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## **Internet Search Strategies Employed By Library and Information Science Students of University of Nigeria, For Research.**

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### **Abstract**

This study examined Internet Search Strategies employed by undergraduate students of Library and Information Science (LIS), University of Nigeria, Nsukka for research. The study was guided by five research questions. 100 students were randomly selected from the undergraduate students of LIS, University of Nigeria, Nsukka. Questionnaire was used as the main instrument for the gathering of data. Data collected were analyzed using simple frequency tables and mean. The study revealed that most of the students were using the Internet to search for materials for writing term papers, projects and other assignments in order to enhance their academic work. The study equally revealed that, the Internet search strategies employed by the students includes: use of search engines, sourcing information from the university library database and key word searching. Frequent power outage, slow Internet connections, and lack of training in basic Internet skills were found to be the major problems encountered by LIS students while using the Internet for research. Following these major findings, it was recommended that, stable power supply, and adequate training should be provided. Also, Internet services and Internet Bandwidth should be made available by the school administration.

**Keywords:** Internet search strategies, LIS students, research.

### **Introduction**

The convergence of computer and telecommunication has revolutionized information management in the present day information environment. One of the products of this myriad of convergence is the birth of the Internet. In the process of trying to make information available to information seekers and users in the past few years, Internet search strategies have become the state of the art. This is so considering the strategic importance of Internet in information retrieval. The world over have been availed the opportunity of Internet in the enhancement of knowledge and research. The invention of the Internet, CD-Rom technology, and on-line information search engines, among others have made this possible.

The information superhighway as it is usually called is simply the interconnectivity of computers that provide a wide range of information in all facets of human endeavors to end-users (Anyokoha, 2005). The Internet can be used for research by browsing the World Wide Web (www) using the Uniform resource locator (URL) to access databases provided electronically by information providers. E-mails can be sent and received; chats and discussion can be conducted in addition to the transaction of e-commerce (Afolabi, 2001). Therefore, among its chief uses are research, entertainment and business (Wajasurriya, 1998). Students need Internet because of its

flexibility and dynamism in information retrieval, storage and processing. Internet is very important to students because they need to have access to timely, accurate and relevant academic information (Adomi, Omodeko and Otolu, 2004). Internet sources like the search engines have greatly increased the speed of searching out information. They have brought considerable relief to students in universities, as students can conveniently walk into any library that has its holdings on Internet and have access to unlimited information.

According to Axelrod and Cooper as cited in Ejizu (2010), the Internet is a global network made up of many smaller networks that enable computer users to share information and resources quickly and easily. The above definition implies that the Internet is a connection of millions of computers around the globe such that one of the connected computers could have access to any information stored in these computers within the global village. One may also describe the Internet as a tool that connects various types of computers to one another in a way that a computer on the Internet can communicate and share information with other computers in the network of networks, even though there may be no direct physical connection between them.

According to Encyclopedia Britannica (2003), the Internet is a system architecture that has revolutionized communications and method of commerce by allowing various computer networks around the world to interconnect Internets, sometimes referred to as network of networks. Many online sources offer varying definitions, but mostly everyone agrees that the Internet is a World Wide Web, publicly accessible network of interconnected networks that allow sharing or networking of files and information at remote sites from other academic institutions, research institutions, private companies, government agencies and individual using Transmission Control Protocol or Internet Protocol, and that communicate through phones and satellite (Mac Bride, 1998).

Ojo-Iginoba (1997) maintains that the Internet has become the market place for learning and online education. Contributing to this, Ojedokun (2001) points out that the Internet has broken down barriers of communication and information access from any part of the World and that it allows users to have access to information and offers them opportunity to access up-to-date research. The Internet is very useful to university student's especially in Nigeria because it enables them to have access to timely, accurate and relevant information that cannot be obtained from library shelves. Chan and Fu (2009) noted that Internet searching helps university students to boost their intellectual development and job preparation. Due to the endless nature of information resources on the Internet, libraries are increasingly investing in provision of Internet services and resources to enable their clients have better access to their information.

With the current interest in creating a society of lifelong learners, it is evident that students must be able to find, evaluate, and use information that is constantly changing. The arrival of the Information Age has created an important new literacy necessary for students to be successful in this ever-changing world, information literacy (Roth, 1999). Berkowitz (2002) reports that information and technology skills are the 'new basics' and being able to find and use information more effectively is essential to the success of students of all ages. In order to provide students with an adequate education, it is necessary to address these changes in the society through the education process.

Thornburg (2000) made several important observations on the changes in the way information is accessed since the advent of the Internet. Thornburg stressed that in the past, information was

pushed to us through newspapers, textbooks, and news reports. Since the development of the Internet and World Wide Web, students increasingly see valid and accurate information mixed with commercial, biased, opinionated, and other less accurate or meaningful information, and all this information is a mouse click away. Due to the information explosion made possible by Internet technologies, the incredible volume of accessible data can be mind-boggling. Because of this, information search strategies are becoming very important to students in information-based fields such as education, medicine, science, law, government, media, sales, and dozens of others. Increasingly, being able to locate quality information on the Web in an effective and efficient manner has become an essential ability in order to learn more rapidly and to make informed decisions. Thornburg has asserted that to be successful in this new age of information people will need training in the skills of finding information and evaluating it for accuracy and relevancy.

Thornburg's assertions are also similar to those of Brown (1999) who stated that the most valuable skill for the 21<sup>st</sup> century will be information navigation. Navigating through the plethora of information stored on the Internet to find accurate and reliable information will be a new form of literacy. Because of all these changes brought about by the Information Age, the American Library Association Presidential Committee on Information Literacy (1989) offered this definition in their final report: "To be information literate, a person must be able to recognize when information is needed and have the ability to locate, evaluate and use effectively the needed information. To become fully literate in today's world, students must become proficient in the new literacies of ICT" (IRA, 2002). Leu, Kinzer, Coiro and Cammack (2004) identified these new literacies in terms of five functions:

- Identifying important question;
- Locating information;
- Critically evaluating the usefulness of information;
- Synthesizing information to answer questions;
- Communicating answers to others.

