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USE OF SEARCH ENGINES AS PREDICTORS OF RESEARCH SKILLS OF POSTGRADUATE STUDENTS IN LIBRARY SCHOOLS: A CASE STUDY OF SOUTH-WEST, NIGERIA

By

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ABSTRACT

Research skills have become so imperative that it is not only needed to write technical research documents like dissertations and theses, but it is also needed after postgraduate studies for research productivity as well as for research and development. Information resources are highly needed when conducting research, which is an indication that the ability to use information resources like search engines could influence research skills. This study examines the use of search engines by postgraduate students in selected library schools in South-West, Nigeria. A descriptive survey research design of the correlational type was adopted for this study. The population comprises 311 postgraduate students in four (4) selected library schools in South-West, Nigeria. The library schools selected are library schools in University of Ibadan, Lead City University, Federal University of Agriculture, Abeokuta, and Tai Solarin University of Education, Ogun State. The total enumeration method was used while data was collected with the aid of a questionnaire. Descriptive and inferential methods were used in presenting the data. Results showed that the level of research skills of most postgraduate students sampled is high (overall mean = 100.2). Google is the most commonly used general search engine (99%), while Google Scholar is the most commonly used academic search engine (95%). The highest purpose for which search engines are used by the respondents is for basic reference information ($x = 3.51$). The frequency of use of the general search engine (Google) is high ($x = 4.64$), while that of the academic search engine (Google Scholar) is low ($\bar{x} = 2.84$). There is a significant relationship between search engine use and the research skills of the respondents ($r = .617$, $df = 303$, $p < 0.05$). Utilization of search engines is an important predictor of the research skills possessed by postgraduate students in library schools. Thus, library educators need to keep putting together all the necessary resources that will help maintain the research skills of their students and also help increase the frequency of academic search engine use.

Keywords: Search Engines, Search engines use, research skills, research competency, library schools (iSchool), postgraduate students, South-West, Nigeria

Introduction

Information is power, while it has also been argued that knowledge is power. Any useful information or knowledge is expected to be searched for and/or researched. The position of this present study is not to judge whether "information" is more powerful than "knowledge," but to serve as an eye-opener that every development seems to be connected with research. Some organizations and companies have even institutionalized research by having a separate department known as Research and Development (R&D). In the same vein, research institutes now exist in different sectors. Mandates of any university in the world are also not complete without "research". What then is a research?

Arguably, research should be one of the easiest terms to define because it has just two syllables ("Re" and "search"), which seem to be easily decodable at a glance. It is however worthy to note here that the seemingly simplicity of research by syllable is not tantamount to simplicity in its context. Kabir (2016) conceptualized research as the process of investigating, testing, and inquiring about a phenomenon. Research can also be seen as the process of generating, discovering, inventing, and creating new knowledge. According to Skovdal and Cornish (2015), research is the systematic process of collecting information (or data) in order to answer a question.

Research is an honest activity where reasoning, interest, critical thinking, experiences, and expertise are combined with the goal of ascertaining facts and finding solutions to problems through investigation and analysis. Research can therefore be summarized as a painstaking investigation that is systematic and scientific in nature for the purpose of filling knowledge gaps and creating new knowledge.

It is interesting to note that research is not peculiar to any field. All existing fields of knowledge conduct research, and the yet-to-be discovered discipline will also not neglect research. In a nutshell, all disciplines conduct research, but to varying degrees and with different approaches. The reason for this is not far-fetched. One of the mandates of universities globally is research. Perhaps this is because of the contribution of research to development. Research, however, may not lead to development if it is not done by qualified hands. Research is unarguably important for the economic development of a country as well as the individual conducting the research. It is imperative for researchers as well as research students in tertiary institutions to acquire the necessary research skills in order to have the requisite research skills. A student who has an understanding of research will be expected to have some traceable and transferable research skills.

Srivastava and Prakasha (2017) described research skills as an integral quality of personality, and this mainly reflects the willingness and ability to "independently" find solutions to novel problems. The word "independently" in the statement of Srivastava and Prakasha is a testament to the fact that research skills are highly needed because it takes competency to be able to conduct research independently. The word "willingness" in the definition is a way of saying one should not be compelled to conduct research. The word "ability" in the definition is synonymous with research skills. Research skills are an essential attribute that should be possessed by everyone in academia, regardless of their background or discipline, because research is mostly tied to development, whether individually or corporately.

Research skills are the ability possessed for research activities, as an integrative personality quality, and as a personality's special property. This implies that research skills could be a personality trait or an ability. The focus of this present study is not on the personality aspect of research skills but on the perspective of ability. Research skills within the context of this study implies knowledge acquired, behavior portrayed, skill possessed, method(s), and approach(s) adopted in relation to investigating a phenomenon or filling an identified gap(s) based on best practices.

It will take research skills for an individual to stand out in his chosen career; for an underrated profession to grow tangentially; for innovative ideas to become reality; for emerging technology to keep emerging; for development to be visible in a nation; for solutions to global problems to be discovered, especially in discovering the cure for the coronavirus (COVID-19); and for bridging necessary gaps in the field of librarianship. The research skills of the respective stakeholders and researchers in the aforementioned areas are highly imperative. Some skills are needed for research. In the study of Hoon et al. (2019), it was revealed that for postgraduate students to be able to successfully write a thesis, they must exhibit certain skills, which are critical reading skills, conceptual skills, writing skills, personal skills, and research skills. The authors further noted that these skills are highly needed before postgraduate students can be able to write research proposals, conduct literature reviews, collect data, analyze data, and report study findings.

A postgraduate student, for instance, should be able to formulate researchable topics, problem statements, study objectives, questions, and hypotheses. A research student who does not possess research skills may not be able to conduct a literature search. The writing of these also requires methodological and analytical skills. Research skills had been measured by Yarullin, Bushmeleva, and Tsyrukun (2015), Oyedokun, Adekunmisi, Oluwanya, Buraimo, and Bakre (2019); Ugwu, Ifeanyieze, and Agbo (2015), out of which research skills were evaluated based on skills related to writing background to the study; writing a review of related literature; writing methodology; analysis and discussion of findings; writing a summary, conclusion, and recommendations, as well as evaluating competencies that focused on referencing consulted materials.

This study opined that research skills should be demonstrated through the formulation of research topics. A student who does not know how to formulate researchable topics may not be considered to have research competency. It takes research skills to be able to identify a gap and clearly define the problem. Only a research-competent student can formulate research objectives, research questions, and research hypotheses seamlessly. Reviewing existing literature and building theoretical and conceptual models requires research skills and research competency. No student can be able to choose the required research design, draw the right sample from the population; choose the right research instrument(s), and draw inferences from the data gathered without some level of research skills.

