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# APPLICATION OF THE BIG 6 SKILLS MODEL AND INFORMATION LITERACY SKILLS OF UNDERGRADUATE STUDENTS ON THE USE OF ELECTRONIC RESOURCES IN NIGERIAN UNIVERSITIES

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## **ABSTRACT:**

*The study aimed at determining the information literacy skills on the use of e-resources by undergraduate students using the Big6 information literacy skills Model. Quantitative research methodology was used, and a total 2,484 sample using Sloven's formula was obtained from a population of 61,804 undergraduate students. A structured questionnaire was used to collect data and was analyzed using descriptive statistics. The findings revealed that the undergraduate students were aware of the information literacy programmes in the Universities (mean=3.87) and possess the necessary information literacy skills to utilize e-resources (mean=3.45). Applying the constructs of the Big6 information literacy skills Model revealed that undergraduate students possess the ability to identify the exact information problem needed to solve problem with clear synthesis and evaluative strategies. Based on the 6 stages in the Big6 information literacy skills Model, the study concluded that student information literacy skills are satisfactory. The study provided a modification of the Big6 information literacy skills model which can be used to inculcate knowledge as well as self-assessment. Based on the findings, the study recommends university management to improve the content of the information literacy programs in order to inculcate the wherewithal of getting relevant, adequate and up to-date information from e-resources.*

**Keywords:** *Big6 Skill Model, e-resources, Information Literacy Skills, Search Skills, Evaluation, Search Strategy*

## **Introduction**

The current advancement of information technology in libraries has an impact on the ease of obtaining information. The provision of education and information is the main objective of every University, and with the current development of ICTs, particularly in e-resources, Universities in Nigeria are now providing resources in electronic formats. With the abundant potential embodied in the electronic format, lacking requisite skills affects the undergraduate student's ability to use and harness the immeasurable advantages embedded to satisfy their information needs. To corroborate this view, Alkhafaji and Samea (2020) identified problems in the adoption and usage

of e-resources which include low basic information literacy skills and competencies levels. Students are faced with boundless information resources to use for their research activities with limited skills to determine the authenticity, validity, and usability of the information they discover. This paper focuses on the impact of information literacy skills on the use of e-resources using the Big6 information literacy skills Model.

Several information problem-solving models exist for the information search process, teaching research, problem-solving, and writing processes, but the Big6 Information Skills Model appeared to foster the acquisition of skills, research, and problem-solving. In today's modern library services, a strong anecdotal record exists supporting the use of Big6, but the empirical research to support this scientific problem-solving method is less evident in library education literature. This study, therefore, becomes imperative as information literacy skills are urgently needed particularly in the current COVID 19 pandemics where students are required to read, write, analyze, and make reports online. These in turn require accuracy in literacy skills. The component of the Big6 information literacy skills Model which includes task definition, strategy information retrieval, determination of access location, information use, synthesis, and evaluation was employed to determine the level of information literacy skills of the undergraduate students as young researchers.

Defining and describing technology skills is the first step in ensuring library users become proficient information and technology users. Equally, it is essential to collaborate among lecturers, librarians, and library users to present a unified and integrated approach to ensure skills needed to thrive in an information-rich problem-solving process are adopted. This can be achieved through empirically studying the application of the Big6 information literacy skills Model Approach as it comprises a unified set of information and technology skills. Iriani and Wicaksono (2021) argued that the adoption of information technology in information search and retrieval makes it easy for individuals who are not responsible for exploiting or manipulating existing data to use the internet, and other social media to find learning resources. But in reality, students do not use these facilities for information retrieval due to a lack of appropriate information searching skills.

Information literacy as a concept seeks to solve problems associated with information overload through the provision of skills set to assist individuals in recognizing when information is needed and can locate, evaluate, and use effectively the needed information. The concept of information

literacy is the ability of the individual to recognize the need for information and knows how to find, evaluate, use, and subsequently communicate information effectively to solve particular problems or to make decisions. To be information literate according to Marlini (2019) requires a new set of skills which include how to identify, locate evaluate and use information needed for problem-solving and decision-making effectively and efficiently. Information literacy is a prerequisite for students to access and use the diverse information in the digital libraries.

Studies by Buba, Song, and Abdullahi (2021); Odede and Zawedde (2018) and Sharma and Kumar (2018) showed the impact of information literacy skills on the use of e-resources by students. Unfortunately, observations and available literature such as Abbas and Song (2019); Adeleke and Emeahara (2016); Gayathri and Sadik, 2015, have indicated low usage of e-resources by students, particularly in Nigerian universities and they are lagging behind their counterparts as indicated in the study of Joshua and King (2020). Thus, Nigerian Universities students seem to be alienated from the global use of e-resources despite the digital revolution and efforts made by the university libraries to provide the resources at their disposal. The under-utilization of the e-resources could therefore be attributed to the lack of requisite information literacy skills by the undergraduate students.

