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An Assessment of Information Literacy Competence of Doctoral Students
in Universities in Ogun State, Nigeria

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Abstract

Information is the foundation upon which all academic activities are built. The quality of teaching, learning and research is a function of the quality of information available to practitioners. While the current information landscape is characterized with information adequacy made possible by the application of ICTs to information handling, the sheer magnitude of available information tending towards overload is itself a challenge in the current technology-driven world we live in. In response to this challenge, academic institutions all over the world came up with what is known as information literacy described as an intellectual framework which enables individuals to identify, locate, access, evaluate, use and communicate information. Despite the argument that technological advances have facilitated access to information, there is ongoing concern globally that university students are still not becoming information literate – that they cannot retrieve and evaluate the information that will be required for problem solving and decision making in the workplace and in society (Buzzetto-Hollywood, et al., 2018; Ondari-Okemwa, 2016). Specifically in Nigeria, recent developments in higher education also indicate that the quality of the students that gained admission has been changing. Most of these students have an increasingly detailed knowledge of information and communication technologies (ICTs), expectedly use new habits of communication and are eager to learn new forms of education including autonomous online learning. However, they have difficulties when it comes to handling large amount of information even at doctoral level (Ekwelem, Eke & Dim, 2009; Oyedokun, et al., 2019; Pelemo, et al., 2020). . This study, therefore, assessed the information literacy competence of doctoral students in universities in Ogun State, Nigeria.

The study used survey research design. The population of the study was 1, 418 doctoral students from six universities in Ogun State already running doctoral programs out of nine licensed by the National Universities Commission (NUC). The Research Advisor's table was used to select a sample size of 306. A structured and validated questionnaire was used for data collection. Cronbach's alpha reliability coefficient for the construct was 0.92. The response rate was 92%. Data were analyzed using descriptive and inferential (simple and multiple regression) statistics.

Findings revealed that information literacy competence of doctoral students in universities in Ogun State was high ($\bar{x}=4.2$). The study concluded by recommending that university administrators and the NUC should strengthen the research capacity and productivity of doctoral

students through target coursework, workshops, conferences and research collaboration with peers and mentors.

Keywords: Information literacy, Doctoral students, Information processing, Information Communication Technologies, Postgraduate Education, Nigeria.

Background to the Study

As noted by Schoole (2011), doctoral education is the core of university research capacity where doctoral education is expected to produce new, cutting-edge and original ideas and knowledge through research productivity. Doctoral students are involved in research that entails thesis writing and publications in journals and conference proceedings. Meanwhile, writing and publishing research results are crucial for progressing scientific thought and reaching a broad audience (Derntl, 2014). In carrying out these activities, doctoral students have to sift out information from varied sources such as the Internet, electronic resources, libraries and other sources in unfiltered form. Because research is accretive and builds on information, doctoral students need to be equipped with information literacy knowledge. Information literacy described “as the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning” (Association of College and Research Libraries (ACRL), 2016, p. 8)

Information literacy includes higher-order abilities such as: identifying information need; locating information; assessing search results for quality and relevance; evaluating the reliability, validity, authority and timeliness of retrieved information; processing and applying new information to the planning and production of scholarly research and professional pursuits; synthesizing retrieved information to form new information and communicating information for further use (Pinto & Fernandez-Pascual, 2017). Again, as the volume of information is constantly increasing, search skills are required not only to gain access to the available information resources, but also to sift from the large quantity and utilize the most appropriate information resources because the real challenge of our time is not producing information or storing information, but getting users to differentiate between essential and irrelevant information. Therefore, information literacy skills are declared as twenty-first-century skills (Batoool & Webber, 2018; Varga & Egervári, 2014). Hence, being information literate is fundamental to the use of information resources in the knowledge society. Moreover, the enormous growth of information within the last couple of years has made it impossible to

prepare doctoral students without being information literate as it plays a key role in lifelong learning and achieving initial steps in the attainment of educational goals and research productivity.

According to Bruce (1995), since the emergence of the information age, with its rapidly developing information technologies, and ever increasing quantities of information, the need for information literacy in academic, professional and private contexts has been brought sharply into focus. Effective research, learning, communication, decision-making and problem-solving, require individuals to be able to locate, manage, evaluate and use appropriate information from a wide range of formal and informal sources. This emphasis indicates that information literacy and information literacy education are relevant to quality research, quality teaching and learning, and quality information environments. Quality research advances knowledge; people doing this research must be able to access and use appropriate information resources and services. Quality teaching prepares graduates for continued lifelong learning; it must ensure that students learn to learn from a wide range of information resources. Access to, and critical use of information and of information technology is absolutely vital to lifelong learning, and accordingly no graduate can be judged educated unless he or she is information literate (Buzzetto-Hollywood, Wang, Elobeid & Elobeid, 2018). Clearly, educational programs at doctoral level need to ensure that students are able to locate, manage and use information for research, problem-solving, decision-making and continued professional development. Because information literacy is an important characteristic of lifelong learners, information literacy education is an important part of all educational curricula.

Despite the argument that technological advances have facilitated access to information, there is ongoing concern globally that university students are still not becoming information literate – that they cannot retrieve and evaluate the information that will be required for problem solving and decision making in the workplace and in society (Buzzetto-Hollywood, et al., 2018; Ondari-Okemwa, 2016). Specifically in Nigeria, recent developments in higher education also indicate that the quality of the students that gained admission has been changing. Most of these students have an increasingly detailed knowledge of information and communication technologies (ICTs), expectedly use new habits of communication and are eager to learn new forms of education including autonomous online learning. However, they have difficulties when it comes to handling large amount of information even at doctoral level (Ekwelem, Eke & Dim, 2009; Oyedokun, et al., 2019; Pelemo, et al., 2020). Therefore, numerous attempts have been made to articulate and standardize the information literacy content that students need. Some of the most

popular associations established to standardize information literacy education are listed thus: Association of College and Research Libraries Frameworks; A New Curriculum for Information Literacy (ANCIL); Society of College, National and University Libraries' Seven Pillars of Information Literacy (SCONUL); National Information Literacy Framework Scotland (Scottish framework) and Information Literacy Framework for Wales (Welsh framework).

Indicators of information literacy according to SCONUL model include **identify** which connotes recognition of the need for information. Others are **scope** which indicates users' ability to evaluate current knowledge so as to identify gaps; **plan**, which means users' ability to map out strategies in locating required information. It also includes **gather** which denotes actual locating and accessing of required information; **evaluate** means users are able to review, compare and assess information and data; **manage** indicating users ability to organize information professionally and ethically and **present** which connotes users' ability to apply, communicate, synthesize and disseminate information.

Objective of the Study

The main objective of the study was to ascertain the level of information literacy competence of doctoral students in universities in Ogun State;

2. find out how doctoral students in universities in Ogun State acquire their information literacy;

Research Questions

1. What is the level of information literacy competence of doctoral students in universities in Ogun State?
2. How do doctoral students in universities in Ogun State acquire their information literacy?

Literature Review

Information literacy has been variously described as a life-long necessity and a basic requirement for the current and emerging technology driven society (Richards, 2014; Yogeve, 2010). Also, the definitions of information literacy as offered by different authors have revolved around similar traits exhibited by an information literate individual. For example, Wilson, et al. (2017) defined information literacy as the ability to identify problems that stem from a lack of information; efficiently access, gather, and manage necessary information from a variety of credible sources; consider multiple interpretations and uses and synthesize information to construct new knowledge; utilize newly constructed knowledge to identify solutions; and communicate the information in a manner appropriate to the audience being addressed. SCONUL in its revised information literacy framework defines an information literate person as someone who will demonstrate an “awareness of how they gather, use, manage, synthesize and create information and data in an ethical manner and will have the information skills to do so effectively” (p.3). In Kollé (2017), the National Forum on Information Literacy defined the phrase as the ability to know when there is a need for information and to be able to identify, locate, evaluate and effectively use that information for the issue or problem at hand. In other words, information literacy encompasses skills and the ability of a person to identify, locate, evaluate and use the required information effectively as and when required. In the same vein, Baro and Zuokemefa (2011) defined the information literates as those “people who recognize their own need for good information and who have the skills to identify, access, evaluate, synthesize and apply the needed information”.(p. 4).

The American Library Association’s Presidential Committee in an earlier characterization of information literates, assert that “to be information literate, one must be able to identify, locate, and use it properly when it is needed” (ACRL, 2015, p. 8). Based on this, the association (ACRL, 2015) defines information literacy as the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning. Kong (2014) sees information literacy as the mastery of necessary knowledge of gathering, synthesizing, analyzing, interpreting and evaluating information; and the proper attitudes for information processing with an understanding of the rationale behind using information which addresses capacities in four major perspectives: the cognitive perspective about capacities to demonstrate necessary information skills to inform decisions and problem solving; the meta-cognitive perspective about capacities to process information

reflectively; the affective perspective about capacities to appreciate and enjoy the process of inquiry; and the socio-cultural perspective about capacities to demonstrate autonomy over and social responsibility for the use of information in both individual and collaborative learning.