Of these five functions mentioned above, the ability to locate information is perhaps the most critical as much of what we do on the Internet stems from our ability to adequately search for specific information. Furthermore, as the size of the Internet increases, efficient access to information becomes increasingly more difficult (Nachmias&Gilad, 2002). The results from a single search task on the Internet can produce an overwhelming amount of information, often causing frustration and a sense of information overload (Brandt, 1997; Nachmias&Gilad, 2002). It takes having the ability to search in a strategic and concise manner to curtail the numerous possibilities that can inundate a searcher and prevent a virtual bottleneck that prohibits access to information. Obviously, information is worthless unless it can be efficiently located and retrieved.

The University of Nigeria, commonly referred to as UNN, is a federal university located in Nsukka, Enugu State, Nigeria. It was founded in 1955 and formally opened on 7th of October 1960; the University Nigeria has four campuses-Nsukka, Enugu and Ituku-Ozalla-located in Enugu State and one in Aba, Abia State. The University of Nigeria was the first full-fledged indigenous and autonomous university in Nigeria, modeled upon the America educational system. It is one of the land-grant university in Africa and one of the five elite universities in the

country. The university has 15 faculties and 102 academic departments. The university offers 82 undergraduate programs and 211 postgraduate programs. Library and Information Science is one of the courses offered in University of Nigeria, Nsukka.

Library and Information Science is a discipline concerned with the study of the principles and skills required for systematic collection, organization and utilization of societies' information resources in libraries. It is also concerned with the forces governing the flow of information resources and with creating ready access to these resources. Library and Information Science Department, University of Nigeria, Nsukka took off in the 1983/84 session with a full-time and four part-time lecturers and 18 students. It attained its full complement of classes in the year 1986/87 session and graduated its foundation students in 1987. The facilities of the department have also expanded and developed since its inception. The department is housed in an office block built for that purpose and uses lecture rooms in the faculty building, the Children's Center Library and the University Library.

According to Best and Kahn (1998), research is the systematic and objective analysis and recording of control observations that may lead to the development of generalizations, principles, theories resulting in predictions and ultimate control of many events that may be consequences or cause of specific activities. In the same vein, Aina (2002) sees true research as the ability of enquiring into a problem involving, a systematic way of enquiring. Also, Kerlinger as cited in Ifidon (2007) defined scientific research as a systematic controlled and critical investigation hypothetical preposition about the presumed relationship among natural phenomena. The implications of these definitions are that research is systematic and controlled, that the investigation is so well-planned that the result can be taken as valid and that the research is empirical. The students under study are the undergraduate students of LIS, University of Nigeria, Nsukka.

### **Statement of the Problem**

It has been observed in this contemporary information age that the Internet has increasingly become an invaluable asset in education in terms of learning, teaching and research. Its role in information handling, packaging, storing, retrieving and dissemination is at the root of any meaningful academic enterprise all over the world. The Internet is used to retrieve information to communicate and conduct business globally, and to access a vast array of services and resources online. It is believed that Internet is so relevant as a result of its capacity to provide accurate and timely information.

It is quite regrettable that despite its numerous advantages, most researchers do not know how to search or to get the right information in the course of their research. Most often, even to synthesize and analyze the information becomes a nightmare to some researchers. The inability of researchers to overcome these problems automatically makes it impossible to explore the potentials of the Internet.

Despite the advantages of the Internet in research, the danger of inadequate or use of the Internet in research and the observed poor state of affairs, no study seems to have been carried out to determine Internet search strategies employed by undergraduate students of LIS in UNN for research. Therefore, the aim of this study is to ascertain the Internet search strategies employed by undergraduate Students of Library and Information Science, University of Nigeria, Nsukka for Research.

### **Purpose of the Study**

The main purpose of this study is to examine the Internet search strategies employed by undergraduate students of Library and Information Science, University of Nigeria, Nsukka for research. Specifically the study intends to:

1. Determine the extent to which LIS students utilize Internet for research
2. Ascertain the Internet search strategies employed by students of LIS when searching the Internet for research
3. Find out the extent to which the use of the Internet Search Strategies enhance students' research in the Internet
4. Ascertain the problems encountered by LIS students while searching the Internet for research
5. Find out the strategies for enhancement of the use of the Internet Search by LIS students for research

### **Research Questions**

1. To what extent do LIS students utilize Internet for research?
2. What are the Internet Search Strategies employed by LIS students for research?
3. To what extent does the use of Internet search strategies enhance students' research in the Internet?
4. What are the problems encountered by LIS students while searching the Internet for research?
5. What strategies could be used to enhance of the use of the Internet Search by LIS students for research?

### **Significance of the Study**

According to Wimmer & Dominick, (2009) "the good of every research is to help further the understanding of the problems and questions in the field of study, if a study does not do this, it has little value beyond the experience regardless need for conducting it". This research is with the hope that it will break new grounds and whatever result that comes out from the analysis will go a long way in helping a lot of people.

The significance of the study lies in the fact that the study will be helpful to libraries in finding ways of initiating Internet skills in research. The study will achieve this by helping the Librarians know, appreciate and consider the potentials of Internet search strategies and the particular needs of students in the use of these resources as well as ensuring that librarians acquire skills needed for user education in the academic use of Internet. Additionally, this study will help to educate the students on how to effectively use the Internet for their academic pursuit and the relevance of Internet to academic works.

The study will also be helpful to university administration, government agencies, and policy makers as it will enable them to realize the interrelationship between Internet and education and thus work towards reflecting it in their educational policies and programs. Also, it will serve as a framework and guideline to them in establishing effective Internet network and maintain the existing ones to enable the students easily access the Internet.

Finally, the study will help future researchers' study as it will go a long way in making them realize the need for further studies in this area and will form a bedrock for further studies. Also this study will add to the existing literature in the field of Library and Information Science in the area under study.

## **Literature Review**

### **The concept of Internet Search Strategies**

Whether used as part of a curse or a compliment, no computer term has been bettered with more remarkable frequency than "the Internet". This suggests that the best place to begin our journey is to demystify the "word" by describing exactly what it means when knowledgeable people refer to the Internet.

Perhaps the easiest way to explore this term is to consider its two parts separately. "Net" is an abbreviation for "networks" which refers to any number of computers that are linked or connected and thus able to share information. The Internet and thus the prefix "inter" arose when several independent networks were joined through high-speed telephone lines into single worldwide of computers. In the work of Owolabi, (2007), the Internet has increasingly become a valuable asset in education in terms of learning, teaching, and research. Its role in information handling, packaging, storing, retrieval and dissemination is at the root of any meaningful academic environment all over the world.

