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**AN INVESTIGATION ON INFORMATION SEARCH AND RETRIEVAL SKILLS  
OF UNDERGRADUATE STUDENTS: A CASE STUDY OF TAI SOLARIN  
UNIVERSITY OF EDUCATION, IJEBU-ODE, OGUN STATE, NIGERIA**

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**ABSTRACT**

*This study investigates the information search and retrieval skills of undergraduate students in Tai Solarin University of Education (TASUED), Ijagun, Ijebu-ode, Ogun State, Nigeria. Descriptive survey design was adopted for this study and the population consisted of 10,713 undergraduates from the College of COSIT, COHUM, COSMAS and COAEVOT of the university. Simple random sampling was used to select a sample of 324 and the questionnaire was the main instrument used for the data collection. Data was analyzed using descriptive statistics consisting of table of frequency and percentage. The findings revealed that Google was often used with 252 (77.8%) response rates while the least respondents 12 (3.7%) never used the search engines at all. Majority of the respondents 170 (52.5%) agreed that the use of Boolean Operators (OR, AND, NOT) were employed when searching for information while 20 (6.2%) respondents disagreed that advanced search strategies were employed when searching for information. Poor internet connectivity, erratic power supply, lack of technical know-how was the major difficulties faced by the respondents. The Google and Google scholar are important sources of searching and retrieving information by the university undergraduate students in TASUED. The search engines employed had tremendously contributed to the information retrieval for academic purposes. Undergraduate students should endeavour to equip themselves with the necessary ICT skills needed for this information age.*

**Introduction**

People generally require information for variety of needs. University students in the same manner need information to satisfy their social, psychological and recreational needs to promote their academic pursuit during their course of study in the university. Information for academic purposes is often sought by students to carry out class assignments, project work,

seminar presentations and conferences. However for research purposes they need information on background knowledge of their topics (Fidel et al, 1999).

The Tai Solarin University of Education (TASUED) was established on 29th January, 2005 with the pronouncement of the transformation of the then Tai Solarin College of Education by His Excellency, Otunba Gbenga Daniel, the Governor of Ogun State, into the said University. The Tai Solarin University of Education, Ijagun, thus became the premier University of Education in Nigeria and second in Africa, after the University of Education, Winneba, Ghana. The Bill formerly establishing the University was passed into law on 31st August 2005. The University has Professor Olukayode Oyekanmi Oyesiku, a distinguish scholar and shrewd administrator as the pioneer Vice-Chancellor and Professor Olatunji Yinusa Oyeneye, a seasoned University administrator, as the pioneer Pro-Chancellor and Chairman of the Governing Council. The university library with seating capacity of 1,000 users and about 15, 457 volumes of books and 1,595 journals title. Apart from training highly professional, academically sound, dedicated and disciplined teachers for the various levels of education in Nigeria, the University also trains the students to be proficient in at least on vocation, thus further empowering the graduates.

Universities are primarily established to support teaching, learning and research activities of the parent institution. University students patronize their university libraries to consult, relevant and current information in both print and electronic format for effective teaching, learning and research work. University library users includes undergraduate, postgraduates, researchers, information professionals, staffs and other users from outside the university community who intends to seek for information in the library.

University students make up a large portion of undergraduate students attending colleges and universities, and they have a variety of information online available to them to complete their academic related work. Information is needed either through primary source or Web based to boost their existing knowledge as well as intellectual development. The content, ease of use and required search techniques are different between the two information retrieval systems. Students often prefer searching the Web, but in doing so often miss higher quality materials that may be available only through their library. Furthermore, each system uses different information retrieval algorithms for producing results, so proficiency in one search system may not transfer to another (Alemna, 2000).

Web based information retrieval systems are unable to search and retrieve many resources available in libraries and other proprietary information retrieval systems, often referred to as the Invisible Web. These are resources that are not available to the general public and are password protected (from anyone not considered to be an affiliated user of that particular organization). These resources are often licensed to libraries by third party vendors or publishers and include fee-based access to content. Therefore, many undergraduate students may not be accessing many scholarly resources available to them if they were to use Web based information retrieval systems (Porter, 2009).

