

Chapter One

Introduction

1.1 Background to the Study

The national system of education is currently undergoing some changes in its organizational, substantive, and structural aspects. The changes are aimed at providing variability and personal orientation. The emerging education system requires a different attitude to the methods of obtaining knowledge by postgraduate students, i.e. a new type of thinking. It is not enough anymore for postgraduate students simply to learn prefabricated knowledge: postgraduate students have to master the methods of scientific knowledge that will help them to acquire and apply knowledge by themselves by using traditional or novel ways and means. The paradigm of the ultimate goal of education is changing as well: it is to be able to produce a competent professional and researcher with well-developed skills that make it possible to plan independent research activities. A great majority of students finish their education after undergraduate education or join in the business life or start graduate education to carry their education onward. Sometimes, students who join in business life before come back to graduate education and join in this process. Graduate education is a period which includes master degree, postgraduate diplomas, doctorate, proficiency in art, examinations for specialty in medicine, pharmaceuticals, dentistry and veterinarian.

Students enter into the process of postgraduate education either directly after undergraduate education or after some time, it depends on the effects of their research education and research culture. "To do research requires specialty at a certain level; getting benefit from studies done, impressed by them and helping them requires general research culture. The education which is regulated for these general knowledge and specialty activities to be acquired is called research

competency”¹. At this level, it is expected in graduate education that students can do more comprehensive and more sound scientific studies than the ones during undergraduate education. Also it is expected that students can solve the problems by scientific ways, produce, analyze and synthesize information, have necessary methods and skills to solve problems that they encounter during their profession and to become expert. Since, these skills are needed both in the scientific world and in the business world.

Today, graduate education has become important in that recruitment process in business world. Therefore, motivating graduate students, forming research culture, awareness and skill, shortly, train people having inquisitive manner and behaviors are some of the most important functions of this education process. “Undoubtedly, giving insight of research culture to students is a problem of education. Research education can be defined as an education which aims to form research consciousness in people and in society by making people gain scientific attitude and behavior and research competencies. Research competency can be stated as a component of research techniques, statistics, assessment and evaluation and computer domain².

In the context of this study, research competency is the possession of skills and methods of research activity at the level of technology in order to solve managerial problems, build own career in accordance with the values of modern society and the desired personal result. The main objective of the education system is to train competent and creative specialists that are able to plan their activities. Conventional skills are becoming less and less important, while interdisciplinary skills are playing an increasingly important role³. Research competency is defined as ability of a postgraduate student on the basis of acquired knowledge, skills, abilities and acquired experience to use information-digital technologies for organization, planning, conducting own research, as well as to evaluate and monitor implement their results⁴. Research

competency is the readiness and ability of an individual on the basis of acquired knowledge, skills, abilities and acquired experience to carry out research, ability to search and select their transformation, storage and transmission using digital technologies, ability to critically evaluate found information (check their accuracy, timeliness, feasibility), and ability to perform research (organization, planning, implementation)⁵. Although research oriented teaching is on the rise, there are only a few tools, measuring student's research competence. One of these tools is the modified German questionnaire F-Komp, which was developed by Böttcher and Thiel and modified by Hauser F., Reuter R. and Moltick J. and the measures are content competency, methodology skills, ethical practices and evaluation and operationalization of research⁶.

Content Competency is related to knowledge which focuses on theories, the scientific standards, literature research and reflection. Methodological skills are factors that cover knowledge about research methods, how the project is realized and how the results are prepared and presented. Evaluation and operationalization of research help the researcher to evaluate the research and projects of other authors. Furthermore, it deals with the creation of hypotheses while ethical issues reflect on ethical implications in the original version.

In Nigeria, the demand for tertiary education is so high because education is not only an investment in human capital, but also a pre-requisite for economic development⁷. Universities all over the world are regarded as engines of economic and sustainable national development; they transmit knowledge and train the human minds. The belief that education is an engine of growth rests on the quantity and quality of education in any country. In Nigeria, the universities are veritable tools for the realization of national development; the development of cultured citizens and the promotion of basic research. University education is therefore the most powerful and critical success factor for individuals and the society⁸. A major challenge to research output in

Africa is the failure to consistently compete with international research. In developed nations like Europe and North America, there is a constant and continued quest for new avenues to ensure that higher education is competitive and remains dynamic knowledge-based economy in the world through innovation and research⁹.