There is seemingly no hard-and-fast rule or how best to define the Internet or what it means or represent. Rather, various academics, professional, and institutions have viewed the concept of Internet as they deem fit. In this regard, this study will review some of these definitions and representations about the Internet and search strategies. Ojokoh (2005) see the Internet as a worldwide collection of networks, gateways, servers and computers using a common set of telecommunication protocols to link up. It provides worldwide access to information resources. The Internet has become the symbol of the information age and a means of accessing and sharing information now extending throughout the whole culture of human beings (Song & Khong 2001). Providing a more detailed explanation, Agba (2001) refers to the Internet as a worldwide assemblage of interconnected computer networks. It connects all manner of private, commercial, government and academic networks including a growing number of home computers. Agba further reveals that the term "Internet" is actually a short and a convenient way of saying "Internet Work". In other words, the Internet is a network of computers, Agba stresses. In the view Ogbomo (2004), the Internet is "a connectivity that connects various types of computers to one another in a way that a computer on the Internet can communicate and share information with other computers on the network of networks, even though there is no physical connection between them".

On search strategies, it is evident that the Internet provides access to a wealth of information on countless topics contributed by people throughout the world. Hence, we discuss the various strategies student adopt while carrying out research work. 'Strategy' according to Oxford Advanced Learner's Dictionary, is a plan that is intended to achieve a particular purpose. Wikipedia defined 'Strategies' as a high level plan to achieve one or more goals under conditions of uncertainty. A strategy may be seen as an approach to using the Web. For example, using

Google is a search strategy; using links in a Web text is a reading strategy. A strategy may be adequate or not adequate within the context of a certain task. According to Vakkiari (2003), search strategies are the products of planned or situational interactions between users and IR Systems. In other words, it highlights a working planned interactive reaction for a given situation. Search strategy is the 'action plan' for retrieving information.

Adding to the above definition, Xie (2008) says that search strategies consist of a series of sequential tactics that take into account both planned and situational elements. Relating this definition to this work, it can be understood as a plan that is intended to achieve academic research work. Internet search strategies can be defined as the organization of search keywords and symbols in order to conduct effective search on the web, and extend and narrow search results accordingly (Brehm, 1999). The Internet is not a library in which all its available items are identified and can be retrieved by a single catalogue. In fact no one knows how many individual files reside on the Internet. The number runs into a few billion and is growing at a rapid pace. The Internet is a self-publishing medium. This means that anyone with little or no technical skills and access to a host computer can publish on the Internet.

Although many students showed instances of adequate searching, reading and evaluating behaviour, they alternated this with inadequate use of the Web, for example, by formulating proper search terms for one assignment or research but failing to do so for another. For both library and educational practices, it is important to identify the origins of students' varying Web behaviour, with a view to both the conceptualization and the teaching of Web literacy. For this reason, it is pertinent to discuss Internet search strategies with respect to students of LIS, University of Nigeria, Nsukka. To find information on the Internet, there are number of basic ways or strategies that are adopted by students.

### **The Extent to which undergraduate Students of LIS use Internet for Research**

A review of literature reveals that the lecturers and the students are the most frequent users of the Internet. They use the Internet mainly for educational purposes rather than for entertainment. Chen (1998) highlighted that the Internet is used for searching for useful information on a specific issue as a result of the tremendous, diversity and volume of information contained. Students not only use the Internet to search for materials to complete their assignment, but also use it to gather resources to supplements curricular offering, Adomi (2003). In the same vain, William (1999) opines that students use the Internet to send and receive messages using electronic mail, Internet telephoning, keyboard chat and video conferencing.

Dike (2000) states that one of the reasons why students prefer digital technology is because it provides instant access to information from multiplicity of choices, and this motivates them to learn. It has been reported that adult Web users search the Internet more than they engage in any other computer activity (about 70% of their time online) except using e-mail Nachmias & Gilad (2002). Therefore, searching on the Internet isn't just a popular activity but an important skill needed to obtain information, thus understanding information searching processes is a relevant research issue. Mutula (2003) observed that students use Internet mostly for educational purposes. Equally, Attama (2005) says that Internet have really helped in conducting a good research and easy dissemination of information in the 21<sup>st</sup> century. Ohakwe & Okwuanaso (2005) are of the opinion that students use the Internet for research and communication. On the part of Usman (2006) the Internet has opened up numerous possibilities for doing resource

sharing at local and global level and that information on latest journals, books and discussion can be exchanged directly through the Internet.

According to Vessy (2005), we are accustomed to using the Internet heavily and sometimes preferentially or exclusively for academic assignments, but are we familiar with effective Internet search methodology? Vessy noted that the Internet provides cost-free access to valuable and practical foreign and local news, information, and analysis sources in many languages. Really effective and efficient research on the Internet, however, is definitely much more difficult and complicated and takes far more patience and efforts to stay current than the traditional and relatively static papers based library research. Internet is the most efficient method of acquiring information.

### **Internet Search Strategies employed by undergraduate students of LIS when searching the Internet**

The Internet is a new technological way to disseminate information to a larger population of people in a more speedy and accurate way. It is as if the world has developed to real information superhighways. Universities worldwide now invest a lot on Internet access because it reduces the time between the production and utilization of knowledge; improves co-operation and exchange of ideas with fellow researchers in other institutions, regions or countries, furthers the sharing of information; and promotes multidisciplinary research. Internet helps to satisfy peoples hunger for knowledge and further research, which is one of the characteristics of a university.

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 users and require specific skills. Many students use the Web quite naturally, but too often, students (and adults, too) mistake their ability to move around the Internet for the skills that they need to navigate and read it (Burke 2002). This is confirmed by extensive research into student's Web behaviour, 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 strategies from students (Shenton& Dixon 2003; Corio 2003; Hoffman et al. 2003). Educational researchers primarily look for ways of using the Web as a meaningful learning tool for knowledge construction (Hoffman et al. 2003). Nachmias and Gilad (2002) indicate that finding information on the Internet requires the ability to use search engines, knowledge of search techniques, browsing through information, a cognitive capacity to organize searches, the ability to execute a search, an understanding of how information is organized, critical-thinking skills, and a working knowledge of Internet notations. It is evident that educators need to assist students in the development of these essential skills for manipulating the Internet. The use of the Web requires the mastery of certain strategies which in turn requires specific Web-related skills.