There are billions of pages of information on the World Wide Web (WWW) and finding relevant and reliable information can be a challenge. Search engines are powerful tools that index million of web sites. When entering a keyword into the search engine you will receive a list with the number of hits or results and link to the related site. The number of hit may vary,

a great deal among different search engines. Some engines search only the title of the web site and others search the full text (Morrissey, 2003).

Technique for using the different search tools vary for the best result, read the search tips or hints that are provided at each search site. Also, note that some of the search engines do not allow Boolean searches that combine words with the logical connectors of AND, OR, or NOT. Common Command Search Engines include:

- Quotation (“)

Using quotation marks will help to find specific phrases involving more than one word. For example: “Definition of Information “

- Addition Sign (+)

Addition + sing before a word mean that it MUST be included in each site listed. For example: + Information + Explosion.

Using an index to find target selections is the basic analytical search strategy. Such look ups depend on an ordered list of concepts that provide pointers to primary information. Textual indexes are often ordered alphabetically and depend on pointers such as page numbers, file offset, and record number. The strategy is to start with index entry points and follows the pointers until information is found or all entry points are exhausted. Electronic systems that are based on inverted files depend on this basic strategy. When Boolean-based query languages are added, users can create complex queries that allow multiple index entry points to be combined in one query. Various specific strategies have been developed for use in online systems (Harter, 1986).

The most widely used online searching strategy is the "building blocks" approach (Harter, 1986). During problem definition, the information seeker identifies the main facets or concept groups associated with the problem. These facets then become the basis for specific query formulations that retrieve sets of document citations for each facet. After the individual sets are formed, they are systematically combined with Boolean operators (most commonly AND) to produce a document set relevant to the problem as a whole.

Search engines are rated by the size of their index. Search engines such as Google are good tools to use when searching for obscure information, but one drawback to an extensive index is the overwhelming number of results on more general topics. If this is the case, it might be better to use a search engine with a directory structure such as Yahoo (Morrissey, 2003).

Information retrieval is the basic technology behind Web search engines and an everyday technology for many Web users. Information retrieval deals with the storage and representation of knowledge and the retrieval of information relevant to a specific user problem. Information retrieval systems respond to queries which are typically composed of a few words taken from a natural language. The query is compared to document representations which were extracted during the indexing phase. The most similar documents are presented to the users who can evaluate the relevance with respect to their information needs and problems (Becker, 2003).

According to Alemna (2000), in African countries, it appears there is so much information generated within our borders which can be used to assist our developmental process. The information search skills of a user depends on the level of education, access to

library and the length of time a user wishes to devote in information searching. Naturally, most undergraduates search information from their friends, colleagues and libraries among others. With the advent of the Internet, many undergraduates, postgraduates, information professionals, researchers and highly placed individuals now search information from the Internet (Aina, 2004). According to Rowley (1988), information retrieval (IR) is concerned with the exploitation of the information and other contents of documents. The establishment of various large databases, which are mounted on computers and made available to anyone who wishes to search them, has a significant impact on the effectiveness and efficiency of the retrieval of information.

Information search and retrieval skills are a key area of expertise for information professionals. Information search is taught routinely at universities and other educational institutions and a wide variety of textbooks about the basics and principles of searching has been published. The educational material covers four main areas focusing on representing (1) the context of information retrieval as a part of information searching activities, (2) basic principles of information retrieval systems, (3) general search strategies applicable in all ordinary retrieval settings, and (4) specific search strategies for particular retrieval settings and information sources. The main goal of instruction is to develop learners' practical capability to perform successfully any search task appearing in the university work situation Hersh (1999).

Information search skills are crucial for retrieving information for educational outcomes. Skill is required to selectively retrieve accurate and enough information stored in documents instead of all the information that may not be relevant for the students' research. Skill in information retrieval reduces the time wasted in searching information. To surmount the problem of retrieving information, student may require a combination of skills which include informational search skill, operation search and strategic search skills to make the process of retrieving information a simple task (Gui, 2007).