In the study of Köksal and Razi, as cited in Heidari, Keshavarzi, and Marzooghi (2019), postgraduate students indicated that writing the discussion of the findings of a research paper was the most challenging aspect, while writing a list of references was the least challenging component. The discussion parts indicated by the respondents include the study background, literature review, and drawing inferences from the analyzed data. Based on the foregoing findings, one could conclude that background, literature of the study, discussion of findings, summary, and perhaps conclusion are the areas where the student finds it difficult because of the requisite expository nature of the study.

Iffat (2020) did an evaluative analysis of students' final research projects submitted at the end of the semester for final grading and the result. Incoherence and plagiarism were found in most of the research projects as a result of insufficient knowledge of subjects and writings related to research. In another study, Alghamdi, Hussaini, and Al-Hattami (2018) found that students plagiarize research work because of the heavy project loads and that their teachers do not check for plagiarism. His finding indicates the college students' reluctance to take a large number of research assignments because of this factor. The studies of Iffat, Alghamdi Hussaini, and Al-Hattami in the foregoing are based on undergraduate students. With this, one may predict that such undergraduate students may have low research skills when they come for their postgraduate study. This is one of the reasons one should not just assume that LIS postgraduate students have the requisite research skills.

During postgraduate study, LIS students may have some level of research anxiety. Anxiety is a common condition noticed in people of all ages. It could be due to a physical condition, a mental condition, the effects of drugs, or a combination of these. Anxiety is defined as a painful or apprehensive uneasiness of mind, usually over an impending or anticipated illness (Merriam-Webster, 2012). Research anxiety, based on the context of this study, can simply be defined as the nervousness of postgraduate students when conducting research. This present study does not see research anxiety as a negative phenomenon in totality. This is because a LIS postgraduate student may just be anxious about the process of conducting research and his/her score at the end of his/her dissertation or thesis. There could also be a part or section of the research that scares the student. Meanwhile, postgraduate students are not expected to have so much research anxiety because they must have undertaken research courses as well as research projects during their undergraduate studies.

A postgraduate student may be skeptical about how to conduct research for a dissertation or thesis. Such a student may not be sure about the whole process even if he or she has a distinction in the Research Methodology course. In other words, postgraduate students may be anxious about research even before undertaking it. Meanwhile, research anxiety is not really a bad thing. It is true that a high level of anxiety interferes with concentration and memory, which are critical for academic success. Without any anxiety, however, students may lack the motivation to study for exams, write research papers, or do daily activities related to their research course. Many students even have the wrong perception of research methods, which may affect their confidence in the processes involved in conducting research.

The foregoing can be buttressed by the statement of Razavi Shahrabi and Siamian (2017), who found that lecturers with research anxiety have the tendency to have more research productivity and quality research. This means that if a lecturer has research anxiety, it can either increase or decrease their research productivity. Many popular self-help books claim that increasing our confidence makes us more likely to be successful in life (Alan, Boneva, & Ertac, 2016), and within the context of this study, it implies that increasing the research confidence of students in research courses may help the lecturers achieve the best from their research interests.

Awodoyin, Adetoro, and Oke (2020) assert that there are variances in undergraduate students perceptions of research skills. Irrespective of the perception, LIS postgraduate students that demonstrate research skills should be able to identify researchable topics because the inability to structure a researchable topic is like starting a journey on the wrong route. Such a student should not just formulate a researchable topic but also demonstrate competency in reviewing existing literature. The good thing about reviewing existing literature is that it can also aid in the formulation of researchable topics for postgraduate students and help identify some existing

gaps in the literature. These existing gaps can be used to make a good statement of the problem, especially in the introduction part of technical writings like dissertations and theses.

Subsequently, LIS postgraduate students need to demonstrate methodology skills. Competency in research methodology will help LIS postgraduate students clearly define the right direction in which the investigated phenomenon should go. The competency in methodology can be demonstrated through the ability to use the right research design, population, sample size, sampling technique(s), and research instruments. Competency in this area may also include the ability to consider the ethics of research in the data collection process. Other areas of research skills that are germane to this present study are in the areas of analytical skills: drawing inferences and drawing conclusions based on the analyzed data. During analysis, it is good for postgraduate students to be able to interpret the analyzed data that may have been computed by an expert somewhere else. With this, such postgraduate students will be able to easily detect if the contracted analyst has done the wrong thing or not. This study opined that analysis of research work should be done by the researcher him/herself and not contracted out. The rhetorical question is how many postgraduate students in library schools can analyze their data themselves?

Yarullin, Bushmeleva, and Tsyrcun (2015) posit that research skills include an individual's ability to locate the needed information resources to perceive a problem theoretically as well as to adopt scientific knowledge in a specific professional situation. Based on the assertions of Yarullin, Bushmeleva, and Tsyrcun, one could infer that the process of "finding resources" is very sacrosanct when conducting research, and it is one of the ways in which research skills can be evaluated. Gone are the days when the library used to be the first thing on the mind of any researcher in order to get research materials. The order has changed from the contents on a "clay tablet" to the contents on a "palm tablet".

In this present age, where the world is now in our palms, one may not do without using a search engine while conducting research because of its potency as a source of information. Search engines provide a direct and indirect link to the relevant information resources for research purposes. In a situation where a researcher just needs to utilize library resources, the search engine can also help locate the resources or verify the authenticity of every piece of information retrieved from the library. Now that no single library can boast of having every information resource, this present study believes that search engine use can serve as a surrogate for retrieving information that is useful for research. Although search engines cannot replace libraries, it is a tool that can greatly complement the services of libraries and information centers, especially for undertaking research. Buttressing the foregoing, Niu, Hemminger, and Lown (2010) assert that scholars and Researchers often enjoy online search tools because of their easy accessibility and use, which is also one of the features of search engines. This corroborates the assertion of Adomi (2015) that researchers are now depending on internet search engines instead of libraries to meet their research information needs. The S. R. Ranganathan law of library services can therefore be related to this study by opining that the world is now turning to the age where *"every researcher his search engine"* and *"every search engine its researcher!"*

As rich and as good as search engines are for research, it takes a competent researcher to be able to utilize the resources because of the challenges posed by the information explosion. Too much information can lead to confusion, and confusion is deadly for research and development. Researchers are expected to have the skills that would enable them to sieve through the huge information sources suggested via search engines so as to get the most relevant materials. In

an information retrieval system, for example, precision and recall are two of the key concepts that one needs to take into consideration as a researcher. A researcher needs to be able to calculate the precision and recall rates of information that was suggested to them by any search engines of interest. It takes research skills to understand that a high precision rate should be preferred to recall rates when conducting research. In other words, a competent researcher should not make recall rates his/her priority because an information material with high recall rates may not be relevant for the purpose of the study compared to a material with high precision rates.