A search strategy is an organized structure of key terms used to search a database. The search strategy combines the key concepts of your search question to retrieve accurate results. According to Swapna and Biradar (2017), undergraduates must be empowered with various skills and abilities such as lifelong learning skills, inquiry and research skills to carry out systematic investigation for finding solutions to complex problems, communication, and information literacy skills, and good collaboration, teamwork. MacFarlanea, Russell-Roseb, and Shokraneh (2021) highlighted the search strategies to include Boolean Operators, Phrase searching, Proximity Search, Fuzzy Search, Stemming, Truncation searches, and Wildcard searches. Information Literacy (IL) plays a very significant role to produce such skilled undergraduates in the present rapidly changing technological era. Iriani and Wicaksono (2021) submitted that synthesis as a construct of the Big6 Model is linked to task definition in that students are expected to answer the specific question they created when initially engaging in the problem-solving process.

The Big6 information literacy skills Model is a process model for information problem-solving. It integrates information search and use skills along with technology tools in a systematic process

to find, use, apply, and evaluate the information for specific needs and tasks. The Big6 information literacy skills Model has the potential of teaching students the use of technology and technology-related attributes. The model is used in determining the level of information literacy skills of the students on the use of e-resources. Various studies (Iriani and Wicaksono, 2021; Marlini, 2019; Baji, Bigdeli, Parsa, and Haeusler, 2018) have applied the Big6 information literacy skills Model to determine the level of information literacy skills. Different types of e-resources such as the Internet, databases, CD-ROM, Telefax, reports on CD-ROM, and electronic journals are available to the undergraduate students. Abdullahi, Buba, and Mohammed (2020) gave a list of e-resources available in Nigeria as Internet sources, Online Databases, CD-ROM, OPAC (Online Public Access Catalogue), and electronic Journals. However, despite the numerous e-resources available, it is not certain that the e-resources are used by undergraduate students in Northern Nigeria. This uncertainty is one of the reasons for undertaking the study.

Abbas and Song (2019) described electronic collection as the collection of information that can be accessed only by the use of electronic gadgets while Buba and Mohammed (2017) referred to e-resources as those materials that require computer access through a personal computer or mobile devices. Studies such as Buba, Song, and Abdullahi (2021); Sharma and Kumar (2018); Adeleke and Emeahara (2016) have all identified the general types of e-resources to include OPAC, e-journals, e-books, social media, CD-ROMs, and e-databases. Manjack, Dangani, and Fari (2019) on the other hand enumerated the following as the types of e-resources that are commonly found: electronic journals, electronic books, Full-text (aggregated) databases, electronic images, and electronic audio/visual resources. In another study, Tiemo (2017) provided the following types of e-resources which include electronic journals, electronic books, online databases, electronic conference proceedings, and CD-ROM databases. According to all the submissions above, it can be deduced that e-resources are operated using electrical gadgets and require a certain set of skills to use. This implies that information can be easily accessible now through these gadgetries and can only be utilized with the skills and competencies of how to access these gadgets.

Consequently, it can be seen from the above that students find it difficult to utilize the vast information imbedded in the electronic formats due to their limited knowledge and skill set to utilize and manipulate the seemingly complex system that is presented to them in the form of the digital world of information technology. The above assertion is in line with Sharma and

Upadhyay (2021) who posited that for students to be able to find information about a topic from a variety of digital sources, they are expected to possess information literacy skills and competencies for a better understanding of the information environment they are in and also develop their ideas of using Information and Communication Technology tools to enhance the quality of their work. Knowledge of the information environment will enable students to focus on the best information source to approach for the impending need whereas, knowledge of Information and Communication Technology will enhance the quality of their work by sharing and exchanging information directly and through electronic media.

Hence, this study was based on the above observations which necessitated the research to be carried out to identify and explore information literacy skills possessed by students while using e-resources through the application of the Big6 Skills Model. In this regard, the central phenomenon of the study is that information literacy skills and competencies as outlined by the Big6 information literacy skills Model are required by the students to use e-resources.

### **Research Objective**

The main objective of the study is to assess the information literacy skills in the use of e-resources by undergraduate students using the concepts and constructs of the Big6 information literacy skills Model of information literacy. While the specific objectives are:

1. To identify the information literacy skills possessed by students about the constructs of the Big6 information literacy skills Model of information literacy
2. To identify the e-resources used by the students under study

### **Theoretical Background (The Big6 Information Literacy Skills Model)**

It is pertinent to note that, although better solutions appear when diverse perspectives are brought to bear on a problem if there is a definite route, it is also important to use that single route. Thus, this study focuses on the application of the Big6 information literacy skills model's theoretical perspectives. The application of this theory is two folds: first the use and manipulation of e-resources, which is the display of the knowledge of information literacy skills. Secondly, how these skills and competencies will benefit the students in using the e-resources. Invented by Mike Eisenberg and Robert B. Berkowitz in 2001, the Big6 Model provides a broad-based, logical skill set that can be used as the structure for developing a curriculum or the framework for a set of distinct problem-solving skills. These fundamental skills provide students with a comprehensive set of powerful skills to conquer the information age.