Search engines offer a variety of features that allows you to construct a precisely-targeted search. Among frequently used searching strategies some of which are cited in Akkoyunlu (2002a) and Brehm (1999) are Boolean search commands (and, or, near, none, not), (+, -, ', etc.), power searching commands ( in titles:, sites:, url:, link:, \*, ?, etc.) and search assistance features (related

search, clustering, stemming, etc.). In the same vein, Xie and Joo (2010) highlighted the following as search strategies:

- Boolean Operators
- Phrase searching
- Proximity search
- Fuzzy Search
- Stemming
- Truncation searches
- Wildcard searches

**1) Boolean Operators:** Boolean Operators are simply words (AND, OR, NOT, or AND NOT) used as conjunction to combine or exclude key words in a search, resulting in more focused and productive results. This should save time and effort by eliminating inappropriate hits that must be scanned before discarding. Using these operators can greatly reduce or expand the amount of records returned. Boolean operator saves time by focusing searches for more ‘on-target’ results that are more appropriate to your needs, eliminating unsuitable or inappropriate ones.

**AND—AND** requires both terms to be in each item returned. If one term is contained in the document and the other is not, the item is not included in the resulting list. (Narrows the search)

Example: a search on **stock market AND trading** includes result contains: stock market trading; trading on the stock market; and trading on the late afternoon stock market.

**OR—**either term (or both) will be in the returned document. (Broadens the research)

Example: A search on **ecology OR pollution** includes results contains: documents containing the world ecology (but not pollution) and other documents containing the word pollution (but not ecology) as well as documents with ecology and pollution in either order or number of uses.

**NOT or AND NOT--** the first term is searched, then any records containing the term after the operators are subtracted from the results.

Example: A search on **Mexico AND NOT city** includes results contains: New Mexico; the nation of Mexico; US-Mexico trade; **but does not return** Mexico City or This city’s trade relationships with Mexico.

**Using Parentheses--** using the ( ) to enclose search strategies will customize your results to more accurately reflect your topic. Search engines deals with search statements within the parentheses first, and then apply any statements that are not enclosed.

Example: a search on **(smoking or tobacco) and cancer** returns articles containing: smoking and cancer; tobacco and cancer smoking; cancer, and tobacco; **but does not return** smoking or tobacco when cancer is not mentioned.

**2) Proximity search--**one can use a proximity search to search for two or more words that occur within a specified number of words (or fewer) of each other in the databases. Proximity searching is used with a keyword or Boolean search. The number of \* represents any intervening words in between. It may be within 1, 2, 3 or more.

Example:

library\* science

Google\* search

**3) Phrase searching—**surrounding a group of words with double quotes tells the search engine to only retrieve documents in which those words appear side-by-side. Phrase searching is a powerful search technique for significantly narrowing your search results.

Example: 'Library science'  
'Information retrieval'  
'Global warming'

4) **Fuzzy Search--** this is a type of search made possible by fuzzy matching. The search engine returns results that it predicts will be relevant, even when the terms used in the query does not appear anywhere in the matched documents.

Example: ~Subramanian will find Subramanian as well as Subramanian ~food will retrieve nutrition, recipes, cooking etc.

5) **Stemming--** this means the engine will search not only for your search terms, but also for words that are similar to some or all of those terms. It will search for all variations of the word.

Example: 'read plan' will find pages with read, reading, reads, and plans, planning.

6) **Truncation search--** truncation places a symbol at the end of the word so you search for variant endings of that word.

Example: litera \$ would look for literature, literacy, literal

7) **Wildcard searches---**wildcards also places a symbol within a word to find variations on it.

Example: analy\*e would find analyse or analyze

Different symbols including \$ \* ~ #! : are used by different search tools

**Operators used for different Search Strategies include the following:**

- ' + ' to specify a must include term
- ' - ' to specify a must exclude term
- ' ' to specify a must include phrase
- ( ) to specify a set of terms
- : generally to separate the reserved word from the search terms
- \* to specify term search (truncation)

**Problems encountered by undergraduate students of LIS while searching the Internet for research.**

Currently, people's daily lives are greatly influenced by information technologies like computers and the web. According to Gulli and Signorini's (2005) estimation, in the mid-2005, there were more than 11.5 billion pages on indexable web. New webpages appear at the rate of 8% per week (Ntoulas, Cho, & Olsten, 2004). However, the increasing number of webpage has also brought problems such as information overload, disorientation, and decreased information quality (Ahuja& 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 order to successfully search the web, users need to consider the usages of their searching strategies to generate better outcome. . The ability to effectively search and locate information on the Internet is an important skill for education and essential for success in the 21<sup>st</sup> century. The results from a single search task can produce an overwhelming amount of information. Without the new literacy skills and strategies that the process of searching and locating information on the Internet requires, this can quickly become a daunting task.

Another problem with the Internet 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 find 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.

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 users and require specific skills. Many students use the Web quite naturally, but too often, students (and adults, too) mistake their ability to move around the Internet for the skills that they need to navigate and read it (Burke 2002). This is confirmed by extensive research into student's Web behaviour, 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 strategies from students (Shenton & Dixon 2003; Corio 2003; Hoffman et al. 2003).

Another problem is the problem of accessibility and usability. Internet usability according to Lee as cited in Ejizu (2010), is the efficient, effective and satisfying completion of a specified task by any given Internet users." Most of the universities in the country are rarely able to exploit the service of information technology, facilities such as Internet, e-mail, telefax, computers, etc. for information acquisition, storage, retrieval and dissemination/transfer. This could be as a result of high cost of Internet facilities.

Furthermore, another factor that militates against Internet usage according to World Bank Report (2000) is low level of ICT skills development among the Nigerian youths. Nigeria ranks among countries with low level of information communication Technology (ICT) adoption as follows; fixed line and mobile telephone per 1000 people – 5; personal computers per 1000-6.6; Internet users per thousand -200 as compared to South Africa with the following figures 304, 61.8 and 2,400 respectively. It has been observed that many students are not computer literate and because of that, their usage of Internet usage is limited.