When utilizing search engines for the purpose of research, the rates of recall and precision are dependent on the search terms used by the researcher. This underscores the need to understand how search engines work and how to combine different terms to get the most useful piece of information. Combining search terms with Boolean operators like AND, OR, and NOT is very essential when searching for information on the search engine for research purposes (Amirova et al., 2022). Boolean operators will make search engines like Google rank the most relevant information sources at the top and exclude the less relevant ones from the first page of all suggested information sources.

While searching for information, some people ignorantly limit the capacity of search engines. This is because search results in search engines are given on pages, but many will not bother to check the information on the second page of the search results. The rhetorical question is: are the other suggested information search results not relevant to the research that is being undertaken? The onus is on every researcher to understand that the top results may not necessarily mean that other results on other search result pages are not relevant. In some cases, Ads from two or three companies may even occupy the top results, which at times limits other relevant results that should make it to the first page of search results. This study therefore opines that researchers should search at least the first-three pages of the search results.

It is important to clarify that a search engine does not contain information in itself; it only provides links to diverse information sources that are available in the "space". The "space" here means both online and offline sources of information. Many people erroneously view search engines as containing only online information. A search engine can help a researcher know the nearest library and information centers he/she can visit to get print materials that can be used as secondary sources for data collection. For example, a researcher might want to investigate how public documents are managed in public libraries.

A search engine may not be able to provide all the information needed on how public documents are managed in a community, but a search engine like Google can crawl information that will provide details on how to locate libraries that will be helpful for such research. Thus, while search engines provide links to online information resources, they can also help point to where offline resources can be found. The concentration of this present study is on the online resources because they seem to be mostly used. The rhetorical question now is: what are the search engines that are mostly used by postgraduate students, and for what purpose?

The Google search engine is one of the search engines that are frequently used for different purposes by postgraduate students. Ngwuchukwu (2017) revealed that research is one of the major purposes of using search engines by postgraduate students at the University of Nigeria, Nsukka, Enugu State. The author further found that Google is the most used search engine by postgraduate students. This finding is an indication that it may be difficult to separate the efficacy of search engines from any research that is being undertaken by postgraduate students.

The types of search engines that are useful for research are general search engines and academic search engines. Examples of academic search engines are Google, Yahoo, Bing, Dogpile Devil Finder, Ask.com, AOL, Yandex, Baidu, and DuckDuckGo, among others. Academic search engines are Google Scholar, Google Books, Microsoft Academic, Semantic Scholar, ResearchGate, Academia.edu, the Educational Resources Information Center (ERIC), Worldwide Science, PubMed Central, and the Bielefeld Academic Search Engine (BASE), among others. Postgraduate students can make use of either general or academic search engines to locate needed open-access resources.

Problem statement

Research is an investigative phenomenon that requires requisite skills and competencies before it can be carried out based on best practices. In fields like information sciences and librarianship, research skills are highly needed because of the interdisciplinary nature of the disciplines. This is why research undertakings in library studies, for instance, may adopt methodologies that cut across disciplines like the sciences, arts, and humanities, to mention a few. Growing researchers and potential researchers in the field of Library and Information Science (LIS) may require research skills to break new grounds and bridge the yet-to-be-filled gaps in librarianship. With the research skills of LIS postgraduate students, the future of librarianship will be brighter.

Search engines are now one of the major first points of contact for information retrieval because they can return innumerable results crawled from different databases on the web. Meanwhile, someone without research skills may find it difficult to identify relevant information from the pool of results returned by search engines during textual queries. There are even academic search engines that are dedicated to literature searches, like Google Scholar. Literature searches can be done using search engines, and postgraduate students may not know how to conduct literature searches on search engines without possessing research competency. There may be hundreds of scholarly materials available for a single research topic for LIS postgraduate students; it will take a research competent postgraduate student to demonstrate the ability to sieve the pool of available information returned by search engines in order to capture the most relevant articles using search engines. A postgraduate student in LIS who frequently makes use of academic search engines may have in-depth knowledge about LIS research. This may possibly increase the research skills of such students, but there are no empirical studies to establish the effect. It therefore becomes imperative to know if the use of search engines predicts the research skills of postgraduate students.

Research objectives

The specific objectives are to:

- i. investigate the level of research skills possessed by postgraduate students in library schools;
- ii. identify the types of search engines used by postgraduate students in library schools;
- iii. ascertain the frequency of search engines used by postgraduate students in library schools;
- iv. examine the purpose of the search engines used by postgraduate students in library schools; and
- v. investigate the relationship between the use of search engines and research skills of postgraduate students in library schools

Research questions

The following research questions

- i. What is the level of research skills possessed by postgraduate students in library schools?
- ii. What are the types of search engines used by postgraduate students in library schools?
- iii. What is the frequency of search engines used by postgraduate students in library schools?
- iv. What are the purposes of the search engines used by postgraduate students in library schools?

Hypotheses

The null hypothesis formulated is as follows:

HO₁: There is no significant relationship between the use of search engines and research skills of postgraduate students in library schools

REVIEW OF RELATED STUDIES

Research skills of postgraduate students

Irrespective of the discipline, research writing for postgraduate students is not an easy task because it is a technical report where every word counts. It takes research skills to be able to write a good technical report that can communicate research findings. Ugwu, Ifeanyieze, and Agbo (2015) conducted a study to show the need for research skills among postgraduate students in Science, Technology, Engineering, and Mathematics (STEM) education. The research design used was a survey, and data were collected using a structured questionnaire. The study population comprises 150 PhD students and 222 Masters Students in STEM education at nine (9) Nigerian Universities in the South-East. The study's findings show that postgraduate students need 32 different competencies in research writing. Out of the 32 research competencies, the authors reported that 25 were very difficult for the students to possess.

According to the authors, the difficult competencies include the ability to generate a good researchable topic; writing all the contents in chapter one (introduction); organizing the review of literature; reviewing empirical studies; summarizing the literature reviewed; selecting study population, sample, and technique; developing instruments; the ability to identify how to validate instruments; finding reliability of instruments; difficulties in post-field; analyzing and interpreting data; the ability to identify major findings; discussing findings based on past literature; making appropriate recommendations; drawing conclusions; as well as the ability to compile references. With the findings of Ugwu, Ifeanyieze, and Agbo (2015), it can be deduced that postgraduate students in STEM have difficulties in all the major parts of research writing. This is, however, a great threat to the growth of STEM in the South-Eastern part of the country and Nigeria at large. There is therefore a need to investigate the status quo in an interdisciplinary field like Librarianship so as to prepare for the future!