**Table 1: Stages of the Big6 Model**

Stages of Big6 Model	12 Sub-Stages of the Model
<b>Stage One:</b> Task Definition	<b>1.1 Determine and Define the Problem:</b> What is expected of me? Do I understand what I need to do? <b>1.2 Identify the Information Needed:</b> What are the questions I need to answer? What do I need to know about the topic?
<b>Stage Two:</b> Information Strategy Seeking	<b>2.1 Determine the Source of Information:</b> Where can you start to look for information? Both in print and online sources such as databases and encyclopedia <b>2.2 Select the best Source:</b> Who can I talk too to get information? What are the best sources to use? Choose sources that has perceived ease of use and perceived usefulness.
<b>Stage Three:</b> Location and Access	<b>3.1 Locate Information Sources:</b> having the ability to use the index and search for information stored in various sources <b>3.2 Find Information:</b> Identifying the information needed and look for sources containing the relevant information that will satisfy users' information needs. Highlight and take notes where necessary
<b>Stage Four:</b> Use of Information	<b>4.1 Engage the Information:</b> Using the stored Information within the problem already defined through reading, listening and observing the information etc <b>4.2 Extracting Information:</b> Choosing an effective way to filter and select large amount of Information that is important and relevant to the identified problems
<b>Stage Five:</b> Synthesis	<b>5.1 Organization of Information:</b> arrange the various sources into one form in order to provide a systematic result, by answering questions such as How do I fit all the information together? How do I write an outline of the project? <b>5.2 Information Presentation:</b> Communicating and storing information into definite order. Ask questions like, how do I present the information to my teacher to answer the question? Did I remember to make notes of all the sources for the bibliography?
<b>Stage Six:</b> Evaluation	<b>6.1 Evaluation of the Product:</b> The user delivers the result and determine whether it solve the information research problem <b>6.2 Evaluation of the process:</b> The User determine whether the process satisfies his/her information need

### Methodology

The study adopted a cross-sectional survey design using a two-stage cluster sampling technique to have an overview of the information literacy skills of the population of the study. In the first instance, federal universities were sampled out of the total universities in Nigeria, while in the second instance; federal universities in North-East, Nigeria were sampled. The study was

conducted in all the six (6) federal universities in North-East, Nigeria which are Modibbo Adama University of Technology, Yola (14,603); Federal University of Kashere (2,905); University of Maiduguri (25,243); Federal University Gashua (2,246); Federal University Wukari (3,129) and Abubakar Tafawa Balewa University, Bauchi (13,674) with a total population of 61,804 students. Sloven's formula was used to generate the sample of the study. The sample size for the study was 2,484, and a questionnaire was used as the research instrument to collect data from the respondents. A total of 2,402 sample questionnaires were filled, returned, and found useful for the study.

## Findings

**Table 2: Task Definition**

<b>Statement</b>	<b>SA/A</b>	<b>Undecided</b>	<b>SD /D</b>	<b>Mean</b>	<b>Decision</b>
Ability to recognize a need for information on a particular topic	1711	328	363	<b>3.8419</b>	<b>Accepted</b>
Ability to formulate questions based on my information needs	2219	121	62	<b>4.3089</b>	<b>Accepted</b>
Ability to recognize a need for information resources	2111	218	73	<b>4.2121</b>	<b>Accepted</b>
Ability to distinguish potential information resources	1823	227	352	<b>3.7981</b>	<b>Accepted</b>
Ability to construct strategies for locating the needed information	1665	253	484	<b>3.5841</b>	<b>Accepted</b>
Ability to evaluate the sources to look for information.	1797	497	108	<b>3.9289</b>	<b>Accepted</b>
Ability to clearly scope/limit search question in an appropriate language	1324	435	643	<b>3.4252</b>	<b>Accepted</b>
<b>Average Mean</b>				<b>3.8713</b>	<b>Highly Significant</b>

**Task Definition** - This step determines exactly what the information problem is and the specific information related to the problem. Table 2 represents the analysis of the task definition of the respondents of the present study. The table showed that the majority (1711, mean=3.84) of the respondents indicated that they possess the ability to recognize a need for information on a particular topic, the ability to formulate questions based on their information needs (2219, mean=4.31), the ability to recognize a need for information resources (2111, mean=4.21), and the ability to distinguish potential information resources and still (1823, mean=3.79). 1665 of the respondents can construct strategies for locating the needed information (mean=3.58), the ability

to evaluate the sources to look for information (1797, mean=3.93), and finally, the ability to scope/limit search questions in an appropriate language (1324, mean=3.43).

