidly and accurately than previously conceived. This has eventually made the internet search engines the doyen of humanities as it continues to extend greateracceptance. The search engines, according to Jayesimi (1999), has become the neology in our society and possibly innovative years ahead. In schools, computers are widely used; and theneed for internet search engines and literacy in the educational system has become morerelevant. It has been found to be effective device for presentationof instructional programme.

In a contribution, Watson (2005) says that, in today's high, tech multi-sensory approach tolearning, education, information and recreation, the use of the internet search engines becomes

inevitable. It has been used in academic for one purpose or the other practically since their inception. In support of the above, Nnamdi (2008) states the relevance of the internet search engines to academic work to include: easy access to information; vast information; easy information retrieval; access to e-books; Database management system etc. Several authors have contributed variously on how the internet search engines have become an inevitable tool in the academic work. Chime (2004) in his opinion maintains that, the internet search engine is one of the major innovations of the computer that has found its way deeply into the academic sector. According to him, the internet is the largest computer network in the world. Most of the information on the Internet is free while search engines pave way to the easy access to this information. The Internet has made the whole world a global village and has great potentials for educational research. Another advantage of the internet according to Nwokede& Sani (2009) is that, it enables the researcher to have discussion group with other researchers in his chosen area of study. Once a group is formed, all that the researcher needs to do is to post plea for ideas on his or her research topic on a "notice board" in the website. Having so many people out there, you will be surprised at the different ideas and suggestions that will come your way within split seconds. Hence the internet has become an invaluable tool for learning,teaching and research. However, as excellent and important the search engine is, it has not reallygained its root in our Nigerian schools, let alone the entire society. Its impact is not stronglyfelt by all, especially by our researchers. This is likely because of some challenges faced in the utilization of the search engines in our society.

According to Lindary and Mclaren (2010) university researchers use search engines for research and made evaluation on the quality and type of research materials being used. In addition to the above, Burton and Chadwick (2000) noted that some of the researchers depend solely on e-

resources in writing research papers. Majority of the researchers used a combination of library and online resources. This did not, however, mean that researchers were necessarily choosing the best or most pertinent sources relating to their topics. Instead, as emphasized by Lindary and Mclaren (2010), they depend on giving the most positive ratings to sources that were easy to understand, easy to find and available. The e-resources are very easy, convenient and accessibility, were major factors influencing academic use. Joe (2011) conducted a survey study on information technology acceptance by professionals in Delta State University, Nigeria. To access the users using search engines, a seven item questionnaire was used to collect data from a sample of 211 users of which 201 users completed the survey, and response rate was high. He found out that 80 (97.95%) respondents used Google daily, while 65 (74.70%) respondents used Yahoo 2- 3 times a week, while 14 (15.09%) respondents used Bing once a week. It was also discovered that 12 (13.50%) respondents used Netscape twice a week, while 10 (11.49%) respondents use AOL once a month, while 10 (11.49%) respondents used Lycos twice in a month and 10 (11.49%). From the findings, it showed that many users made more use of Google than other search engines because of the knowledge of Google to them.

Thanuskodi and Ravi (2011) survey on use of digital resources by faculty and research scholars of ManonmaniamSundaranar University, Tirunelveli investigated utilization of search engines by postgraduate and research scholars. The result shows that 67.14% of the faculty is familiar with the use of search engines. Awareness of search engines has changed what users actually read and use. They now tend to use only what is easily accessible. Therefore, they visit the library a lot less, and, as such, discovery through serendipity is reduced. Users often prefer increased access to databases of online-refereed journals and to the Web—which provides information that is up

to the minute, international in scope and sometimes not available elsewhere because they see these resources as easier to access and search (Dalgleish& Hall, 2000).

Prangya and Rabindra (2013) opined that awareness is core to usage of search engines. Where materials are in closed access, users' ease of access to such e-resources is by far reduced. But where they are in open access (not subscription-based), researchers' find them, and make do with them for whatever reasons they need them for. The usage of search engines in recent years has yielded positive results in the area of teaching and research and that through the use of search engines, researchers, academics and students now have access to global information resources, particularly the Internet for their scholarly intercourse (Egberongbe, 2011; Ellis &Oldman,2005). Waldman (2003) reported high usage of search engines at City University of New York. Gakibayo (2001) carried out a study on Internet usage by students and staff at Mbarara University of Science and Technology and the result of the study indicated low usage of electronic information resources by students and staff of the university. Researches as show that men are heavier users of the Internet search engines (Teo, 2001; Chong, 2002; Agba, Kigongo-Bukenya&Nyumba, 2005). Bar-llan, Peritz and Wolman (2003) conclude that gender and academic rank have only a minor influence on the usage of search engines and the Internet.

In the study described by Tanya Cothran, which surveyed the postgraduate population at University of Minnesota, participants rated Google Scholar's ease of use high (Cothran, 2011). They considered the interface to be clean and simple. Subjects in her study also perceived Scholar to be useful. They believed that the search engine helps them in their research. York identifies that a majority of searchers prefer to use Google and Google Scholar for discovering topics and ideas (York, 2005). However, they still rely on library resources, such as library databases, to obtain trustworthy materials. But the simplicity and speed of Scholar gives it an

edge and makes it preferable for users and faculty when they have the "desire to explore and survey information." (York, 2005) As studies show, library institutions are still considered relevant and are in use by students and faculty. In the study by George and colleagues, most academic staffs (78%) relied on the university library databases along with Internet searches (George, Bright, and Hurlbert, 2006).

Jamali and Asadi (2010) show that the vast majority of students prefer to use article index databases when searching for scholarly articles in particular. Libraries provide reliable scholarly materials and all the resources needed to conduct research: journal and magazine subscriptions, books, article database subscriptions, etc. Web search engines, however, search across a variety of resources. The interviews conducted by Jamali and Asadi (2010) showed that one of the most valued benefits of Google as a search engine is that it is not limited to a specific research domain. It indexes everything that is available online. Interviewed students also pointed out they considered the search engine a good "point to start". For the most part they agree that it gives them a quick overview of an area that they may not know much about. Moreover, if searchers use Google Scholar, they will receive results that index everything containing the keywords entered in the search box. Scholar conducts a federated search across multiple databases. Arguably, as Ettinger (2008) demonstrates, using the search engine can produce better results. They may provide more inter-disciplinary results by spanning multiple areas of study. Cheney and Perry (2005) compare the comparative size of Yahoo! and Google's indexes. Mowshowitz and Kawaguchi (2005) examined the difference between web search engine results from an expected distribution. Egghe and Rousseau (2006) analyse IR system overlap from a mathematical perspective, and Bar-Ilan (2005) discusses a statistical comparison of overlap in

web search engines. Bar-Yossef and Gurevich (2006) discuss methods for comparing web search engine indexes.

In summary, studies show that overlap is an important issue for web search engine performance research. Most web search engine overlap studies were performed in the 1990s using small query samples. Given the technological advances since this time in web search engine design, we are examining the current state of web search overlap using a large set of queries. Overall, most web searchers view only the first or second page of results (Spink and Jansen, 2004). Therefore, examining overlap levels for queries on first page results is an important research issue.

2.5ICTs Skills of Lecturers for Information Searching

The use of information and communication technology (ICT) as a tool for enhancing students' learning, teachers' instruction, and as catalyst for improving access to quality education in formal andnon-formal settings has become a necessity. Simply having ICT in schools will not guarantee theireffective use. Regardless of the quantity and quality of technology available to lecturers and students the key to howthose tools are used is the researcher's skill; therefore, lecturers and students must have the competence and the rightattitude towards technology (Kadel, 2005; Yusuf &Balogun, 2011). Observation has shown that there is alow level of skilfulness in the use of ICT among respondents (Obuh, 2009; 2010). He further suggestedthat the skills required to maximize the potential of internet search engines that pave way to electronic resources are much greater than thoserequired for searching printed sources. These skills include a knowledge of the structure of the databaseand the instructions which must be input into the computer by the searcher, as well as an understanding ofthe ways in which the instructions are linked with one another.

ICT literacy skills comprise a 21st century form of literacy, in which research andcommunication of information via digital technology are as important as reading and writingwere in earlier centuries (Katz, 2005). In 2002, the Educational Testing Service (ETS) convened an international panel which comprised of academics, development specialists and telecommunications experts representing the governmental and private sectors to study thegrowing importance of existing and emerging ICT (Katz and Macklin, 2006; Pernia, 2008). The international panel defines ICT literacy as the ability to use digital technology, communications tools and networks to access, manage, integrate, evaluate and create information in order to function in a knowledge-driven society (Kenney, 2006).Krubu and Osawaru (2011) conducted a study on the impact of ICTs in Nigerian universities. The survey design was employed, data were collected through questionnaire, and simplepercentages were used for the analysis of data. The authors found that out of the 48 respondents studied,Majority of the respondents who have good computer skills and there are 21 (43.7%), followed by those that havefair computer skills, they are 19 (39.6%) respondents; few of the respondent representing 5 (10.4%) hadno skill at all. Only 3 respondents representing 6.3% had excellent computer skills. The result of the studyrevealed that majority of the respondents, i.e. 18 (37.5%) acquire ICT training skills via formal training;followed by 17 (35.4%) respondents which also acquired the skills via trial and error, while few i.e. 10(20.8%) respondents acquired ICT skills via self - study and the least was 3 (6.3%) respondents thatacquired the skills via staff-in-house training.

Al-Ansari (2006) as cited by Nweze (2010) focused on the Internet search engines use by the faculty includingpurpose of use, impact on teaching and research, Internet resources that they use and the problem facedwhile using the Internet search engines. It was discovered that majority of them have been using the computer andInternet search engines for more than five years. The

Internet search engines has helped them save time, find up-to-date information andcompare with their colleagues. Almost all of them want to improve their Internet search engine use skill through formaltraining. Bassi and Camble (2011) stated that different studies have identified how researchers acquire theirsearch skills for the use of search engines to access e-resources. Klatt (2001) opined that a majority of search engines users obtained theirknowledge by trial and error or with the help of fellow users. Similarly, Adomi, Omodeko, and Otlo(2004) revealed that electricity failure has been a persistent problem militating against ICT applicationand usage in Nigeria this also prevents universities with ICT facilities for academics to usethem regularly; unstable electricity makes information, communication and technology impossible. In thissame vein most students acquired Internet knowledge and skills through practical self-teaching. (Adomi,et.al, 2003; Adomi, 2005).

The study of Bassi and Camble (2011) on gender differences in use of internet search engines to access electronic resources inuniversity libraries of Adamawa State, Nigeria table 6 shows the most common ways through whichusers acquire their search skills. A total of 321 (64.7%) and 138(60.5%) males and female usersagreed that they acquire the skills through friends and colleagues respectively, 253(51.0%) and 120 (52.7%) males and female users obtained their search skills through library instructions and 250 (50.4%) males users agreed that they obtained their search skill through courses they offer in the university. On the other hand, 109 (47.8%) females responded that they acquire the search skills through trial and error. Other results show that the margin between how males and females acquire their search skills is negligible, because basically both male and female searchers obtained their search skills and knowledge in the same ways. The ability to use search engines to access e-resources efficiently depends on basic search skills knowledge of what is available and how to use it, and ability to define a research problem.

The findings of Okiki (2012) revealed that 30 respondents, representing 27% of total lecturers had 'excellent' computer skill. Further, the computer skill of 45 respondents (40%) was 'good', followed by17 respondents (19%) with 'satisfactory' level computer skill, and 16 respondents with (14%) were 'fair'in their computer skill. The results show that University of Lagos Academic Staff members to certain degree were computer literate as a result of compulsory computer training program organized by the University Centre for Information Technology and Systems (CITS).

Bashorun, Isah and Adisa (2011) asserted that searching skills and the attitudes of users towards searching are important factors towards use and non-use of search engines to access e-resources cited in LIS literature. This explains that searching skills and computer literacy insignificantly influence the low use of search engines to retrieve e-resources in the UNILORIN. One can concretely stress that the high frequency of using Web and Microsoft software has increased the exposure of UNILORIN community on the internet. Ratcliff, Swartz and Ivanitskaya(2013) in their study, 87% of the respondents reported insufficient knowledge and skills to use the PubMed online database, and almost half of the respondents indicated limited knowledge of search engines. This was true despite other results of the same survey that showed that professionals who graduated within the past 10 years were more likely to respond to online correspondence than those who graduated >10 years ago. The result from the study of Egberongbe (2011) indicated that 67 (69.8%) and 10 (14.3%) postgraduate students and scholars respectively had taken training regarding access to electronic resources, while 33(38.4%) postgraduate students and 60(86%) scholars did not get training in the use of search engines to access electronic resources. The study showed that majority of scholars did not receive training in the use of search engines to retrieve e-resources. The study revealed that the level of IT skills among

lecturers, scholars and also library staff were variable and low. Most users used informal methods for training themselves. It was also observed that these groups of users were not getting proper encouragement from the University management to participate in training programs.Abdullahi and Haruna (2008) found that lack of basic knowledge of ICT is the second majorconstraint after the problem of erratic power supply to the use of ICT in the university libraries inAdamawa State, Nigeria.

The result from the study of Igun (2005) shows that, 71% of the respondentsrated their internet skills between average and very high. 78.8% acquired their Internet search engines skills either online or through teaching by colleagues or friends. World Wide Web (WWW) skills were the most sought after additional skill (73%). Continuing education and self-study were the most preferred ways to acquire new skills. The majority of respondents reported that they talk less on phones because of their Internet use and that it had improved their teaching and research. This paper concludes that given the current constraintson opportunities for Internet search engines skills acquisition and Internet connectivity in Nigeria and at the Delta State University, the University should pursue vigorously and urgently to completion its current drive (through an ICT department) to install and run a functional and comprehensive Internet and University-wide information system. Thus, the University will ultimately create the enabling environment for Internet and ICT skill acquisition and link the University fruitfully to the seamless World Wide Web.

Based on the above findings, it is palpable that, no similar study was conducted from the area of the research; therefore, the gap has established which this research work intends to cover using research questions number three.

2.6 ICT Infrastructures to Support the Use of Search Engines in Institutions of Higher Learning

The building blocks of ICTs are the communication processes and infrastructures. ICT refers to information and communications technologies such as computers and the Internet, as well as fixed-line telecommunications, mobile phones, other wireless communications devices, networks, broadband and various specialized devices ranging from barcode scanners to global positioning systems (Singapore:Ministry of Economic Development, 2004).

According to Vanderlinde and van Braak (2010), ICT infrastructure measures the perceived availability and suitability of the ICT tools such as hardware, software and peripheral equipment provided in the universities. In Pelgrum's (2001) study, ICT infrastructure refers to the availability of equipment, software, Internet access and other similar resources in the institution of higher learning. Additionally, recourses and facilities in universities are designed and enabled in the direction of supporting continuous transformation and use of various search engines to retrieve vast information that will assist lecturer in effective delivery of learning and research (Anderson & van Weert, 2002).In the year 1998, Krysa conducted a research to determine and examine regularly occurring factors that affect the implementation of the technology among the university lecturers. A qualitative study among four university lecturers was carried out to identify the factors. Based on the findings, it was reported by one of the lecturers that the outmoded hardware limits the use of search engines in the institution of higher learning (Krysa, 1998). The lecturer was not able to effectively use search engines to retrieve information due to the old and outdated hardware. Conversely, one of the informants stated that limited software act as one of the antecedents that prevents the use of search engines as a means of accessing information (Krysa, 1998).

ICT infrastructure is significant to the universities to achieve its goals for management of information, effective uses and extension of boundaries from the four-walls to the globe. ICT infrastructure presents an opportunity to lecturers to provide value-added information through meaningful research papers and teaching in the universities and access to a wide variety of digital-based information. Universities are using modern ICT to automate their core functions, implement efficient and effective information searching, cooperation and resource sharing through networks. They use ICT to implement the management information systems (MIS), develop institutional repositories (IR) of digital local content, and digital libraries.(Rana, 2008).