Emphasizing its lifelong indispensability, Catts (2012), defines information literacy, as the capacity to locate, evaluate and use information to create new knowledge as a core adult life skill and an extension of the notion of functional literacy, which has been re-echoed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) when it identified information literacy as an essential capacity for participation in the knowledge economy. Furthermore, Pinto and Fernández-Pascual (2017) described information literacy as including higher-order abilities such as assessing search results for quality and relevance; evaluating the reliability, validity, authority, and timeliness of retrieved information and applying new information to the planning and creation of scholarly and professional pursuits. Viewed as a multi-dimensional construct, Pinto and Fernández-Pascual (2017b) sees information literacy as a set of literacies or competencies that an informed citizen needs in order to participate judiciously and actively in an information society. Similarly, Igun and Odafe (2014) assert that information literacy can combine various elements of library literacy, computer literacy, media literacy, network literacy and other literacies. Simply put, information literacy is the ability to locate, manage, critically evaluate and use information for problem solving, research and decision making.

In Simisaye and Popoola (2019), information literacy is conceptualized as sets of skills that encompass the ability of the individual to know the need for information, identify, locate, evaluate, organize and effectively create, use and communicate information ethically to address issues or problem relating to research activities leading to research publications. Petrucco (2017) sees information literacy as concerning that set of technical and methodological skills that enable a person to know where and how to search for information, to filter it effectively and above all to evaluate it appropriately. In addition, White (2019) opined that while it may not be possible for an individual to retain all information given, an information literate individual will certainly know how to find, access, evaluate and use information from a variety of sources wisely and effectively translating into the ability to derive meaning from information. In essence, the author believes that the hallmark of information literacy is to teach people how to learn.

Measuring Information Literacy

According to Shavelson, Zlatkin-Troitschanskaia, and Mariño (2018) educators and policy makers now recognize the importance and necessity of assessing student learning outcomes (SLOs) in higher education especially as it concerns the 21st century skills among which information literacy is core with emphasis shifting from whether such outcomes should be measured to how they should be measured. Pinto and Fernández-Pascual (2017b) also re-affirmed that the issue of assessment of information literacy in higher education occupies a central position in recent research, and it remains an open matter that still has a long way to go. Today, student learning outcomes are typically assessed by student self-reports of learning or with multiple-choice and short-answer tests with each method having its strengths and limitations. Moreover, the demand to measure higher education learning outcomes has gained worldwide momentum partly due to both the internationalization and harmonization trends associated with the globalization of the job market, as well as a very rapid expansion of higher education in developing countries. Perhaps the most notable internationalization drive is the Organisation for Economic Cooperation and Development's (OECD) project, the Assessment of Higher Education Learning Outcomes (*AHELO*). This international study examined the feasibility of validly measuring student learning outcomes in higher education internationally and focused among other things on assessments for measuring performance-oriented generic skills (OECD 2012). In addition, a number of standardized tests as identified by Pinto and Fernández-Pascual (2017b) include Project SAILS (Standardized Assessment of Information Literacy Skills), the Information Literacy Test (ILT), the iSkills Assessment of the Educational Testing Service (ETS), ISS (Information Skills Survey) and INFOLITRANS (Information Literacy for Translators). See Table 1 for a list of the most frequent standardized IL tests.

Table 1

Most frequent standardized tests of information literacy

Test	Institution	Standards	Competencies	Tool	Target population
SAILS (Standardized Assessment of Information Literacy Skills), https://www.projectsails.org/	Kent State University, Kent, Ohio	Association of College and Research Libraries (ACRL), 2000	<ul style="list-style-type: none"> • Need for information. • Accesses needed information effectively and efficiently. • Evaluation of information. • Use information ethically and legally. 	Computerized multiple-choice test	Higher education
ILT (Information Literacy Test), www.madisonassessment.com/assessment-testing/information-literacy-test	Center for Assessment & Research Studies, James Madison University,	ACRL, 2000	<ul style="list-style-type: none"> • Need for information. • Accesses needed information effectively and efficiently. 	Computerized multiple-choice test	Higher education

ETS (Educational Testing Service) ISkills Assessment, https://www.ets.org/iskills/about	California State, University Long Beach	ACRL, 2000	<ul style="list-style-type: none"> • Need for information. • Accesses needed information effectively and efficiently. • Evaluation of information. • Use information to accomplish a purpose. • Use information ethically and legally. 	Online test of simulation-based tasks	High school and higher education
ISS (Information Skills Survey)	Council of Australian University Librarians (CAUL)	Australian and New Zealand Institute for Information Literacy (ANZIIL), 2004	<ul style="list-style-type: none"> • Accesses needed information effectively and efficiently. • Evaluation of information. • Manages information collected or generated. • Use new information to construct new concepts or create new understandings. • Use information ethically and legally. 	Simulated computer-based test of performance of IL skills	Higher education
INFOLITRANS (Information Literacy for Translators)	University of Granada and University Jaume I		<ul style="list-style-type: none"> • Searching information • Evaluation 	Computerized multiple-	Higher education

Source: Pinto, M. & Fernández-Pascual, R (2017b). A Diagnosis of the levels of information literacy competency among social sciences undergraduates. *portal: Libraries and the Academy*, 17(3), 569-593. doi:<https://doi.org/10.1353/pla.2017.0035>

Information Literacy and Postgraduate Education

The emergence of information communication technologies have altered radically information generation, processing, storage, dissemination and use. Every aspect of human life has been affected by this radical change, reducing the world to a global village. Dearth of information, which characterized the former, traditional approach to information processing, has given way to what is now termed information overload (Batool & Webber, 2018; Kollé, 2017). Information literacy, which is the library's response to tackling the attendant challenges of information overload has been described as an intellectual framework aimed at equipping individuals with the requisite knowledge and skill necessary to survive in a technology driven information society. Because of its indispensability in this dispensation, various studies have been conducted to assess its influence on postgraduate education. Some of the related studies are reviewed in this section.

Travis (2010) in a study titled 'From the Classroom to the Boardroom: The Impact of Information Literacy Instruction on Workplace Research Skills', evaluated the impact of information literacy instruction on workplace research skills. The study adopted a survey design with questionnaire been the main instrument of data collection. While the survey was opened to anybody who attended a 4-year course in the United States of America, only 98 responses were found useful out of the 133 individuals who responded to the questionnaire cutting across 24 campuses. Among other findings, the study revealed that 48% of the respondents declared that

information literacy knowledge assisted in securing their current position while 77% felt that finding information was an essential part of their work. In terms of information literacy and research engagement, 51% responded that their research skills had improved while 31% felt no change in their research skills with just few responding to deteriorating research skills.

In a study titled 'Exploring LIS Students' Beliefs in Importance and Self-Efficacy of Core Information Literacy competencies', Pinto and Fernandez (2016) examined the perceptions of library and information science (LIS) students on two dimensions of belief in the importance of a set of core information competencies and self-efficacy (SE). The survey design sampled a total of 524 undergraduate and 133 graduate LIS students from four different programmes within the Faculty of Communication and Documentation at the University of Granada, Spain. A self-assessment instrument was administered to the respondents that used a previously validated self-assessment tool, the Information Literacy Humanities Social Sciences (IL-HUMASS; Pinto, 2010). The findings of the study show that, LIS students were well aware of the importance of information literacy competencies, although self-efficacy was not so high when tackling these competencies in practice. Greatest belief in importance level with regard to the competencies included in the categories of communication and evaluation was reported, which are strongly correlated (by analysis). On the other hand, respondents felt the most skilled (SE) in the activities of evaluation and searching two categories that were also highly correlated. Again, findings from this study accentuate the importance of information literacy competence bolstered by a positive self-efficacy on academic activities of which productive research endeavor is an integral part.

In another study titled 'How a Cycle of Information Literacy Assessment and Instruction Stimulates Attitudes and Motivation of LIS Students: A Competency-Based Case Study', Pinto and Fernández-Pascual (2017) investigated LIS students' affective and effective status with regard to a range of basic information literacy competencies, through their attitudes, belief in importance (BI), motivations – self/efficacy (SE) and actual levels of knowledge and skills (KS). Targeting an initial population of 39 first year LIS students at the University of Granada (Spain) enrolled during the spring semester (2015), 32 were finally selected having contributed to both pre- and post-tests. Mixed methods approach including pre-test on affective and actual values concerning information literacy competencies, information literacy instruction on 'content analysis' subject, post-test replicating the same questionnaires (ILHUMASS and EVALCI) were employed. Various statistical methods such as paired sample tests, factor analysis and correlations were used for data analysis. The findings confirmed significant relationships

between students' attitudes, motivations and actual levels of information literacy knowledge and skills, but not in all competencies. Furthermore, it was revealed that instruction had greater impact on students' self-efficacy (SE) and lower on belief-in-importance (BI). Also, instruction/assessment experience has been relevant for LIS students' motivations (SE), and to a lesser extent for their attitudes (BI). The study recommended that both information literacy dimensions should be approached separately, with greater emphasis on BI. Though limited to a group of LIS students from one institution, a new research path towards better understanding of the relationships between their affective and actual values on information literacy competencies was suggested.