### **Objective of the Study**

The objectives of the study are to:

1. find out the search engines used by the undergraduate's for searching and retrieving relevant information needed for their academic pursuit;
2. determine the search strategies employed by the undergraduate's in information search;
3. determine time expended on information search by undergraduate's on a weekly basis;
4. identify the difficulties experienced by undergraduate's students in information search.

### **Review of Related Literature**

Information seeking means different things in different context that involves the search, retrieval, recognition and application of meaningful content (Kuhlthau, 1993). Adeyemi (2002) added that information seeking is a personal and situation dependent activity that is underpinned by access to information and the strength of the information sources. (Allen, 1996), information seeking is a process in which participants can act as both receivers and senders. It is defined as a purposive process, in which the individual attempts to find information through information sources in order to satisfy his or her information needs (Brystrom, 1999).

Student's information seeking behaviour largely depends upon teacher's attitude. Students are interesting in good grades and they attempt to figure out what their instructors want in a research paper and just give attention on the number of pages and types of sources. There is often a gap between the instructors' definitions of "good resources" and the students' ability and tendency to find them (Valentine, 2001). Students try their best to find information in a chaotic fashion, using the most familiar resources and focusing on speed and convenience, without giving attention to quality. When students are asked about their search strategies, they often have a hard time describing what resources they used and how they accessed them, because they have no logical reasons to explain it and followed methods taught by their teachers. The view of searching for information as an iterative process that is central to the information searching field. In information searching, searching is viewed as a dynamic, ever-changing process that may cover a rather lengthy temporal span. This concept of searching as an iterative process appears in nearly every model of information searching (Xie, 2008).

Chang and Perng (2001) carried out a research work on "*Information search habits of graduate students at Tatung University*". The purpose of their study was to investigate the information requirements and search habits of graduate students at Tatung University in Taipei City, Taiwan. They show that 90% of the subjects conducted information searches using outside sources in addition to the university library. They also reported making extensive use of the Internet in the recent past, mostly World Wide Web-based databases, electronic journals and search engines. In the field of information searching, the lack of a central definition of information has allowed advances along several nuanced fronts, but it also has been a limiting factor for information searching in developing more formal models. There are certainly exceptions, such as poly representation (Ingwersen, 1996).

Okpala and Igbeka (2004) observed that some users use multiple databases while searching information. They, for instance, maintain two or three databases at a time to obtain information. However, the major need of the user is to identify the search terms, the synonyms, broader and narrower terms. The user may further specify the types of data to be searched for, such as, title, author, descriptors and other entries. These may be grouped together (Greaves, 2002). Adesanya (2002), Greaves (2002) and Aina (2004) wrote on the Boolean logic (OR, AND, NOT), a mechanism used for search accuracy which allows the inclusion of all synonyms and related terms. The Boolean operators, they explained are often used to narrow or broaden a user's search. Adesanya, Greaves and Aina stated that the operator OR (additive) indicates that either one or the other or both terms may be present in the document: AND (intersection) means that both terms may be present in the document while NOT (subtractive) indicates that the presence of the term makes the document irrelevant.

Truncation is another useful search strategy. Adesanya (2002) remarked in her work that in any given system, certain characters are approved to designate truncation. In Adesanya's view, the dollar sign (\$) is widely used in most systems but Aina (2004) pointed out that truncation includes an asterisk (\*) and a plus (+) after a single word. However, Rowley (1998) asserted that the truncation is sometimes available in the middle of words. Truncation as Rowley explained, can be useful to cater for alternative spellings, for example, NA\$IONAL will search for records with NATIONAL and NACIONAL. Also, Mutsheva (2008) wrote on Wildcards which he described as symbols that are used to substitute for characters in words.



The Letters S and Z in organization could be substituted by Wildcards for instance, Organi?ation this would aid in retrieving information with both spelling.