In addition, incapacitation of Power Holding Company of Nigeria (PHCN) due to government negation and the prevalent cases of corruption within the sector by the staff who are supposed to see to the welfare of the company, as a result, power supply becomes a log in the wheel of electricity supply. Internet connectivity has been described as poorest in the continent of Africa. Only 3 per 1000 people have access to Internet (Mutala, 2003). There are problems of poor telecommunications infrastructure, and some governments do not want to issue licenses for VAST connections to help speed up the telecommunications services to rural areas. Internet connectivity and access are not common services in Nigeria.

Finally, not all information on the Internet is reliable or safe. Horrigan (2000), Sturges (2002), and Weitzner (2007) mentioned the unreliability of information on the Internet. There are not necessarily quality or authenticity checks on information on the Internet. Misrepresented, fake, and pirated literature causes problems for researchers and students. Users may have privacy concerns. There are sites that many users may find offensive, as well as instructions for carrying out violent or illegal acts.

### **Strategies for enhancement of the use of the Internet Search by LIS students for research**

Education is the bedrock of any nation and Internet is an indispensable innovation in the field of education for research, publication and communication generally today. The academic society must learn the new methods of searching and acquiring materials and information through the Internet. Not many researchers in developing countries have been able to develop the methods and skills for searching for relevant information and materials, knowledge of web design, skills for using discussion forums, even basic knowledge of how to send e-mail, etc. (Lacay 1999). Therefore, there is need for user's education on the strategies with which to search the Internet by students or researchers. Also, Audu (2006) recommended that more Internet facilities be made available to students, and the students be taught internet skills.

Searching on the Internet is not an easy task. The features of the Web discussed above are often highly disorienting to novices and can be quite a challenge even to more experienced users (Rubenking, 2000). Overcoming this disorientation is a primary goal of teaching strategies for applying problem solving and critical thinking to the search process. With a systematic approach, searchers exhibit less distraction by irrelevant or inappropriate material and needless wandering online. Experienced searchers have the ability to find accurate and valid information that make the effort of researching online efficient and beneficial. The problem is not entirely the Internet, but the approach we have been taking to using the Internet. What educators must realize is that Internet searching requires information problem-solving skills that involve critical thinking (Bertram, 2000).

One of the most popular models for information problem solving is the Big6 Information Problem Solving Approach developed by Eisenberg and Berkowitz in (2000). Their research shows that all successful information problem solving involves 6 steps: (a) Task Definition, (b) Information Seeking Strategies, (c) Location and Access, (d) Use of Information, (e) Synthesis, and (f) Evaluation.

In this model task definition involves students defining the information problem and identifying the information needed in order to complete the task. The information seeking strategies step involves brainstorming the range of possible sources and evaluating those sources to determine priorities. On the location and access step students locate sources (intellectually and physically), and find information within sources. On the fourth step, use of information, students engage (read, hear, view, or touch) the information and extract relevant information. In synthesis, students organize information from multiple sources and present the information. And finally, on the last step, evaluation, students judge the product and the information-solving process. The steps in this model also work well with Internet searching.

Using this model in conjunction with the National Information Literacy Standards for student learning provides a powerful tool for educators interested in promoting Internet research skills (Eisenberg, 2000). Hill (2000) discovered that success in searching was very dependent on user knowledge, specifically metacognitive abilities, familiarity with the computer system being used, and prior subject knowledge. The research indicates that individuals with little system knowledge, and understanding of how to conduct a search, have greater difficulty finding success in Internet searches (Hill, 2000). Given this information, providing instruction in

Internet search strategies so as to develop skills in computer system use may help students improve their knowledge of the system and therefore improve their ability to conduct successful Internet searches.

An important means of reducing disorientation while searching is to ensure the searcher has the necessary prior knowledge about the open-endedness of the system and also the nature of how the data is created, distributed, and related (Bertram, 2000). It is crucial the user realizes that current knowledge about the search topic may potentially be used in finding the additional information needed. With this realization comes the ability to form lists of keywords that will probably appear in desired documents or to predict what may be found in the desired solution. Next, the ability to form complex queries is a necessary skill, as this is the primary means of reducing the initial number of hits to a level that can reasonably be reviewed. Some training on logic and multiple keyword searches, or use of the search engines refine search feature if it has one, is necessary.

Cullier and Piotrowski (2001) recommended that the government should make students aware of what is available online as this will increase their access to Internet; they concluded that government should promote the use of the Internet for seeking information and strengthening personal efficiency.

Lastly, Okezie (2005) suggested for a proper digest of regulations, agreements, legislation and laws affecting information sourcing and dissemination as this will facilitate effective use of the Internet for research.

### **Review of Related Empirical Studies**

In order to evaluate and describe the Internet search strategies of adolescent learner, Guinee & Hall (2003) conducted a study with 161 middle and high school students. Data were collected through students' descriptions of their search process, observations of students searching behaviours and audit trail list of search strings used by students. Approaches adopted by students to locate information were listed as dot-com formula, shopping mall, and search engine all of which were used by students regardless of the computer experience. They revealed four techniques for recovering from unsuccessful search attempts, which were switching topics, visiting additional web sites, trying new keywords, and continuous instruction and support, students fall back on their previous stage of web search results from ineffective search queries. Thus, it was suggested that students should be trained in a way that they may become more metacognitive about their searching to differentiate between successful search and unsuccessful search.

Kuiper et al. (2008) realized a multiple case study design with 5<sup>th</sup> grade teachers who carried out a program, which consisted of eight weekly sessions to teach students Web searching, reading and evaluating skills. The purpose was to investigate the contextual factors that influence the realization of the program and the learning gains in the participants in terms of content knowledge and Web skills. Videotaped and written lesson observations, interviews with students and teachers, teacher diaries, student questionnaires and student assignments were the data sources. Findings revealed that contextual factors that influenced the program were related to conditions as teachers' investment of time and effort, and school's way of organizing computer work. In addition, student's knowledge and skills improved in terms of both content knowledge

and Web skills. Nevertheless, most students did not act upon their knowledge of Web searching, reading and evaluating skills, and showed unexpected or inconsistent behaviours.