Recognizing the importance of educators in curriculum development and delivery, Yazon, Ang-Manaig, Buama and Tesoro (2019) conducted a study titled 'Digital literacy, digital competence and research productivity of educators'. The study employed the descriptive-correlational research design. The respondents of the study were the permanent faculty members of Laguna State Polytechnic University, Los Banos, Laguna, Philippines. The research instruments used were the standardized scales of Being Digital (2012), Digital Literacy Checklist of The Open University, United Kingdom, which measured the digital literacy of the respondents while digital competence was assessed through the self-assessment tool of the European Digital Competence Framework for Educators (DigComEdu). The statistical tools used were the weighted mean, standard deviation and Chi-Square. The findings revealed a significant relationship between faculty members' digital literacy and research productivity. This means that increase in understanding, finding, using and creating information using digital technologies were positively related to faculty members' ability to conduct, complete, present and publish research articles. Likewise, faculty member's digital competence was strong and significantly correlated to their research productivity, which clearly indicates that as their knowledge, skills and attitudes for working, living and learning in the knowledge society increased, so also was there significant increase in their ability to produce publishable research outputs. However, only two out of the seven colleges surveyed showed moderate research productivity based on the study's pre-determined productivity index. While the study was able to establish correlation among studied variables, it did not specify the totality of target population and the statistical basis for the selected sample size which has implication for acceptable generalization of study findings.

In a trans-national comparative study titled 'Information Literacy, Research, Scholarship and Publication: Comparative of Ph.D. Students in Nigerian and South African Universities, Oyewo and Uwem (2016) conducted an analysis of Ph. D. students' at University of Lagos, Nigeria and

University of Kwazulu-Natal, South Africa and their level of information literacy skills in terms of ICTs, use of library facilities and its implication on their research, scholarship and publication productivity. The study adopted a mixed method design involving interviews, focus group study and qualitative thematic data analysis. A simple random sampling technique was used to select forty participants comprising twenty (20) Nigerian participants referred to as ‘ international students ‘studying at Howard and Edgewood campus, University of Kwazulu-Natal, South Africa while twenty (20) participants were also selected from the University of Lagos (Unilag), Nigeria. Qualitative data generated were analyzed using interpretivist paradigm approach. Preliminary findings revealed that Nigerian students enrolled at the University of KwaZulu-Natal had an edge over their counterparts at the University of Lagos, Nigeria in terms of information literacy, research, scholarship and publication output because of availability and accessibility of ICTs and efficient university library. Although findings of the study established a relationship between information literacy and research productivity, the mediating effects of availability of ICTs and efficient university library almost blurred the relationship. Moreover, the sample size and the subjective interpretivist data analysis cast a doubt on the generalization of the findings.

In another study titled ‘Relationship between Information Literacy Skills and Research Productivity of Researchers in Nigeria and the Mediating Role of Social-Economic Factors’, Simisaye and Popoola (2019) investigated the influence of information literacy skills on the research productivity of academic staff in Nigeria. The study adopted a descriptive survey research design with a total population of 782 academic staff comprising 746 research fellows and thirty-six (36) academic librarians from twelve research institutes. The instrument used for data collection was a structured questionnaire, containing items on demographic and socio-economic factors, information literacy and research productivity scales of the studied population. Out of the 782 copies of the questionnaire administered to the target population, 610 were found useful. Data generated were analyzed using descriptive, correlation and hierarchical regression analyses. The results of the study established an indirect relationship between information literacy skills and research productivity at ($r=0.56$, $p<0.05$) with socio-economic factors (monthly salary, academic status, age, highest educational qualification, work experience and employment nature) having mediating effects on the relationship between information literacy skills and research productivity. Together, they accounted for 47% of the variance in the research productivity of the respondents. However, the mediating role of monthly salary, academic status, age, educational qualification, work experience and employment nature in the research productivity of the respondents is misleading.

In another development, Omeluzor, Bamidele, Onuoha and Alarape (2013) conducted an investigative study titled 'Information Literacy Skills Among Postgraduate Students of Babcock University, Nigeria, aimed at showing the impact of information literacy skills (IL) on the research skills of postgraduate students. The study identified some IL programs that were of utmost importance to enhance research skills of postgraduate students. A total enumeration method was adopted where structured questionnaire was administered to two hundred and fifty-three (253) postgraduate students of 2012/2013 academic session. The results indicated that most of the respondents had their information literacy skills through seminar, user education, orientation, one-on-one discussion and tutorial. The result further indicated that majority (90%) of the respondents could identify information in their study area; also, information literacy skills programme (briefing by librarian) organized by the postgraduate school was not well attended where 209 (86%) of the respondents were absent and thus had no significant impact on their selection and use of a wide range of information sources in their discipline. Consequently, the study recommended that postgraduate students should be mandated to attend information literacy skill programmes organized by the library such as briefing by librarian. While the study dwelt so much on information literacy, it was rather too silent on its resultant impact of the research skills of the studied population. Moreover, while it recommended making attendance mandatory for students at IL programmes, it did not provide enforcement guidelines to ensure students' attendance.

Similarly, in a study titled 'Library Orientation and Information Literacy Skills as Correlate of Scholarly Research of Postgraduate Students in Federal University of Agriculture, Abeokuta', Pelemo, Onanuga, Ilori and Ugbala (2020) sought to show the relationship between library orientation, information literacy skills and scholarly productivity of postgraduate. The study adopted a survey research design culminating in the random selection of nine hundred (900) postgraduate students from a target population of one thousand, three hundred and sixty-one (1,361) cutting across Postgraduate Diploma, Masters and Doctor of Philosophy from the ten (10) colleges in the institution with questionnaire being the main data collection instrument. Results of the study revealed non-availability of library orientation and information literacy programmes for postgraduate students at FUNAAB, while the only form of information literacy programme available to them was the use of computer course. Consequently, the study also discovered a rather low level of information literacy skills among postgraduate students where majority were unable to access the library's catalogue and e-resources unless assisted by a librarian. On the strength of the findings and their possible influence on postgraduate research

output, the study recommended the inclusion of library orientation and information literacy programme into postgraduate curriculum. Also, it was recommended that seminars and workshops on online catalogue and electronic databases for research should be organized periodically for postgraduate students. While findings of the study showed the absence of orientation and information literacy programmes for postgraduate students and their effects on students' information retrieval and access skills, it did not show the strength and direction of the association on the research output of the studied population. It could thus be inferred that the research productivity of the respondents was at par with their low or non-existent information literacy skills. Moreover, the roles of different social, demographic and institutional variables among strata of the studied population were not considered.

Also, Madu and Dike (2012) examined the extent to which information literacy correlates with academic productivity in a study titled 'An assessment of the relationship between information literacy competencies and academic productivity amongst staff in Nigerian universities in North Central geographical zone'. The research design for the study was correlational survey, drawing on a sample of four hundred and twenty-one (421) academic staff (15%) from six (6) universities out of a total population of 2,810 from twelve (12) universities through the multi-stage sampling techniques. Two instruments, a Standard Information Literacy Test and an Academic Productivity Index were used to collect data for the study. Data collected were analyzed with the Pearson Product Moment Correlation Coefficient. Results revealed a significant relationship between information literacy competencies and the productivity of academic staff. It was therefore recommended that academic staff should take advantage of the enabling environment to enhance their level of information literacy competence which will have positive effect on their research output. Although the study further confirmed a correlation between information literacy and research productivity of academic staff in the study area, it neither specify the degree of productivity of respondents nor delineate what constitutes research productivity, as this varies from one locale to another as well as from one institution to another.

In a related study titled 'Information Literacy Skills and Availability of Information Resources as Factors Influencing Research Productivity of Academic Staff of Federal Universities in Nigeria', Okiki (2013) adopted a descriptive survey research design using a multistage sampling technique to select one thousand and fifty-seven (1,057) academic staff members of different cadres from twelve federal universities in the six geo-political zones of Nigeria. The instruments used for data collection included Information Literacy Skills ($r=0.92$), Literacy Skills Acquisition ($r=0.83$), Availability of Information Resources ($r=0.69$) and Research Productivity of Academics

($r=0.91$) to answer seven research questions and the hypotheses tested at 0.05 level of significance. Descriptive statistics, Pearson Product Moment Correlation Coefficient and multiple regressions were used to analyze the data. Like Madu and Dike (2012), results showed that information literacy skills correlated significantly with academics' research productivity ($r=0.47$; $df=87$; $p<0.05$). Also, information literacy skills and availability of information resources jointly contributed significantly to research productivity of academics ($F=139.78$; $df=(2,872)$; $p<0.05$; $R^2= 0.24$). However, there was no significant relationship between availability of information resources and academics research productivity. The mean score of overall research productivity of academics was ($=3.51$; $SD = 2.64$). The mean scores of information literacy skills was ($= 2.06$; $SD = 0.38$), an indication that information literacy skills of academics in Nigerian federal universities was high. Information literary skills of academic was high in the South South ($= 151.89$; $SD = 17.3$) and North East ($=136.21$; $SD = 19.8$). Similarly, research productivity was high in the North East ($= 20.69$; $SD = 31.2$) and South West ($= 21.74$; $SD = 87.2$). Also, the mean score of information resources availability was adequate in Nigerian federal universities libraries ($=2.41$; $SD = 0.90$) which means that information resources were readily available to academics for research productivity. The study also revealed that low Internet bandwidth and financial constraint constituted barriers to research productivity of academics in the studied universities. While the study established a correlation between information literacy skills and research productivity of respondents, the strength and direction of the findings are conflicting. For example, the study indicated that 90% of the total respondents agreed that their information literacy was high, but only two out of the six geo-political zones studied reported a corresponding level of research productivity in comparison to their level of information literacy skills. It can then be deduced that research productivity in the remaining zones were not as high as their reported information literacy skills.