2.7 Types of Search Engines for Information Retrieval and their Evaluation

A substantial body of literature already exists on use of search engines and Internet by the academic community. A number of studies (Kumar and Kaur, 2005; Asemi, 2005; Kumar and Sampath Kumar, 2007; Kaur and Manhas, 2008; Sampath Kumar and Kumar, 2010) have looked at the use of internet as an educational tool, purpose of use of internet, advantages and disadvantages of internet. Problems in the use of the internet are also discussed (Mishra, 2005; Madhusudhan, 2007; Riahinia and Azimi, 2008). There are also many studies conducted by the different authors regarding the use ofsearch engines (Asemi, 2005; Patitungkho and Deshpande, 2005; Koovakkai and Noor,2006). Asemi (2005) found that Yahoo and Google were most popularly and widelyused search engines followed by HotBot, MSN, AltaVista, and Scirus. Patitungkho andDeshpande (2005) study indicated that majority respondents (56 percent) used searchengines, especially Google, followed by Yahoo (35 percent), Sanook (6 percent) andExcite (2 percent).Alshare, (2005) explored the perceptions of academic staff's regarding the useof search engines. The main objective was to determine how frequently academics usevarious search engines and their search features. Various factors that might influence academics

responses were examined. Results showed that 94 percent of the academics usedsearch engines for class-related activities. Almost 61 percent of them used searchengines 1-2 times per day and 28 percent used them 3-4 times per day. Males were morelikely than females to use search engines for news, weather, and sports activities; females were more likely to use for travel information. Yahoo and Google received thehighest overall ratings.The purpose of search engine is to extract requested information from the huge database of resources available on the internet.

It is use to assist the internet users to locate resources of interest when needed on the web. Thus, to make a web search, the user points their web browser to one of the search engines (e.g. to http://www.google.com) and enter query, which is usually a list of keywords that describe the information for which the user is looking. A list is returned which contains hyperlinks to the documents that contain the requested information. Very often the hyperlinks are accompanied by short excerpts from the source documents called snippets. Bradley (2002) was on the view that there are over 20,000 web search engines that one can use to get available resources on the internet. Search engines are classified into various ways such as academic search engines that retrieve high quality information relevant to scholars; meta search engines that search for several other search engines along with top results from each; subject-based search engines retrieving web pages in a certain field of knowledge; special search tools for searching for images, videos, people and news; and deep Web search engines retrieving web pages that are not searchable by general search engines.

Search engines provide a basic tool for research on the World Wide Web. The characteristics of each search engine influence their performance. The ever-growing number of search engines led various researchers to attempt to evaluate them. Chu and Rosenthal (1996) were amongst the first to propose criteria (content of database, search facilities, retrieval performance, search

results facilities, user effort) for the evaluation of search engines, as they noticed that methodologies and evaluation criteria differed between papers; thus there was a lack of established, commonly accepted evaluation criteria. Oppenheim (2000) reviewed the literature on evaluation of search engines and concluded that there was “little consistency” in the way researchers undertook such studies.Gwizdka and Chignell (1999) pointed out how the criteria of Chu and Rosenthal corresponded to the ones listed by Cleverdon and Keen (1966) for the evaluation of an information retrieval system, while at the same time they noted the need to define a wide range of evaluative measures representing the views of researchers.

Landoniand Bell (2000) proposed a series of criteria for the evaluation of search engines, which was a mixture of classic evaluation techniques with new more specialized ones for the web (such as retrieval of duplicate records, dead links, accessibility). Bar-Ilan (2002) and Vaughan (2004) adopted a similar approach to that of Landoni and Bell (2000). Johnson et al. (2001, 2003) developed a framework of guidelines for the evaluation of internet search engines in the project DEVISE based on user satisfaction of search performance. A total 23 university students were requested to evaluate the following search engines: excite.com, northernlight.com and hotbot.com, based on the criteria of effectiveness, efficiency, utility, and interaction. From the answers it was found that the dimension of efficiency of each search engine played the most important role in the evaluation, and interaction was the least important.

Griesbaum (2004,) compared the German versions of three big search engines (Altavista.de, Google.de and Lycos.de) by conducting 50 random searches with the search results evaluated by 27 independent jurors and came to the conclusion that “Google reached the highest values, followed by Lycos and then Altavista”. Google scored the highest number of relevant items across all 50 queries and achieved the highest top 20 precision values for nearly half of the

queries. But the differences are rather low. In fact, they are so low that a statistical validation with the help of the sign test indicates that Google performs significantly better than Altavista, but there is no significant difference between Google and Lycos. Although Lycos also attains better values than Altavista, the differences between these two engines reach no significant value". Griesbaum (2004, p. 22) concluded that "a closer look at the deviations between relevance assessments of results and representation of results on the search engine result pages makes it apparent how tentative these supplementary test results are. Results and result presentations are judged by different people. Hence the consistency of the judgments is debatable".

The huge amount of information at their disposal enable researchers to have an in depth view of the research topic. Research and other academic activities require originality and this leads academics to retrieve information for their work from remote computers around the world through the Internet search engines. The Internet, which is an important resource for lecturers, is regarded by Oyegade (2000) as the best source of information retrieval because it is the gateway to the globe. It has allowed different groups of people, especially researchers, to create channels of communication and self-expression. According to Thomas (2004), the Pew Research Centre in 2001 reported that 94% of researchers with access to Internet rely on online information for research tasks and 71% of them used the Internet as the major source for their most recent academic publications. Fifty-eight percent (58%) of the academics have used websites set up by the university library, 34% have downloaded a guide while 17% have created a web page for a publication. Electronic resources, are beneficial for teaching, learning and research, however lack of skill would probably inhibit researchers' retrieval of information from electronic resources.

Crawler Based Search Engine

All crawler based search engines use a crawler or bot or spider for crawling and indexing the new content to the search database. Batzios et al. 2007 outline four basic steps which every crawler based search engines follow before displaying any sites in the search results. They are crawling, indexing, calculating Relevancy and retrieving the result. Search engines crawl the whole web to fetch the web pages available. Crawling is performed by software, called a crawler or spider. Crawling or spidering is an automated process to gather the data with web spiders. They can be visualized as little spiders and are also known as crawlers, robots, software agents, web agents, wanderers, walkers, or knowbots [Clay and Esparza, 2009]. Named after those special software robots, this type of search service is called "spider-based" or "crawler-based" search engine. Spiders continuously crawl web pages by fetching them and build lists of words and phrases found to keep them as a full-text index in a database of the search engine. They find pages either through the URL, which web authors add to a list to notify of their web page's existence, or through hypertext links embedded in most web pages [Sherman & Price, 2001]. In the latter case, spiders start by crawling a few web pages and follow the links on those pages. After fetching the pages, they point to, they follow the links that are on the last pages.

The same process will be continued until they have indexed a certain part of the web that includes pages they store across many machines, what leads to the next task.Indexing is the second part of search engines. It is the process of "taking the raw data and categorizing it, removing duplicate information, and generally organizing it all into an accessible structure" [Clay andEsparza, 2009].Crawler-based search engines are constantly searching the internet for new web pages and updating their database of information with these new or altered pages. Also web crawlers are used to collect specific information from Web pages (Batzios, 2007). Even web

crawlers are very easy program; they find millions of documents and help users to retrieve correct information in easy way. Also sometimes, crawler can find the information which is hidden by website owner or webmaster. Because of this, many web crawlers work according to robots exclusion protocol. Some search engines use more than one web crawler for different purposes but not all web crawlers work to find information. Web crawlers also may work as link checker, page change monitor, file transfer protocol client or web browser (Dolowitz, 2008). The crawler based search engines three basic tasks include:

a. Searching the WWW and collecting the pages.
b. Keeping the index of the words they find and where they were found.
c. Allowing users to search for words or a combination of them from the index by using efficient software.

The tasks are performed by the three parts of search engine. The first part is the 'crawler' (bot or robot or spider). As discuss above, it is used to search the Internet and create listings of web pages. The second part is the 'Index', which is a huge collection of copies of web pages and the third part is the 'Search Engine Software' which ranks the results. Because the crawler in this engine searches the Internet constantly, it provides updated information. Google, Live Search, Ask, Bing, Baidu and most other search engines are crawler based. Crawler search engines are good when a user has a specific search topic in mind and can be very efficient in finding relevant information in this situation. However, when the search topic is general, crawler-based search engines may return hundreds of thousands of irrelevant responses to simple search requests, including lengthy documents in which the keyword appears only once.

Batzios et al, (2007), opined that Crawler search engines have the following advantages:

- Ease of use

- Familiarity. Most people who search internet are familiar with them.
- They contain a huge amount of pages

All search engines have a search field where the user will enter the search terms. Search terms are the keywords a search engine will use to find the most relevant information on the internet.

Hybrid Search Engines (HSEs)

Hybrid search engines use both crawler-based and manual indexing for listings the sites in search results. Most of the crawler based search engines like Google basically uses crawlers as a primary mechanism and manual screening as a secondary mechanism. Anne (2000) stated that when a site is being identified for spammy activities, manual review is required before including it again in the search results. Hybrid search engines use a combination of crawler-based results and directory results. Hybrid search engines include the features of crawler based search engines and human powered directories. Currently, some search engines are using both features to provide effective results. More and more search engines these days are moving to a hybrid-based model. Examples of hybrid search engines and they addresses are: Yahoo (www.yahoo.com) and Google (www.google.com). Hybrid search combines the flexibility of keyword-based retrieval (as in traditional search engines) with the ability to query and reason on metadata typical of semantic search systems. Metadata is information associated to a document describing both its context (e.g author, title, etc.) and its content.

Anne (2000) classified web search engines into three (3) groups: General search engines (GSEs), specialized search engines (SSEs) and Meta search engines.

Meta Search Engines (MSEs)

A Meta search engine, (or aggregator) are search tools that use another search engine's data to produce their own results from the internet. Meta search engines take input from a user and

simultaneously send out queries to third party search engines for results. Sufficient data is gathered, formatted by their ranks and presented to the users.Meta-search engines, also known as multiple search engines, metasearchers, or metacrawlers, are special search tools that present the results by accessing multiple search engines and web directories. This way, they allow users to quickly receive combined results that are merged in one place at once. Thus, web users neither need to type the query several times nor have to access every single search engine by themselves. This job will be done for the users by meta-search engines, which might additionally suggest engines that the user had not considered before. By performing a search query, meta-search engines transmit the typed terms simultaneously to multiple individual search engines. Multi-search engines don't do the crawling or maintain their own database like single search engines, but usually filter the results they found instead. Based on a specific algorithm, they eliminate duplicates and rank the results from their sources into a list. The list of collection will be displayed on the SERP, very similar to the search engines' results page that relies on the indices of other search engines (Sherman & Price, 2001; Clay and Esparza, 2009).

There are also some meta-search engines that don't use an algorithm, but presents the resulted information of the sources. Meta-search engines differ from each other in the selection and quantity of search engines and in the presentation of results (Mohamed, 2004). However, Meta search also has issues. Scores of websites stored on search engines are all different: this can draw in irrelevant documents. Meta search engines usually don't search the internet (or web) themselves to collect information rather they submit the query to a number of search engines, then sort and present the results to the user. In other word, it directs the user's query to other search engines merges the obtained results and sends them back to the user. The rationale behind such approach is that if single search engine is able to index the whole web, then maybe it is

sensible to combine their coverage, which might extend the searchable area. Examples of Meta search engines includes, Metacrawler (www.metacrawler.com), Dogpile (www.dogpile.com) and mamma (www.mamma.com) (manoj and jocob, 2008), went further and stated that Meta search engines perform the following tasks sequentially.

i. Accept a user query
ii. Query processing
iii. lunch multiple queries
iv. Collect and merge results
v. Present post-processed results to the user.

Meta search engines are therefore, the useful tools for academic staff of tertiary institutions. By searching several search engines all at a time, MSEs, find more information for a single query. MSFs provide an integration of results from different search engines, comparison of rank positions and advanced search features on top commodity SEs like clustering, question answering and personalized results. Meta search engines use other information retrieval tools such as web directories, deep-web search tools. By using Meta search engine, one gets snapshot top results from a variety of information retrieval tools.Dogpile is a meta-searcher which fetches results from leading search engines, including the three analysed before, among which users are allowed to make a selection for their individual search. It belongs to one of the most popular meta-search engines and won the Best meta-search engine 2003. In 2006 and 2007, it was ranked highest in customer satisfaction by J.D. Powers and Associates, global marketing information firm (Dogpile, 2010).

A very interesting research study by Dogpile was published in April 2007 that measured the overlap and ranking differences of the four leading web search engines back then,

Google,Yahoo!, Windows Live and Ask Jeeves. Overlap occurs for a given query when a result from a search engine matches a result from another. The study from Dogpile, collaborated with researchers from Queensland University of Technology and the Pennsylvania State University, shows that there is a great difference in the top results of web search engines. To get representative findings, over 19 thousand random user-entered queries had been tested with the help of a tool which automatically retrieved the search engines and stored the result data after capturing them from all the first pages. People rarely go beyond the first page of the results form (Lewandowski, 2005). The measure of only page one was the limitation of this study, because it's a barometer for the most relevant results from the search engines. A distinction between organic results and sponsored results was also necessary, because both have their own ranking position. The findings showed that from the four tested engines, there were 88.3% total results unique, that means no overlap to one search engine. By any two search engines, the percentage of total results shared was 8.9%, by three engines 2.2% and by four only 0.6%. This means that the overlap across first results page of the evaluated search engines was only 0.6% for a given query (Dogpile, 2010).

In addition, if a person only searches Google, he won't get approximately 72.7% of the web's best results showing on the first page. If he, on the contrary, only uses Yahoo, he can miss 69.2%, and by utilizing only Live, 69.9% may result in a loss of the first page answers (Dogpile, 2007). Compared to earlier researches from April and July 2005, done by Dogpile and collaboration, a trend could be observed: The content on search engines over time is unique and it's assumed that it will continue as each engine will keep modifying their crawling and rankingtechnologies (Dogpile, 2007).

The Google search engine has become predominant, to the extent that "to Google" had become de facto a verb in the English language by mid-2003, despite the objections of the company (Quint, 2002; BBC, 2003). Google is, therefore, representative of the variety of easy-to-use search engines, based on free-text searching of the content of public web pages. It is indeed their major representative, given the mission of the company "to make the entire world's information available" (Library Journal News, 2003). The extension of the "basic" Google search functions into Google scholar (providing access to non-copyright academic material (Tenopir, 2005). According to Bell (2004), "Google has become the symbol of competition to the academic library". He uses the term "infobesity" to compare the way users now search for information with the modern consumption of fast food. Originally coined by James Morris, the Dean of the School of Computer Science at Carnegie Mellon University, "infobesity" refers to the belief that searching Google for information provides a junk information diet. Google is most likely recognized worldwide as the largest search engine.

A global search survey conducted by ComScore, a leader in measuring digital world, proves that this statement is acknowledged: In 2009, Google dominated 66.8% of worldwide search with 87,809 searches, followed by Yahoo! with 9,444 searches, the Chinese search engine Baidu with 8,534 searches, and Bing that ranked fourth with 4,094 searches (comScore, 2010). Lee's interviews with undergraduate students pointed to ease of use as a big plus of Internet search engines, and specifically Google (Lee, 2008). Students were generally dissatisfied with library tools for online search. They found them confusing because of their complexity. The complexity, as established by Capra, Marchionini, and Oh (2007), is caused by the constant growth of information from online resources available through the libraries. This increase poses great challenges to organizing the information. While physical libraries have spatial boundaries to

structure data (rooms, shelves), digital libraries do not. Therefore, library interfaces become cluttered and hard to use (Capra, Marchionini, and Oh, 2007).

Google and other web search engines, on the other hand, are much simpler and offer an easy to use alternative to users. Google Scholar, as described by Ettinger, gives the user the simplicity that is so commonly referred to when speaking of Google, and the notion that scholarly content is being retrieved (Ettinger, 2008). It is almost as if Scholar gives users that extra confirmation that the results come from reliable resources. People feel "safe" using content obtained through the search engine.

Bell (2000) believes that searchers often want to find something quickly and that they are generally not concerned about the quality. It is vivid from a review of the numerous articles published on this subject, that there is a general belief in the library community that more "nutritious" information can be retrieved by using the specialized databases available in an academic library. There are debates as to the amount of information available through systems such as Google compared to the "hidden web" of library databases (Tenopir, 2004; Herring, 2001; Devine and Egger-Sider, 2004), as well as of concerns about the quality of material retrieved (perhaps uncritically) from a search engine (Herring, 2001;Tennant, 2001).Griesbaum (2004, p. 21) compared the German versions of three big search engines (Altavista.de, Google.de and Lycos.de) by conducting 50 random searches with the search results evaluated by 27 independent jurors and came to the conclusion that "Google reached the highest values, followed by Lycos and then AltaVista". Google scored the highest number of relevant items across all 50 queries and achieved the highest top 20 precision values for nearly half of the queries. But the differences are rather low. In fact, they are so low that a statistical validation with the help of the sign test indicates that Google performs significantly better than AltaVista, but there is no

significant difference between Google and Lycos. Although Lycos also attains better values than AltaVista, the differences between these two engines reach no significant value". Griesbaum (2004, p. 22) concluded that "a closer look at the deviations between relevance assessments of results and representation of results on the search engine result pages makes it apparent how tentative these supplementary test results are. Results and result presentations are judged by different people. Hence the consistency of the judgments is debatable [. . .]".