Frat, et al (2010) in their work titled 'Opinion of teachers on using internet searching strategies: an elementary school case in Turkey' Using questionnaire as a method of data collection found out that the elementary school teachers primarily use Google for searching on the internet. It was also revealed that internet search strategies applied by teachers differ between the inception and the development processes of the search. They further revealed in the study the irrelevant information, accessing insufficient information, accessing websites with virus threats while searching were the problems faced by the teachers while searching the internet for research. They however, recommend that there is need for in-service training regarding the ways of accessing and retrieving information from the internet should be started.

## **Research Method**

### **Research Design**

The design adopted for this study was descriptive survey. This was chosen because according to Nworgu (2006), descriptive survey is a type of survey in which a large group is studied by collecting and analyzing data from only a few people or items, considered to be a representative of the entire group. Similarly, Eboh (2009) noted that descriptive survey is fact-finding in nature. It focuses on selective dimension of a phenomenon and measures them in a systematic and precise manner. It is appropriate because it sets out to report people's opinion and responses as it affect question raised in the questionnaire and finding solution to the problems.

**Area of Study:** University of Nigeria, Nsukka.

### **Population of Study**

The population of this study consists of the undergraduate students of library and information science, University of Nigeria, Nsukka (2012/2013 session). Based on the statistic provided by the department of Library and Information Science, University of Nigeria, Nsukka, the department has a total number of one hundred and ninety-three (193) undergraduate students for 2012/2013 session.

### **Sample and Sampling Technique**

The sample size is 100 representing a percentage of 51.8 of the total population of (193). This is in line with Nwanna, cited in Agbonmiewalen (2007) when he recommended that 'when the population runs into few hundreds use 40% or more, when several hundreds use 20%, when thousands use 10%, and when several thousands use 5% or less'.

### **Instrument for Data Collection**

The instrument used for data collection for this study was questionnaire. The questionnaire which is a structured schedule and which is essentially a qualitative instrument was the most suitable for obtaining data from a representative sample of people which could be used to describe or analyze a large population. It was divided into two sections; section 'A' contained the bio data of the students, while section 'B' focuses on the specific issues of the study. The

questionnaire was titled Internet Search Strategies Employed by Undergraduate Students Questionnaire (ISSEUSQ). The instrument contained five (5) research questions. Question 1 contained seven items, question 2 contained six items, question 3 contained seven items, question 4 contained nine items and question 5 contained eight items bringing the total items to 35. Each of the questions was intended to elicit relevant information that could be used to answer each research questions.

### Method of Data Collection

The instrument for data collection was questionnaire, which was developed based on the purpose and research questions formulated for the study. The questionnaire was administered to the respondents and collected back by the researchers to ensure high return rate of the completed questionnaire.

### Method of Data Analysis

The collected data was presented in tables and analyzed using frequency and mean. The weighted mean was used to determine the weight of the responses. Any response with mean weight of 2.5 and above all be regarded as positive and accepted. While less than 2.5 will be regarded as negative and rejected.

### Presentation and Data Analysis

In this section, the data obtained were organized and analyzed with respect to the research questions. The data were represented in tabular form and arranged in such a way that the research questions were answered after one another. The responses were organized using simple frequency and mean ( $\bar{x}$ ) scores, with brief commentaries to expatiate on them. 100 copies of questionnaire were prepared and shared among the students and collected back by the researcher.

**Research question 1:** To what extent do LIS undergraduate students utilize Internet for research?

The aim of this question was to find out the level of LIS undergraduate students usage of Internet for their research. The data is presented in table 1:

**Table 1: Responses on the extent of Internet utilization by LIS undergraduate students for Research.**

S/N	Items	VHE	HE	LE	NE	X	Decision
1	I use Internet to search for materials for writing term papers, projects and other assignments	82	17	1	—	3.81	Agreed
2	I use Internet to send and receive messages	29	40	23	8	2.9	Agreed
3	I use Internet to search for information on upcoming courses	26	30	29	15	2.67	Agreed
4	I use Internet for communication purpose	47	31	17	5	3.2	Agreed
5	I use Internet to search for information to enhance my academic research	63	30	7	—	3.56	Agreed

6	I use Internet to keep up-to-date with news, music and sports. (entertainment)	45	32	23	—	3.22	Agreed
7	I use Internet to supplement lectures given in class	33	44	20	3	3.07	Agreed

**Grand Mean ( $\bar{X}$ ) score =3.2**

From table 1, it is seen that the use of Internet to search for materials for writing term papers, projects and other assignments attracted 3.81 mean of respondents; use of Internet to send and receive messages attracted 2.9 mean of respondents; use of Internet to search for information on upcoming courses attracted 2.67 mean of respondents; use of Internet for communication purpose attracted 3.2 mean of respondents; use of Internet to keep up-to-date with news, music and sports attracted 3.22 mean of respondents and use of Internet to supplement lectures given in class attracted 3.07 mean of respondents.

**Research question 2:** What are the Internet Search Strategies employed by LIS undergraduate students for research?

The aim of this question was to find out the Internet Search Strategies employed by LIS undergraduate students for research. The data is presented in table 2:

**Table 2: Responses on the Internet Search Strategies employed by LIS undergraduate students for research.**

S/N	Items	VHE	HE	LE	NE	$\bar{X}$	Decision
1	I use Boolean Operators (AND, NOT, OR, and AND NOT) to narrow down my research topics.	13	21	37	29	2.18	Disagreed
2	I visit search engines (e.g. Google, Ask. Com, Alta Vista, etc.) for my research queries.	72	27	1	—	3.7	Agreed
3	I do phrase searching e.g. ‘Information retrieval’, ‘Global warming’.	18	28	29	25	2.39	Disagreed
4	I source information university libraries’ databases.	28	25	25	22	2.59	Agreed
5	I send e-mails to researcher to send me research materials.	19	28	26	27	2.39	Disagreed
6	I do key word searching e.g. information technology.	32	23	17	28	2.59	Agreed

**Grand Mean ( $\bar{X}$ ) score =2.6**

Table 2 reveals that the use of Boolean Operators to narrow down research topics, use of phrase searching and sending e-mails to researchers to send research materials attracted 2.18, 2.39, and 2.39 mean of respondents respectively, which is regarded as negative. Visit of search engines;

sourcing information from the university library databases; and doing key word searching attracted 3.7, 2.59, and 2.59 mean of respondents respectively.