In a recent study titled 'Information literacy skills, availability of information resources as factors influencing research productivity of academic staff at Lead City University, Afolabi and Oladokun (2020), adopted a quantitative research method using a self developed questionnaire as data collection instrument. The sample size consisted of seventy-one (71) academic staff selected through the proportionate sampling procedure from four faculties in the university. Results from the study indicated adequate availability of information resources for lecturers and other academic staff at Lead City University for their research. However, a significant number of the respondents were unaware of available information resources, accessible in the library or through the library OPAC as well as lacked the required information literacy skills. In addition to this

lack of awareness and low information literacy skills, the study further revealed that the research productivity of the academic staff of Lead City University was low due to lack of infrastructure, lack of financial support, excess workload, lack of information resources, low personal development drive, lack of institutional support and mentoring. Based on the findings, the study recommended that the library create more awareness about available resources and conduct information search and retrieval training for library patrons to improve their information literacy skills. Despite the availability of information resources, the study respondents were neither aware nor used the resources for their research resulting in low research productivity thus accentuating the influence of information literacy on research productivity by showing that availability is not tantamount to utilization. Again, the strength and direction of the relationships among the variables were explicitly indicated.

Furthermore, Oyedokun, Adekunmisi, Olusanya, Buraimo and Bakre (2019) examined information literacy as determinant of research competency among postgraduates of Olabisi Onabanjo University (OOU), Ago-Iwoye and Federal University of Agriculture, Abeokuta (FUNAAB), Nigeria. A descriptive survey research design involving multistage sampling technique were employed to select three hundred and thirty-seven (337) participants from a target population of 2,089 postgraduate students. A validated questionnaire made up of two scales was used to measure information literacy skills (0.79) and research competency (0.78) variables of the study. Findings from the study indicated that the sampled postgraduate students possessed high level of research competence, although competencies in handling research methodology, data analysis and discussions of finding were low. The study further revealed that respondents possessed high information literacy skills. Finally, information literacy skills positively influenced research competency of the sampled postgraduates. The study therefore recommended the promotion and sustenance of research and research methodology courses, provision of library resources and services and effective integration and teaching of library instructions to postgraduates amongst other recommendations. However, there appears to be conflicts in the findings of the study especially the aspect of research competence. Respondents cannot be said to possess a high level of research competence if they have little knowledge of research methodology, data analysis and discussions of findings. In addition, the recommendations are clearly at variance with the stated objectives of the study.

In another development, Nwosu, Obiamalu and Udem (2015) investigated the relationship between information literacy skills and research output of academic staff in Nnamdi Azikiwe University, Awka, Nigeria. A correlational research design was adopted for the study. From a

target population of 1,038 academic staff, a sample size of one hundred and fifty eight (158) respondents were selected through stratified sampling technique. Five research questions guided the study and three hypotheses were tested at 0.05% level of significance. Questionnaire consisting two scales of achievement test and research output index was used to generate data from respondents. Mean and Pearson correlation coefficient were used to analyze the data obtained. Findings revealed that the level of information literacy skills possessed by the academic staff in Nnamdi Azikiwe University, Awka was moderate with the test of hypothesis showing a significant and positive relationship between level of information literacy skills possessed by the respondents and their rank. Also, the research output of academic staff of Nnamdi Azikiwe University, Awka was high, indicating a significant and positive relationship between the research output and rank of lecturers. More specifically, findings of the study also showed a significant relationship between information literacy skills of the respondents and their research output with the test of hypothesis indicating a positive correlation between information literacy skills possessed by the academic staff and their research output. However, it could be deduced that the driving force behind the research productivity of the respondents is dictated more by the imperative of publishing so as not to perish rather than any other consideration.

Similarly, Anekwe (2018) investigated the impact of web-based information literacy on research productivity among academics in Nigerian federal universities. The study employed a descriptive survey drawing study participants from four Nigerian universities (two federal and two state universities). Three (3) research questions and three (3) hypotheses guided the study. The sample size was 480 academic staff drawn from a total population of 2,885. The instrument for data collection was a 24-item structured questionnaire developed by the researcher. The instrument was face and content validated and its reliability was computed to be 0.82. Data collected were analyzed using mean and standard deviation while the hypotheses were tested at 0.05 level of significance. Findings indicated that web-based information literacy has enhanced research productivity of academics in both federal and state universities with paucity of funds and inadequate information and communication technologies constituting institutional challenges while low web-based information literacy competence and excess workload were seen as hindrances by the participants.

In Ardebil, Iran, Rezaee, Pourbairamian and Zarifsanaie (2016) assessed information literacy competency standards and critical thinking in higher education using a cohort of students of medical sciences, Ardabil University of Medical Sciences, Ardebil, Iran, from different fields and years of study. The survey drew a sample of 400 respondents from 13 different fields and

from different entrances using two standard tests and information literacy questionnaire. Findings from the study demonstrated that students did not have enough ability and skill in all five standards of information literacy skills, scoring below average. The study also found that there was a positive and significant correlation between information literacy and critical thinking ($P < .005$, $r = .468$). While the participants of the study were not doctoral students, the result of the study however established a relationship between information literacy and critical thinking and the students' proficiency in these skills.

In a related study also from Iran, Nourizadeh, Vahedi, and Morsali (2016) conducted an investigation and comparison of information literacy, critical thinking and academic motivation with academic achievement of Ilkhichi PN University students in Iran. The survey research design was adopted resulting in a simple random selection of two hundred and five (205) students from a total population of four hundred and thirty-five (435) students from Engineering and Humanities faculties. The survey instrument used for the collection of data were the Eisenberg and Berkowitz Questionnaire, California Critical Thinking Disposition Questionnaire, MacYarny and Sinclair Academic Motivation Questionnaire and final-term average academic record of students. Data were analyzed using cluster analysis, t-test and correlational statistics. Findings demonstrated a significant correlation between information literacy, academic motivation, and academic achievement of students. The implication of the finding is that students who are highly proficient in information literacy are favorably disposed to achieving outstanding academic feats. However, unlike Rezaee, Pourbairamian and Zarifsanaie (2016), the study found no significant correlation between information literacy and critical thinking which could be due to different population size and instrumentation. However, while the study was able to establish a relationship between information literacy and respondents' academic achievement, it failed to show in clear terms the influence of that association on the academic achievement of respondents.

Still on information literacy and academic performance, Banik and Kumar (2019) assessed the impact of information literacy skill on students' academic performance in Bangladesh using a sample of undergraduate students in Varendra University, Rajshahi district of Bangladesh. The study used a mixed method approach. Statistical and econometric tools were also used to analyze the primary data collected from 325 students. A standardized information literacy skill index was administered to measure the level of students' information literacy skill and linear regression estimation was applied to examine the impact of information literacy skill on students' academic performance. The findings showed that most of the participants' Grade Point Average (GPA) fell

within medium standard ranging from 3.01 to 3.50 with a low level of information literacy skill ranging from 10 to 20. Besides, the study also found that social demographic factors like study hour, family income, class attendance and past academic result significantly influenced students' academic performance. More specifically, the study found that students' GPA may be increased by 0.012 if students' information literacy skill is increased by one unit. Consequently, the study suggested boosting students' information literacy skill to improve the students' academic performance.

In Saint Leo University, Saint Leo, Florida, United States of America, Bryan (2014) investigated the relationship between critical thinking, information literacy and quality enhancement plans of the university. The study sought to know the influence of critical thinking in arriving at solutions to a wiki project that mapped the Association of College and Research Libraries (ACRL) Information Literacy Competency Standards for Higher Education (ACRL IL Standards) to the university's quality enhancement plan (QEP). The QEP was developed as part of the process of reaffirmation of accreditation required by the Southern Association of Colleges and Schools (SACS), the success of which depends on the ability of the concerned institution to develop a campus-wide QEP that focuses on an issue that will enhance student learning. This was followed by a literature review and a quasi-experimental design involving the mapping of ACRL IL Standards with the elements of a university's QEP (critical thinking, core values, decision-making). A wiki was then created to elicit specific examples from librarians regarding how they incorporate the elements of critical thinking in their reference/instruction work. The findings of the study showed considerable correspondence between the ACRL IL Standards and the elements of critical thinking in the QEP, but this varied with the specific standard and the specific QEP component. However, mapping the ACRL IL Standards to QEP components was subjective as it was performed by only one individual. This therefore put a limitation on generalization of findings. However, the findings established a relationship between information literacy and its possible influence on students' scholarly activities.