Shafi and Rather (2005) investigated precision and relative recall of search engines altavista.com, google.com, hotbot.com, scirus.com and bioweb.co.uk. These search engines were examined to see which of the first ten records retrieved could be judged "scholarly information" in the field of biotechnology. The results showed that scirus.com is the most comprehensive followed by google.com and hotbot.com. Searching to learn is far more complex than lookup. As Marchinonini (2006) points out, it requires multiple attempts at querying and using multiple search tools. In addition, the user needs to analyse and process the retrieved information using critical thinking skills. These "learning" search tasks are best executed when there is an interaction that combines both browsing techniques and lookup search strategies (Marchionini, 2006; White and Roth, 2009). Academic researchers are a perfect example of a user group where this could prove extremely resourceful. They often have vague or not well-defined ideas about a topic or a research area of interest. Exploratory browsing can help them refine or expand their research. This is also confirmed by previously stated studies where browsing was found very helpful by students when they did not have much knowledge of a topic and/or the assigned task (Lee, 2008).

Specialized search engines(SSEs). The specialist search engines may cover a particular subject (such as library and information science) a particular geographical area (such as Africa or

Nigeria) or a particular type of information (such as quotations) they may also be design for a particular group of users. A search engine which is specialized in a particular topic usually generates a better quality of results than a general one. This happens for several reasons: first of all, a specialized search engine has a smaller and more manageable index because the pages indexed are fewer in number and consequently, a specialized search engine can crawl the pages more frequently. The search engines in this group are enormously varied, in terms of their size and in terms of what they cover.

Meta search engines: are powerful search engines that search several search engines and databases to get their results. They are search engines that return results from multiple search sites all at once. The followings are example of Meta search engines: 1. Dogpile: this search engine searches other search engines, such as Google, Yahoo, Bing and Ask, to bring you the best of the web in one handy results list. 2. Yippy: this is a unique meta search engine that delivers results in related clusters to help you find exactly what you need as fast as possible. 3. Metacrawler: this search engine searches Google, Yahoo, Bing, Ask, About, MIVA and others. This engine is use to find information, images, videos, news, yellow page listings and white page listings. 4. Mamma: this search engine is known as the 'mother of all search engines; Mamma allows the user to perform a general Web meta search like the above engines, or focus your results on Twitter, news feeds, images and video, local results and job opportunities. 5. Info. Com: this also returns results from everyone's favorite search engines, including Google, Yahoo, Bing and About. The site also offers filtering for subjects like flights, jobs, multimedia, shopping and more.6. DuckDuckGo: this is another example of "Metasearch engine" that gets its results from over 50 sources, including Bing, yahoo, WolframAlpha and Blekko.

Information retrieval systems accessed over the internet are now globally used for providing access to information (Bates, 2012). Their effectiveness for information retrieval has extended their use beyond general-purpose systems to domain specific systems within an organization or industry including traditional online retrieval systems (Jansen, 2006). Finding information on these systems is usually done through a search. Marchionini (1997) describes a search as the behavioural manifestation of humans engaged in information seeking and also describes the actions taken by computers to match and display information objects. In order to evaluate these systems on how well they support people information seeking, there is a need to understand information seeking behaviour of users on the system (Ruthven and Kelly, 2011). Information retrieval systems (search engines) are not just a means to access information; they can provide information on the interaction between a user and a system through logs that are kept which can be analysed (Jansen and Spink, 2006). Analysing these logs through a process called transaction log analysis provides information on system performance, information structure and measurements of user interactions (Jansen, 2006).

Information retrieval skills are crucial for retrieving information in this era of technology that most of the information needed for research can be retrieved from electronic sources. However, lecturers' efforts to complement their work with electronic resources may be limited due to lack of skills. Therefore, knowledge of skills is necessary to selectively retrieve accurate, relevant and up-to-date information stored in documents instead of all the information that may not be relevant for their academic activities. Skills acquisition is in fact, very crucial to the use of electronic resources because information in electronic forms can only be used if academic staff possess the skill to retrieve the exact information needed for learning and research. Turner (1998) made emphasis on conceptualization of users need through the information retrieval

system saying satisfying the information needs of the library users is the main purpose and function of information retrieval system in the library. For Centuries libraries have been organizing reading materials on shelves for easy access. However, systematic methods that have been widely adopted for the organization of library materials and their recordings for use by readers came into being a little more than a century ago.

According to Spack and Willet (1997), the term Information retrieval was coined in 1952 and gain popularity in the research communities from 1961. At that time, Information retrieval's organizing function was seen as a major advance in libraries that were no longer just storehouses of books, but as places where information was catalogued and indexed. Information retrieval is concerned with retrieving documents that are likely to be relevant to a user's information need as expressed by his request. A request is an imperfect expression of a user's information need; only a user will be able to tell whether a document contains the information he is seeking. This implies that documents are not relevant to a request, that is, two users with identical request submitted can be satisfied in different ways. One document may be relevant to one user and not to the other. Relevance is connected firmly to 'aboutness'. A document is not relevant because of its colour or shape. It is relevant because it is about the information sought. The relationship between a document and a request will be formalized as a logical implication to which a measure is uncertainly attached.

The concept of information retrieval presupposes that there are some documents or records containing information that have been organized in an order suitable for easy retrieval.

An information retrieval system is designed to retrieve the documents or information required by the user community. It should make the right information available to the right user, evidence to this, is the assertion of Ranganathan (1959) in his five laws of library science published in 1973,

where he laid special emphasis on use rather than preservation of the resources. The five laws emphasized that, the library resources are for "use", the user of the library is the prime factor, and that, his requirement (information needs) must be satisfied, and to satisfy these needs, relevant information resources must be acquired, processed and organized for easy retrieval and use. Thus, an information retrieval system aims at collecting and organizing information in one or more subject areas in order to provide it to the user as soon as it is asked for.

Lancaster (1968) comments in Chowdhury (1999) that an information retrieval system does not inform i.e. change the knowledge of the user on the subject of his enquiry; it merely informs him of the existence or nonexistence and whereabouts of documents relating to his request.

The information retrieval system serves as a bridge between the world of creators or generation of information and the users of that information. Two broad categories of information retrieval have been identified:

- In-house Information retrieval
- Online Information retrieval

- In-house Information retrieval systems are set up by a particular library or information centre to serve mainly the users within the organization. An example of an in-house database is the library catalogue. Online public access catalogue (OPAC) provides facilities for library users to carry out online catalogue searches, and then check the availability of the item required.

- By online information retrieval systems, we mean those that have been designed to provide access to remote databases to a variety of users. Such services are available mostly on commercial basis, and there are a number of vendors that handle this sort of service.

Writers in times past have suggested that an effective and reliable information retrieval system must have provision for:

- Prompt dissemination of information
- Filtering of information
- The right amount of information at the right time
- Browsing,
- Getting information in an economical way
- Current literature
- Interpersonal communication and personal help

The usability contributed (or constrained) by the browser used was reviewed by Cockburn and Jones (1996) who concluded that web users were frequently not aware of where they were in 'WWW Subspace', and that they frequently did not interpret web navigation and use the web browsers' capabilities in the way that web site designers anticipated. A lot of studies (for example Muylle 1999, Battleson 2000, Diaper and Waelend 2000) follow user's information retrieval skills or experience on a given site, but do not include a review of how the user finds the site in the first place. Greenburg (2000) found that 85% of web users turn to a search engine when they are trying to find information without skills on how to properly use search techniques to retrieve the most accurate and relevant information. Electronic resources are the bedrock of provision of accurate and timely information for better educational outcomes. They aid in the retrieval of huge amount of information for teaching, learning and research. Owing to information explosion and the emergence of new technologies, information needed by lecturers are now, majorly found in electronic resources in university libraries, Information communication technology centres and computer laboratories. These technologies have brought an alternative to facilitate access to scholarly information from around the world which enhances learning. In this era of competitive research and knowledge acquisition, academic staff now

patronizes their university libraries to retrieve accurate and current information from electronic resources available in all subjects. However, the optimal use of electronic resources by academic staff may depend on their information retrieval skills Greenburg (2000).

There is no much research in Nigeria context; therefore, gap has established which will be filled using research question number four.

2.7 Factors that Influenced the Choice of Search Engines

Various user-related characteristics influence information seeker's use of search engines. Information retrieval arises out of situations pertaining to a specific task that is associated with one or more of the work roles. Review of various related research have identified factors that influenced the use of search engines among users. Okello-obura and Ikoja-Odogo (2012) maintained that, search engines provide access to a wider range of information, faster access to information, and easier access to information. Search engines therefore, provided a number of advantages over traditional print-based sources.Chiparausha and Zuvalinyenga (2012) also concur that, the following factors facilitating the use search engines: easier to find material, easier to get hold of material, extended the range of material, easier to keep up to date, improved the quality of work, saved working time, reduced browsing in libraries. Renwick (2005) buttressed that, availability of search engines has changed what users actually read and use. They now tend to use what is easily accessible. Therefore, they visit the library a lot less, and, as such discovery through serendipity is reduced. Access to search engines has decreased the time spent on searching for information in the manual retrieval system, especially when coupled with adequate searching skills.

Purcell (2011) stated that, search engines are used for a wide variety of research purposes, and they are often the first place to go when searching for information. Search engines

are so popular that they are, together with e-mail, the most commonly used service on the Internet. Search engines can help academics to supplement their lecture materials, write journals, conference and communicate with their friends. Balakrishnan (2010), in a study of 92 postgraduate students in a Malasia university revealed students preferred to use search engines such as Yahoo, Google and others to supplement materials provided by the university library, such as ProQuest, university E-Learning resources, university webresources and university library publications.

Awoleye and Siyanbola (2006) who indicated that the postgraduate students of the Obafemi Awolowo University Ile-Ife in Nigeria used search engines to seek for information.Mereku (2009) on Ghana's Report on ICT reveals that the availability of computers and other technologies are some of the factors that encourage the usage of search engines in tertiary institutions.Goyal (2010) revealed that the availability of time is another factor that facilitates the use of search engines by the academics. Findings from Shen and Shakir (2009) in one public and one private university in United Arab Emirates showed that academics accessed search engines daily for the following purposes: to seek information, e-mail, online discussions and all their academic issues. Toprackci's (2007) finding showed postgraduate students used search engines for various reasons such as courses related activities, e-mail, downloading of software and reading news.Xie, (2004) outlined the followings has factors that influenced the choice of search engines as information retrieval tool; its simplicity and ease of use, its quickness, its volume and also search engine like Yahoo serve as a guide to user when he/she are not completely sure what he/she is searching for.

However, combinations of factors have made it extremely difficult for individuals and institutions to have access to the search engines in Nigeria. These include the lack of technical-

know how, lack of adequate telecommunications infrastructure and few reliable internet service providers. Other reasons are capital, high cost of machines, (PCs) and of bandwidth (Ahiakwo,1998; Adomi, 2007; Chibgu and Dim, 2012).

The available literature came across by the researcher was silent about the factor that influence the choice of search engines as information retrieval tool in universities in Bauchi State. Therefore, the gap was established which this research work intended to fill in.

2.8Challenges Associated with the use of search engines for information retrievalin Nigerian Universities

Despite the usefulness of search engines, there are many factors identified as challenges associated with the awareness and use of search engines for information retrieval. Many scholars have observed that, lack of knowledge and skills, insufficient ICT infrastructure and difficulty in integrating ICT instruction in library setting are some of the factors that impede the use of search engines for information retrieval. According to Willy (2011) the problems include: The risk of plagiarism. This is becoming more prevalent because of the ease of using "copy and paste" word processing function, to directly take material from information sources and place it within assignment and the study habit of many students as may change into scanning and surfing. Writing skills may become replacing synonyms into existing sentences or paragraphs. The Internet is a vast ocean of information by its nature. The amount of information available on the search engine means that students tend to be misled with a lot of unnecessary information. As the Internet is not owned by anyone, the search engine lacks any sort of bibliographic control, as well as censorship of information available, searching for a particular web page without the use of proper tools can be tedious and even useless. The major problem with search engine is that, search queries turn up for many results, erring on the side of recall rather than precision.

According to Gellieb (2013), it is of concern that most students have only a vague understanding of the way search engine works, which resulted in a poor exploitation of their facilities. The potential of the search engine is also currently being limited by relatively slow data transmission speed and by the problems of information management and retrieval posed by the existence of such vast amount of information. Chapman (2002) stated that students are often not able to make sound judgment about the quality and relevance of information on the search engine.

Amoritpal (2019) asserted that students are faced with the problems of slow Internet connectivity, many sites disappear without any notice or warning, slow access is also barrier, when a large number of simultaneous users are connected to the Internet. Techno-stressed is another problem, where the frustration, confusion and fear caused by technology. Many scholars have observed that, lack of knowledge and skills, insufficient ICT infrastructure and difficulty in integrating ICT instruction in library setting are some of the factors that impede the use of search engines for information retrieval. The increasing number of webpage has also brought problems such as information overload, disorientation, and decreased information quality (Ahuja and Webster, 2001; Rockland, 2000). Although plentiful information can be accessed on the web, there is no guarantee to its validity and reliability in any way (Tsai, 2001). Therefore, in other to successfully search for relevant information on the web through the use of search engines, users need to consider the usages of their searching techniques to generate better outcome.

The ability to effectively search, locate and retrieve information online an important skill for education and essential for success in the 21st century. The results from a single search task can display an overwhelming amount of information. Without the new literacy skills and techniques that the process of searching, locating and retrieving information requires, this can quickly become a daunting task. Another problem with online information is finding the desired

information being sought among its near-limitless and often poorly-organized resources (Rubenking, 2000).

In addition, the quality of information available on the web varies widely. Eva Shaw, author and historian, stated it well when she said "I think of researching material on the internet like crossing a swamp: I don't know ahead of time if I'll fine something that makes me scream or something solid—a fact (Shaw, 2001)." Considering, that more than 7.3 million pages of information are added to the internet in conjunction with its unregulated sprawl, it is no wonder that searching for information can be a difficult task. In the same vein, Ely (1999) identified: dissatisfaction with the status quo, existence of knowledge and skills, and availability of resources as major conditions relevant to ICT integration in every organization. Both studies reveal something in common because existence of knowledge and skills relate to factor relating to lack of knowledge and skills.

The studies of Winnans and Brown (1992); Hadley and sheinggold (1993); Dupagne and Krendi (1992) investigated the factors that hinder students of tertiary institutions to effectively search and retrieve electronic resources, the following factors were summarized from their studies: lack of information retrieval skill, lack of ICT experience, lack of support in using search engines, lack of knowledge of query formulation (search techniques), lack of digital librarians to train the users when using search engines, and finally, lack of static network. Mereau, et al. (2009) stated that, inadequate number of computers in libraries and institutions, poorly trained staff and lack of internet connectivity pose major challenges to proper retrieval of information through search engines. Belkin (2000) has illustrated the challenges that users of search engines as context based information retrieval as how to guess what words to use for the query that will adequately

represent the searchers problem and be the same as those used by the system in its representation.

The web has certain characteristics such as its size, topicality and accessibility, as well as the use of hypertext and non-textual element that are complicated for user and require specific skills. Many searchers use the Web quite naturally, but too often, students (and adults, too) mistake their ability to move around the world of information for the skills that they need to navigate and read it (Burke 2002). This is confirmed by extensive research into student's Web behavior, which shows that students are lacking adequate search skills as well as the necessary skills for critical evaluation of Web information. Although much research is based within librarianship and information science, with its tradition in the study of information seeking behaviour, reading researchers and educational researchers have also focused on the web as a new educational tools, requiring new skills and techniques from students (Shenton and Dixon 2003; Corio 2003; Hoffman, 2003).

Furthermore, Ray and Day (1998) pointed that, limited time and lack of effective information retrieval skills seem to be the main barrier against using modern resources. With effective information retrieval skills and knowledge of the most useful databases to search for a specific query, a smaller amount of information is often retrieved, and the time spent searching databases reduced. However, with more effective search engines and user-friendly interfaces, in-depth information retrieval skills would not be as essential and therefore the time spent using the source would also reduce. Meanwhile, Kebede (2007) identified factors affecting access to modern information resources are: constraint to accessing the electronic technologies, information sources and the content caused by the characteristics of the user, the characteristics of the electronic information carriers, the characteristics of the electronic content, and the

characteristic of the environment.Search engine also provide way too much useless results. Sometimes one even cannot find anything useful from searching results. It wastes much time to pick up useful information from ocean of searching results. Second, those who use search engine frequently may become lazy. Every time they meet difficulties they just go for search engine. Third, search engine may bring people to various pornographic websites. However, search engine can benefit a lot, one need to use it carefully to gain what one wants and avoid harmful information.