The analysis on the table above with an average mean of 3.87 based on the Big6 information literacy skills Model shows that the students are information literates in the first stage of the literacy skills ladder since they can identify when information is needed, formulate questions based on the needed question, recognize a need for information resources, distinguish potential information resources, construct strategies for locating the needed information, evaluate the sources to look for information and then to scope/limit search question in an appropriate language. The finding of this table shows that the students have information literacy skills based on the conclusion by Marlini (2019) that to be information literate, requires a new set of skills which include how to identify, locate evaluate and use information needed for problem-solving and decision making effectively and efficiently.

**Table 3: Information Seeking Strategies of e-resources**

**Search strategies used**

<b>Search strategies used</b>	<b>SA/A</b>	<b>Undecided</b>	<b>SD /D</b>	<b>Mean</b>	<b>Decision</b>
Boolean Operators	643	558	1203	<b>2.2862</b>	Rejected
Keyword searching	1213	710	479	<b>2.5904</b>	<b>Accepted</b>
Nesting	536	811	1055	<b>2.2875</b>	Rejected
Parentheses	891	702	809	<b>2.7366</b>	<b>Accepted</b>
Phrase searching	1311	689	402	<b>3.3406</b>	<b>Accepted</b>
Snowballing	804	971	627	<b>2.7778</b>	<b>Accepted</b>
Truncation	391	1213	798	<b>2.3272</b>	Rejected
<b>Average Mean</b>				<b>2.6209</b>	<b>Significant</b>

**Information Seeking Strategies** - Once the problem is clearly defined, attention turns to the range of possible information sources. Information Seeking Strategies involves making use of various strategies to get to the information sources appropriate to the defined task. Table 3 showed that 1203 of the respondents disagreed with using Boolean Operators. The overall mean for use of Boolean Operators is (mean=2.28), which is rejected. The table showed that 1311 (mean=3.33) have indicated that they use phrase searching while seeking information. It also showed that 1212 (mean=2.59) indicated that they use keyword searching. While 804 (mean=2.78) and 891 (mean=2.74) showed that the respondents do utilize snowballing and parentheses respectively. While 536 (mean=2.29) and 391 (mean=2.33) showed that the respondents have rejected that they utilize nesting and truncation.

The overall average mean for the information-seeking strategies is 2.6209 (mean=2.62) which is significant as the second construct of the Big6 skill model. It shows that although the respondents do use some of the search strategies, they still utilize the search strategies significantly as they use phrase searching, keyword searching, snowballing, and parenthesis. The results showed that the students have significant information literacy skills to utilize e-resources which corroborates the findings by Buba, Song, and Abdullahi (2021) that information literacy skills are important in the use of e-resources with implications both in theory and in practice.

**Table 4: Importance of search strategies on the use of e-resources**

<b>Search strategies used</b>	<b>SA/A</b>	<b>Undecided</b>	<b>SD /D</b>	<b>Mean</b>	<b>Decision</b>
Boolean Operators	643	558	1203	<b>2.2862</b>	Rejected
Keyword searching	1213	710	479	<b>2.5904</b>	<b>Accepted</b>
Nesting	536	811	1055	<b>2.2875</b>	Rejected
Parentheses	891	702	809	<b>2.7366</b>	<b>Accepted</b>
Phrase searching	1311	689	402	<b>3.3406</b>	<b>Accepted</b>
Snowballing	804	971	627	<b>2.7778</b>	<b>Accepted</b>
Truncation	391	1213	798	<b>2.3272</b>	Rejected
<b>Average Mean</b>				<b>2.6209</b>	<b>Significant</b>

Table 4 showed that the majority (mean=3.25) of respondents indicated that search strategies make their search very easy, while (mean=3.23) of the respondents indicated that it helps to retrieve relevant information. The respondents that indicated that search strategies help narrow their search are (mean=2.75) and another (mean=3.10) of the respondents indicated it makes the internet user friendly while those who indicated that it enhances speedy access to information. The table further showed that those who indicated that it helps write good research work are (mean=2.90) and those who indicated that it saves time (mean=3.4). The result mirrors that the average mean=3.1302 which is significant. As highlighted by MacFarlane, Russell-Rose, and Shokraneh, (2021), all searches related to online information searching strategies as explored in several studies, are very important in understanding the effect of such in the information search process, and these searches cannot start without properly understanding the need of the information.