Furthermore, Liao and Wang (2016) at Chung Shan Medical University, Taiwan, conducted a research using complementary learning clusters in studying literature to enhance students' medical humanities literacy, critical thinking, and English proficiency. The study sought to know whether students studying literature in complementary learning clusters would show more improvement in medical humanities literacy, critical thinking skills and English proficiency compared to those in conventional learning clusters. Ninety-three (93) students participated in the study. A quasi-experimental design was used over 16 weeks, with the control group (n=47)

working in conventional learning clusters and the experimental group (n=46) working in complementary learning clusters. Complementary learning clusters were those in which individuals had complementary strengths enabling them to learn from and offer assistance to other cluster members, hypothetically facilitating the learning process. The instruments used for data collection are the Medical Humanities Literacy Scale, Critical Thinking Disposition Assessment, English proficiency tests, and Analytic Critical Thinking Scoring Rubric. The results of the study showed that complementary learning clusters have the potential to improve students' medical humanities literacy, critical thinking skills and students' academic performance and by implication, research productivity.

In a related study titled 'Developing Information Literacy and Critical Thinking Skills through Domain Knowledge Learning in Digital Classrooms: An Experience of Practicing Flipped Classroom Strategy', Kong (2014) investigated the effect of digital classrooms on students' information literacy competence and critical thinking skills through domain knowledge learning in digital classrooms. The study employed a quasi-experimental design involving one hundred and seven students from four secondary one classes in Hong Kong. In the 13-week of trial teaching, every three students shared a Tablet PC for learning two topics in the Integrated Humanities subject. Findings showed that the pre- and post-tests of the two target subject topics had a statistically significant growth in domain knowledge. The three identical information literacy tests and critical thinking tests throughout the trial teaching found that the students had a statistically significant growth in information literacy competency. Also, the semi-structured interviews found that both students and teachers positively perceived the effectiveness of the pedagogical designs of the digital classrooms in supporting the development of information literacy competency. Based on the findings, the author thus concluded that, the twenty first education pedagogy should be designed to foster the development of learners' information literacy skills through a day-to-day domain knowledge learning in class. Also, education in the twenty-first century is expected to equip students with both domain knowledge and the twenty-first century soft skills to meet the requirements of a vigorously changing society.

Desirous of strengthening the research capacity of postgraduate students in Southern African universities, Hepworth and Duvigneau (2012) in a study titled 'Building Research Capacity: Enabling Critical Thinking through Information Literacy in Higher Education in Africa', investigated current strategies in higher education in Southern Africa focusing on postgraduate students in higher education from three countries – Zambia, Malawi and Botswana. The study sponsored by the British Library for Development Studies (the library at the Institute of

Development Studies, IDS) focused on what needed to be done in higher education to assist in building the research capacity and strengthening the role and contribution of Southern researchers. Specifically, it sought to determine whether an institutional strategy could be developed that would plan, monitor and evaluate the building of information capabilities and research capacity among postgraduate students in higher education in three countries in Africa – Zambia, Malawi and Botswana. The research was undertaken by BLDS in May 2012 as an exploratory exercise with the potential for leading to a larger, change-driven programme. It comprised interviews with staff at the University of Zambia and Mzuzu University in Malawi, and a workshop with staff at the University of Botswana.

The study built on previous research and provided further insight into how research capabilities could be encouraged among students and potential future researchers by a combination of information literacy, critical thinking and independent learning and the mediating effects of institutional norms and strategies; staff capabilities and information and communication technology (ICT) infrastructure. The findings revealed that many African graduates lacked information literacy with the students being often described as passive and embracing a ‘least effort’ culture. The study identified issues that present challenges to include inadequate and inappropriate resources including lopsided student/staff ratio, funding, limited and outdated ICT equipment among other. Consequently, the study recommends training of academic staff in the use of alternative, more engaging, interactive and participatory approaches to learning in order to foster information literacy as well as monitoring and evaluating the impact of this on teaching and learning. In addition, staff should be given necessary support in integrating information literacy, critical thinking and independent learning throughout the higher education curriculum.

Also, Han and Schuurmans-Stekhoven (2017) argued that holistic research literacy training support should be provided to higher degree research (HDR) students, especially those from Asia, being regarded as having serious plagiarism problem in their research study. Consequently, in the study titled ‘Enhancement of Higher Degree Candidates’ Research Literacy: A pilot study of International Students’, Han and Schuurmans-Stekhoven (2017) developed and examined a three-step framework that covered technological searching and locating, accurate understanding and interpretation and critical evaluation and synthesis of information. Two cohorts of Asian HDR students enrolled in an Australian university were involved through a parallel group, pre–post test design. One group progressed with ‘supervision-as-usual’ (SAU), whilst the other received SAU plus formal research literacy workshops. Supplementary data were also collected from the intervention cohort through focus group interviews. Findings revealed that an early

stage of intervention, using the holistic research literacy framework developed in the study can largely improve students' skills with technological searching and location of information. The data also indicated that students also improved in the aspects of interpreting and synthesizing information but this improvement was not as great. The result of the quasi-experimental study again shows the link between aspects of information literacy and the research productivity of the respondents.

Research Design

The study adopted the survey research design to assess the level of information proficiency of doctoral students in universities in Ogun State.

Population of the Study

The target population of this study consisted of 1,418 doctoral students from universities in Ogun State accredited by the National Universities Commission (NUC) to offer doctoral degrees.

Table 2: Population of doctoral students across selected universities in Ogun State.

S/N	Name of University	Population of Doctoral Students
1	Babcock University, Ilishan-Remo	300
2	Covenant University, Ota	211
3	Federal University of Agriculture,	170
4	Mountain Top University, Mowe	2
5	Olabisi Onabanjo University, Ago Iwoye	719
6	Tai Solarin University of Education	16
	Total	1,418

Source: Primary Records of Registered Doctoral Students across Selected Universities in Ogun State

Sample Size and Sampling Technique

A simple random sampling technique was used to select sample from the population. Specifically, the sample size was drawn from the total number of students enrolled for doctoral studies at the aforementioned universities accredited by the National Universities Commission (NUC) to offer doctoral programs. Research Advisor's (2006) published table was thereafter used to select the sample size for the study. The published table at confidence level 95% with margin error of +5.0 was used to select sample size of 306 out of the total population of **1,418** doctoral students for this study. This is illustrated in Table 3

Table 3: Research Advisors Sample Selection Table

Sample Size Table

Required Sample Size†

Population Size	Confidence = 95%				Confidence = 99%			
	Margin of Error				Margin of Error			
	5.0%	3.5%	2.5%	1.0%	5.0%	3.5%	2.5%	1.0%
10	10	10	10	10	10	10	10	10
20	19	20	20	20	19	20	20	20
30	28	29	29	30	29	29	30	30
50	44	47	48	50	47	48	49	50
75	63	69	72	74	67	71	73	75
100	80	89	94	99	87	93	96	99
150	108	126	137	148	122	135	142	149
200	132	160	177	196	154	174	186	198
250	152	190	215	244	182	211	229	246
300	169	217	251	291	207	246	270	295
400	196	265	318	384	250	309	348	391
500	217	306	377	475	285	365	421	485
600	234	340	432	565	315	416	490	579
700	248	370	481	653	341	462	554	672
800	260	396	526	739	363	503	615	763
1,000	278	440	606	906	399	575	727	943
1,200	291	474	674	1067	427	636	827	1119
1,500	306	515	759	1297	460	712	959	1376
2,000	322	563	869	1655	498	808	1141	1785
2,500	333	597	952	1984	524	879	1288	2173
3,500	346	641	1068	2565	558	977	1510	2890
5,000	357	678	1176	3288	586	1066	1734	3842
7,500	365	710	1275	4211	610	1147	1960	5165
10,000	370	727	1332	4899	622	1193	2098	6239
25,000	378	760	1448	6939	646	1285	2399	9972
50,000	381	772	1491	8056	655	1318	2520	12455
75,000	382	776	1506	8514	658	1330	2563	13583
100,000	383	778	1513	8762	659	1336	2585	14227
250,000	384	782	1527	9248	662	1347	2626	15555
500,000	384	783	1532	9423	663	1350	2640	16055
1,000,000	384	783	1534	9512	663	1352	2647	16317
2,500,000	384	784	1536	9567	663	1353	2651	16478
10,000,000	384	784	1536	9594	663	1354	2653	16560
100,000,000	384	784	1537	9603	663	1354	2654	16584
300,000,000	384	784	1537	9603	663	1354	2654	16586

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Following the determination of the sample size, proportional random sampling was used to select the required sample size from the sample frame for each of the universities. This was achieved by dividing the selected sample size by the total population of doctoral students.

$(306 \div 1,418)$ in all the universities and multiplied by the target population in each of the universities to select sample size for each of the universities. However, for Mountaintop University with only two doctoral students, two of them were eventually included in the survey. The sample size for the study is as shown in table 3.3

Table 3: Sample Size of Doctoral Students at Selected Universities in Ogun State

S/N	Name of University	Population of Doctoral Students	Determined Sample of Doctoral Students
1	Babcock University, Ilishan-Remo	$306 \div 1,418 \times 300$	65
2	Covenant University, Ota	$306 \div 1,418 \times 211$	45
3	Federal University of Agriculture,	$306 \div 1,418 \times 170$	36
4	Mountain Top University, Mowe	2	2
5	Olabisi Onabanjo University, Ago Iwoye	$306 \div 1,418 \times 719$	155
6	Tai Solarin University of Education	$306 \div 1,418 \times 16$	3
	Total	1,418	306

Research Instrument

The research questionnaire designed for this study was titled “**Information Literacy Competence Questionnaire**” The questionnaire targeted at doctoral students in universities in Ogun State was divided into the following sections :

Section A: This section was designed to capture the demographic data of respondents. Data like gender, age range, programme of study, year of admission, year(s) already spent on the program, expected year of graduation, current level of study, mode of study and status of program were gathered.