Information retrieval researchers generally take an information-as-thing view, which suggests that one can do things with information, such as index it, encode it, break it into segments, parse it, and so on. This view is based on the tenet that information is inherently concrete, definable and encodable. Information retrieval follows the positivist or rationalistic tradition (Winograd and Flores, 1986) by considering information to be something objective in the external reality. As van Rijsbergen (1986) stated, an information retrieval system is concerned solely with statistical analysis of a document, although he later somewhat modified this statement to include broader aspects of the user and context (van Rijsbergen, 1986). Since then, information retrieval researchers have acknowledged that the context, task, or situation is also important (Shen, Tan, and Zhai, 2005).

Commercial search engines, such as Google, have often been dismissed as information retrieval tools that give access to “infobesity” (Bell, 2004), “a junk information diet” (Brophy and Bawden, 2005) that leads to a “more is better” approach (Joint, 2005). However, recent studies indicate that widely used search engines, such as Google, could play a more important role in the information seeking process. For example, Brophy and Bawden (2005) after comparing an Internet search engine (Google) with academic library resources in order to assess the relevant value, strengths and weaknesses of the systems found that good coverage requires the use of both systems as both have unique features. The authors concluded that both systems had advantages and disadvantages but Google managed to retrieve a high proportion of relevant documents, adequate or good quality results and unique documents and there were no problems with accessibility.

Biradar (2008) reports the results of a study exploring university students’ and teachers’ use of search engines for retrieval of scholarly information. The main objectives are to examine the use of search engines, use of popular search engines, factors influenced on search engines’ use, use of search strategy for information retrieval and also to know the methods of learning search strategy by students and faculties in the university environment. The results revealed that 100% of the students and 97.91% of faculties use search engines for retrieval of information on the Internet. Google and Yahoo receive the highest overall ratings. The study also reveals that majority of the respondents take help from their friends and use help messages of search engines to learn the search strategy.

## **Methodology**

The survey research design was adopted for this study and the target population consisted of undergraduates students in Tai Solarin University of Education Ijagun, Ijebu-Ode Ogun State. There were 2439 students in College of Applied Education and Vocational Technology (COAEVOT), 1230 in College of Humanities (COHUM), 2823 in College of Science and Information Technology (COSIT), and 4221 in College of Social and Management Science (COSMAS). This therefore gave a total of 10,713 undergraduate students in the university which represent the total estimated population of the study. Simple random sampling technique was employed to select a total of 324 respondents from the university. The

questionnaire was the major instrument used for the data collection. Data collected was analyzed using descriptive statistics such as tables, frequencies and percentages.

### Results and Discussion

A total of three hundred and twenty four (324) copies of the questionnaire were administered to the respondents. The whole questionnaire administered were duly completed and returned giving a response rate of 100%. Thus, the overall response rate was 100%.

### Demographic Characteristics of the Respondents

Table 1 revealed that majority of the respondents 132 (40.5%) in the University were in their 200 level and 101 (31.2%) were in their 300 level while the least of the respondents 41 (12.7%) were in 400 level (Final Year). Also, 178 (54.9%) of the respondents in the university were female. Most of the respondents 141 (43.5%) in the university were between 22 and 24 years of age and 109 (33.9%) were between 19 and 21 years of age while 2 (.6%) were the least in the university and this are above 27 years of age. The analyses also revealed that majority of the respondents in the university were in their 200 and 300 level, while the least respondents were in their final year. It was also shown that majority of the respondents were female.

*Table 1: Demographic Characteristics of Respondents*

		Frequency	%
<b>Level of Study</b>	100	50	15.4
	200	132	40.7
	300	101	31.2
	400	41	12.7
<b>Sex</b>	Male	144	44.4
	Female	178	54.9
<b>Age</b>	Less than 16years	7	2.2
	16-18	30	9.3
	19-21	109	33.6
	22-24	141	43.5
	25-27	31	9.6
	Above 27	2	.6

Table 2 showed that Google was very often used with 252 (77.8%) response rates. Also most of the respondents 140 (43.2%) sometimes used the search engines for searching and retrieving information, the least respondents 12 (3.7%) never used the search engines at all. This supports the findings of Biradar (2008) who reported the results of a study exploring university students' and teachers' use of search engines for retrieval of scholarly information. The main objectives are to examine the use of search engines, use of popular search engines, factors influenced on search engines' use, use of search strategy for information retrieval and also to know the methods of learning search strategy by students and faculties in the university

environment. The results of the study shows that 100% of the students and 97.91% of faculties use search engines for retrieval of information on the Internet. Also, Google and Yahoo receive the highest overall ratings.