**Research question 3:** To what extent does the use of the Internet Search Strategies enhance students' research in the Internet?

The aim of this question was to find out to what extent does use of the Internet Search Strategies enhances students' research for information on the Internet. The data is presented table 3:

**Table 3: Responses on how Internet Search Strategies enhance students Research on the Internet.**

S/N	Items	VHE	HE	LE	NA	X	Decision
1	It makes my search very easy	54	38	4	4	3.42	Agreed
2	It helps me to retrieve relevant information	58	23	19	—	3.39	Agreed
3	It helps to narrow my search	35	49	13	3	3.16	Agreed
4	It makes the Internet user-friendly	45	31	20	4	3.17	Agreed
5	Speedy access to information	66	22	12	—	3.54	Agreed
6	It helps me to write a good research work	54	24	18	4	3.28	Agreed
7	It saves the time of the students	62	34	4	—	3.58	Agreed

*Grand Mean (X) score =3.3*

From table 3, 100 responses came out positive in terms of how Internet Search Strategies have enhanced students' research on the Internet. Each of the items attracted 3.42; 3.39; 3.16; 3.17; 3.54; 3.28 and 3.58 mean of respondents respectively.

**Research question 4:** What are the problems encountered by LIS undergraduate students while searching the Internet for research?

The objective of this question was to find out the problems encountered by LIS undergraduate students while searching the Internet for research. The data is presented in table 4:

**Table 4: Responses on the problems encountered by LIS undergraduate students while searching the Internet for research**

S/N	Items	SA	A	D	SD	X	Decision
1	Slow Internet connections	52	42	1	5	3.41	Agreed
2	Difficulty in finding relevant information	40	50	9	1	3.29	Agreed
3	Frequent power outage	72	25	3	—	3.69	Agreed
4	Lack of training in basic Internet skills	48	40	8	4	3.22	Agreed
5	Unreliable information on the Internet	33	32	19	16	2.82	Agreed
6	Abuse of Internet, such as fraud, plagiarism	40	44	12	4	3.2	Agreed
7	Lack of skills in the use of computers	51	37	10	2	3.37	Agreed
8	Ignorance of relevant search engines	34	33	27	6	2.95	Agreed
9	Software related problems	38	33	29	—	3.09	Agreed

*Grand Mean (X) score =3.2*

Table 4 reveals that slow Internet connection attracted 3.41 mean of respondents; difficulty in finding relevant information attracted 3.29 mean of respondents; frequent power outage attracted 3.69 mean of respondents; lack of training in basic Internet skills attracted 3.22 mean of respondents; unreliable information on the Internet attracted 2.82 mean of respondents; abuse of Internet, such as fraud, plagiarism attracted 3.2 mean of respondents; lack of skills in the use of computers attracted 3.37 mean of respondents. Ignorance of relevant search engines, software related problems attracted 2.95 and 3.09 mean of respondents respectively.

**Research question 5:** What strategies could be used to enhance the use of the Internet Search by LIS undergraduate students for research?

The aim of this question was to find out the strategies that could be used to enhance the use of the Internet Search by LIS undergraduate students for research. The data is presented in table 5:

**Table 5: Responses on the strategies that could be used to enhance the use of the Internet Search by LIS undergraduate students for research**

S/N	Items	VA	A	FA	NA	X	Decision
1	Provision of adequate training on the use of Internet by the university administration	75	24	—	1	3.73	Agreed
2	The cost of access of the Internet services should be made affordable	49	36	10	5	3.29	Agreed
3	More stable power supply should be provided by the university administration	81	19	—	—	3.81	Agreed
4	The server/system should be up graded regularly to make faster for information retrieval	43	27	30	—	3.13	Agreed
5	Licensing the Internet service providers (ISPS), the focal points for offering services	38	37	25	—	3.13	Agreed
6	There is need for user education by the university administration	47	33	10	10	3.17	Agreed
7	Increase of Internet Bandwidth by university administration	31	30	39	—	2.92	Agreed
8	Regulations, legislations and laws affecting information sourcing and dissemination should be established	28	52	20	—	3.08	Agreed

**Grand Mean (X) score =3.2**

From table 5, it can be seen that provision of adequate training on the use of Internet by the university administration; making the cost of access of the Internet services affordable; stable power supply; upgrading of server/system attracted 3.73, 3.29, 3.81 and 3.13 mean of respondents respectively while Licensing the Internet service providers (ISPS); need for user education; Increase of Internet Bandwidth attracted 3.13, 3.17, 2.92 and 3.08 mean of respondents respectively. This shows that provision of adequate training on the use of Internet and provision of stable power supply will enhance students' application of Internet Search Strategies.

## Discussion of Findings

From table 1, the finding of this study is that the respondents responded positively on the Internet as a means of carrying out effective teaching, learning and research. This is in line with what Adomi (2003) said that students not only use the Internet to search for materials to complete their assignments, but also use it to gather resources to supplement curricular offering. Owolabi (2007) also supported this view that the Internet has increasingly become a valuable asset in education in terms of learning, teaching and research.

The findings reveal that the undergraduate students of LIS, University of Nigeria, Nsukka indicated that Internet provides them with materials for writing term paper, projects and other assignments, they also use the Internet to search for information to enhance their academic research as well as using the Internet for communication purpose. This confirms Mutula (2003)'s statement that students use Internet mostly for educational purposes. William (1999) noted that students use the Internet to send and receive messages using electronic mail, Internet telephoning, keyboard chat and video conferencing. Usman (2006) noted that the Internet has opened up numerous possibilities for doing resource sharing at local and global level and that information on latest journals, books and discussion can be exchanged directly through the Internet. Also, This is supported by Ubogu (2006) noted that the Internet enables any citizen to access all human knowledge anytime and anywhere in a friendly, multi-modal effective way by overcoming barriers of distance, language and culture and by using multiple connected devices.