Khan et al. (2016) evaluated the program effectiveness of Research skills Development. The research design adopted was quasi-experimental, comprising a control group and an experimental group. The study population was 102 students from a training University. The authors found that there is a low level of research skill formation among students. The reason for the low level of research skills is not far-fetched. As revealed, the students are only exposed to theoretical training. Khan et al.'s findings are an indication that research skills cannot be achieved through ordinary theoretical work.

Rumman and Alheet (2019) conducted a study on the role of researcher competencies in delivering successful research. The author delves into some of the research abilities that researchers should possess. The author reviewed past literature, from which inferences were drawn. As found out by the author, the skills required by researchers, irrespective of discipline and level, include good writing skills, the ability to understand a problem, and the ability to clearly communicate the results.

To an extent, hands-on learning could also help improve students research skills. Davidson and Palermo (2015) investigated how a research course unit improved the research skills of undergraduate students. Before commencing the "research method course", the students were made to fill out a research skills questionnaire (pre-survey). On completion of the course, a post-survey was conducted. The data gathered were analyzed using Mann-Whitney-U tests and Wilcoxon tests at the 0.05 significance level. The Whitney-U tests were adopted to determine the difference in variables of interests, while Wilcoxon Tests were used to determine the difference between attitude towards research and self-perceived competence in research skills.

While a postgraduate student might want to be "smart" about research ethics, an undergraduate student may not even be aware of some ethical considerations in research. Iffat (2020) did an evaluative analysis of students' final research projects submitted at the end of the semester for final grading and the result. Incoherence and plagiarism were found in most of the research projects as a result of insufficient knowledge of subjects and writings related to research. In another study, Alghamdi, Hussaini, and Al-Hattami (2018) found that students plagiarize research work because of the heavy project loads and that their teachers do not check for plagiarism. The finding indicates the college students' reluctance to take a large number of research assignments because of this pertaining factor. The studies of Iffat (2020) and Alghamdi, Hussaini, and Al-Hattami (2018) in the foregoing are based on undergraduate students. With this, one may predict that such undergraduate students may have low research skills when they come for their postgraduate students. This is one of the reasons one should not just assume that LIS postgraduate students have research skills.

In the study of Ndege, Migosi, and Onsongo (2011) on determinants of research productivity, major determinants of the research productivity of academics in Kenya were revealed. The research design was a survey. Out of a population of 5,000 academics, a sample of 277 faculty members and 17 heads of departments were drawn from Kenyan universities using stratified sampling techniques. The disciplines of the faculty members sampled are medicine, architecture, arts, science, law, education, science, and business studies. Document analysis and a questionnaire were the two main research instruments. One of the findings of the study revealed that the research productivity of academics in universities is positively affected by research skills gained, with a strong positive correlation coefficient of 0.830. The implication of the foregoing findings in the present study is that research skills have a great resultant effect on research productivity. In other words, anyone in the academic environment can only be productive in research if he/she has research skills. This underscores the need for research

skills, especially for postgraduate students who are planning to build a career in academia or for some of them who are already building theirs in the academic environment.

It is, however, worthy to clarify that research skills are not synonymous with Research Productivity (RP). While RP has to do with the number of publications or research outputs, research skills deal with the ability of an individual to produce quality research. RP has been described by many authors (Catherine, 2016; Chen, 2010; Okonedo-adegbaye, 2016; Morales et al., 2017; D'Angelo and Murgia, 2017), and all the authors' submissions have common meeting points. In the study of Abramo, D'Angelo and Murgia (2017), research productivity was measured by using the sum of the citations received by the publication of each respondent.

Research productivity is easier to measure than research skills. Several studies on research productivity are already in the literature, and many of the authors indicated that research productivity can be measured using indicators that include but are not limited to the number of published articles, patent filings, book chapters, conference proceedings, number of projects undertaken, chapter-in-a-book, workshop papers, seminar papers, and technical reports (Altbach, 2015; Fauzi et al., 2019; Ifijeh and Ifijeh, 2018; Iroaganachi and Izuagbe, 2018; Morales et al., 2017; Musa, 2015; Okiki and Mabawonku, 2013; Simisaye and Popoola, 2019; Suhardi et al., 2019). There is still a dearth of studies on the indicators of research skills. The reason is not far-fetched. While research productivity deals with "number", research skills focus on exhibited traits and proven abilities that relate to research, which may not be so easy to appraise.

The use of search engines by postgraduate students

Search Engines can be conceptualized as a resource that crawl different web pages based on keywords. The major description of search engine can be inferred from the features of different search engines. Malik, (2014) indicated that one of the features of search engines is that it often uses the special algorithms to sort the web pages on Search Engine Results Pages (SERPs). The most popular or highest quality web pages will be near the top. Search engines are very useful to find information about anything quickly and easily. Using more keywords or different keywords improves the results of searches. It presents the extensive review and analysis of search engines and examines the user behavior while interacting with search engines.

A search engine can be described as an information superhighway system that can be used to retrieve information on the World Wide Web based on search queries. Search engines are internet-enabled software systems that use algorithms to crawl related search queries from a database(s) within a nanosecond. Ngwuchukwu (2012) described a search engine as a fast and effective tool that can be used to retrieve information from the internet. The author further explains that search engines are similar to other information retrieval systems like catalogs and book indexes, but their services are provided in different ways. Different studies have been conducted on the use of search engines by students.

Onuh and Ekwueme (2020) conducted a study on the awareness and utilization of search engines for information retrieval by students. A survey research design was adopted, and the needed data was gathered by 293 respondents. Findings showed that the awareness level of search engines for information retrieval was low. The level of search utilization for information retrieval by the students was also low. The most preferred search engines utilized by the students are Yahoo, Google, Bing, and Ask.com.

A related study was conducted by Ngwuchukwu (2012) on the use of search engines by postgraduate students of the University of Nigeria, Nsukka (UNN) using a survey research design. Data was gathered from 56 postgraduate students at UNN using a questionnaire. Findings of the study revealed that the highest purpose of using search engines by almost all the respondents (98%) was to source information related to research. The top search engines mostly used are Google and Yahoo, respectively. It was also found out that Google facilitates more literature searches than other search engines. In a comparative study conducted by Grover, Singh, and Kumar (2014), the performance analysis of five search engines revealed that Google is the best among the five search engines analyzed because of its unique features, interface, and user friendliness. The author also concludes that Google is the best of all and that it performs better than others. The other four search engines are Yahoo, Alta Vista, Ask, and Bing. The studies of Kaur and Bhatia (2011) and Bar-Ilan (2011) also corroborate those of Grover, Singh, and Kumar (2014) by concluding that Google has the best features and interface.