*Table 2: Search engines used for searching and retrieving relevant information*

Search Engines	Very often	Often	Sometimes	Never
Google	252 ( 77.8)	53 (16.4)	19 ( 5.9)	-
Google scholar	76 (23.5)	114 (35.2)	78 (24.1)	56 (17.3)
Docsfiles	39 (12)	41 (12.7)	140 (43.2)	104 (32.1)
Ask	140 (43.2)	78 (24.1)	75 (23.1)	31 (9.6)
Yahoo	192 (59.3)	77 (23.8)	42 (13)	12 (3.7)
Mamma	41 (12.7)	39 (12)	122 (37.7)	122 (37.7)
Dog pile	46 (14.2)	32 (9.9)	74 (22.8)	172 (53.1)
Other	65 (20.1)	58 (17.9)	94 (29)	104 (32.1)

Table 3 revealed that majority of the respondents 170 (52.5%) agreed that the use of Boolean Operators (OR, AND, NOT) were employed when searching and retrieving information while 20 (6.2%) respondents disagreed that advanced search strategies were employed. Also, most of the respondents 105 (32.4%) agreed that change of search terms were employed when searching and retrieving relevant information, while 69 (21.3%) disagreed that the use of proximity features (ADJ & SEN) were employed when searching and retrieving information. This result concurs with the findings of Al-Kharashi and Evens (1994) who found out that using roots and stem as index terms give better retrieval results than using words. The root performs as well as or better than the stems at low recall levels and definitely better at high recall levels.

*Table 3: Search strategies employed in Information Search*

Search Strategies	SA	A	SD	D
Use of OR, AND, NOT (Boolean Operators)	170(52.5)	110 (34)	27 (8.3)	17(5.2)
I use proximity features (ADJ & SEN)	74 (22.8)	152(46.9)	69(21.3)	29 (9)
Advanced search strategy is used to retrieve relevant information	122(37.7)	133(41)	49(15.1)	20 (6.2)
Use of asterisk (*) is very important in retrieving information	72 (22.2)	125(38.6)	73(22.5)	53(6.4)
Use of dollar sign (\$) is very important in retrieving information	80 (24.7)	108(33.3)	75(23.1)	61(18.8)
Change of search terms is important when you do not retrieve relevant information	105(32.4)	120 (37)	63(19.4)	35(10.8)
I always retrieve information from the web using the range search i.e. using the (Less than >, Greater than <, or equal to = sign.	91 (28.1)	97 (29.9)	86(26.5)	50 15.4)
I can use the library catalogue in information retrieval	144(44.4)	107 (33)	42 (13)	31 (9.6)



Table 4 showed that majority 102 (31.5%) of the respondents spend 15 minutes on searching information on news and recreation, while only 1 (.3%) of them spend 10 hours above on entertainment, and most of them 97 (29.9%) spend 30 minutes on searching information for their academic pursuit while the least respondents 8 (2.5%) spend 5 hours on searching information on their class work and assignment. It also shows that 53 (16.4%) respondents spend 1 hour on searching information on current awareness. This supports the findings of Murphy (2003) who found out that many participants have at least less period in keeping up with research in their field(s) of study in regard to time. As a result, many participants do at least some of their information-gathering in their off-time or delegate certain research responsibilities to others.