**Table 5: Location and Access**

<b>Search strategies used</b>	<b>SA/A</b>	<b>Undecided</b>	<b>SD /D</b>	<b>Mean</b>	<b>Decision</b>
Boolean Operators	643	558	1203	<b>2.2862</b>	Rejected
Keyword searching	1213	710	479	<b>2.5904</b>	<b>Accepted</b>
Nesting	536	811	1055	<b>2.2875</b>	Rejected
Parentheses	891	702	809	<b>2.7366</b>	<b>Accepted</b>
Phrase searching	1311	689	402	<b>3.3406</b>	<b>Accepted</b>
Snowballing	804	971	627	<b>2.7778</b>	<b>Accepted</b>
Truncation	391	1213	798	<b>2.3272</b>	Rejected
<b>Average Mean</b>				<b>2.6209</b>	<b>Significant</b>

*Location and Access* - This is where the active information seeking begins. Once the students decide on the appropriate strategy, the strategy is carried out. Table 5 above showed that 2143 (mean=4.25) of the respondents agreed that they possess the ability to locate information sources, 1739 (mean=3.87) indicated that they can access information sources and 1295 (mean=3.52) indicated that they can locate information from the sources. The table further revealed that 1039 (mean=3.24) indicated that they can locate information from the sources and 1274 (mean=3.61) agreed that they possess the ability to extract the required information from the information sources.

The overall average mean=3.69 shows that the respondents possess the third skill of the Big6 information literacy skills Model which is location and access. This is in agreement with the findings by Joo-Nagata and Martinez-Abad (2021) that despite belonging to two different teaching levels, in which there are different methodologies and contents within the school, the students behave as heterogeneous groups in the information competencies area. It shows that they all possess the information literacy skills of locating and accessing information.

**Table 6: Use of Information**

<b>E-Resources used</b>	<b>SA/A</b>	<b>Undecided</b>	<b>SD/D</b>	<b>Mean</b>	<b>Decision</b>
Audios	1012	823	567	<b>3.2779</b>	<b>Accepted</b>
CD- Rom	1311	804	287	<b>3.6395</b>	<b>Accepted</b>
Database	1621	321	460	<b>3.7250</b>	<b>Accepted</b>
E-Book	1123	917	362	<b>3.4753</b>	<b>Accepted</b>
E-dissertation and theses	1293	356	753	<b>3.3372</b>	<b>Accepted</b>
E-Journal	1322	719	316	<b>3.6001</b>	<b>Accepted</b>
E-mail	1291	701	410	<b>3.5501</b>	<b>Accepted</b>
E-news	1229	657	516	<b>3.4453</b>	<b>Accepted</b>
E-reference	729	989	684	<b>3.0280</b>	<b>Accepted</b>
Internet	1465	233	704	<b>3.4752</b>	<b>Accepted</b>
Social media	1672	256	474	<b>3.7594</b>	<b>Accepted</b>
YouTube	823	923	656	<b>3.1043</b>	<b>Accepted</b>
<b>Average Mean</b>				<b>3.4514</b>	<b>Significant</b>

*Use of Information* is concerned with understanding what information sources are chosen and how the information is applied to make sense of the various information needs. Table 6 indicated that majority 1012(mean=3.28) use audios, 1311 (mean=3.64) use CD-Rom, 1621 (mean=3.73) use Databases and 1123 (mean=3.48) indicated they use e-books. The table further showed that 1293 (mean=3.34) indicated they use e-dissertations and theses, 1322 (mean=3.60) indicated they use e-journals, 1291 (mean=3.55) have indicated they use e-mails, while 1229 (mean=3.45) and 729 (mean=3.03) indicated they use e-news and e-references respectively. The table also showed that 1465 (mean=3.48), 1672 (mean=3.76), and 823 (mean=3.10) indicated that the respondents use the Internet, social media, and YouTube respectively.

The result in the table above showed that the majority of the respondents use e-resources significantly with an average mean of 3.45. This is in agreement with the findings of Bashorun, Bashorun, and Akinbowale, (2021) in their study, 'evaluating information literacy competence in the use of electronic resources among medical students' which found that students in Nigerian possess skills and competencies to use e-resources.