METHODOLOGY

This study adopted a correlational type of survey research design, and the data was collected using a structured questionnaire. The study population comprises all 311 postgraduate students in four (4) library schools in South-West, Nigeria. Library schools are tertiary institutions offering degree programs in Library, Archival, Information Science, and Information Studies. Library schools are popularly known as iSchools (information schools) in the United States, Canada, and some European countries. The library schools selected in the South-west geopolitical zone of Nigeria are the University of Ibadan, Oyo State; Lead City University, Oyo State; Federal University of Agriculture, Abeokuta; Ogun State; and Tai Solarin University of Education, Ogun State. Out of the 311 copies of the administered questionnaire, 305 were returned and found useful for analysis. This gave a response rate of 98% (see Table 1). Total enumeration method was used to select all the participants. Total enumeration method is the practice of choosing the entire study population as respondents. The distribution of questionnaire administration is shown in Table 1:

Table 1: Distribution of questionnaire administration and return rate

SN	Name of University and Library School	Distribution	Return
1	Department of Library, Archival and Information Studies, University of Ibadan (UI)	201	198
2	Department of Library and Information Science, Lead City University (LCU)	19	18
3	Department of Library and Information Studies, Federal University of Agriculture, Abeokuta (FUNAAB)	26	25
4	Department of Library and Information Science, Tai Solarin University of Education (TASUED)	65	64
	TOTAL	311	305

Results

Demographic characteristics of respondents

Table 2 presents the results of the demographic information of the respondents

Table 2: Demographic information of respondents

Demographic Characteristics	Freq	%
Gender		
Male	116	38.0
Female	189	62.0
Marital status		
Single	221	72.5
Married	80	26.2
Widowed	3	1.0
Divorced	1	0.3
Age bracket		
Less than 25years	31	10.2
25-30years	106	34.8
31-35years	63	20.7
36-40years	55	18.0
41-45years	18	5.9
46-50years	24	7.9
Above 50years	8	2.6
Current Program of Study		
MLIS	287	94.1
M.Phil	6	2.0
PhD	12	3.9

N=305

Data from Table 2 above revealed that more female LIS postgraduate students 189 (62%) participated in the study that the males 116 (38%). Majority of the respondents are still single 221 (72.5%) followed by 80 (26.2%) of them who are married. In addition, most of the sampled LIS postgraduate students are between the age brackets of 24-30 years 106 (34.8%) followed by those between 31-35years 63 (20.7%) while the least are those above 50years 8(2.6%).

Majority of the students are currently enrolled for MLIS 287(94.1) while only 6 (2.0%) currently enrolled for M.Phil in LIS.

RQ1: What is the level of research skills possessed by postgraduate students in library schools?

The indicators that make up research skills are identification of researchable topics, reviewing previous studies, conceptual modelling, theoretical framework, methodology, data analysis and skills in drawing inferences from analyzed data. Table 3 showed the responses of postgraduate students in selected library schools on the statements intended to measure their level of research skills.

Table 3: Research skills of LIS postgraduate students in library schools

STATEMENTS	SA		A		D		SD		Mean	SD
	F	%	F	%	F	%	F	%		
Identification of researchable topics										
I choose my research topic based on identified gaps	199	65.2	59	19.3	10	3.3	37	12.1	3.38	1.02
I ensure that all my chosen variables are measurable	210	68.9	65	21.3	3	1.0	27	8.9	3.50	0.90
After choosing my research topic, the value of my dependent variable depends on changes in the independent variable(s)	179	58.7	97	31.8	3	1.0	26	8.5	3.41	0.88
I believe that a concise research topic with the required variables is better than a long research topic	148	48.5	131	43.0	15	4.9	11	3.6	3.36	0.74
I know that my independent and dependent variables have cause and effect relationship	68	22.3	54	17.7	63	20.7	120	39.3	2.23	1.19
Reviewing previous studies										
I give priority to information in peer-reviewed journals when reviewing existing literature	72	23.6	79	25.9	6	2.0	148	48.5	2.25	1.28
I prioritise currency before using any existing literature for my literature review	179	58.7	105	34.4	11	3.6	10	3.3	3.49	0.72
I make citations in my review even if I paraphrase the author's idea	136	44.6	142	46.6	12	3.9	15	4.9	3.31	0.77
I always ensure that all cited works in my literature are referenced	183	60.0	98	32.1	14	4.6	10	3.3	3.49	0.74
After reviewing existing studies, I appraise literature reviewed so as to identify existing gaps	69	22.6	75	24.6	74	24.3	87	28.5	2.41	1.13
Conceptual Modeling										
I input both the independent and dependent variables each time I want to build my model	119	39.0	127	41.6	44	14.4	15	4.9	3.15	0.84
Variables in my research work should have indicators that will be used to measure it	69	22.6	105	34.4	14	4.6	117	38.4	2.41	1.21
I know how to include intervening variable in my model, where necessary	90	29.5	36	11.8	0	.0	179	58.7	2.12	1.37
I know how to clearly show the relationships among my variables while constructing my model	89	29.2	58	19.0	2	.7	156	51.1	2.26	1.34

Conceptual model helps to graphically understand the relationship between the dependent and independent variables	120 39.3	95 31.1	11 3.6	79 25.9	2.84 1.20
Theoretical framework					
Theories in my research should have a good connection with my research topic	132 43.3	118 38.7	7 2.3	48 15.7	3.10 1.04
I am expected to indicate who propounded my chosen theory in my research writings	121 39.7	128 42.0	9 3.0	47 15.4	3.06 1.02
My theoretical framework gives a clear explanation on what guides my study	167 54.8	90 29.5	5 1.6	43 14.1	3.25 1.03
I am expected to indicate the year my chosen theory was propounded in my research writings	110 36.1	107 35.1	7 2.3	81 26.6	2.81 1.19
Relevance of my chosen theory with my research topic should be clearly explained	188 61.6	100 32.8	8 2.6	9 3.0	3.53 0.69
Methodology					
I choose my research design based on the nature of the investigated phenomenon and my variables	141 46.2	121 39.7	35 11.5	8 2.6	3.30 0.77
Mixed method research is when both the qualitative and quantitative approaches are used while conducting research	57 18.7	64 21.0	37 12.1	147 48.2	2.10 1.20
I prefer to increase my sample size so as to reduce sampling error	64 21.0	78 25.6	9 3.0	154 50.5	2.17 1.26
I know that data collected using interview guide is a qualitative data	208 68.2	67 22.0	2 .7	28 9.2	3.49 0.90
I will like to know the reliability score of any research instrument before administering the questionnaire in the actual study area	178 58.4	98 32.1	3 1.0	26 8.5	3.40 0.88
Data Analysis					
I know how to appropriately present my data in Tables and charts, where necessary	121 39.7	73 23.9	10 3.3	101 33.1	2.70 1.29
I know how to run tests on data gathered using statistical software	91 29.8	81 26.6	8 2.6	125 41.0	2.45 1.29
I can use correlation tests to predict the strength of association between two variables as well as the direction of the relationship	71 23.3	73 23.9	7 2.3	154 50.5	2.20 1.28
I can use statistical software to run regression analysis to show the effects of two or more independent variables on a single independent variable	63 20.7	36 11.8	9 3.0	197 64.6	1.89 1.26