Yau (2003) stated that, poor ICT infrastructure, inadequate ICT skills, poor query formulation (search techniques), lack of information retrieval skills and financial implication of internet connectivity are hindrances to the effective search and retrieval of relevant information needed by the searchers. Based on the above, it is vivid that, the challenges associated with the awareness and use of search engines for information retrieval in universities in Bauchi state was not stated in the available literature, therefore the gap has established which this research work intend to cover using research question number six.

2.10 Theoretical Framework

This study used Technology Acceptance Model (TAM) as its primary theoretical underpinning on the awareness and use of search engines for information retrieval by lecturers in universities, Bauchi state. TAM is well known for predicting and explaining individual behaviour on the usage of information technology (Shih, 2004). The justification for using the model is that, TAM is one of the most widely used model that determines and predicts technology use. The model also explains the adoption process and underlying influencing factors in technology acceptance and use. Additionally, the model has been widely used in Information System (IS) or information technology research (Arbuckle, 1995). Hence, this study aims to investigate the extent to which

TechnologyAcceptance Model constructs (Perceived Ease of Use and Perceived Usefulness) and predicts use of search engines at universities under study.

The opinion of Marangunic and Granic (2015: 81), the constant improvement and progress in technology, especially ICT related applications, makes the choice to decide on matters of acceptance and rejection a dilemma. Based on this, many models and theories have been developed to shed more light on the effective use of technology and, out of all the models, the Technology Acceptance Model (TAM) stands out in examining issues affecting user's acceptance of modern technology. Without considerable understanding of the foundation, growth, and adjustment, along with the limitations of the model, there can be no broad and systematic in the field.

In the opinion of Davis (1989), who is the creator of the Technology Acceptance Model (TAM), the two important variables, Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), influence the perceptions determining the adoption of technology and are suggestive of user intentions to develop new skills. The extent of the acquisition of new skills can be affected significantly by both extrinsic and intrinsic motivations (Davis 1989). Extrinsic motivation refers to the performance of an activity because it is perceived to be helpful in achieving special outcomes that are different from the activity itself. In contrast, intrinsic motivation, Davis further explains, refers to the performance of a task for no apparent reinforcement other than the procedure of performing the activity per se. The rationale why Perceived Usefulness is relevant to the acceptance of information Literacy skill is that it is adopted first and foremost because it is instrumental in achieving specific objectives that are not inherent in the use of the skill itself. The underlying principle for each variable in the model is examined below.

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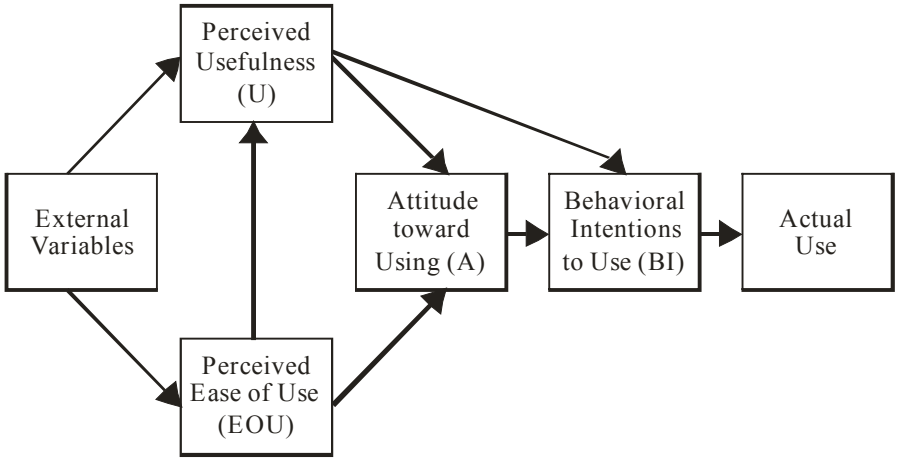

Figure 1: Technology Acceptance Model (TAM) based on Davis et al (1989)

Perceived Usefulness (PU)- This is defined as the extent to which a person believes that using a technology will enhance his or her performance, thus using search engines in the universities enhances the lecture's performance to render their services in a more effective and efficient manner and at the same time professionally improving the skills and competencies of the lecturers. Access to information offers the possibility for improved human competence. Lombardi(2007) observed that the acquisition of capacity to access authentic information is prevented by users' reluctance to accept and use available strategies and techniques to access the information. Perceived usefulness, according to Davis (1989) is the extent to which a person believes that utilizing a particular method or technique would enhance his or her job performance or routine responsibility. This perception, he explains, is anchored on the consideration that the capacity acquired will strengthen performance.

Perceived Ease of Use (PEOU)- It is defined as the degree to which a person believes that using a technology will be free of effort. As such, the use of search engines in the libraries reduces much of the manual efforts of the user such as the lecturers. In other words, it will save the time of the lecturers in retrieving information, rendering services at the appropriate time without undue and unnecessary delay. It further theorizes that the effect of external variables on

behaviouralintention will be mediated by perceived usefulness and perceived ease of use. Over the last two decades, there has beensubstantial empirical studies infavour of TAM such as Adams,(1992), Agarwaland Karahanna,(2000), Karahanna, Agarwal and Angst (2006), Venkatesh et al., (2003,2007). Information-systems-community considered TAM as a powerful, valid androbust model (Lucas and Spitler, 1999). The studies of Leaderre, Maupin Sena and Zhuang(2000) support the use of TAM as a predictive or explanatory model of the usage ofdifferent technologies. Based on the strengths of the model, the researcher isconvinced to use the model to examine the awarenessand use of search engines for information retrieval at university libraries.

On the other hand, TAM has been widely criticized, despite its frequent use leading the original proposers to attempt to redefine it several times. Criticisms of TAM as a"theory" include its questionable heuristic value, limited triviality and lack of anypractical predictive value (Chuttur, 2009). Benbasat and Barki (2007) suggest that TAMhas diverted researchers' attentions away from other important research issues andhas created an illusion of progress in knowledge accumulation. Furthermore, theindependent attempt by several researchers to expand TAM in order to adapt it to theconstantly changing IT environment has led to a state of theoretical chaos andconfusion. In general, TAM focuses on the individual 'user' of a computer with theconcept of perceived usefulness, with no extension to bring in more factors to explainhow the perceived usefulness ignores the essentially social processes of informationsystem development and implementation without question where more technology isactually better and the social consequences of information system use (Bagozzi, 2009).In the context of the present study, the application of the model's (TAM) two mainconstructs perceived ease of use and perceived usefulness will serve as thefoundation of the conceptual framework. Within the context of using

a new technology,Venkatesh, Morris and Ackerman (2000) provide the evidence that the most importantdeterminants of user's attitude towards the use of a new technology is his perceptionof the usefulness and ease of use of the technology i.e a technology they believe willhelp them achieve their work goals which is also free of effort.

Table1: Mapping the TAM and AIDS constructs with the variables of the study

S/No.	Study variables	Construct of the models
1	Use of search engines	Perceived ease of use
2	Information retrieval	Perceived usefulness

2.10.2 Conceptual Framework

Base on the analysis of the research findings, it was discovered that several factorsaffect lecturers' use of search enginesfor information retrieval in universities. The researchertherefore, will build upon the Technology Acceptance Model (TAM) main constructs ofperceived usefulness and perceived ease of use. Therefore, the use of search engines for information retrieval at Universities is influenced by Perceived Ease of Use,Perceived Usefulness, awareness, use of search engines, skills in using search engines as depicted in Fig.2 in the conceptual model.Determinants,PerceivedUsefulnessof Search engines,information retrieval skill.

Determinants

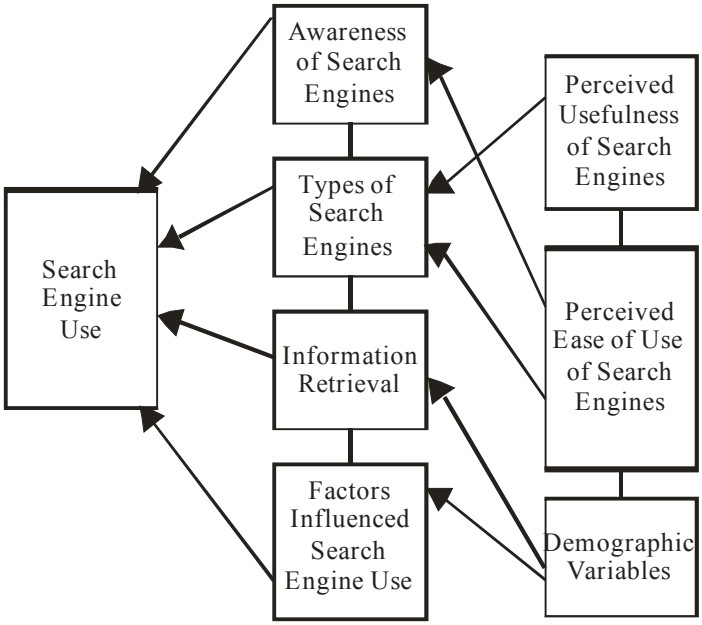

Figure 2: The Proposed Model for Search Engines Use

The conceptual model of the awareness and use ofsearch engines for information retrieval in universities in Bauchi State is composed of twocomponents. The first component comprises of seven antecedents for Search engines use which includesPerceivedEase of Use,perceived usefulness, DemographicVariable,Awareness of search engines, skills in using ofSearch engines, Information retrieval. The second component is the use of search engines for information retrieval. A detail of each component is provided below:

Perceived Ease of Use: The use of search enginesfor information retrieval at universities is influenced by perceived ease of use. It is perceived that search engines wouldbe simple to use, saving the time oflecturers in accessing and retrieving information. With this perception, the Lecturerswouldbe prepared to use search engines for effective information retrieval.

Perceived Usefulness: Perceived usefulness influences the lecturers to usesearch engines for information retrieval. In this context, it is perceived thatsearch engines enhance the lecturers' job performance. The use of search enginestherefore, helps improve the lecturer's professional skills and competenciesmaking them more relevant in their profession and to their students:

Demographic Variable: This refers to demographics or characteristics thatinfluence the use of search engines by lecturers, such as age,educational qualification, gender, income and computer use and skills ashighlighted by different researchers such as (Thong, 1999; Teo and Lim, 2000).However, the studies have found that there is a relationship between gender andlevel of computer skills, reporting that females have greater computer anxietythan males, while other studies found no gender difference (Straub, 2009;Sweden and David, 2005).

Types of Search engines: The lecturer having become conversant of search engines andits usefulness in enhancing performance and a tool that saves effort, identifiesthe various types of search engines that exist, identifying their ease of use andusefulness and also taking into consideration their importance, features,contents, variations, and applicability to his work environment which would helpthe retrieval of information to be effective, efficient and timely.

Information Retrieval: skill is an ability and capability acquired through deliberate, systematic, and sustained effort to smoothly and adaptively carryout complex activities or job functions involving ideas (cognitive skills), things (technical skills), and/or people (interpersonal skills. In the context of this study, it refers to the lecturers' ability to use search enginesbearing in mind the search engine as atechnology will be easy to use and free of effort.

ICTs infrastructures that aid the use of search engines: This refers to the set of facilities that helps inachieving the smooth utilization of search engines. In this context, ICTs infrastructures such as internet bandwidth, computers, stable power,storage facilities etc. are considered important antecedents to the use of search enginesby lecturersfor information retrieval.

2.11 Summary of the Review and the Uniqueness of the Study

This chapter has presented and discussed the various literatures on the concept and significanceof search engines for information retrieval, where literatures in this respect showed

that search engineis an information retrieval system based web site that helps users to retrieve any information from huge internet database and it is a kind of tool that crawl in the web according to user direction and record everywhere it has been and everything user is looking for.(Capra and Quinones, 2005). The researches were conducted on search engines as information retrieval tool in developed countries where these search engines came from. However, a few or no researches were conducted on the significant of search engines for information retrieval at university libraries in Nigerian context.

The Chapter has also presented and discussed various literatures on awareness, usage, types of search engines and search tools for information retrieval and revealed that, there are more than twenty thousand ofweb search engines that can be used to get available resource on internet. Search engines are classified into various ways such as lecturers search engines that retrieve high quality information relevant to scholars; meta- search engines that search for several other search engines along with top results from each; special search engines for searching for images, videos, people and news etc (Bradley, 2002). No similar study of this nature was conducted in the area of study, the literature revealed that, there are different search techniques used in information retrieval. For example, the studies of Akkoyunlu (2012) and Brehm (2011) revealed that, among the frequently used search techniques are: Boolean search command, power search command, and search assistance features. The studies of Cool, (2012) revealed that, the types of search technique used by the participants of their study are: facet analysis, broad to narrow, Boolean, specific term search, restriction, iterative/interactive searching and structured query. The literature also revealed that, the online information searchers search information with the help of simple search techniques, complex searching technique, alternative methods to use Boolean

logic, phrase search technique and natural language searching. However, a few or no similar research is conducted on information search techniques.

The Chapter has also presented and discussed various literatures on factors influencing the use of search engines for information retrieval, these factors are easier to find material, easier to get hold of material, extended the range of material, easier to keep up to date, improved the quality of work, saved working time, and reduced browsing in libraries. Chiparausha and Zuvalinyenga(2012) study were also discussed. No similar study conducted in the area of the study.

It also discussed the challenges associated with the use of search engines for information retrieval by lecturers in universities. Studies of Belkin (2000), winnans and Brown (1992) were discussed.

Technology Acceptance Model (Davis, 1989) was used as the theoretical framework of the study, where two construct of TAM- Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) in addition to other variables and two constructs of found in the study, form the basis of the conceptual framework of the study.

The uniqueness of this study lies in the fact that, most previous studies concentrated on developed world with little or no attention given to African countries and locations like Bauchi state, Nigeria. Modification of Technology Acceptance Model (TAM) where the research used two constructs of the model- Perceived Usefulness (PU) andPerceived Ease of Use (PEOU) and. The proposed conceptual framework also made the study unique, because in most of the studies on search engines reviewed by the researcher, no model for search engine and usage has been empirically developed.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

Research methodology is the theoretical perspectives of the research process. It is the systematic, theoretical analysis of the body of methods and principles associated with a branch of knowledge. It typically, encompasses concepts such as paradigm, theoretical models, phases and quantitative or qualitative techniques (Imy and Rose, 2005). Crotty (2008) describes methodology as a way of choosing a process or design lying behind the choice and use of particular research methods and linking the choice and use of method to the desired outcomes. A methodology does not set out to provide solutions but to offers the theoretical underpinning for understanding which method, or set of methods can be applied to a specific study.

3.2 Research Methodology

For this study, quantitative research methodology is employed because the research approach is considered suitable for the study looking at the area of coverage and the study population, there is a possibility of making generalization of the findings as stated by Gorman and Clayton (2005). The researcher found it very relevant for this study, as itenables the premises to obtain relevant information from the population or its sample through a well-structured questionnaire. The quantitative research methodology provides significant premises that best describe and explain the major objectives of the study.

3.3 Research Design

Research design is a comprehensive plan for data collection in an empirical research thesis. It is a blueprint for conducting the study in such a way that maximum control will be exercised over factors that could interfere with the validity of the research result.

The cross-sectional survey research design was employed for this study. This design was adopted for its opportunity of allowing data to be collected at one point in time. It also makes it possible for many subjects to be studied and is cheaper and faster than longitudinal design. Haruna, (2010) Nworgu (2009) describes this method as one in which a group of people or items are studied by collecting and analysing data from an aggregated number of people or items considered to be representative of the entire population. Glass (2005) also describes survey research design as the means for gathering information about characteristics, actions or opinion of a large sample population and are easy for generalization. A survey research technique is found to be suitable for the study because it is aimed at measuring the attitude and feeling on the awareness and use of search engines for information retrieval.

3.4 Preliminary Study and its Results

The preliminary study is conducted to sort the information about the number of lecturers, internet services andwhether they are awareness of search engines in the universities in Bauchi state. The study reports that, there are eight hundred and sixty-two (862) lecturers in ATBU and four hundred and eighty-six (486) in BASUG. The study also reveals that, there is strong internet service and almost all the lecturers are aware of search engines. Table 3.1 provides information on date of establishment, locations and number of lecturers in universities under study.