**Table 7: Synthesis**

<b>Statement</b>	<b>SA/A</b>	<b>UD</b>	<b>SD /D</b>	<b>Mean</b>	<b>Decision</b>
Ability to synthesize and create new information	2206	131	65	<b>4.2962</b>	<b>Accepted</b>
Ability to integrate new information into an existing body of knowledge	1984	210	208	<b>4.0221</b>	<b>Accepted</b>
Ability to organize and communicate information	1595	137	670	<b>3.4096</b>	<b>Accepted</b>
Ability to use information in critical thinking and problem solving	1887	94	421	<b>3.8083</b>	<b>Accepted</b>
Ability to apply information for practical use	1923	308	171	<b>3.9944</b>	<b>Accepted</b>
<b>Average Mean</b>				<b>3.9496</b>	<b>Highly Significant</b>

*Information synthesis* is the process of analyzing information from various sources, making connections between the information found, and combining the recently acquired information with prior knowledge to create something new. Without information synthesis strategies, we cannot derive new knowledge from these large amounts of data. Effective information synthesis is also vital in developing effective writing and communication skills to share new knowledge. Table 7 represents the skills of the respondents in synthesizing new information into existing information. The table indicated that 2206 (mean=4.29) of the respondents agree that they

possess the ability to synthesize and create new information, 1984 (mean=4.02) indicated that they possess the ability to integrate new information into an existing body of knowledge, while 1595 (mean=3.41) indicated they can organize and communicate information.

The table further showed that 1887 (mean=3.81) of the respondents indicated that they possess the ability to use information in critical thinking and problem solving, and 1923 (mean=3.99) indicated that they possess the ability to apply information for practical use. The average mean is 3.95, which indicates highly significant literacy skills in the synthesis of information. This is in agreement with the conclusion of Bashorun, Bashorun, and Akinbowale (2021) that the students mastered the constructs of the Big6 information literacy skills Model and they possess the ability to synthesize information retrieved from e-resources.

**Table 8: Criteria for Evaluating e-Resources**

<b>Evaluation</b>	<b>SA/A</b>	<b>Undecided</b>	<b>SD /D</b>	<b>Mean</b>	<b>Decision</b>
Authenticity	893	794	715	<b>3.1112</b>	<b>Accepted</b>
Authority	924	879	599	<b>3.2030</b>	<b>Accepted</b>
Efficiency	934	761	707	<b>3.1418</b>	<b>Accepted</b>
Objectivity	962	739	701	<b>2.9198</b>	<b>Accepted</b>
Relevance	922	810	670	<b>3.1573</b>	<b>Accepted</b>
Reliability	876	862	664	<b>3.1324</b>	<b>Accepted</b>
Timeliness.	972	629	801	<b>3.1068</b>	<b>Accepted</b>
<b>Average Mean</b>				<b>3.1103</b>	<b>Significant</b>

*Evaluating information* encourages the user to think critically about the reliability, validity, accuracy, authority, timeliness, point of view, or bias of information sources. Table 8 showed that 893 (mean=3.11) of the respondents check the authenticity of the source, 924 (mean=3.20) check the authority of the source, another 934 (mean=3.14) checks the efficiency of the source, while 962 (mean=2.92) of the respondents indicated that the check the objectivity of the source. The table further showed that 922 (mean=3.16) check the relevance of the source, 876 (mean=3.13) of the respondents check the reliability, and 972 (mean=3.11) of the respondents check the timeliness.

The table showed that the majority of the respondents evaluate information sources using the set-out criteria with an average mean of 3.11. This contradicts the study of Yeboah, Dadzie, and Owusu-Ansah (2017) that students do not evaluate internet sources but print resources. This

study is in agreement with the conclusion of Keboh and Baro (2020) that students evaluate information sources using authority, authenticity, relevance, and timeliness of resources.

**Table 9: Method used to evaluate e-resources**

<b>Statement</b>	<b>SA/A</b>	<b>Undecided</b>	<b>SD /D</b>	<b>Mean</b>	<b>Decision</b>
I crosscheck information I access through e-sources with others.	962	752	688	<b>3.1710</b>	<b>Accepted</b>
I check various sources of information from the internet.	723	935	744	<b>2.9869</b>	<b>Accepted</b>
I pay attention to addresses I use in online searches	852	964	586	<b>3.1661</b>	<b>Accepted</b>
I check the date of sources that I have accessed through electronic sources.	946	879	577	<b>3.2304</b>	<b>Accepted</b>
Information accessed through e-sources have bibliographic details	855	979	568	<b>3.1792</b>	<b>Accepted</b>
I investigate various view points of the literature	803	934	665	<b>3.0862</b>	<b>Accepted</b>
I consult knowledgeable people about credibility of sources	1109	672	621	<b>3.3047</b>	<b>Accepted</b>
<b>Average Mean</b>				<b>3.1606</b>	<b>Significant</b>

In an evaluation of e-resources, the assessment is done through various means which include; a statistical report from the vendor on a series of downloads that are captured electronically, access criteria based on the technical reliability of the content provider, cost-effectiveness; satisfaction or dissatisfaction of the users with the resource. But this study used students' self-assessment criteria which have shown the student's measurement of their information literacy skills in the evaluation of e-resources. Table 9 showed that 962 (mean=3.17) of the respondents indicated they crosscheck information I access through e-sources with others, 723 (mean=2.99) indicate that they check various sources of information from the internet, 852 (mean=3.17) indicated that they pay attention to addresses while using online searches. The study further showed that 946 (mean=3.23) indicated they check the data of sources that they have accessed through electronic sources, 855 (mean=3.18) indicated that they check if the information they access through e-sources has an author, 803 (mean=3.09) indicated that they investigate various viewpoints of the literature, and 1109 (mean=3.31) indicated that they consult knowledgeable people about credibility of information sources.