*Table 4: Time expended when searching for information*

<b>Information Search</b>	Less than 15 min	15 min	30 min	1 hour	2 hours	5 hours	10 hours above
Academic information	72(22.2)	52 (16)	97(29.9)	70(21.6)	25(7.7)	6 (1.9)	2 (.6)
Research/project information	32 (9.9)	40(12.3)	76(23.5)	70(21.6)	64(19.8)	26 (8)	14(4.3)
News & recreation	78(24.1)	102(31.5)	90(27.8)	35(10.8)	13 (4)	5 (1.5)	1 (.3)
Entertainment	84(25.9)	95(29.3)	79(24.4)	50(15.4)	12 (3.7)	3 (.9)	1(.3)
Social networking	75(23.1)	60(18.5)	96(29.6)	58(17.9)	28 (8.6)	6 (1.9)	1 (.3)
Class work/assignment	52(16)	56(17.3)	88(27.2)	94 (29)	26 (8)	8(2.5)	-
Current awareness	49(15.1)	98(30.2)	88(27.2)	53(16.4)	28 (8.6)	7(2.2)	1(.3)

Table 5 showed that majority of the respondents 190 (58.6%) were faced with the problem of poor internet connectivity. Also, the problem of erratic power supply were faced by the respondents in the university with 97 (29.9%), while only few of the respondents 42 (13%) and 26 (8%) disagreed with lack of technical know-how and lack of relevant information respectively. However, lack of assistance from the library staff and lack of ICT skills were some of the barriers experienced by the undergraduates which were found to be more peculiar to the respondents in the university.

*Table 5: Difficulties experienced*

<b>Difficulties</b>	<b>SA</b>	<b>A</b>	<b>SD</b>	<b>D</b>
Poor internet connectivity	190 (58.6)	90 (27.8)	34 (10.5)	10 (3.1)
Lack of relevant information	59 (18.2)	160 (49.4)	79 (24.4)	26 (8)
Difficulty to access.	88 (27.2)	107 (33)	83 (25.6)	46 (14.2)
Erratic power supply.	97 (29.9)	114 (35.2)	87 (26.9)	26 (8)
No assistance from the library staff	79 (24.4)	117 (36.1)	84 (25.9)	43 (13.3)
Costly to access and use.	71 (21.9)	109 (33.6)	96 (29.6)	48 (14.8)
Lack of technical know-how.	90 (27.8)	116 (35.8)	76 (23.5)	42 (13)

Lack of training and support of staff and users.	80 (24.7)	142 (43.8)	65 (20.1)	37 (11.4)
Technological constraints	76 (23.5)	131 (40.4)	84 (25.9)	33 (10.2)
Lack of ICT skills	85 (26.2)	114 (35.2)	80 (24.7)	45 (13.9)
Social factor	84 (25.9)	108 (33.3)	89 (27.5)	43 (13.3)
Malfunction of the computers to search for information.	99 (30.6)	97 (29.9)	70 (21.6)	58 (17.9)

## Conclusions

Search engines are a sine qua non to information acquisition by undergraduate students in the university. The search engines, particularly the Google and Google scholar are important sources of information for the university undergraduate students in Tai Solarin University Education. This is evident in the study as the undergraduate students used these search engines for searching and retrieving relevant information needed for their academic per excellence.

The search strategies, particularly the Boolean Operators (OR, AND, NOT), change of search terms and the use of Proximity features (ADJ & SEN) were employed to be important, relevant and useful when retrieving information. The search engines and use has no doubt contributed meaningfully to the information retrieval for academic as well as their research and project work.

The study also concluded that there were a lot of challenges hindering the undergraduate students when searching and retrieving relevant information as highlighted by the respondents and these includes the following: poor Internet connectivity, lack of relevant information, difficult to access, erratic power supply, costly to access and use, technical constraint etc.

## Recommendations

The following recommendations were made based on the findings of the study.

1. Undergraduate students should endeavour to equip themselves with the necessary ICT skills needed for this information age.
2. There should be provision for alternative source of power generation in order to solve the problem of erratic power supply which is hindering information search and retrieval in the university.
3. The university management should improve on the bandwidth and enhance the Internet connectivity so as to enable the students to search and retrieve relevant and needed information.
4. The Internet should be made readily available to students in their colleges/faculties, hall of residences as well as school area for retrieval of relevant information for their research work, class work, assignment, seminar presentations and term papers.

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