Section B: This section was designed to measure the information literacy level of respondents. Adopted from Okiki (2013); Pinto and Fernández-Pascual (2017), it was further divided into 4 subscales to measure the degree of respondents’ knowledge of (a) information search (**5 items**) (b) information evaluation (**5 items**) (c) information processing (**4 items**) and (d) information communication and dissemination (**5 items**) summing up to 19 items for the section. Respondents’ were required to respond to items using the following scales :

(a) Highly Competent=5, (b) Competent=4, (c) Moderately Competent=3, (d) Barely Competent=2 and (e) Not Competent=1

Section C: This section adopted from Okiki (2013) aimed to know how respondents acquire their information literacy. Respondents were required to respond to the **8 options** provided using **Strongly Agree=4; Agree=3; Disagree=2 and Strongly Disagree=1**. However, where the available options were not applicable, respondents were at liberty to use **option 9** which was open-ended.

Pilot Study

A pilot study was conducted to assess the extent to which the instrument correctly measured the intended variables prior to the real study and sieve out inherent errors. Forty (40) copies of the questionnaire were administered to doctoral students at Bowen University, Iwo, Osun State out of which thirty (30) copies were retrieved and found useful for the analysis. Meanwhile, Bowen University where the pilot study was conducted was not included in the real study but was selected because the respondents share similar characteristics with the actual study population. Completed copies of the research questionnaire were subjected to Cronbach's Alpha reliability test and results obtained were used as estimates of the internal consistency of the instrument.

Table 3: Reliability of Instrument

S/N	Variable	No of Items	Cronbach's alpha coefficient
1	Information Literacy	27	0.92

Method of Data Collection

Data was collected from respondents through the designed questionnaire administered by the researcher and trained assistants. The researcher made use of seven (7) research assistants trained for one week on how to approach and relate with respondents, ensure data confidentiality and integrity, comply with ethical standards and understand the nitty-gritty of the questionnaire in order to be able to respond to issues when raised. Two (2) of the research assistants covered Covenant University while the remaining five (5) research assistants covered the remaining five (5) universities each. While the distribution and collection of questionnaire was initially projected to take a month as the selected universities were spread across diverse geographical terrains in Ogun State, it eventually took more than two (2) months as most of the respondents had to be reached online because they were no longer coming to school in compliance with the COVID-19 preventive protocols.

Data Analysis

Data collected were subjected to descriptive analysis involving mean, standard deviation, percentages and frequency count. Data collected were also coded using Statistical Package for Social Science (SPSS) version 20.0 for windows. Inferential statistical analysis such as ANOVA, Stepwise Multiple Regression, multiple classification and Beta were applied to determine the influence of the independent variables on the dependent variable

Ethical Considerations

Ethical consideration has become an important issue for researchers globally. Therefore, the approval of participating universities' Health Research and Ethical Committee regarding content similarity standard, ethical compliance of study instrument and any other consideration was sought and obtained before the field study. Furthermore, respondents were informed of what the whole study was all about based on which their informed consent was obtained. To achieve this, a short introduction detailing the objective of the study and the assurance of anonymity was attached to the questionnaire. Besides, respondents were guaranteed of the confidentiality of their identity and data provided in this study. Also, respondents were informed of their prerogative to withdraw at any point from the study so as not to feel compelled whatsoever. Moreover, respondents were also informed of the potential benefits of the findings of the study which would be made available to them on completion of the study. Also every source used in this study was duly acknowledged and referenced guided by APA 6th edition referencing manual.

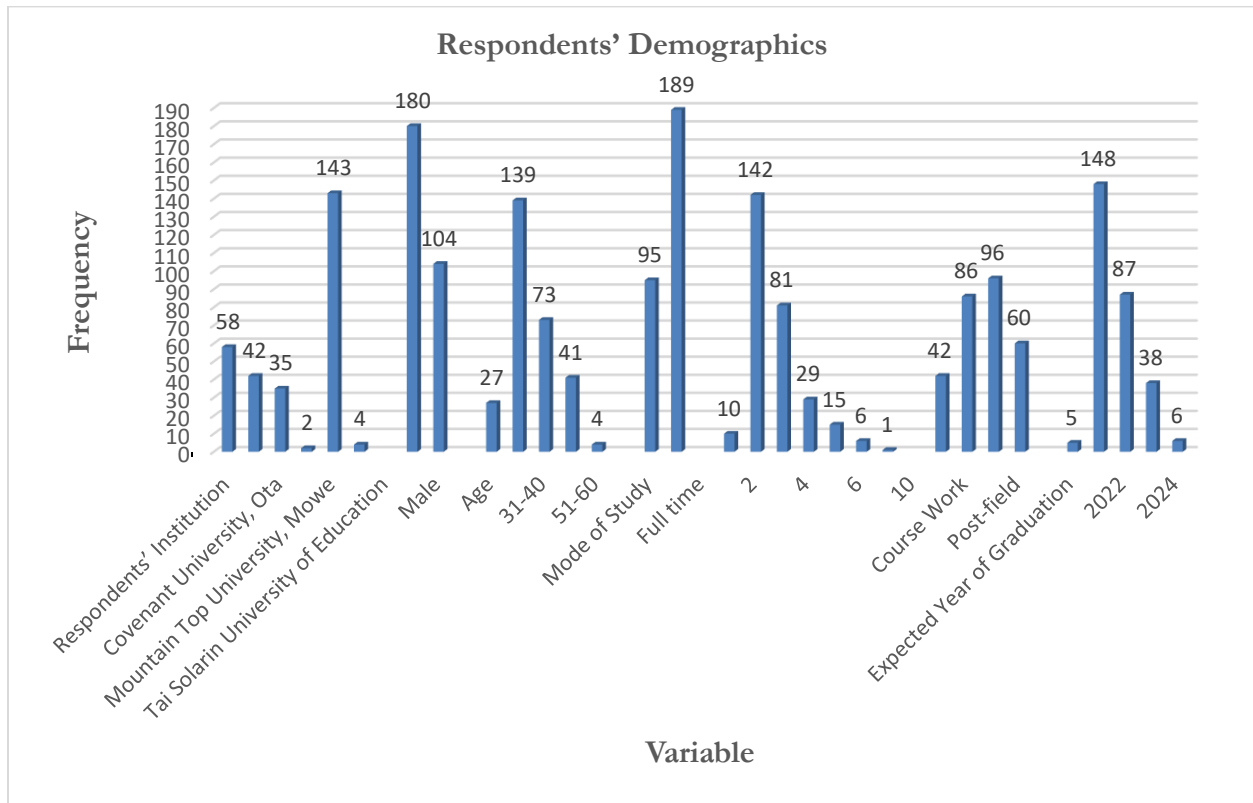
DATA ANALYSIS, RESULTS AND DISCUSSION OF FINDINGS

This section presents details of data analysis, interpretation and discussion of findings from the study conducted to investigate the information literacy competence of doctoral students in universities in Ogun State. Three hundred and nine (306) copies of the questionnaire were administered while two hundred and eighty-four (284) were retrieved representing 92% response rate. Descriptive statistical tools of frequency counts and percentages have been used to analyze demographic information of respondents, while analyses of research questions were carried out using frequency, percentage, mean and standard deviation. To pave way for the analyses, values were assigned to the various Likert scale responses with the criterion mean determining the result of the measured constructs. The decision rule was that where the overall weighted mean is lower than the criterion mean, the construct is adjudged low and vice-versa. The criterion mean was derived by dividing the total numerical value of the scale of measurement by the number of scales e. g. $(1+2+3+4+5=15 \div 5=3)$.

Analyses of Demographic Characteristics of Respondents

This section presents the demographic characteristics of doctoral students who participated in the study.

Figure.1: Respondents' Demographics



Source: Field Survey (2022)

Figure 1 gives a breakdown of respondents' demographics. Although 309 participants were originally targeted for the study, only 284 copies of questionnaire were retrieved and found useful for the analysis representing 92% response rate which was considered adequate for the study. Out of the six (6) selected participating universities, Olabisi Onabanjo University had the highest number of participants numbering 143 (50.4%), followed by Babcock University with 58 (20.4%) respondents. Mountain Top University had the least with just two (0.7%) respondents. The data showed that of the total 284 respondents who participated in the study, 180 (63.4%) were male while 104 (36.6%) constituted female respondents. Moreover, majority of the respondents 139 (48.9%) were within the age bracket of 31-40 years. In addition, 111 (33%) of the respondents had spent 2-3 years on the doctoral program while 122 (43%) of the respondents had spent between 4-14 years on the program. On the status of the program, 42 (14.8%), 86 (30.3), 96 (33.8) and 60 (21.1%) were on course work, pre-field, post-field and viva

respectively. On the issue of gender distribution, the result indicates that more males than females were enrolling for doctoral program probably because of the enormous challenges associated with it. Looking at the number of years already spent on the program, the result seemed to confirm the unusually prolonged period of doctoral training which might had given room to stagnation and frustration thus precipitating low research productivity among doctoral students in universities in Ogun State. However, looking at the age bracket, majority of the respondents (48.9%) fell withing the age bracket of 31-40. This is an indication that despite the challenges associated with doctoral education younger students were still attracted to the program and might actually started early so they can finish before advancing in age.