The findings of the table showed that the respondents evaluate the e-information resources. The average means of 3.16 shows that they significantly evaluate the e-resources. The result is in agreement with the findings of Makinde, Jiyane, and Mugwisi (2020) who found that students evaluate e-resources based on their information literacy skills. The evaluate information retrieved from the internet using a predetermined set of criteria.

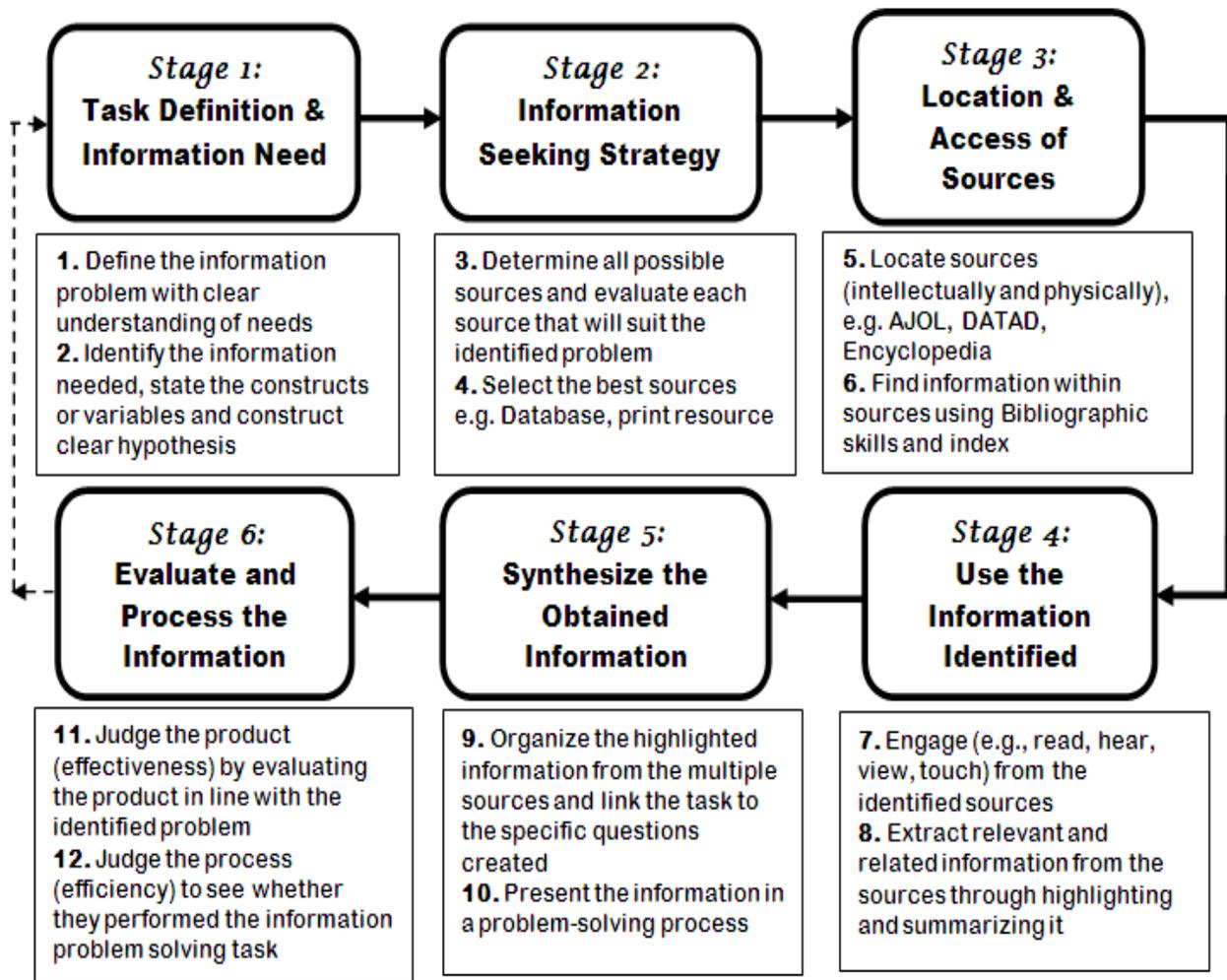
### **Application of the Big6 information literacy skills Model to the findings of the study**

This study describes the context of the task that students were asked to complete, their experiences and reactions, and some conclusions that might be drawn from their experiences. It is a study based on a homogenous set of undergraduate students, but it tends to show the value of concise models that illustrate the full problem-solving process for young "researchers" to perhaps more fully grasp the extent of the task facing them. Based on these 6 steps, the study identified students' information literacy skills using the Big 6 Skills model as satisfactory.