3.4.1 Objectives of preliminary study

To find out the numbers of lecturers in the universities under study and to ascertain the presence of internet services as well as the awareness of search engines in the universities in Bauchi State.

Table: 2.1 Universities in Bauchi State.

Name of Institutions	Year of Establishment	Location	Number of Lecturers
Abubakar TafawaBalewa University	1981	Bauchi	862
Bauchi State University	2011	Gadau	486
TOTAL			1348

Source: Preliminary Study data as of February 2018

Table 2.2: Awareness of Lecturers towards search engines

	Frequency	Percentage
Aware	189	94.5%
Not Aware	11	5.5%
Total	**200**	**100**

Source: **Preliminary Study**

3.5Population of the study

A population is referred to as all the existing members or elements of the group to whom the result of an investigation could generalized upon. In a research, the term population is not restricted to human beings only but may refer to events, things or ideas as well (Bichi 2004).

Therefore, the population of this study comprises of all lecturers in both Abubakar TafawaBalewaUniversity Bauchiand Bauchi State University Gadau in which at as of March, 2017, as provided by the various institutions human resources department as the primary

population. The table below shows the population of the institutions. Table 2.2 below provides about the population of the lecturers in universities in Bauchi state.

Table 2.2: Population of the Study

Name of Institutions	Lecturers Population
Abubakar TafawaBalewa University Bauchi	862
Bauchi State University Gadau	486
TOTAL	1348

Source: preliminary study data

3.6Sampling Technique and Sample Size

The researcher uses simple random sampling techniques which is the basic sampling techniques where subject (sample) for the study are selected from a larger group (population) and each individual as observed by AbdulMalik (2006) is chosen entirely by chance and each member of the population has an equal chance been included in the sample. Simple random sampling is the process of selecting a sample in such a way that all individual in the defined population have an equal right and independent chance of being selected for the sample. Table 3.3 below provides information about sample size of the study.

Table 2.3: Sample size of the study

Name of Institutions	Lecturer population	Sample size
Abubakar Tafawa Balewa University	862	183
Bauchi State University	486	103
TOTAL	**1348**	**286**

Mcmillan and Schmacher (2006) defines a sample as “a small portion selected for observation and analysis”. Due to the size of the population in this study which is one thousand three hundred

and forty-eight (1348) lecturers. Israel (2012), states that, if the population is 1348at ±5% precision, the sample should be 286 at the 95% confidence level. The sample for the research is distributedamong the two universities proportionately, using a formula recommended by Krejcie and Morgan (1970) represented below:

$$\frac{N \times S}{TP}$$

Where,

N = Number (i.e. population of each university)

S = Sample T (total sample size)

P = Population

Based on this formula, the distribution of samples across the two universities is;

1. ATBU $\frac{862}{1348} \times 286 = 183$

2. BASUG $\frac{486}{1348} \times 286 = 103$

3.7 Research Instruments

Questionnaire isused for data collection for this study. A questionnaire is a form containing questions about the research problem that is distributed to the respondents for their reactions. They are meant to discover the feelings, beliefs, experiences or activities of respondents. A questionnaire is observed by Abdulmalik (2006) as an assemblage or set of questions embodied in one document and intended to be answered by several persons in order to provide information for specific purpose.Abdulmalik (2006) described the use of questionnaire as the most important

and effective instrument through which reliable and less bias information can be generated and analysed.

However, self-developed questionnaire was constructed for the study; the questionnaire contained closed ended questions that provide opportunity to the respondents to easily respond.

The questionnaires consist of twenty-six (26) questions and grouped into six (6) sections (section A-F). Section A consist the name of the institution and the demographic data of the respondents. Section Bcentres on awareness. Section C consists skills. Section D focuses on the use of search engines in the universities under study. Section Ecentred on the ICT infrastructure that support the use of search engines. Section F focuses on the challenges affecting the awareness and use of search engines.

3.8Validity and Reliability of the Research Instrument

Validity is defined as the extent to which a concept is accurately measured in a quantitative study. While Reliability refers to the consistency of a measure.

3.8.1 Validity of the Research Instrument

The questionnaire is pre-tested to ascertain the validity and reliability of the instrument, two experts in the department of library and information science ModibboAdama University of Technology Yola, and Bayaro University Kano are asked to retest look at and determine the face validity of the research instrument while the internal consistency of the instrument is established through pre-test method. The content validity is adopted to address the following questions:

1. If the questionnaire is valid? In other words, is the questionnaire measuring what it intends to measure?
2. Does the questionnaire represent the content?
3. Is the questionnaire appropriate for the sample/ population?

4. Is the questionnaire comprehensive enough to collect all the information needed to address the purpose and objectives of the study?

3.8.2Reliability of the Research Instrument

Reliability is the degree to which a test consistently measures whatever it is measuring. Kumar (2005) opines that "if a research instrument is consistent, stable, predictable and accurate, it is hence, said to be reliable". The reliability of the findings depends on the likely recurrence of the original data and the way they are interpreted (Ritchie and Lewis, 2003).

Using Cronbach's alpha to determine the reliability, the overall reliability result stands at 0.838. The coefficient is considered as high enough to be used for this study.Furthermore, the instrument is pre-tested using the Cronbach's alpha reliability test which is ran to ensure full reliability of the instrument. The idea behind a pre-test is basically to find out if the survey, will work in the real world by trying it out first on a few people. In the pre-test 20 copies of the questionnaire are administrated. The table below provides information about the results of the reliability test:

Table: 2.4 Results of Overalland item by itemReliability Test

Research Variable	Number of items	Cronbach's Alpha coefficient
Overall Reliability	79	.838
Awareness of search engines	10	.840
Use of search engines	10	.882
Problems hindering the use of search engines	8	.741
Measures for overcoming the problems hindering the use of search engines	8	.487

Source: SPSS version 2

3.9 Administration of Research Instrument

In an attempt to ensure maximum retrieval of the questionnaire and to obtain factual information from the respondents, the researcher travels to the two (2) universities in the state to administer the questionnaire to the respondents in the study area with the help of research assistants and administered the instrument to the lecturers, following the instructions on the instrument. This approach has optimum benefit and ensures on the spot clarification of ambiguities or misunderstanding of any part of the questionnaire as highlighted by Kahn (2007).

3.10 Techniques for Data Analysis

Data collected from this study are analysed using descriptive and inferential statistic.

The data is coded, tabulated and analysed using Statistical Package for Social Science (SPSS) software version 20 for windows and Excel.Descriptive statistics the mean value is greater than 3.0 of cutting mark as a minimum for acceptance of the sets of questions raised. For inferential statistics t-test is used in testing the hypotheses, the decision rule was to accept the null hypothesis where the t-calculated value of the t-test is less than0.05% level of significance otherwise is rejected.

Data interpretation is an attempt by the researcher to find meaning in the data and to answer questions in terms of the implications of the study findings. (Gay 2006). However, the result of data is analysed and interpreted in terms of the objectives of the study and with respect to other studies that have been conducted in the same area of research.

CHAPTER FOUR
DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Introduction

This chapter deals with the presentation, analysis and interpretation of data obtained from respondents through the questionnaires that are distributed for the study. The responses are presented in frequency tables and percentages. The results of the study are presented according to the objectives of the study as encapsulated in chapter one (section 1.4). The data is presented under the following sub-headings;

4.1 Introduction

4.2 Response Rate

4.3 Demographic Data of the Respondents

4.4 Level of Awareness of Lecturers toward Search Engines

4.5 Level of Usage of Search Engines by Lecturers

4.6 Lecturers Skill in the Use of Search Engines

4.7Factors Responsible for the Choice of Search Engines

4.8 ICT Infrastructure to Support the Use of Search Engines

4.9 Problems Hindering the Use of Search Engines for Information Retrieval

4.2 Response Rate

A total of two hundred and eighty-six (286) copies of questionnaire were administered but only two hundred (200) copies which is 69.9% were returned. See table 4.1

Table 4.1 Response Rate

Response Rate	Frequency	Percentages
Administered	286	100%
Returned	200	69.9%
Not Returned	86	30.1%

Table 4.1 reveals that a total of 286 copies of questionnaires are distributed to the respondents, out of which majority 200 (69.9%) copies of the questionnaires are duly completed, returned and found usable. While 86 (30.1%) copies were not returned. This shows that there is a high return of 200 which represent 69.9% which is significant enough for analysis in this study. Hence the response rate is adequate enough for analysis in this study because it was appreciable and would give affirmation to the result of the study. Therefore, the analysis for this study is based on the 200 copies returned questionnaire.

4.3Demographic Data

The study investigates the demographic data variables of the respondents in terms of institution, gender, age, qualification and rank.

4.3.1 Institution/University of the respondents

The table shows the distribution of respondents by institutions

Table 4.2: Distribution of Responses by Institutions

Institution	Frequency	Percentage
ATBU	130	65%
BASUG	70	35%
Total	**200**	**100**

Source: SPSS version 20

Table 4.2 reveals the Distribution of Respondents by Institutions, which shows that majority of the respondents 130(65%) are from ATBU while the remaining 70(35%) are from Bauchi State University, Gadau (BASUG).

4.3.2 Gender of Respondents

The table shows the gender of respondents in universities in Bauchi state.

Table 4.3: Distribution of Respondents by Gend**er**

Gender	Frequency	Percentage
Male	159	79.5%
Female	41	20.5%
Total	**200**	**100**

Source: SPSS version 20

Table 4.3 shows the distribution of respondents by gender. The table revealed that 79.5% of male participates in this study. While only 20.5% of female participates in the study. This implies that there are more male participants in the study than female participants.

4.3.3 Age of Respondents

The table shows the age distribution of the respondents

Table 4.4: Distribution of Respondents by Age

Age	Frequency	Percentage
18-23yrs	5	2.5%
24-30yrs	32	16%
31-36yrs	87	43.5%
37-43yrs	52	26%
44yrs and above	24	12%
Total	200	100%

Table 4.4 The table reveals that the respondents with the highest age range are between 31 – 36years with 87 (43.5%) followed by 37 – 43years 52 (26%), followed by 24 – 30years, with 32 (16%), followed by 44years and above with 24 (12%). The table also reveals that only 5(2.5%) of the respondents are within the age range of 18 – 23years.

4.3.4 Educational Qualification

The table shows the educational qualification of the Respondents

Table 4.3.4 Educational qualification

Table 4.5: Distribution of Respondents by Educational Qualification

Qualification	Frequency	Percentage
First Degree	30	15%
Masters	112	56%
Ph.D.	58	29%
Total	200	100

Table 4.5 The table reveals that Majority of the respondents are master's degree holder 112 (56%), while 58(29%) of the respondents are Ph.D. holders and only 15% are First degree holders.

4.3.5 Rank of the Respondents

Table 4.6: Distribution of Respondents by Rank

Rank	Frequency	Percentage
Graduate Assistant	14	7%
Assistant Lecturer	66	33%
Lecturer II	54	27%
Lecturer I	16	8%
Senior Lecturer	32	16%
Associate Prof	18	9%
Total	200	100

Table 4.6 reveals the rank of the respondents, which shows that majority of the respondents 66 (33%) are Assistant Lecturer, followed by Lecturer II 54 (27%), followed by Senior Lecturer 32 (16%), this followed by the respondents who are Associate Professor 18 (9%). About 16 (8%) of

the respondents were Lecturer I. It was only 14 (7%) of the respondent are Graduate Assistants. This result shows thatmajority of the respondents are Assistant Lecturers.

The results of the preliminary studies show that majority of the lecturers are aware about the existence of different types of search engines. The result has been encapsulated in section 3.4, Table 2.2.

4.4 Level of awareness

The study seeks to find out the level awareness of Lecturers towards search engines in universities in Bauchi State, since the question about awareness have been established at the preliminary study level in which majority of the respondents claimed that they are aware about search engines (See Section 3.4). The question is addressed to the Lecturers in universities in Bauchi State. Table 4.1 shows the details of the responses.

Table 4.4 Summary of Level of Awareness of Lecturers towards the Use of Search Engine

S/N	Level of Awareness	Frequency	Percentage
1	Very High	15	7.5%
2.	High	38	19.0%
3.	Moderate	123	61.5%
4.	Low	24	12%
	Total	**200**	**100%**

Table 4.4Shows the summary of level of awareness of lecturers towards the use of search engine. The table reveals that majority (61.5%) of the respondents have a moderate level of awareness towards the use of search engine, while 19% of the respondents have high level of awareness whereas 7.5% of the respondents have a very high level of awareness. However, only 12% of the respondents have a low level of awareness towards search engine.

4.4.1 Sources of awareness

The table shows the way the respondents get aware of search engines.

Table 4.1.1 Sources of getting aware of search engines

Means	Yes	No
One particular course in the university	79 (39.5%)	121 (60.5%)
Workshop/ seminar/ conferences	84 (42%)	116 (58%)
Friends and colleagues	178 (89%)	22 (11%)
Self-training/ effort	172 (86%)	28 (14%)
Professional training/ short courses	159 (79.5%)	41 (20.5%)

Source: SPSS version 20

From the Table 4.1.1it indicates that respondents are asked to show the means at which respondents get aware of search engine. The table reveals that majority 178 (89%) of the respondents got the awareness of search engine through friends and colleagues in the universities. While 172 (86%) of the respondents got awareness from self-training. This is followed by 159(79.5%) of the respondents get awareness of search engines through private training centres. However, only 84(42%) of the respondents get the awareness of search engines through workshop training program in the university. It is only 79 (39.5%) of the respondents that are aware through one particular course in university.

4.5 Level of Usage of Search Engines

The study seeks to examine the level of usage of search engines by Lecturers in the universities.

Table 4.2 shows the details of the usage of search engines

Table 4.2: Level of usage of search engines by Lecturers in the universities

sn	Search Engine	Daily	Weekly	Monthly	Occasionally	Never	Mean	Std.Dev
1.	Google scholar	126 (63%)	31 (15.5%)	0	33 (16.5%)	10 (5%)	4.15	1.314
2.	Opera	140 (70%)	35 (17.5%)	8 (4%)	17 (8.5%)	0	4.49	0.919
3.	Yahoo	103 (51.5%)	45 (22.5%)	15 (7.5%)	36 (18%)	1 (0.5%)	4.07	1.165
4.	Bing	10 (5%)	27 (13.5%)	6 (3%)	104 (52%)	53 (26.5)	2.19	1.121
5.	Dogpile	12 (6%)	17 (8.5%)	12 (6%)	97 (49%)	62 (31%)	2.10	1.116
6.	AltaVista	5 (2.5%)	21 (10.5%)	14 (7%)	98 (49%)	42 (31%)	2.05	1.014
7.	Ask Jeeves	23 (11.5%)	16 (8%)	0	93 (46.5%)	68 (34%)	2.17	1.295
8.	Google chrome	120 (60%)	40 (20%)	7 (3.5%)	14 (7%)	19 (9.5%)	4.14	1.326
9.	Mozilla Firefox	115 (57.5%)	33 (16.5%)	11 (5.5%)	24 (12%)	17 (8.5%)	4.03	1.373
10	MSN	24 (12%)	32 (16%)	19 (9.5%)	101 (50.5%)	24 (12%)	2.66	1.230
	Decision Mean							***3.00***

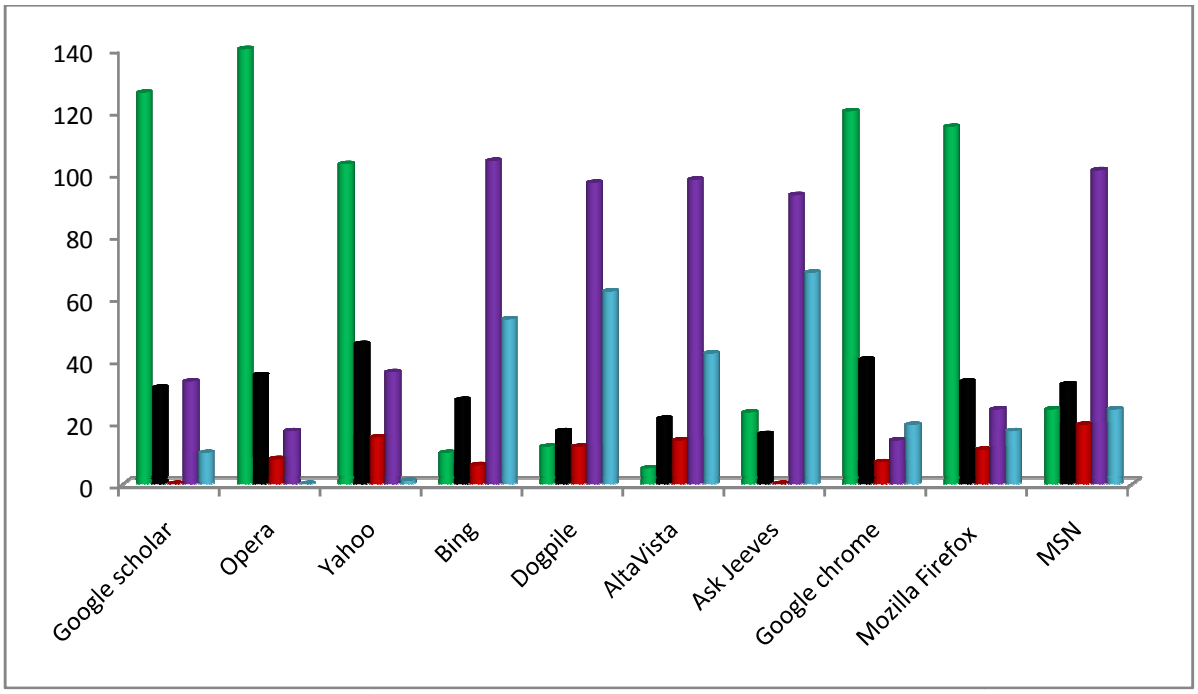

Fig 4: *Bar chart showing the level of usage of search engines by lecturers in the universities*

Table 4.2 shows the level of usage of search engines by Lecturers in the universities. The Table reveals that Items 2, 1, 8, 3 and 9 with mean scores of 4.49, 4.15, 4.14, 4.07 and 4.03 respectively have the mean scores greater than the decision mean (3.00). This implies that those items have higher levels of usage by Lecturers in the universities under study. On the other hand, Items 4, 5, 6, 7 and 10 have mean scores below the decision mean of 3.00. The implication of this is that the level of usage of these search engines by lecturers in the universities of is poor. In the same vein, Fig I buttresses the information on the usage of search engines by lecturers in the universities in a Bar chart format.