This could be due to a number of identified challenges including inadequately organized doctoral programmes which also fail to compete with those found in institutions in developed countries. Some countries and institutions have realized this gap and tried to solve it by introducing collaborative research. For instance, the African Economic Research Consortium (AERC), along with universities and other stakeholders within and outside Africa agreed that a collaborative PhD degree programme would be the optimum way to address the quality issues¹⁰. Another well-known challenge with doctoral research is the issue of funding. It is unfortunate that the ability of research students to act as engines of growth and development is being challenged by the long-standing problem of inadequate funding. Most public universities in Africa especially Nigeria are poorly funded by the national governments and quite often this translates to inadequate funding for research and research capacity development. In contrast, the United States, the Australia government and many countries in Europe and Asia expend hundreds of billions of dollars annually on funding research in academic institutions, as well research capacity building. Poor funding could in turn delay in the completion of research work¹¹. Developed countries have been able to tackle this challenge by providing financial support to doctoral education and researchers through fund raisers, government grants and various funds from industries. The issues identified with Nigeria education do not exempt postgraduate students in Lagos State, Nigeria. These issues could be resolved at least to a certain level by exposing postgraduate students and researchers to information literacy skills.

Information literacy is the ability to recognize when information is needed and to have the ability to locate, evaluate, and use effectively the needed information and “information literacy encompasses knowledge of one's information concerns and needs, and the ability to identify locate, evaluate, organize and effectively create, use and communicate information to address issues or problems on hand”¹². It is a prerequisite for participating effectively in the information world. Information literacy embraces all kinds of information: electronic, non-electronic and verbal¹³. Research has shown that information users (students) often seek for information in libraries and through library databases without getting what they need¹³. To attain information literacy it is necessary for one to ask for assistance in acquiring information needed. The search for the information is what will bring the results. Information professionals are happy and poised to help with any questions information users may have and will always be ready to acquire the necessary skills to enhance information literacy¹⁴.

Information literacy skill means possessing knowledge as to which type of information is required, what type of resources is available for that information, have the knowledge on how to find the information and how to communicate the findings with others. Information literacy skill is the acquisition of skills used in communicating and sharing the results of the information problem-solving efforts accurately and creatively across the range of information format and evaluating how well the final product resolved the information problem and how appropriate and efficient the steps taken to reach the desired outcome¹⁵. The Big6 Model for information literacy, according to Michael Eisenberg and Bob Berkowitz, an information literate person must possess some characteristics like knowing how to locate and access needed information (locate sources and find information within sources), seek information at the right time with all strategies (determine all possible sources and select the best sources), evaluate information {judge the

result (effectiveness) and judge the process (efficiency), synthesize available information (organize the information from multiple sources and present information), use information effectively to accomplish specific purposes (engage e.g. read, hear, view as well as extracting relevant information) and to be able to define the task the information is to be used for (define the problem and identify the information needed); the above listed factors were adopted¹⁶. Such as Task Definition, information seeking strategies, location and access, use of information and synthesis and evaluation. In the context of this study, an information literate person must be able to make use of information skills for identification of information needed for research evaluation and analysis, must have the ability to determine the type and nature of information needed for research, must have the ability to access information needs effectively and efficiently, must have the ability to critically evaluate information needed for research, and must be able to use information effectively and efficiently.

D. Stentof “From Saying to Doing Interdisciplinary Learning: Is problem-Based Learning the Answer”, lack of requisite skills on the use of the library has been an impediment inhibiting accessibility of information resources of library for research among postgraduate students of universities in Lagos State. Despite the success of information literacy skill to promote access to information for research, these students are still plagued by a number of constraints such as information literacy skill. Information literacy skills among postgraduate students of universities in Lagos State have been hampered by insufficient fund as government is unable to provide follow-up reading materials for research. Lack of information literacy skills among students is a bane to impacting information literacy to researchers.

Many countries have recognized the importance of information literacy skills among their citizens and have implemented programs to inculcate the necessary competencies and skills

among students at all levels. In the United States, the National Forum on Information Literacy, established in 1989, and the Institute for Information Literacy, established in 1998, have been instrumental in formulating information literacy standards for the school and higher education sectors. The US Department of Education has included information literacy as one of the country's five goals in education since December 2000. Information literacy developments have also taken place in Canada, China, Japan, Mexico, Namibia, New Zealand, Singapore and South¹⁷.

1.2 Statement of the Problem

Research Competency is the ability of a researcher (postgraduate student) to select a researchable topic based on the standard requirement for solution of an identified problem. Postgraduate students are individuals who are furthering their studies in universities after obtaining the bachelor degree. Each student carries out a research into a problem area in their different fields of study. The postgraduate students are in two major groups which are masters and PhD although there are some students that are taking postgraduate diploma in different areas of education. Each of these groups of students carries out research writing which need certain research competencies. When the research competency skill of the postgraduate students is enhanced, they will be able to make use of acquired information skills to find solutions to identified problems both academically and in the corporate world. However, preliminary investigation, close observation and literature review has revealed a decline in the research competency of postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria. As a result, information are not effectively sourced, the little they could source for are not effectively and efficiently evaluated and synthesized. If care is not taken, the purpose of doing research will not be achieved and problems will remain in the case study without being solved which will eventually

hinder development and innovations in the education sector. This may also affect Nigeria economy by preventing infrastructural development and innovations because education is the bedrock of development in a nation and research is not promoted in an academic environment, it affects the nation economically and developmentally. Exposure of students to information literacy programmes to acquire information literacy skills has been identified to be influencing research competency among postgraduate students.