I know how to compute tests using descriptive statistics like mean, median, and standard deviation	136 44.6	143 46.9	12 3.9	14 4.6	3.31 0.76
Drawing inferences from analyzed data					
I always make reference to existing studies and relate it with my findings	165 54.1	83 27.2	9 3.0	48 15.7	3.20 1.08
If your maximum expected mean value is 5.0 and the result of a test shows 3.9 mean score, it means that there is a high agreement to such response by the respondents	119 39.0	108 35.4	31 10.2	47 15.4	2.98 1.05
If your p-value is less than 0.05 when analyzing your data, it means that the test is statistically significant	59 19.3	82 26.9	43 14.1	121 39.7	2.26 1.17
I ensure I give meaning to all analyzed data in simple terms	75 24.6	81 26.6	9 3.0	140 45.9	2.30 1.28
I know how to draw conclusion from my findings	127 41.6	121 39.7	14 4.6	43 14.1	3.09 1.01
Overall Mean					100.2

Test of norm for level of research skills possessed by LIS postgraduate students

Score	Level
0-46.7	Low
46.8-93.5	Moderate
93.6-140	High

There are thirty-five (35) statements in the scale used to measure research skills and four measures (Strongly Agree, Agree, Disagree and Strongly Disagree). The 35 statements were multiplied by the four measures, which gives a score of 140. The division of 140 by 3 gives 46.7. Thus, the scale between 0-46.7 shows that the level of research skills is low, the scale between 46.8-93.5 indicates that the level of research skills is moderate while the scale between 93.6-140 shows a high level of research skills possessed by LIS postgraduate students.

From the findings, the overall mean for research skills is 100.2 which falls within the scale of “93.6-140” implying that the level of research skills possessed by LIS postgraduate students in four selected library schools is high. The responses of the postgraduate students corroborated the high level of research skills especially in the skills related to identification of researchable topic, reviewing previous studies and in theoretical framework. Apart from the overall ratings which reported high research skills of postgraduate students, the students seem to have low skills in conceptual model building. This was evident in the fact that majority of them disagree to the statement that variables in research work should have indicators that will be used to measure it ($\bar{x} = 2.41$). Majority of the LIS postgraduate students also indicated that they do not know how to include intervening variable in their model ($\bar{x} = 2.12$) while more than half of the students noted that they do not know how to show the relationships among variables while constructing conceptual model ($\bar{x} = 2.26$).

About from their seemingly low skills in building conceptual model, similar situation was recorded in their methodological skills. Majority of the students disagree to the fact that mixed method research is when both the qualitative and quantitative approaches are used ($\bar{x} = 2.20$); and that they do not like to increase their sample size so as to reduce sampling error ($\bar{x} = 2.17$). In the same vein, more than average of the students indicated that they do not know how to run tests on data gathered using statistical software ($\bar{x} = 2.45$). Also, majority of them cannot use correlation tests to predict the strength of association between two variables as well as the direction

of the relationship ($\bar{x} = 2.20$), and cannot use statistical software to run regression analysis to show the effects of two or more independent variables on a single independent variable ($\bar{x} = 1.89$). This is an indication that postgraduate students in the library schools sampled have low data analytical skills despite their high level of research skills.

RQ 2: What are the types of search engines used by postgraduate students in library schools?

Table 4 presents result on the types search engines used by postgraduate students in the library schools sampled

Table 4: Types of search engines used by postgraduate students in library schools

N=305

ITEMS	Used		Not Used		Mean	SD
	F	%	F	%		
General Search Engines						
Google	303	99.3	2	0.7	0.99	0.81
Yahoo	117	38.4	188	61.6	0.38	0.49
Bing	19	6.2	286	93.8	0.06	0.24
Dogpile	14	4.6	291	95.4	0.05	0.21
DevilFinder	7	2.3	298	97.7	0.02	0.15
Ask.com	24	7.9	281	92.1	0.08	0.27
AOL	4	1.3	301	98.7	0.01	0.11
Yandex	11	3.6	294	96.4	0.04	0.19
Baidu	5	1.6	300	98.4	0.02	0.13
DuckDuckGo	3	1.0	302	99.0	0.01	0.99
Academic Search Engines						
Google Scholar	290	95.1	15	4.9	0.95	0.22
Google Books	111	36.4	194	63.6	0.36	0.48
Microsoft Academic	51	16.7	254	83.3	0.17	0.37
Semantic Scholar	21	6.9	284	93.1	0.07	0.25
ResearchGate	234	76.7	71	23.3	0.77	0.42
Academia.edu	249	81.6	56	18.4	0.82	0.39
Educational Resources Information Centre (ERIC)	23	7.5	282	92.5	0.08	0.26
WorldWideScience	9	3.0	296	97.0	0.03	0.17
Bielefeld Academic Search Engine (BASE)	16	5.2	289	94.8	0.05	0.22
PubMed Central	32	10.5	273	89.5	0.10	0.31

As shown in Table 4, there are twenty (20) items on the scale showing different types of search engines. The items were divided into general search engines and academic search engines with each category having ten (10) items. In the general search engines category, findings of the study revealed that almost all the respondents make use of Google search engine 303(99%, $\bar{x} = 0.99$) which was followed by Yahoo 117(38.4%, $\bar{x} = 0.38$). The least general search engines used was DuckDuckGo 4(1.0%, $\bar{x} = 0.01$). Also, the academic search engine commonly used by the LIS postgraduate students is Google Scholar 290(95.1%, $\bar{x} = 0.95$). The other search engines commonly used by them are Academia.edu 249(81.6%, $\bar{x} = 0.82$) and ResearchGate 234(76.7%, $\bar{x} = 0.77$). The least search engine used is WorldWideScience 9(3.0%, $\bar{x} = 0.03$).