4.6 Lecturers skills in the use of search engines

The study seeks to find out the lecturers skilled in the use of search engines. The question is addressed to the lecturers of universities in Bauchi State. Table 4.8 below shows the detail of skilled of lecturers on the use of search engines.

Table 4.3: lecturers' skills in the use of search engines in the universities

Skills	Frequency	Percentage
Novice	15	7.5%
Specialist	23	11.5%
Competent	100	50.0%
Proficient	31	15.5%
Expert	31	15.5%
Total	200	100.0%

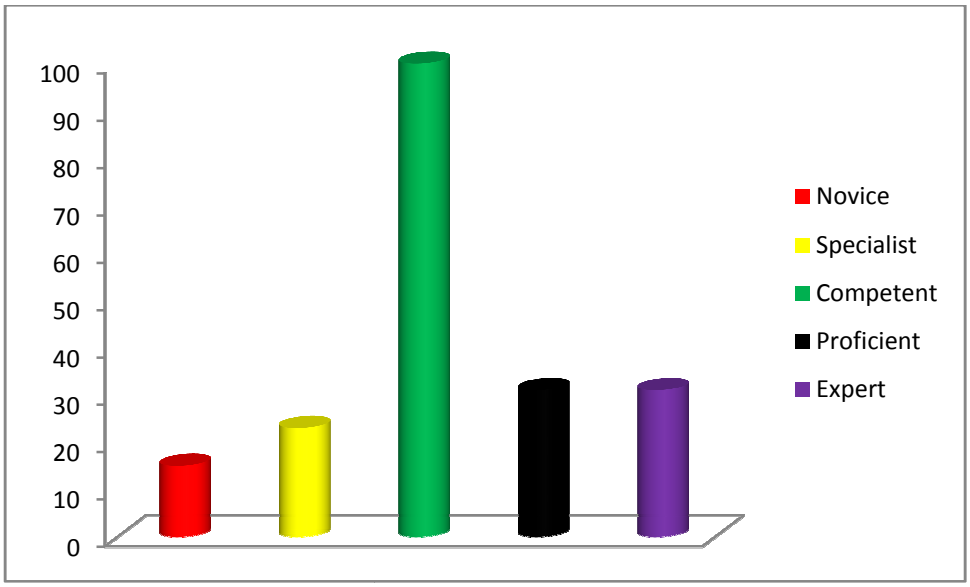

Fig 5: Bar Chart showing the lecturers skills in the use of search engines

Table 4.3 shows the lecturers skilled in the use of search engines. The Table and the Chart reveals that 100 (50%) of the respondents are competent in the use of search engines. Also, 31 (15.5%) of the respondents show proficient and experts in the use of search engines while 23(11.5%) and 15(7.5%) of the respondents are specialists and novice respectively in the use of search engines. The findings reveal that the extent at which the respondents use the search engines is at competent level.

4.7 Factors influencing the choice of search engine.

Table 4.4Factors influencing the choice of search engine as information retrieval tools

S/N	Factors	Yes	No
1.	Easy access to information	***159***	41

		(79.5%)	(20.5%)
2.	Save users' time	***164 (82%)***	36 (18%)
3.	Availability of search tools	***135 (67.5%)***	65 (32.5%)
4.	Currency	75 (37.5%)	125 (62.5%)
5.	Ease of use	***179 (89.5%)***	21 (10.5%)
6.	Reliability	82 (41%)	118 (59%)
7.	Quick response time	***132 (66%)***	68 (34%)
8.	Access to wider range of information	***182 (91%)***	18 (9%)

Table 4.4 shows the factors influencing the choice of search engine as information retrieval tools. The table reveals that six (6) out of the eight (8) items in the table are selected by the respondents as factors responsible for the choice of search engine as information retrieval tools. The factors are items 1, 2, 3, 5, 7 and 8, while items 4 and 6 are not the major factors influencing the choice of search engine as information retrieval tools.

4.7 ICT infrastructure available to support the use of search engines

The study wants to find out the ICT infrastructure available to support the use of search engines in the universities. The table 4.5 below shows details on the available ICT infrastructure to support the use of search engines.

Table 4.5:ICT Infrastructures available to support the use of search engines in the universities

S/NO	INFRASTRUCTURES	SA	A	UN	D	SD	Mean	Std.Dev.
1.	There is Internet service in the universities	98 (49%)	63 (31.5%)	5 (2.5%)	34 (17%)	0	4.13	1.089
2.	Computers are made available	65 (32.5%)	103 (51.5%)	10 (5%)	22 (11%)	0	4.06	0.903
3.	Network bandwidth	45 (22.5%)	96 (48%)	15 (7.5%)	36 (18%)	8 (4%)	3.67	1.130
4.	Hardware	74 (37%)	106 (53%)	3 (1.5%)	16 (8%)	1 (0.5%)	4.18	0.849

5.	There is constant power electricity supply	29 (14.5%)	58 (29%)	22 (11%)	76 (38%)	15 (7.5%)	3.05	1.247
	Decision mean							***3.00***

Table 4.5 shows the Infrastructure available to support the use of search engines for information retrieval in the universities. The Table reveals that Items 1, 2 and 3 have the mean scores of 4.13, 4.06 and 4.18 respectively which are far above the decision mean of 3.00. This implies that infrastructure such as Internet service, computers and printers are available to support the use of search engines for information retrieval in the universities. However, Items 3 and 5 have the mean score slightly above the decision mean.

4.8:Problem Hindering the Use of Search Engines for Information Retrieval

The study seeks to investigate the problem hindering the use of search engines for information Retrieval in the universities. The question was addressed to the lecturers of universities in Bauchi State.

Table 4.10 shows the detail of the problem hindering the use of search engines.

Table 4.6: Problem Hindering the Use of Search Engines for Information Retrieval

S/NO	ITEMS	SA	A	UN	D	SD	Mean	Std.Dev
1.	Lack of information retrieval skills	43 (21.5%)	8 (4%)	10 (5%)	76 (38%)	8 (4%)	3.29	1.281
2.	Lack of confidence in using search engines	18 (9%)	68 (34%)	22 (11%)	89 (44.5%)	3 (1.5%)	3.05	1.100
3.	Poor ICT infrastructures in the universities	41 (20.5%)	56 (28%)	35 (17.5%)	59 (29.5%)	9 (4.5%)	3.31	1.220
4.	Insufficient time to usesearch engines	33 (16.5%)	71 (35.5%)	33 (16.5%)	61 (30.5%)	1 (1%)	3.36	1.112
5.	Difficulty in findingrelevant information	16 (8%)	61 (30.5%)	22 (11%)	87 (43.5%)	14 (7%)	2.89	1.155
6.	Problem of network	41	119	19	14	7	3.87	0.939

	failure from time to time.	(20.5%)	(59.5%)	(9.5%)	(7%)	(3.5%)		
7.	High cost of internet access	24 (12%)	68 (34%)	32 (16%)	67 (33.5%)	9 (4.5%)	3.16	1.148
8.	Low Bandwidth	50 (25%)	100 (50%)	19 (9.5%)	25 (12.5%)	6 (3%)	3.82	1.042

Table 4.5 shows that only item 5 (difficulty in finding relevant information, is not identified as part of the problems hindering the use of search engines for information retrieval in the universities under study. The mean score of item 5 (2.89) is found to be lower than the decision means (3.00), while other items have the mean scores above the decision mean. These items (1, 2, 3, 4, 6, 7 and 8) were strongly identified as problems hindering the use of search engines for information retrieval in the universities under study.

4.9 Suggestions to the Problem hindering the use of search engines for information retrieval

Table 4.7: Suggestions to the Problem hindering the use of search engines for information retrieval

S/NO	ITEMS	SA	A	UN	D	SD	Mean	Std.Dev
1.	Adequate information retrieval skills	91 (45.5%)	95 (47.5%)	3 (1.5%)	6 (3%)	5 (2.5%)	4.31	0.852
2.	Develop full confidence in using search engines	59 (29.5%)	119 (59.5%)	4 (2%)	18 (9%)	-	4.10	0.818
3.	Adequate ICT infrastructures	83 (42.5%)	95 (47.5%)	14 (7%)	7 (3.5%)	1 (0.5%)	4.26	0.778
4.	Sufficient time to use search engines	55 (27.5%)	118 (59%)	14 (7%)	9 (4.5%)	4 (2%)	4.06	0.840
5.	Adequate access to relevant information	22 (11%)	30 (15%)	18 (9%)	62 (31%)	68 (34%)	2.38	1.373
6.	Addresses network failure from time to time	104 (52%)	77 (38.5%)	1 (1.5%)	9 (4.5%)	7 (3.5%)	4.31	0.969

7.	Affordable internet service	46 (23%)	125 (62.5%)	6 (3%)	20 (10%)	3 (1.5%)	3.96	0.893
8.	Effective internet network/ broadband network	86 (43%)	91 (45.5%)	14 (7%)	9 (4.5%)	-	4.27	0.781
	Decision mean	***3.00***						

The table reveals that only item 5 was not parts of the suggestions made by the respondents of the solutions or remedies for the problems hindering the use of search engines for information retrieval. This is because; the mean score of this Item (Item 5) is below the decision mean score of 3.00. However, other items in the table are found to be good to remedy the problems hindering the use of search engines for information retrieval.

4.10Testing of Research Hypotheses

4.10.3 Research Hypothesis One

There is no significant difference between Awareness of the availability and the Use of Search Engines

Table: 4.8. Summary of independent sampled t-test on the awareness of availability and use of search engines

Use of Search Engine	N	Mean	Std.Dev	Df	t-cal	t-crit	p-value	Remark
Aware	189	32.36	6.979	198	2.874	1.984	0.005	Significant
Not Aware	11	26.18	5.964					

Significant at P≤0.05 level of confidence

Table: 4.8 shows the summary of independent sampled t-test on the awareness of the availability and use of search engines. The table reveals that the mean score of those that are aware of the availability of search engines (32.36) is greater than the mean score of those that are not aware of the availability of search engines (26.18). In the same vein, at df = 198, the t-cal (2.874) is greater than t-crit (1.984), therefore the hypothesis is rejected. This implies that there is a

significant difference between the Awareness of the availability and the Use of Search Engine among the respondents. This is because awareness is knowledge, one has to get awareness of a particular technology before it can be effectively and efficiently used.

4.10.4 Research Hypothesis Two

There is no significant difference in the demography variables such (Qualification, Gender and Age) and the skills in using search engine in the universities.

Table: 5.4 Summary of Analysis of Variance (ANOVA) on the demography variables (Qualification, Gender and Age) and the skills of using search engines of the respondents

Qualification	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1309.856	2	654.928	15.002	.000
Within Groups	8600.064	197	43.655		
Total	9909.920	199			
Gender	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	6.738	1	6.738	.135	.714
Within Groups	9903.182	198	50.016		
Total	9909.920	199			
Age	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	582.953	4	145.738	3.047	.018
Within Groups	9326.967	195	47.831		
Total	9909.920	199			

Table:5.4 shows the summary of one-way Analysis of Variance (ANOVA) on the demographic variables (Qualification, Gender and Age) and the skills of using search engines of the respondents. The results from the analysis reveals that only gender is not significant (p-value = 0.714 which is greater than 0.05 level of confidence) among the three demographic variables (Qualification, Gender and Age). The Table also reveals that qualification and age of the respondents are significant at 0.05 level of confidence (p-values = 0.000 and 0.018 respectively). This indicate that being either male or female does not have any significant effect in the use of

search engines. However, age and qualification have significant effect in the use of search engines. This implies that as one's age increases the tendency to use technology related devices or tools reduces. Also people with higher qualifications may tend to use search engines for academic purpose more than those with lower qualifications.

4.11 Discussion of Findings

The summary of the major findings is outlined as follows:

1. Lecturers in Bauchi State Universities are fully aware of search engines
2. Lecturers in Bauchi State Universities prefer to use Opera, Google scholar, Google chrome, Firefox and yahoo as their search tools.
3. The lecturers are well skilled in the use of search engines
4. Easy access to information, save users' time, Availability of search tools, Quick response time, Access to wider range of information were factors that influence the choice of search engines.
5. Infrastructure such as Internet service, computers and Network bandwidth are available to support the use of search engines for information retrieval in the universities.
6. Lack of information retrieval skills, Lack of confidence in using search engines, insufficient time to make use of search engines, problem of network failure from time to time, high cost of internet access and slow internet network were strongly identified as problems hindering the use of search engines for information retrieval.

The study investigates the Awareness and Use of Search Engines for Information Retrieval in the Universities in Bauchi State.The discussion of findings of this study is presented based on the objectives of the study and the discussion is presented below;

The findings with regard to the awareness and use of search engines for information retrieval by lecturers of universities in Bauchi state as reveals by the studyshow that, majority of the lecturers in the universities displayed moderate level of awareness towards search engines. This goes in line with the findings of Choo (2011) who carries out a study on faculties to assess awareness and attitudes towards search engines in City University, London. Using email as instrument of data collection, found that, out of 131 respondents, 69.5% of the lecturers were aware of the existence of Yahoo and Google as well as other search engines, From the findings of this study, it shows that lecturers in London have high awareness of search engines. The present study is not consistent with findings of Adams (2010) who reports that the level of awareness of various search engines to lecturers in higher institutions of learning is very low. The present study also is in sharp contrast with the findings ofOjo and Akande (2005), who reports that lecturers' level of awareness of search engines at the University College Hospital (UCH) Ibadan, Nigeria is not high. The findings agree with the present study in terms of model, methodology but differs in population and scope.This also goes in line with Watson's (2005) findings which states that, in today's high, tech multi-sensory approach to learning, education, information and recreation, the use of the internet search engines becomes inevitable. It has been used in academic for one purpose or the other practically since their inception. To further support this view, Nnamdi (2008) states the relevance of the internet search engines to academic work to include: easy access to information, vast information; easy information retrieval; access to e-books; Data base management system etc.

The findings further reveal that the lecturers of the study areas retrieved information for academic and research purposes. This justifies the second mapping of the construct of the model and the variable of the study. This is supported by Lindary&Mclaren (2010) who suggests that

university lecturers use search engines for research and made evaluation on the quantity and type of research materials being used. This suggests that the findings of this research agrees with some previous researches.