The increasingly evolving information environment has exposed the need for new evolutionary methods and practices to evolve and be adapted accordingly in the information search process. These include skills and competencies which involve the ability to do something successfully or efficiently, well or with expertise, with the knowledge of practical situations. The task definition step requires users to identify the exact information problem needed to solve the problem with a clear hypothesis and a clear understanding of what is needed to answer any question. The information-seeking strategies stage requires them to identify all the possible sources of information and then evaluate each source to determine the best source that will solve the already established problem.

This stage is followed by location and access and then use of information, which consists of traditional bibliographic skills. They locate resources such as print materials, online databases, and websites to access the information within each source through the use of indexes and other resource-specific tools and engage each source and extract specific information from it by applying note-taking, highlighting, and summarizing. Synthesis requires the users to make a decision, create a product, or formulate an answer. The fifth stage is linked to task definition in answering the specific question they created when initially engaging in the problem-solving

process. Finally, the evaluation stage requires the users to evaluate their final product and evaluate how well they performed the information problem-solving task.



**Fig 1: Modified Big6 Information Literacy Skills Model (Source: The Authors, 2022)**

At the evaluation stage when the acquired information did not address the identified problem, then the search process returns to the first stage of problem identification and definition. Adetunji and Oladokun (2019) argued that the functional view of information sources describes them as neither good nor bad, but just more or less relevant to a given information need. Thus, information sources may be relevant and suitable to specific information needs, at a particular time or for a particular purpose. For information needs to be met by a user, he must identify appropriate information sources and be able to select the right search tools to access the information. The information must also be evaluated before being used to meet the information

needs. Accordingly, they argued that e-resources should be evaluated because they are created at a very high level and that they are meant to be used for a varied audience. As surmised by Makinde, Jiyane, and Mugwisi (2020), students reported twice as many frustrations with conducting course-related research as they did with "everyday life research".

### **Implications of the Study**

There are several implications of the results presented in this study. Such a model should continue to be tested among many groups of learners to determine the full range of their value for giving the student greater confidence and understanding of the complexities involved in information problem-solving.

The study expands the walls within the model and exposed that the Big6 information literacy skills model can be used for various levels of users of technology, unlike the earlier purpose it was aimed at (kindergarten through twelfth grade). It further showed that the process model can be self-instructive, and users can follow the various stages without any tutor guide. That means that anyone can use the model to first identify their literacy skills, and secondly, to teach themselves the various components of the information literacy skills set.

The findings of the study also provide support for young researchers and suggest University library readers' services units consider collaboration in providing instruction in information problem solving and information literacy skills. The most compelling implication suggested from the results of this study is the potential link between a specific information problem-solving model and the Big6 information literacy skills Model in providing a structured vocabulary that librarians and users can use while discussing the problem-solving strategies. The benefit of strengthened literacy skills is that library users can apply these skills to a variety of situations that may differ from the original problem-solving task in which the process was initially initiated.

### **Limitations**

The self-reporting nature of the questionnaire is such that it may introduce issues prone to biases. Measuring the students' information literacy with practical exams would have provided much more precise results than a mere expression based on a response generated from a questionnaire.

Also, as a result of the limitation of the study population (the students of federal universities in North-East Nigeria), the generalization of the findings of the study has to be done with caution.

## **Conclusions and Recommendations**

Based on the constructs of the Big6 information literacy skills Model, the study concludes that undergraduate students possess the skills required for the utilization of e-resources. The conceptual model for the study highlighted the various connections between the variables and the constructs. Based on the findings of the study, the Big6 information literacy skills Model was slightly modified and can be used to inculcate knowledge as well as self-assessment. The study also concludes that undergraduate students use e-resources often, such as social media, e-journals, databases, the Internet, and e-dissertations. Therefore, the following recommendations were made based on the findings of the study.

1. The involvement of lecturers and librarians as facilitators in identifying information needs, accessing information, and evaluating information to maximize information search literacy activities through collaboration should be encouraged in achieving the target of increasing information literacy.
2. The university managements need to improve the content of the information literacy programs to inculcate in the undergraduate students the wherewithal of getting relevant, adequate, and up-to-date information from the e-resources.
3. There is a need to make information literacy programs a stand-alone course in the curriculum, which will improve the information literacy skills of the students.

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