RQ 3: What is the frequency of search engines used by postgraduate students in library schools?

Table 5: Frequency of search engines used by postgraduate students in library schools

SEARCH ENGINES	Daily		Weekly		Monthly		Occasionally		Never		Mean	Std Dev
	F	%	F	%	F	%	F	%	F	%		
General Search Engines												
Google	244	80.0	25	8.2	26	8.5	8	2.6	2	0.7	4.64	0.78
Yahoo	13	4.3	4	1.3	7	2.3	93	30.5	188	61.6	1.56	0.94
Bing	1	0.3	11	3.6	5	1.6	2	0.7	286	93.8	1.16	0.65
Dogpile	-	-	-	-	2	0.7	12	3.9	291	95.4	1.05	0.25
DevilFinder	-	-	-	-	-	-	7	2.3	298	97.7	1.02	0.15
Ask.com	-	-	2	.7	9	3.0	13	4.3	281	92.1	1.12	0.45
AOL	-	-	-	-	2	0.7	2	0.7	301	98.7	1.02	0.18
Yandex	-	-	-	-	1	0.3	10	3.3	294	96.4	1.04	0.21
Baidu	-	-	-	-	-	-	5	1.6	300	98.4	1.02	1.27
DuckDuckGo	-	-	-	-	-	-	3	1.0	302	99.0	1.01	0.10
Academic Search Engines												
Google Scholar	40	13.1	41	13.4	68	22.3	141	46.2	15	4.9	2.84	1.14
Google Books	-	-	3	1.0	10	3.3	98	32.1	194	63.6	1.42	0.61
Microsoft Academic	2	.7	3	1.0	8	2.6	38	12.5	254	83.3	1.23	0.61

Semantic Scholar	3	1.0	2	0.7	3	1.0	13	4.3	284	93.1	1.12	0.53
ResearchGate	9	3.0	38	12.5	61	20.0	126	41.3	71	23.3	2.30	1.05
Academia.edu	-	-	36	11.8	87	28.5	126	41.3	56	18.4	2.34	0.91
Educational Resources Information Centre (ERIC)	-	-	-	-	-	-	23	7.5	282	92.5	1.08	0.26
WorldWideScience	-	-	-	-	-	-	9	3.0	296	97.0	1.03	0.17
Bielefeld Academic Search Engine (BASE)	-	-	-	-	-	-	16	5.2	289	94.8	1.05	0.22
PubMed Central	-	-	-	-	-	-	32	10.5	273	89.5	1.10	0.31

N=305

Table 5 showed responses of LIS postgraduate students on their respective frequency of search engines used. The general search engine that is being used regularly is Google. This is because 244 (80%) of the students indicated that they make use of it daily ($\bar{x} = 3.24$). The students rarely make use of other search engines like yahoo, Bing, dogpile, AOL, ask.com, Yandex, Baidu, and DuckDuckGo. The academic search engine that is being used by the students sampled is Google Scholar ($\bar{x} = 2.84$) but majority of the students make use of it occasionally. It is worthy to infer that frequency of use in general search engines is higher than that of academic search engines. For instance, only 40 (13.1%) make use of Google Scholar daily; 41 (13.4%), weekly, 68 (22.3%) monthly, 141 (46.2%) occasionally, and 15 (4.9%) of them has never used Google Scholar. Majority of the respondents has never used other types of academic search engines.

RQ 4: What is the purpose of search engines used by postgraduate students in library schools

Table 6: Purpose of search engines used by postgraduate students in library schools

STATEMENTS	SA		A		D		SD		Mean	Std Dev
	F	%	F	%	F	%	F	%		
I use search engine to locate OPAC	152	49.8	132	43.3	9	3.0	12	3.9	3.39	0.73
I use it to find seminar proposal material and thesis online	138	45.2	143	46.9	16	5.2	8	2.6	3.35	0.70
I use search engines for basic reference information	181	59.3	105	34.4	12	3.9	7	2.3	3.51	0.68
Search for a particular authors' profile (publications and citation index)	136	44.6	143	46.9	12	3.9	14	4.6	3.31	0.76
To search for terms that are not understood	185	60.7	96	31.5	10	3.3	14	4.6	3.48	0.77
I use search engine for random search	136	44.6	123	40.3	36	11.8	10	3.3	3.26	0.79
I use it to gather materials for my assignment in my postgraduate courses	123	40.3	128	42.0	45	14.8	9	3.0	3.20	0.80
I use it for literature search	119	39.0	154	50.5	17	5.6	15	4.9	3.24	0.76
For getting links to websites that its address are unknown to me	147	48.2	134	43.9	17	5.6	7	2.3	3.38	0.70
Searching current trends in LIS profession and other related disciplines	123	40.3	119	39.0	58	19.0	5	1.6	3.18	0.79

Table 6 showed the purposes of search engines used by postgraduate students in selected library schools in South-west, Nigeria. There are ten (10) statements in the scale use to measure the purposes of search engines and four measures (Strongly Agree, Agree, Disagree and Strongly Disagree). As shown in Table 6, all the mean scores on the items provided rated between a mean score of 3.18 – 3.51. This implies that all the items have been rated positively and accepted by the respondents since none of it falls below 2.5 mean score. This implies that majority of LIS postgraduate students in Oyo and Osun has common purposes of search engines use. The highest of all the purposes among the students is that they use search engines for basic reference information ($\bar{x} = 3.51$) followed by those using it to search for terms that are not well understood ($\bar{x} = 0.77$). In connection with research, the purposes the students make use of search engines are

to find seminar proposal material and thesis online ($\bar{x} = 3.35$); to search for a particular authors' profile especially their publications and citation index ($\bar{x} = 3.31$) and for literature search ($\bar{x} = 3.24$)

Hypothesis: There is no significant relationship between search engine use and research skills of postgraduate students in library schools

The results of the correlation analysis conducted between search engine use and research skills of postgraduate students in library schools are presented in Table 8.

Table 7 Relationship between search engine use and research skills of LIS postgraduate students

Variables	Mean	Std. Deviation	N	r	Sig. (P)	Remarks
Research skills	100.2	36.78	305	.617**	.001	Sig.
Search engines use	68.51	24.95				

As shown in Table 7, the results showed that there is a significant positive relationship between search engine use and research skills of LIS postgraduate students ($r = .617^{**}$, $df=303$; $p<0.05$). This implies that the research skills of LIS postgraduate students is expected to increase as their rate of search engine use increases. Thus, the null hypothesis is rejected and the alternative states that there is a significant relationship between search engine use and research skills of postgraduate students in library schools is accepted.