Research question one: What is the level of information literacy competence of doctoral students in universities in Ogun State?

Table 5: Information literacy competence level of doctoral students in universities in Ogun State

S/N	Information Literacy Items	NC=1	BC=2	MC=3	C=4	HC=5	Mean (\bar{x})	SD
Information Search ($\bar{x}=4.1$, $SD=0.86$)								
1	Find electronic sources of information (Library OPACs, e-databases, e-journals, etc.)		5 (1.8%)	35 (12.3%)	94 (33.1%)	150 (52.8%)	4.37	.766
2	Find printed sources of information (books, papers, etc.)		5 (1.8%)	31 (10.9%)	108 (38.0%)	140 (49.3%)	4.35	.744
3	Know information-search strategies (descriptors, Boolean operators, etc.)		2 (.7%)	31 (10.9%)	123 (43.3%)	128 (45.1%)	4.33	.695
4	Search for and retrieve internet information (advanced searches, directories)	6 (2.1%)	19 (6.7%)	63 (22.2%)	95 (33.5%)	101 (35.6%)	3.94	1.017
5	Use informal electronic sources of information (blogs, social media, wikis, listservs)	13 (4.6%)	20 (7.0%)	82 (28.9%)	92 (32.4%)	77 (27.1%)	3.70	1.082
Information Evaluation ($\bar{x}=4.2$, $SD=0.75$)								
6	Assess the quality of information resources	1 (.4%)	1 (.4%)	23 (8.1%)	142 (50.0%)	117 (41.2%)	4.31	.665
7	Recognize the author's ideas within the text	1 (.4%)	4 (1.4%)	45 (15.8%)	134 (47.2%)	100 (35.2%)	4.15	.759
10	Know the most relevant authors and institutions within your subject area	1 (.4%)	3 (1.1%)	44 (15.5%)	140 (49.3%)	96 (33.8%)	4.15	.739

8	Know the typology of scientific information sources (thesis, proceedings, etc.)		12 (4.2%)	43 (15.1%)	136 (47.9%)	93 (32.7%)	4.09	.801
9	Determine whether an information resource is updated	1 (.4%)	7 (2.5%)	52 (18.3%)	133 (46.8%)	91 (32.0%)	4.08	.794
Information Processing (\bar{x}=3.9, SD=0.876)								
14	Use bibliographic reference managers (Endnote, Reference Manager, etc.)	1 (.4%)	2 (0.7%)	18 (0.3%)	114 (40.1%)	149 (52.5%)	4.44	0.677
11	Systematically arrange and abstract information	1 (.4%)	7 (2.5%)	51 (18.0%)	146 (51.4%)	79 (27.8%)	4.04	.767
13	Use database managers (Access, MySQL, etc.)	10 (3.5%)	27 (9.5%)	66 (23.2%)	122 (43.0%)	59 (20.8%)	3.68	1.019
12	Recognize text structure	16 (5.6%)	41 (14.4%)	93 (32.7%)	101 (35.6%)	33 (11.6%)	3.33	1.041
Information Communication and Dissemination (\bar{x}=4.2, SD=0.688)								
17	Know the laws on the use of information and intellectual property	1 (.4%)	13 (4.6%)	110 (38.7%)	160 (56.3%)	0	4.51	0.621
15	Communicate in public	0	4 (1.4%)	12 (4.2%)	131 (46.1%)	137 (48.2%)	4.41	0.642
16	Know the code of ethics in your academic/professional field	1 (.4%)	2 (.7%)	27 (9.5%)	134 (47.2%)	120 (42.3%)	4.30	0.698
18	Create academic presentations (PowerPoint, etc.)	6 (2.1%)	12 (4.2%)	50 (17.6%)	119 (41.9%)	97 (34.2%)	4.02	0.938
19	Disseminate information on the internet (webs, blogs, etc.)	2 (0.7%)	4 (1.4%)	80 (28.2%)	198 (69.7%)	0	3.67	0.541
Overall Weighted Mean							4.1	
Criterion Mean							3	

Source: Field Survey (2022)

Key: NC (Not Competent)=1; BC (Barely Competent)=2; MC (Moderately Competent)=3; C (Competent)=4 and HC (Highly Competent)=5

Decision Rule: Information literacy is low if overall weighted mean is lower than criterion mean

As shown in Table 5, with an overall weighted mean (\bar{x} =4.1) higher than the criterion mean (\bar{x} =3), the information literacy competence level of doctoral students in universities in Ogun State is adjudged high. A closer look at the results also revealed that in all the subconstruct, doctoral students still scored high. For information search subconstruct with the highest mean (\bar{x} =4.37), an item by item analysis showed that respondents finding electronic sources of

information (Library OPACs, e-databases, e-journals, etc.) recorded the highest mean ($\bar{x}=4.37$). Others are finding printed sources of information (books, papers, etc.) ($\bar{x}=4.35$); knowing information-search strategies (descriptors, Boolean operators, etc.) ($\bar{x}=4.33$) and searching for and retrieving internet information (advanced searches, directories) ($\bar{x}=3.94$). The implication is that doctoral students in universities in Ogun State considered themselves proficient at finding information from different sources which is the bedrock of research and its productivity. However, using informal electronic sources of information (blogs, social media, wikis, listservs) recorded the lowest mean ($\bar{x}=3.70$) under information search items. This might just be a pointer to the fact that respondents were not aware of the importance of these alternative sources of information to boosting their research productivity. For instance, for scholars to increase the impact factor of their publications, such publications must be visible on these informal electronic sources of information which is known as almetrics.

Under information evaluation subconstruct with a weighted mean of ($\bar{x}=4.2$), assessing the quality of information resources recorded the highest mean ($\bar{x}=4.31$) while recognizing the author's ideas within the text and knowing the most relevant authors and institutions within your subject area followed with ($\bar{x}=4.15$) each. Items bordering on determining whether an information resource is updated recorded the lowest mean ($\bar{x}=4.8$). In this age of information overload with its concomitant tendency for misinformation, scholars not only require information search skills but more importantly, information evaluation skills that will enable them sift through the whole mass of available information. Results as shown in this table clearly indicated that doctoral students in universities in Ogun State were able to differentiate facts from fictions when it comes to information authentication. Further analysis of the results revealed that under information processing subscale with a weighted mean of $\bar{x}=3.9$, item on the use of bibliographic reference managers (Endnote, Reference Manager, etc.) scored the highest mean ($\bar{x}=4.44$) followed by items on systematically arranging and abstracting information ($\bar{x}=4.04$), using database managers (Access, MySQL, etc.) ($\bar{x}=3.68$) while item on recognizing text structure recorded the lowest mean ($\bar{x}=3.33$). Because research builds on information, ability to process information meaningfully is a basic requirement for researchers especially in this information-driven age. As shown in the results, while it is apparent that doctoral students in universities in Ogun State scored high in information processing with a weighted mean of $\bar{x}=3.9$ which is still higher than the criterion mean ($\bar{x}=3$), it revealed some form of weaknesses among the respondents in their abilities to execute those information processing items.

Pertaining to information communication and dissemination subconstructs, doctoral students in universities in Ogun State scored high as indicated in the results. Taking a closer look at the items under it, results revealed that knowing the laws on the use of information and intellectual property scored the highest mean ($\bar{x}=4.51$), closely followed by communicating in public ($\bar{x}=4.41$), knowing the code of ethics in your academic/professional field ($\bar{x}=4.30$) and creating academic presentations (PowerPoint, etc.) ($\bar{x}=4.02$). The item pertaining to the dissemination of information on the internet (webs, blogs, etc.) recorded the lowest mean ($\bar{x}=3.67$). It could be inferred from these analyses that doctoral students in universities in Ogun State recognized the sanctity of intellectual property rights and allied issue of plagiarism can communicate well in public and were aware of ethical consideration in the conduct of research. However, it could be gleaned from the result that they were not so proficient at creating academic presentation and disseminating information on the internet. These deficiencies one way or the other would have affected their research productivity.

Research Question 2: How do doctoral students at universities in Ogun State acquire their information literacy?