From table 2, the researchers' findings show that the undergraduate students of LIS, University of Nigeria, Nsukka visit search engines such as Google, Ask. Com, Alta Vista, etc. as Internet Search Strategies, but are ignorant of other Internet Search Strategies such as Boolean operators, phrase searching, sourcing information from the university library databases, and sending e-mail to researchers to send them research materials. This is in line with what Nachmias and Gilad (2002) said that finding information on the Internet requires the ability to use search engines, knowledge of search techniques, browsing through information, a cognitive capacity to organize searches, the ability to execute a search, an understanding of how information is organized, critical-thinking skills, and a working knowledge of Internet notations. The use of the Web requires the mastery of certain strategies which in turn requires specific Web-related skills. According to Xie and Joo (2010) following as are the Internet Search Strategies: Boolean Operators, Phrase searching, Proximity search, Fuzzy Search, Stemming, Truncation searches and Wildcard searches. This was supported by Akkoyunlu (2002a) and Brehm (1999) who noted some search strategies as Boolean search commands (and, or, near, none, not), power searching commands (in titles:, sites:, url:, link:, \*, ?, etc.) and search assistance features (related search, clustering, stemming, etc.).

From table 3 the findings revealed that the undergraduate students of LIS, University of Nigeria, Nsukka responded positively to the fact that the Internet Search Strategies enhances their research on the Internet. The students agreed that the knowledge of Internet Search Strategies help to make their search very easy; helps them to retrieve relevant information; helps to narrow down their search; makes the Internet user-friendly; makes for speedy access to information; helps them to write a good research work and that, Internet Search Strategies helps to save the time of the students. This is in line with what Chen (1998) said that the Internet is used for searching for useful information on a specific issue as a result of the tremendous, diversity and

volume of information contained. This is supported by Dike (2000) who noted that one of the reasons why students prefer digital technology is because it provides instant access to information from multiplicity of choices, and this motivates them to learn. Attama (2005) noted that Internet have really helped in conducting a good research and easy dissemination of information in the 21<sup>st</sup> century.

From the findings on the problems encountered by LIS undergraduate students while searching the Internet for research (table 4) frequent power outage, slow Internet connection; difficulty in finding relevant information; lack of training in basic Internet skills; unreliable information on the Internet; abuse of Internet, such as fraud, plagiarism; lack of skills in the use of computers; software related problems and ignorance of relevant search engines were indicated as the major problems hindering the use of Internet by the students, these findings confirm what World Bank Report (2000) said that low level of ICT skills development among the Nigerian youths is a problem that militate against the use. Sturges (2002) and Weitzner (2007) said that information on the Internet is unreliable. This is supported by Ayo (2001) who identified the factors that hinders the use of Internet in Nigeria as power supply, telephone, poverty, illiteracy, lack of adequate manpower, lack of adequate infrastructure and virus attack. Chigbu and Okafor cited in Ejizu (2010) said that ‘the cost of communication link to Internet in Nigeria is high and unreliable and noted that to depend entirely on web resources means that resources will not be available when communication line has problem. Power failure is the major problem facing the students in the utilization of Internet as founded by the researcher.

Finally, table 5 shows the strategies that could be used to enhance the use of the Internet Search by LIS undergraduate students for research. Many students responded that provision of adequate training, making the cost of access of the Internet services affordable; stable power supply; upgrading of server/system; Licensing the Internet service providers (ISPS), user education and increase of Internet Bandwidth will help to enhance the use of Internet by LIS undergraduate students for research. These findings confirm Audu (2006) who recommended that more Internet facilities be made available to students, and the students be taught internet skills.

According to Lacay (1999) ‘not many researchers in developing countries have been able to develop the methods and skills for searching for relevant information and materials, knowledge of web design, skills for using discussion forums, even basic knowledge of how to send e-mail, etc. Therefore, there is need for user’s education on the strategies with which to search the Internet by students or researchers. Okezie (2005) suggested for a proper digest of regulations, agreements, legislation and laws affecting information sourcing and dissemination as this will facilitate effective use of the Internet for research.

### **Implications of the study**

From the research findings, Internet is used to search for materials for writing term paper, projects and other assignment given to students. We are accustomed to using the Internet heavily and sometimes preferentially for academic assignments, but are we familiar with effective Internet search methodology? Therefore, searching on the Internet isn’t just a popular activity but an important skill needed to obtain information, thus understanding information searching processes is a relevant research issue. Internet helps to satisfy peoples hunger for knowledge and

further research. Therefore, there is need for user education because Internet has increasingly become a valuable asset in education in terms of learning, teaching and research and to effectively search the Internet for information, we must have the knowledge of the Internet search strategies that will make our search easier and faster. At this point, it becomes pertinent for the Nigerian government to address the various problems facing the use of Internet as it will go a long way to enhance the services rendered by the Internet.

### **Recommendations**

In the light of the findings, the researchers recommend the following:

1. Library and Information Science students should be trained on the Internet Search Strategies which will in turn enhance their research on the Internet.
2. Considering the epileptic Power supply in Nigeria, by Power Holding Company of Nigeria (PHCN) plc., a private generating outfit such as solar energy should be installed in the institution to ensure steady power supply for a successful service delivery in the universities
3. There is need to include computer based programme in the curriculum to enable students acquire basic and specific Internet skills necessary to operate computer.
4. The server/system should be up graded regularly to make faster for information retrieval with the available ICT resources by the university administration.
5. Regulations, legislations and laws affecting information sourcing and dissemination should be established to ensure less abuse of the Internet.

### **Conclusion**

The Internet is a new technological way to disseminate information to a larger population of people in a more speedy and accurate way. Therefore, the findings of the study revealed that students use the Internet to search for materials for writing term paper, projects and other assignments. Also, the results from this study show that searching and locating information on the Internet requires not only literacy skills but problem solving skills as well.

Additionally, the study revealed that the students use the following Internet Search Strategies for their research: search engines, source information from the university library databases, doing key word searching but it was discovered from the research that the students are unaware of other ISS such as Boolean operators, phrase searching, sending e-mails to researcher to send them research materials.

Also, the study revealed that the inadequate power supply, slow Internet connection, and lack of skills in the use of computers were problems militating against the use of Internet for research in University of Nigeria, Nsukka.

However, more research is needed in this area to better understand the complexities of searching materials from the Internet. It was suggested in the study that efforts should be made at providing stable power supply; adequate training on the use of Internet and user education by the university administration will enhance effective use of the Internet. Clearly we must improve our understanding of the skills required for information searching on the Web and of the processes involved to help adequately prepare students for life in the 21<sup>st</sup> century.

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