Discussion of findings

Findings of this study revealed that the level research skills of postgraduate students in library schools in University of Ibadan, Lead City University, Federal University of Agriculture, Abeokuta and that of Tai Solarin University is high. The high research skill is a function of their ability to be able to identify researchable topics; ability to conduct literature review, methodology as well as their ability in the areas of theoretical framework. These skills they possessed could be as a result of their frequent engagement with research-related activities in their postgraduate programs. As a matter of fact, some coursework of LIS postgraduate programs require engagement in research activities.

Also, majority of the postgraduate students in the library schools selected in Southwestern Nigeria could have been trained by seasoned researchers and library educators in their respective universities. The high research skills possessed by the students could also be as a result of personal development of some LIS postgraduate students. This may through accumulated learning of research methodologies. This could also be premise on the research methodology course as partial requirement for the award of postgraduate degree in LIS. With these high research skills, one would expect that current postgraduate students in library schools will have quality research write-ups especially in their final dissertation and thesis writings. This is in tandem with the assertion of Hoon et. al. (2019) that research skills is highly needed to be able to write quality thesis in postgraduate schools.

However, the high research skills of postgraduate students in the library schools is not a thing of a “cap fits all.” This is because not all of the postgraduate students have high research skills. As a matter fact, findings of this study revealed that majority of LIS postgraduate students seem to have inadequate skills needed for conceptual modeling. This was indicated by many of them. Subsequently, the sampled LIS postgraduate students seem to not know the potency of increasing sample size so as to reduce sampling error. It was also worthy to note that the students have low analytical skills. This was why many of them seem to have difficulties in drawing inferences from their analysis. This could be a function of background and/or them not having love for numbers. The low analytical skills found out among the postgraduate students corroborates the study of Litman (2019) and that a good researcher should also possess analytical skill.

It was found out that the postgraduate students use different search engines. The search engines they use include the general and academic search engines. The general search engines used by the students are Google, Yahoo, Bing, Dogpile, DevilFinder, Ask.com, AOL, Yandex, and DuckDuckGo while the academic search engines used are Google Scholar Google Books, Microsoft Academic, Semantic Scholar, ResearchGate, Educational Resources Information Centre (ERIC), Bielefeld Academic Search Engine (BASE) and PubMed Central. In terms of frequency of use, the type of general and academic search engines that is mostly used by virtually all the LIS postgraduate students is Google and Google Scholar respectively. Majority of the students make use of Google almost every day but majority of them mostly make use of Google Scholar on monthly basis. The general search engine that is popularly being used after Google is Yahoo. This findings corroborates the findings of Sivasubramanian and Gomathi (2015) and that of Sambana (2016) who found that Google is the most used search engines followed by Yahoo and then Ask.com.

It is also worthy to note that LIS postgraduate students make use of general search engines than the academic search engines. This is an indication that the students may have varying purpose of use. The highest of all their purposes of search engines use is search basic reference materials. These students also make use of search engines to clarify their ambiguities. The students' purpose of use that is mostly lined with research is that they make use of search engines to find materials for their seminar materials and thesis as well as to search author's profile so as to be familiarized with their publication and citation index. One could then conclude that the students could be using the general search engines to suit their research and non-research information needs while the academic search engines is strictly being used for research.

The findings of the study revealed that there is a significant relationship between search engines use and research skills of postgraduate students in library schools. The relationship is shown in Table 4.11 which makes it evident that a strong positive significant relationship exists between the two variables ($r = .617$; $p < 0.05$). By rejecting the null hypotheses, it can be concluded that there is a linear relationship between research skills and search engine use by postgraduate students in library schools. This implies that there is high tendency of an improved research skills if the concerned postgraduate students increasingly make use of search engines. In the same vein, there

is a probability that a postgraduate student with low rate of search engines use may likely have relatively low research skills.

This finding supports outcome of the study of Ngwuchukwu (2012) who asserted that the use of search engines by postgraduate students in University of Nigeria, Nsuka (UNN) is very low which is having a negative effect on the research ability of the postgraduate students. In a more recent study by Jimoh (2022), it was discovered that majority of the tertiary institution students sampled make use of search engines, and that research is one of the purposes of search engines use by the respondents. Although the study fails to investigate how the high rate of search engines use influences the research ability of the students, the author opine that search engines could contribute to the research skills by recommending the use of Boolean Operators to the students sampled. Therefore, it can be concluded that search engines have a direct connection with research skills. Frequent use of academic search engines like Google Scholar, Microsoft Academic, and ResearchGate during postgraduate research and coursework will definitely improve the research ability of the postgraduate students.

Conclusion

Research skills are not just a kind of skills that are needed by everyone in academia, every postgraduate student need research skills to be able to excel in thesis writings and even while practicing as librarians in their respective organisations. As a matter of fact, postgraduate studies in the field of librarianship are expected to be research oriented. While conducting research in any form, tools like search engines and open access resources now becomes imperative especially in this present information age. This was evident in the type, frequency and purpose of search engines use by postgraduate students in library schools in South-west, Nigeria. This category of students makes use of both academic and general search engines to gratify their information needs, including needs that are related to research. The situation was also similar with utilisation of open access resources by these sets of students in library schools. It can then be concluded that high level of research skills possessed by postgraduate students in library schools in Southwestern part of Nigeria is attributed to the way and manner they utilize open access resources and search engines.

Recommendations

Based on the findings of the study, the following recommendations are proffered:

1. Library educators in Southwestern Nigeria should intensify more effort in building up the research skills of their students. It is understandable that the research skills of the current students are high but library educators should not relent in their effort to impart the necessary research skills because continuity is very pivotal to development.
2. Because of the fact that LIS postgraduate students have low analytical skills, library educators should look inward to develop analytical skills of their students. It is understandable that most library schools teach their postgraduate students Statistics so as to increase their numeracy skills but that may not be enough. The students may not really need the statistics that are being taught in library schools unless it is being incorporated with statistical software. Thus, this study recommends that library schools should also incorporate teaching of statistical software like SPSS, EViews, and NVivo in one or two courses being undertaken by LIS postgraduate students. This will drastically improve their analytical skills with respect to research than theories on statistics.
3. Postgraduate students in the library schools sampled should develop more interest in the use of academic search engines. This is because academic search engines are very inclined with researches in all disciplines especially in LIS research. LIS postgraduate students can arouse their interest by being familiar with the algorithms of academic search engines like Google scholar. They should keep checking their own citation index from time to time, if they have research publications. By so doing, their interest will increase. The interests of LIS postgraduate students in academic search engines can also be influenced through their course work. When they start using it, they will be familiar with how they can easily query search terms in terms of currency in academic search engines like Google Scholar which they may not be able to do in the general search engines.

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