The second result obtained in the present study is that, lecturers in the universities under study do use search engines, opera, Google scholar, chrome and Firefox Mozilla are the most preferred and used search engines by lecturers of Universities in Bauchi State. This result is in agreement with Duke (2010), who conducts a study to find out the search engines lecturers are aware of and used in higher institutions learning, with an assignment that was specified to use search engines, in University of Uyo Nigeria. From the total population of 98 respondents, he discovered that the respondents that used Yahoo and Google are more than those that didn't, which was about 74% of the total population. The findings show that majority of the respondents used Yahoo and Google. It also goes in line with Ozoemelem (2008) who carriesout a research on perception and use of search engines as a search tool amongst researchers, to access the researcher's usage of the search engine in South Africa using questionnaire for data collection. He found out that from a sample of eighty (80) researchers, seventy-five (75) completed the survey showing high response rate. Out of 75 respondents, 10 (11.44%) made use of Google and Yahoo for their journal articles and they use Google and Yahoo regularly, while 65 (74.70%) of the respondents reported that they lack knowledge of other search engines like Google Scholar, Bing, Ask and WebCrawler and never made use of them. From the findings of this study the researchers were only aware and make use of Yahoo and Google. This study also agrees with Duke (2010) and Ozoemelem (2008) because both research works are survey type of research.

The result of the present research reveals that lecturers of universities in Bauchi state are well skilled in the use of search engines. The findings also reveal that majority of the lecturers used

search engines at competent level. This agrees with the earlier studies of Krubu and Osawaru (2011) in a study conducted on the impact of ICTs in Nigerian universities, found that,majority of the respondents 21 (43.7%) good computer skills, followed by those that have fair computer skills, with 19 (39.6%) respondents; few of the respondents representing 5 (10.4%) hadno skill at all. Only 3 respondents representing 6.3% have excellent computer skills. This study also agrees with Krubu and Osawaru (2011) because both research works are survey types, using well-structured questionnaire and technology acceptance model.

The third findings alsoreveal that, Easy access to information, save users' time, Availability of search tools, Quick response time, Access to wider range of information were factors that influence the choice of search engines as search tool. This agrees with okello-obura and Ikeja-odogo (2012) they maintain that, search engines provide access to wider range of information, faster access to information and easier access to information. It is in line with Awoleye and Siyanbola (2006) who indicates that the postgraduate students of Obafemi Awolowo University Ile-Ife in Nigeria used search engines to seek information because they find it easy of use and quick access to information. The study is also in agreement with the findings of Mereku (2009) on Ghana's report on ICT revealed that the availability of computers and other technologies are some of the factors that encourage the usage of search engines in tertiary institutions. It is also in agreement withChiparausha and Zuvalinyenga (2012) who concur that, the following factors facilitating the use search engines: easier to find material, easier to get hold of material, extended the range of material, easier to keep up to date, improved the quality of work, saved working time, reduced browsing in libraries. The study is also in sharp contrast with the findings of Shen and Shakir (2009) who find that lecturers public and private Universities in United Arab Emirates accessed search engines daily for the following purposes: to seek information, e-mail,

online discussions and all their academic issues as they perceived it (search engines) as ease of use, time saving and access of current information. The present study is in line with Xie, (2004) who outlines the followings as factors that influenced the choice of search engines as information retrieval tool; its simplicity and ease of use, it quickness, its volume. It also agrees with Toprackci's (2007) finding which reported that postgraduate students used search engines for courses related activities, email, downloading of software and reading news because of its simplicity and quick access to information.

The finding of the study also reveals that, ICT infrastructure such as internet service, computers, hardware, electric board and high network bandwidth are available to support the use of search engines in the institutions under study. This is in consistent with the findings of younger P. (2005) who conducted a research to determine ICT infrastructure that support the use of search engine. A quantitative study among four universities was carried out to identify the factors. Based on the findings, it was reported that ICT infrastructures such as computers, high network bandwidth, strong electricity among others are infrastructures that support the use of search engines. The present study is also in line with Vanderlinde and van Braak (2010) who reports that hardware, software and peripheral equipment's were found to be ICT infrastructures that support the use of search engines.The study justifies the fourth mapping of the construct of the model and the variable of the study, which suggested the provision of motivation that will encourage the use of ICT. Through incentives such as computer laboratory, increase in internet bandwidth, hardware and other ICT infrastructures.

Findings of the problems hindering the use of search engines for information retrieval in universities in Bauchi, the study reveals that, lack of information retrieval skill, lack of confident in using search engines, poor infrastructures in the universities,problem of network failure from

time to time and high cost of internet access are identified as the problems hindering the use of search engines for information retrieval in the universities under study. This is in line with Ya'u (2003) who reports that, local ICT infrastructure, inadequate ICT skills, poor query formulation (search techniques), lack of information retrieval skills and financial implication of internet connectivity are hindrances to the effective searching and retrieval of relevant information needed via search engines. It also goes with Ray and Day (1998) who reports that, limited time and lack of effective information retrieval skills seem to be the main barrier against using modern resources. The present study is in sharp contrast with the studies of Winnans and Brown (1992) who reports the followings as the factors that hinder the effective use of search engines in tertiary institutions; lack of information retrieval skill, lack of ICT experience, lack of knowledge of query formation (search Techniques), lack of support in using search engines and finally, lack of static network. This finding contradicted with the earlier findings of research question three (3) thatrevealed that majority of the lecturers used search engines at competent level. This implies that, the lecturers are well skilled in the use of search engines for information retrieval. Although reasonable number of the respondents about (42%) disagrees with lack of information retrieval skills as one of the problem hindering the use of search engines.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the summary of the study, major findings, draw final conclusion and seeks to recommend the best practices to create awareness and use of search engines for information retrieval in universities. The summary of findings, conclusion and recommendations are presented, as much as possible, based on the sequence of the research objectives.

5.2 Summary of the study

This research work is made up of five chapters. Chapter one covers the general introduction which includes; the background to the study, statement of the problem, research questions, research objectives, research hypotheses, significance of the study, scope and limitation of the study and definition of the research terms.

Chapter two presents a review of relevant literature on the area of study. Issues on which the literature reviewed includes: concept and significance of search engines, awareness of search engines in institutions of higher learning, use of search engines for information retrieval in institutions of higher learning, ICTs skills of lecturers /researchers, ICT infrastructure that support the use of search engines in universities, types of search engines for information retrieval and their evaluation, factors that influence the choice of search engines, information search techniques, challenges associated with awareness and use of search engines, theoretical and

conceptual frame work. The review focused on various research problem addressed by those studies, the methodology used and the findings and conclusions drawn from them. The uniqueness of the study also highlighted.

Chapter three presents methodology of the study and was carried out using cross-sectional survey design. A target population of(1348) and a sample of (286) are used. Questionnaire is used as the research instrument to gather data which were analysed using descriptive and inferential statistics.

Data analysis dealt with the analysis of data collected for interpretation. Also, it was established in the chapter that out of two hundred and eighty-six (286) copies of questionnaire distributed, two hundred (200) were filled and returned; the remaining eighty-six (86) are not returned. This represents the response rate of 70%. The demography of the respondents reveals that they have different gender, age, educational qualification and working experiences.

5.3 **Summary of the major findings**

The overall objectives of the study were to investigate the awareness and use of search engines for information retrieval by lecturers in universities in Bauchi state.

Based on the presentation, analysis and discussion of results generated from the sampled population of the study, the summary of the major findings are outlined as follows:

1. Lecturers in Bauchi State Universities are fully aware of search engines
2. Lecturers in Bauchi State Universities preferred to use Opera, Google scholar, Google chrome, Firefox and yahoo as their search tools.
3. The lecturers are well skilled in the use of search engines

4. Easy access to information, save users' time, Availability of search tools, Quick response time, Access to wider range of information were factors that influence the choice of search engines.
5. Infrastructure such as Internet service, computers and Network bandwidth are available to support the use of search engines for information retrieval in the universities.
6. Lack of information retrieval skills, Lack of confidence in using search engines, insufficient time to make use of search engines, problem of network failure from time to time, high cost of internet access and slow internet networkwere strongly identified as problems hindering the use of search engines for information retrieval.

5.4 Conclusion

The main aim of the research work was toexamine the awareness and use of search engines for information retrieval by lecturers of universities in Bauchi state.

- Level of awareness of search engines by lecturers in Bauchi state universities. The findings of the study revealed that almost all the lecturers in Bauchi universities are fully aware of search engines, which implies that, the lecturers fully use search engines as their search tool for their academic activities.
- Patterning the level of usage of search engines by lecturers in universities in Bauchi state,the result of the study shows that, the usage of search engine is high: Google scholar, opera, Google chrome, Firefox and Yahoo happened to be the most preferred and usedin universities in Bauchi State. This implies that, Lecturers in universities in Bauchi stateupdate their knowledge of various existing search engines to access current information for their daily teaching and research.

- The findings also revealed that, the extent at which majority of the lecturers in the universities under study used search engine is at competent level. This implies that, the lecturers under study possessed the required skills to access and use various types of search engines for their information searching activities.
- The ICT infrastructure available to support the use of search engines in universities understudy, as revealed by the findings of the study included: internet service, computers and Network bandwidth. The result of the study shows that ATBU has more ICT infrastructure then BASUG.
- The problems hindering the use of search engines for information retrieval in Bauchi State Universities included:lack of information retrieval skills, confidence in using search engines, insufficient time to make use of search engines, problem of network failure from time to time, high cost of internet access and slow speed of internet service. The findings revealed the above listed problems as threat to the use of search engine for information retrieval. Although the first mention problem as earlier discuss in the discussion of findings is contradicted with the findings of research question 3 which revealed that the lecturers are well skilled in the use of search engines.

5.5 Recommendations

Recommendations are made based on the findings of the study and conclusions drawn thereof, the following recommendations are made:

1. In light of the findings of the study, it is recommended that, there is need for the universities to organize seminars/workshops on information retrieval so that the lecturers will improve their skill of retrieving effective information.

2. For effective use of search engines, the study recommends, the need for the provision of latest ICT infrastructure that will pave way for easy use of search engines in the Universities.
3. Based on the findings of the study, there is need for lecturers of universities to find appropriate time for making use of search engines to retrieving relevant information for teaching and research activities.
4. In tackling the problem of network failure based on the findings of the study, the study recommends that, there should be a very strong internet service in the Universities.
5. For frequent use of search engines, the study recommends that There should be free internet service in the Universities.

5.6 Contributions and Originality of the study

the study contributes in many ways such as in theory, practice, policy and society. Theoretically, the study bridged research gap on the awareness and use of search engines for information retrieval universities particularly in Bauchi state, as well as an addition to the existing literature on information retrieval. Practice, the study brings the attention of lecturers and other researchers about the significant of search engines, how it pave way for retrieving relevant information. This would once again help the university and other lecturers to improve their research and teaching activities. Policy, the study brings back the spirit of lecturers, other researchers and university management about the importance of search engines which may lead to policy formation.

Originality: the study is unique in terms of theories used in other studies.

5.7 Suggestion for further studies

The research wishes to invite researchers to conduct their studies in other related areas as follows;

1. Awareness and use of search engines for information retrieval can also be conducted using different theory constructs.

2. Awareness and use of search engines for information retrieval can also be conducted in others universities in Nigeria using different research approach.

3. Investigate awareness and use of search engines in colleges of education in Nigeria.

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APPENDIX I

Faculty of Education,
Department of Library and Information Sciences,

Bayero University, Kano.
28th February, 2018.

Dear Sir/Madam,

I am a Post-graduate student of the above named Department currently undertaking a research on the “awareness and use of search engines for information retrieval in universities”. I request your cooperation and assistance in answering the attached questionnaire. All responses to the questions will be used for the purpose of the study and will be kept strictly confidential.

Thank You.

Yours faithfully,
AbdulkarimAbdullahi
SPS/14/MLS/00018

APPENDIX II

QUESTIONNAIRE

SECTION A: DEMOGRAPHIC DATA

Q1. Name of Institution (University) ----------

Q2. Faculty ----------

Q3. Gender: a. Male [ ] b. Female [ ]

Q4. Age: a.18-23 [ ]] b. 24-30 [ ] c. 30-36 [ ] d. 37-43 [ ] e. 44 and above [ ]

Q5. Discipline: a. Arts [ ] b. Sciences [ ] c. Social Sciences [ ] d. Education [ ] e. Law [ ] f. Engineering [ ] g. Agriculture [ ] h. Medicine [ ] i. Others, specify

Q6. **Please indicate your highest educational qualification by ticking the appropriate box**

S/NO	Qualification	Tick
1.	First Degree	
2.	Master's Degree	
3.	Ph. D	
4.	Others, please specify	

Q7. **please indicate your working experience as lecturer by ticking the appropriate box**

S/NO	Years of working experience	Tick
1	0– 4 years	
2	5– 9 years	
3	10– 14 years	
4	15 – 19 years	
5	20 – 24 years	

6	25 – 29 years	
7	30 – 34 years	
8	35 years and above	

Q8. Kindly indicate your current position in the University by ticking in the appropriate box

S/NO	Position	Tick
1	Graduate Assistant	
2	Assistant Lecturer	
3	Lecturer II	
4	Lecturer I	
5	Senior Lecturer	
6	Associate Professor/ Reader	
7	Professor	
8.	Others, specify	

SECTION B: Level of Awareness of lecturers towards the Use of Search Engines in Universities.

Q9. Are you aware of search engines on the Internet?

5.	**Yes**	
6.	**No**	

Q10. Please indicate if you know any of these search engines

S/NO.	Search Engine	I know very well	I know	Not sure	I don't know very well	I don't know at all
1.	Google scholar					
2.	Opera					
3.	Yahoo					
4.	Bing					
5.	Dogpile					
6.	AltaVista					
7.	Ask Jeeves					
8.	Google chrome					
9.	Mozilla Firefox					
10.	MSN					

Q11. Please indicate your preference of these Search Engines

S/NO.	Search Engine	Most Preferred	Preferred	Not sure	un-preferred	Most Un-preferred
1.	Google scholar					
2.	Opera					
3.	Yahoo					
4.	Bing					
5.	Dogpile					
6.	AltaVista					

7.	Ask Jeeves					
8.	Google chrome					
9.	Mozilla Firefox					
10.	MSN					

Q12. Please indicate if you know any of these search techniques

S/NO	Techniques	I know very well	I know	Not sure	I don't know very well	I don't know at all
1.	Boolean operators					
2.	Vector-space technique					
3.	Probabilistic method					
4.	Latent semantic technique					
5.	Use of natural language					
6.	Others, specify					

Q13. indicate your satisfaction with these search engines

S/NO.	Search Engine	Most satisfied	Satisfied	Not sure	Most un-satisfied	Un-satisfied
1.	Google scholar					
2.	Opera					
3.	Yahoo					
4.	Bing					
5.	Dogpile					
6.	AltaVista					
7.	Ask Jeeves					
8.	Google chrome					
9.	Mozilla Firefox					
10.	MSN					

SECTION C: lecturer's skills on the Use of Search Engines in Universities.

Q14. Please indicate your level of skills in the use of search engines.

S/NO.	Level of skill	Rank
1.	Novice	
2.	Specialist	
3.	Competent	
4.	Proficient	
5.	Expert	

Q15. Please indicate how competent you are based on the following skills

S/NO	Skills	Very good	Good	Average	Very Poor	Poor
1	Use of Boolean operators					
2	Access to online database					

3	Scanning images					
4	Downloading files from online databases					
5	Copying information into storage devices					
6	Burning information into CDs					
7	Searching electronic catalogue					
8	Using search engines					

Q16. How would you rate yourself on the following skills in information searching?

S/NO	Skills	Very good	Good	Average	Poor	Very poor
1.	Internet searching					
2.	Database searching					
3.	Formulating good search query					
4.	Computer software e.g. MS word, Excel etc.					
5.	Educational social media					
6.	Others, specify					

Q17. Through which of the following means did you get trainig on the usage of search engines?

S/NO	Means	Yes	No
1	One particular course in the university		
2	Workshop training program		
3	Friends and colleagues		
4	Self-training		
5	Private training centers		

SECTION D: Use of Search Engines

Q18. Do you use search engines for academic purposes?

1.	**Yes**	
2.	**No**	

Q19. Please indicate how often you use the following search engines for information retrieval

S/NO.	Search Engine	Daily	Weekly	Monthly	Occasionally	Never
1.	Google scholar					
2.	Opera					
3.	Yahoo					
4.	Bing					
5.	Dogpile					
6.	AltaVista					
7.	Ask Jeeves					
8.	Google chrome					
9.	Mozilla Firefox					
10.	MSN					

Q20. Why do you choose to use search engines for information retrieval? Tick as many as possible

S/NO.	Factors	Yes	No
1.	Ease of access to information		

2.	Saves users' time		
3.	Availability of search tools		
4.	Currency		
5.	Ease of use		
6.	Reliability		
7.	Quick response time		
8.	Access to a wide range of information		
9.	Others, specify		

Q21. For which purpose do you use search engines? Tick as many as possible

S/NO	Reasons for using search engines	Yes	No
1.	Communication		
2.	Recreation		
3.	For academic purpose		
4.	Research activities		
5.	Others, please specify		

SECTION E: ICTs Infrastructure Available to Support the Use of Search Engines

Q22. Is there ICT infrastructure in the university?