Postgraduate students of universities in Lagos State were perceived not to have the required information literacy skills. Therefore, their research work is negatively affected. Several studies have been conducted on information literacy programmes and information literacy skills on research competency but this topic is scarce among postgraduate students¹⁸. Hence, this study seems to investigate information literacy programmes, information literacy skills and research competency of postgraduate students of Universities in Lagos State, Nigeria.

1.3 Aim and Objectives of the study

The aim of the study is to examine information literacy skills and research competency of postgraduate students of Universities in selected tertiary institutions in Lagos State, Nigeria. The following objectives guided the study:

- i. examine the level of research competency among postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria.
 - ii. identify different information literacy skills available for postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria.
 - iii. determine the influence of task definition on research competency in universities of postgraduate students in selected tertiary institutions in universities in Lagos State, Nigeria
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- iv. determine the influence of information seeking strategies on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.
- v. ascertain the influence of locating and accessing information on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria
- vi. determine the influence of use of information on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.
- vii. investigate the influence of synthesizing information on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.
- viii. examine the influence of information evaluation on research competency of postgraduate students in universities in Lagos State, Nigeria.

1.4 Research Questions

The investigation directed by the following research questions.

- i. What is the level of research competency of postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria?
- ii. What are the different information literacy skills available to postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria?

1.5 Hypotheses

The following hypotheses have been developed and evaluated at a significance level of 0.05:

H₀₁: There is no significant influence of task definition on research competency in universities of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.

H₀₂: There is no significant influence of information seeking strategies on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.

H₀₃: There is no significant influence of locating and accessing information on research competency of postgraduate students in selected tertiary institutions in universities in Lagos State, Nigeria.

H₀₄: There is no significant influence of use of information on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.

H₀₅: There is no significant influence of synthesizing information on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.

H₀₆: There is no significant influence of information evaluation on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.

1.6 Significance of the Study

Postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria, Researchers, and the Government will significantly profit from this research. This study will focus on information literacy skills and research competency of postgraduate students. This

research work will serve as guideline for postgraduate students on how to acquire the right information literacy skills in writing and evaluating research. Because this study is based on current events that are still unfolding, it is expected that the research work will deliver pertinent and current data to scholars and students that would embark on researches about different phases of research writing and raise further questions for future researchers of information literacy.

1.7 Scope of the Study

This study concentrated on information literacy skills and research competency of postgraduate students in selected tertiary institutions in Lagos State, Nigeria. The measures of research competency are content competency, methodology skills, evaluation and operationalization of research and ethical practices. The measures used for information literacy skills are task definition, information seeking strategies, location and access of information, use of information, information synthesis and information evaluation. The geographical scope covers government owned universities in Lagos State which are University of Lagos (UNILAG), Akoka and Lagos State University (LASU), Ojo. The respondents will be postgraduate students of UNILAG and LASU while private universities are excluded.

1.8 Limitation of the Study

There are limitations faced with this study.

- i) One of it is the delay experienced during the gathering of data in the two University.
 - ii) Also, the ingenuity of respondents who filled the questionnaires for accurate data analysis, time factor for retrieval of information, and
 - iii) The financial implications of carrying out this study is limited to inability to meet some of the respondents.
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1.9 Operational Definitions of Terms

Research Competency: A combination of motivational, gnoseological, operational, and personal components, developed at such a level that allows one to successfully apply the acquired research skills and knowledge in practical tasks.

Content Competency: This is the capability of postgraduate students of universities in selected tertiary institutions in Lagos State to apply or use a set of related knowledge.

Methodology Skills: Evaluate and interpret evidence of different types, including documentary and other qualitative sources as well as statistical data.

Operationalization of Research: The process of turning abstract concepts into measurable observations..

Evaluation of Research: A form of disciplined and systematic inquiry that is carried out to arrive at an assessment or appraisal of an object, program, practice, activity, or system with the purpose of providing information that will be of use in decision making.

Ethical Practices: The branch of ethics or theology that studies the relation of general ethical principles to particular cases of conduct or conscience.

Information Literacy Skills: This is the process by which postgraduate students of universities in selected tertiary institutions in Lagos State are equip with the skill to evaluate, organize, and make use of information for research.