Figure 2: Information Literacy Acquisition Methods of Doctoral Students

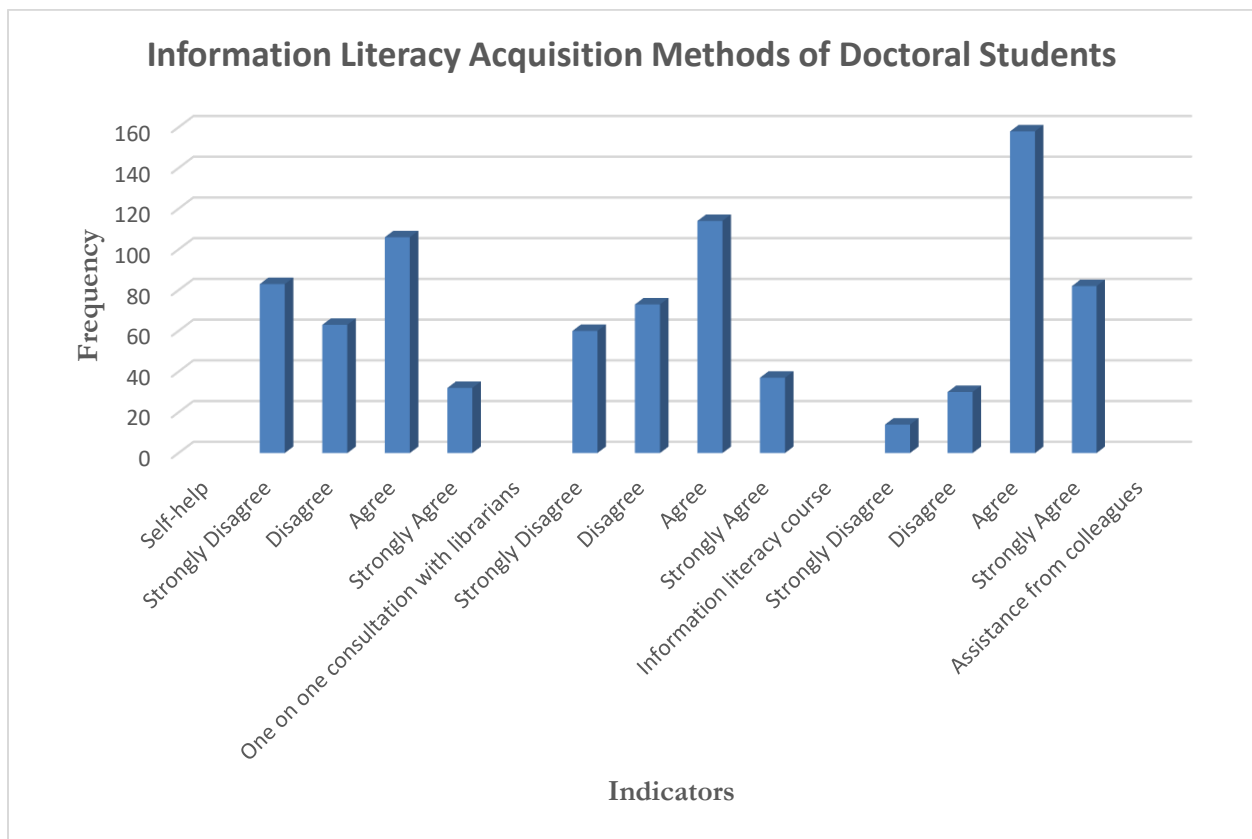
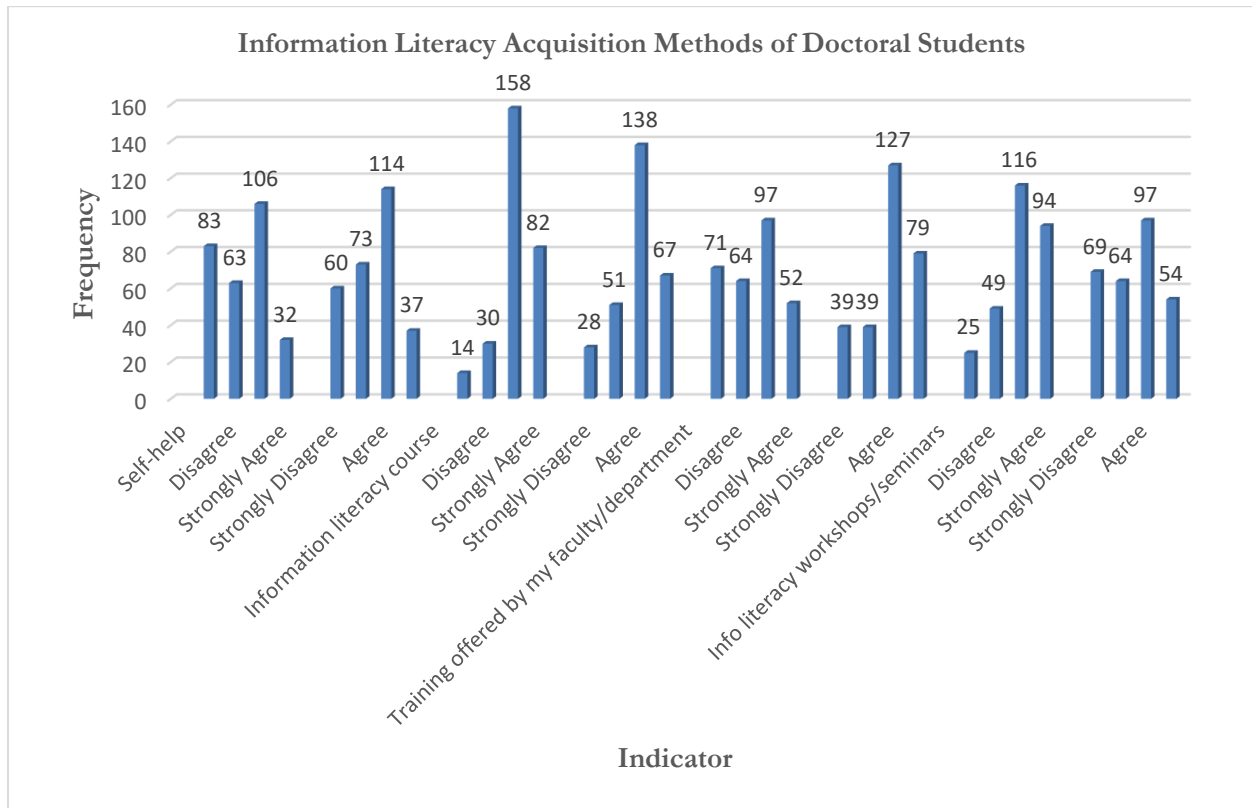


Figure 3: Information Literacy Acquisition Methods of Doctoral Students



Source: Field Survey (2022)

SA=Strongly Agree=5; A=Agree=4; D=Disagree=3; S=Strongly Disagree=2; SD=Standard Deviation

As seen in Figures 2 and 3, in response to the research question bordering on how they acquire their information literacy, information literacy course being one of the options recorded the highest mean ($\bar{x}=3.08$). Coming on its heels was info literacy workshops/seminars ($\bar{x}=2.98$). Others were library orientation ($\bar{x}=2.87$), closely followed by assistance from colleagues ($\bar{x}=2.86$), online tutorials ($\bar{x}=2.48$), faculty/departmental training ($\bar{x}=2.46$), one on one consultation with librarians ($\bar{x}=2.45$) while self help recorded the lowest mean ($\bar{x}=2.31$). From indications, it seems doctoral students in universities in Ogun State acquired their information literacy through regular course experience. This underscores the need for sustaining existing information literacy programs across schools and constant review of information literacy curriculum to reflect the rapidly changing information landscape. Moreover, it might just confirm the belief that most students are adept at using ICTs but are not necessarily information literate.

Discussion of Findings

Concerning the level of information literacy competence of respondents, findings revealed that doctoral students in universities in Ogun State possessed high level of information literacy competence. This finding was corroborated by Oyedokun, et al. (2019) which revealed that postgraduate students in Olabisi Onabanjo University (OOU), Ago-Iwoye and Federal University of Agriculture, Abeokuta (FUNAAB), Nigeria possessed high information literacy skills. Also, Nwosu, Obiamalu and Udem. (2015) showed that information literacy skills possessed by respondents were moderate. Okiki, (2013) in a study involving faculty members from selected universities in Nigeria reported that information literacy skills of academics in Nigerian federal universities were high and contributed significantly to their high research productivity. However, several other studies contradicted the current study. These included Pelemo, et al. (2020); Afolabi and Oladokun (2020); Banik and Kumar (2019); Anekwe (2018); Rezaee, et al. (2016) as well as Omeluzor, et al. (2013). In Pelemo, et al. (2020) as well as Afolabi and Oladokun (2020), sampled postgraduate students and faculty members were reported to possess low information literacy with majority of them unable to access library automated catalogue unless assisted by a librarian. Finding from Banik and Kumar (2019) showed that most of the participants scored low in information literacy skill which precipitated poor academic performance. While Anekwe (2018) found that web-based information literacy had enhanced research productivity of academics in both federal and state universities studied, respondents were reported to have scored low in web-based information literacy competence. Furthermore, findings from Rezaee, et al. (2016) and Omeluzor, et al. (2013) demonstrated that students did not have enough ability and skill in all five standards of information literacy skills, scoring below average.

Conclusion

The study which examined the information literacy competence of doctoral students in universities in Ogun State has succeeded in establishing the fact that the information literacy competence of doctoral students in universities in Ogun State was high. Consequently, learning environment that fosters further development of information literacy should be maintained. Universities should strive to always update academic curriculum to reflect the ever dynamic information landscape

Recommendation

Sustaining and Improving Existing 21st Century Skills

Information literacy and critical thinking are listed among the 21st century skills and considered important educational outcomes. Universities therefore should constantly strive to sustain and possibly improve upon existing training platforms to ensure that doctoral students remain relevant and up-to-date in an ever changing and dynamic information society. Periodic workshops, seminars and hands-on-practical sessions should be organized while student-centered teaching and learning methods should be encouraged.

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