1.	**Yes**	
2.	**No**	

Kindly use the Likert Scale 1- 5Strongly agree (SA), Agree (A), Undecided (UN), Disagree (D), Strongly disagree (SD)

Q23. Which of the following infrastructures are available to support the use of search engines in the university?

S/NO	INFRASTRUCTURES	SA	A	UN	D	SD
6	There is Internet service in the university					
7	Computers are made available					
8	Hard discs are available for retrieving information					
9	Printers are available for print out					
10	There is constant power electricity supply					

Q24. Are you satisfied with the ICT infrastructure in the university?

1	**Yes**	
2	**No**	

SECTION F: Challenges Hindering the Use of Search Engines for Information Retrieval.

Q25. Which of the following are considered as barriers for effective utilization of Search engines for Information Retrieval?

S/NO	RATING ITEMS	SA	A	UN	D	SD
9.	Lack of information retrieval skills					
10.	Lack of confidence in using search engines					

11.	Poor infrastructures in the university					
12.	Insufficient time to make use of the search engines in the university					
13.	Difficulty in finding relevant information					
14.	Problem of network failure from time to time.					
15.	High cost of internet access					
16.	Slow internet network					

Q26. Measures for overcoming the challenges hindering the Use of Search Engines in the University.

S/NO	RATING ITEMS	SA	A	UN	D	SD
17.	Adequate information retrieval skills					
18.	Develop full confidence in using search engines					
19.	Adequate infrastructures in the university					
20.	Sufficient time to make use of the search engines in the university					
21.	Easy in finding relevant information					
22.	Solution to network failure from time to time.					
23.	Low cost of internet access					
24.	Effective internet network					

APPENDIX III

Output from SPSS

School

	Frequency	Percent	Valid Percent	Cumulative Percent
ATBU	130	65.0	65.0	65.0
GADAU	70	35.0	35.0	100.0
Total	200	100.0	100.0	

Gender

	Frequency	Percent	Valid Percent	Cumulative Percent
Male	159	79.5	79.5	79.5
Female	41	20.5	20.5	100.0
Total	200	100.0	100.0	

Age

	Frequency	Percent	Valid Percent	Cumulative Percent
18-23yrs	5	2.5	2.5	2.5
24-30yrs	32	16.0	16.0	18.5
31-36yrs	87	43.5	43.5	62.0
37-43yrs	52	26.0	26.0	88.0
44yrs and above	24	12.0	12.0	100.0
Total	200	100.0	100.0	

Qualification

	Frequency	Percent	Valid Percent	Cumulative Percent
First Degree	30	15.0	15.0	15.0
Masters	112	56.0	56.0	71.0
Ph.D	58	29.0	29.0	100.0
Total	200	100.0	100.0	

Position

	Frequency	Percent	Valid Percent	Cumulative Percent
Graduate Assistant	14	7.0	7.0	7.0
Assistant Lecturer	66	33.0	33.0	40.0
Lecturer II	54	27.0	27.0	67.0
Lecturer I	16	8.0	8.0	75.0
Senior Lecturer	32	16.0	16.0	91.0
Associate Prof	18	9.0	9.0	100.0
Total	200	100.0	100.0	

Awareness

	Frequency	Percent	Valid Percent	Cumulative Percent
Yes	189	94.5	94.5	94.5
No	11	5.5	5.5	100.0
Total	200	100.0	100.0	

Statistics

	Google Scholar	Opera	Yahoo	Bing	Dogpile	Alta Vista	Ask Jeeves	Google Chrome	Mozilla Firefox	MSN
	200	200	200	200	200	200	200	200	200	200
Missing	0	0	0	0	0	0	0	0	0	0
Mean	4.15	4.49	4.07	2.19	2.10	2.05	2.17	4.14	4.03	2.66
Std. Deviation	1.314	.919	1.165	1.121	1.116	1.014	1.295	1.326	1.373	1.230

Google Scholar

	Frequency	Percent	Valid Percent	Cumulative Percent
Never	10	5.0	5.0	5.0
Occasionally	33	16.5	16.5	21.5
Weekly	31	15.5	15.5	37.0
Daily	126	63.0	63.0	100.0
Total	200	100.0	100.0	

Opera

	Frequency	Percent	Valid Percent	Cumulative Percent
Occasionally	17	8.5	8.5	8.5
Monthly	8	4.0	4.0	12.5
Weekly	35	17.5	17.5	30.0
Daily	140	70.0	70.0	100.0
Total	200	100.0	100.0	

Yahoo

	Frequency	Percent	Valid Percent	Cumulative Percent
Never	1	.5	.5	.5
Occasionally	36	18.0	18.0	18.5
Monthly	15	7.5	7.5	26.0
Weekly	45	22.5	22.5	48.5
Daily	103	51.5	51.5	100.0
Total	200	100.0	100.0	

Bing

	Frequency	Percent	Valid Percent	Cumulative Percent
Never	53	26.5	26.5	26.5
Occasionally	104	52.0	52.0	78.5
Monthly	6	3.0	3.0	81.5
Weekly	27	13.5	13.5	95.0
Daily	10	5.0	5.0	100.0
Total	200	100.0	100.0	

Dogpile

	Frequency	Percent	Valid Percent	Cumulative Percent
Never	62	31.0	31.0	31.0
Occasionally	97	48.5	48.5	79.5
Monthly	12	6.0	6.0	85.5
Weekly	17	8.5	8.5	94.0
Daily	12	6.0	6.0	100.0
Total	200	100.0	100.0	

Alta Vista

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	62	31.0	31.0	31.0
	Occasionally	98	49.0	49.0	80.0
	Monthly	14	7.0	7.0	87.0
	Weekly	21	10.5	10.5	97.5
	Daily	5	2.5	2.5	100.0
	Total	200	100.0	100.0	

Ask Jeeves

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	68	34.0	34.0	34.0
	Occasionally	93	46.5	46.5	80.5
	Weekly	16	8.0	8.0	88.5
	Daily	23	11.5	11.5	100.0
	Total	200	100.0	100.0	

Google Chrome

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	19	9.5	9.5	9.5
	Occasionally	14	7.0	7.0	16.5
	Monthly	7	3.5	3.5	20.0
	Weekly	40	20.0	20.0	40.0
	Daily	120	60.0	60.0	100.0
	Total	200	100.0	100.0	

Mozilla Firefox

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	17	8.5	8.5	8.5
	Occasionally	24	12.0	12.0	20.5
	Monthly	11	5.5	5.5	26.0
	Weekly	33	16.5	16.5	42.5
	Daily	115	57.5	57.5	100.0
	Total	200	100.0	100.0	

MSN

	Frequency	Percent	Valid Percent	Cumulative Percent
Never	24	12.0	12.0	12.0
Occasionally	101	50.5	50.5	62.5
Monthly	19	9.5	9.5	72.0
Weekly	32	16.0	16.0	88.0
Daily	24	12.0	12.0	100.0
Total	200	100.0	100.0	

Q14

	Frequency	Percent	Valid Percent	Cumulative Percent
Novice	15	7.5	7.5	7.5
Specialist	23	11.5	11.5	19.0
Competent	100	50.0	50.0	69.0
Proficient	31	15.5	15.5	84.5
Expert	31	15.5	15.5	100.0
Total	200	100.0	100.0	

Statistics

	Infracstructures	Q23.2	Q23.3	Q23.4	Q23.5
N Valid	200	200	200	200	200
N Missing	0	0	0	0	0
Mean	4.13	4.06	3.67	4.18	3.05
Std. Deviation	1.089	.903	1.130	.849	1.247

Infracstructures

	Frequency	Percent	Valid Percent	Cumulative Percent
D	34	17.0	17.0	17.0
UN	5	2.5	2.5	19.5
A	63	31.5	31.5	51.0
SA	98	49.0	49.0	100.0
Total	200	100.0	100.0	

Q23.2

	Frequency	Percent	Valid Percent	Cumulative Percent
D	22	11.0	11.0	11.0
UN	10	5.0	5.0	16.0
A	103	51.5	51.5	67.5
SA	65	32.5	32.5	100.0
Total	200	100.0	100.0	

Q23.3

	Frequency	Percent	Valid Percent	Cumulative Percent
SD	8	4.0	4.0	4.0
D	36	18.0	18.0	22.0
UN	15	7.5	7.5	29.5
A	96	48.0	48.0	77.5
SA	45	22.5	22.5	100.0
Total	200	100.0	100.0	

Q23.4

	Frequency	Percent	Valid Percent	Cumulative Percent
SD	1	.5	.5	.5
D	16	8.0	8.0	8.5
UN	3	1.5	1.5	10.0
A	106	53.0	53.0	63.0
SA	74	37.0	37.0	100.0
Total	200	100.0	100.0	

Q23.5

	Frequency	Percent	Valid Percent	Cumulative Percent
SD	15	7.5	7.5	7.5
D	76	38.0	38.0	45.5
UN	22	11.0	11.0	56.5
A	58	29.0	29.0	85.5
SA	29	14.5	14.5	100.0
Total	200	100.0	100.0	

Statistics

		Challenges Hindering	Q25_2	Q25_3	Q25_4	Q25_5	Q25_6	Q25_7	Q25_8
	Valid	200	200	200	200	200	200	200	200
	Missing	0	0	0	0	0	0	0	0
Mean		3.29	3.05	3.31	3.36	2.89	3.87	3.16	3.82
Std. Deviation		1.281	1.100	1.220	1.112	1.155	.939	1.148	1.042

Challenges Hindering

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	8	4.0	4.0	4.0
	D	76	38.0	38.0	42.0
	UN	10	5.0	5.0	47.0
	A	63	31.5	31.5	78.5
	SA	43	21.5	21.5	100.0
	Total	200	100.0	100.0	

Q25_2

	Frequency	Percent	Valid Percent	Cumulative Percent
SD	3	1.5	1.5	1.5
D	89	44.5	44.5	46.0
UN	22	11.0	11.0	57.0
A	68	34.0	34.0	91.0
SA	18	9.0	9.0	100.0
Total	200	100.0	100.0	

Q25_3

	Frequency	Percent	Valid Percent	Cumulative Percent
SD	9	4.5	4.5	4.5
D	59	29.5	29.5	34.0
UN	35	17.5	17.5	51.5
A	56	28.0	28.0	79.5
SA	41	20.5	20.5	100.0
Total	200	100.0	100.0	

Q25_4

	Frequency	Percent	Valid Percent	Cumulative Percent
SD	2	1.0	1.0	1.0
D	61	30.5	30.5	31.5
UN	33	16.5	16.5	48.0
A	71	35.5	35.5	83.5
SA	33	16.5	16.5	100.0
Total	200	100.0	100.0	

Q25_5

	Frequency	Percent	Valid Percent	Cumulative Percent
SD	14	7.0	7.0	7.0
D	87	43.5	43.5	50.5
UN	22	11.0	11.0	61.5
A	61	30.5	30.5	92.0
SA	16	8.0	8.0	100.0
Total	200	100.0	100.0	

Q25_6

	Frequency	Percent	Valid Percent	Cumulative Percent
SD	7	3.5	3.5	3.5
D	14	7.0	7.0	10.5
UN	19	9.5	9.5	20.0
A	119	59.5	59.5	79.5
SA	41	20.5	20.5	100.0
Total	200	100.0	100.0	

Q25_7

	Frequency	Percent	Valid Percent	Cumulative Percent
SD	9	4.5	4.5	4.5
D	67	33.5	33.5	38.0
UN	32	16.0	16.0	54.0
A	68	34.0	34.0	88.0
SA	24	12.0	12.0	100.0
Total	200	100.0	100.0	

Q25_8

	Frequency	Percent	Valid Percent	Cumulative Percent
SD	6	3.0	3.0	3.0
D	25	12.5	12.5	15.5
UN	19	9.5	9.5	25.0
A	100	50.0	50.0	75.0
SA	50	25.0	25.0	100.0
Total	200	100.0	100.0	

Statistics

	Measures	Q26.10	Q26.11	Q26.12	Q26.13	Q26.14	Q26.15	Q26.16
Valid	200	200	200	200	200	200	200	200
Missing	0	0	0	0	0	0	0	0
Mean	4.31	4.10	4.26	4.06	2.38	4.31	3.96	4.27
Std. Deviation	.852	.818	.778	.840	1.373	.969	.893	.781

Measures

	Frequency	Percent	Valid Percent	Cumulative Percent
SD	5	2.5	2.5	2.5
D	6	3.0	3.0	5.5
UN	3	1.5	1.5	7.0
A	95	47.5	47.5	54.5
SA	91	45.5	45.5	100.0
Total	200	100.0	100.0	

Q26.10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D	18	9.0	9.0	9.0
	UN	4	2.0	2.0	11.0
	A	119	59.5	59.5	70.5
	SA	59	29.5	29.5	100.0
	Total	200	100.0	100.0	

Q26.11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	1	.5	.5	.5
	D	7	3.5	3.5	4.0
	UN	14	7.0	7.0	11.0
	A	95	47.5	47.5	58.5
	SA	83	41.5	41.5	100.0
	Total	200	100.0	100.0	

Q26.12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	4	2.0	2.0	2.0
	D	9	4.5	4.5	6.5
	UN	14	7.0	7.0	13.5
	A	118	59.0	59.0	72.5
	SA	55	27.5	27.5	100.0
	Total	200	100.0	100.0	

Q26.13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	68	34.0	34.0	34.0
	D	62	31.0	31.0	65.0
	UN	18	9.0	9.0	74.0
	A	30	15.0	15.0	89.0
	SA	22	11.0	11.0	100.0
	Total	200	100.0	100.0	

Q26.14

		Frequency	Percent	Valid Percent	Cumulative Percent

Valid	SD	7	3.5	3.5	3.5
	D	9	4.5	4.5	8.0
	UN	3	1.5	1.5	9.5
	A	77	38.5	38.5	48.0
	SA	104	52.0	52.0	100.0
	Total	200	100.0	100.0	

Q26.15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	SD	3	1.5	1.5	1.5
	D	20	10.0	10.0	11.5
	UN	6	3.0	3.0	14.5
	A	125	62.5	62.5	77.0
	SA	46	23.0	23.0	100.0
	Total	200	100.0	100.0	

Q26.16

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	D	9	4.5	4.5	4.5
	UN	14	7.0	7.0	11.5
	A	91	45.5	45.5	57.0
	SA	86	43.0	43.0	100.0
	Total	200	100.0	100.0	

Q20.1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	*159*	*79.5*	*79.5*	*79.5*
	No	*41*	*20.5*	*20.5*	*100.0*
	Total	*200*	*100.0*	*100.0*	

Q20.2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	164	82.0	82.0	82.0
	No	36	18.0	18.0	100.0
	Total	200	100.0	100.0	

Q20.3

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	135	67.5	67.5	67.5
	No	65	32.5	32.5	100.0
	Total	200	100.0	100.0	

Q20.4

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	75	37.5	37.5	37.5
	No	125	62.5	62.5	100.0
	Total	200	100.0	100.0	

Q20.5

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	179	89.5	89.5	89.5
	No	21	10.5	10.5	100.0
	Total	200	100.0	100.0	

Q20.6

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	82	41.0	41.0	41.0
	No	118	59.0	59.0	100.0
	Total	200	100.0	100.0	

Q20.7

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	*132*	*66.0*	*66.0*	*66.0*
	No	*68*	*34.0*	*34.0*	*100.0*
	Total	*200*	*100.0*	*100.0*	

Q20.8

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	*182*	*91.0*	*63.5*	*63.5*
	No	*18*	*9.0*	*36.5*	*100.0*
	Total	*200*	*100.0*	*100.0*	

Group Statistics

	School	N	Mean	Std. Deviation	Std. Error Mean
Infrastructure	ATBU	130	19.51	3.264	.286
	GADAU	70	18.29	4.746	.567

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Infrastructure	Equal variances assumed	19.391	.000	2.143	198	.033	1.222	.570	.098	2.346
	Equal variances not assumed			1.923	104.982	.057	1.222	.635	-.038	2.482