Task Definition: This is the ability of postgraduate students of universities in selected tertiary institutions in Lagos State to able to define their purpose of information literacy skills acquisition.

Information Seeking Strategies: These are the available channels or process through which postgraduate students of universities in selected tertiary institutions in Lagos State are able to seek information for research.

Information Synthesis: The process of analyzing and evaluating information from various sources, making connections between the information found, and combining the recently acquired information with prior knowledge to create something new.

Information Location and Access: This is the ability of postgraduate students in selected tertiary institution to locate information and have access to information needed for research.

Information Evaluation: This is the ability of postgraduate students of universities in selected tertiary institutions in Lagos State to analyze and decide information required for research.

Use of Information: This is the ability of postgraduate students of universities in selected tertiary institutions in Lagos State to make use of information as a solution to an identity problem for research at the right time.

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Chapter Two

Literature Review

This phase revised related literature that enabled the researcher broaden her understanding on the research problem. The chapter is presented under the following headings:

2.1 Conceptual Review

2.1.1 Overview of Research Competency

Emergence of knowledge based society with its challenges and demands has increased the urge for research in every sector of life endeavour. Research means a methodological investigation into a subject in order to discover facts about it¹. Research is the logical, systematic and objective collection, analysis, synthesis, evaluation and recording of accurate and controlled observations for the development of generalizations, principles or theories that are ultimately aimed at description, explanation, prediction and control of natural phenomena to meet specific needs of man². In the context of this study, research is a systematic, scientific investigation aimed at finding a solution to an identified problem. That is, it is an action directed towards collection, analysis and interpretation of data on competency needs of postgraduate students in research writing in Universities with a view to making them competent in thesis writing in their various institutions. Research is carried out in many areas of study including education. Educational research is a systematic scientific investigation involving identifying ways and means of solving problems relating to teaching and learning so that the goals of education can be attained³. Research writing involves creation, diffusion and utilization of new knowledge through processes or mechanisms with the aim to link it to its relevant use. Research writing is a pre-requisite for the award of a degree to postgraduate students in universities⁴.

Research is an activity aimed at a comprehensive study of an object, process or phenomenon, their structure and connections, as well as the obtaining and putting into practice of its results that are useful for humans. Its object is the material or ideal system, and the subject is the structure of the system, the interaction of its elements, various properties, patterns of development, etc.⁵. Research implies that one needs to know everything that has already been achieved in a particular area of knowledge and to be able to produce new knowledge by oneself; to be able to put into practice the methods of scientific research and obtain new scientific knowledge independently. Research is the search for new knowledge or a systematic investigation to establish facts. In a narrower sense, research is a scientific method (process) of studying something. Scientific research, based on the application of the scientific method, provides scientific information and theories to explain the nature and properties of the surrounding world. Such a study may have practical application⁶.

Research is a careful and detailed study into a specific problem, concern, or issue using the scientific method. It's the adult form of the science fair projects back in elementary school, where you try and learn something by performing an experiment. This is best accomplished by turning the issue into a question, with the intent of the research to answer the question. The primary purposes of basic research (as opposed to applied research) are documentation, discovery, interpretation, and the research and development (R&D) of methods and systems for the advancement of human knowledge⁷. Approaches to research depend on epistemologies, which vary considerably both within and between humanities and sciences. There are several forms of research: scientific, humanities, artistic, economic, social, business, marketing, practitioner research, life, technological, etc. The scientific study of research practices is known as meta-research. Scientific research is a systematic way of gathering

data and harnessing curiosity. This research provides scientific information and theories for the explanation of the nature and the properties of the world. It makes practical applications possible. Scientific research is funded by public authorities, by charitable organizations and by private groups, including many companies. Scientific research can be subdivided into different classifications according to their academic and application disciplines. Scientific research is a widely used criterion for judging the standing of an academic institution, but some argue that such is an inaccurate assessment of the institution, because the quality of research does not tell about the quality of teaching (these do not necessarily correlate)⁸.

Research in the humanities involves different methods such as for example hermeneutics and semiotics. Humanities scholars usually do not search for the ultimate correct answer to a question, but instead, explore the issues and details that surround it. Context is always important, and context can be social, historical, political, cultural, or ethnic. An example of research in the humanities is historical research, which is embodied in historical method. Historians use primary sources and other evidence to systematically investigate a topic, and then to write histories in the form of accounts of the past. Other studies aim to merely examine the occurrence of behaviours in societies and communities, without particularly looking for reasons or motivations to explain these. These studies may be qualitative or quantitative, and can use a variety of approaches, such as queer theory or feminist theory⁹. Artistic research, also seen as 'practice-based research', can take form when creative works are considered both the research and the object of research itself. It is the debatable body of thought which offers an alternative to purely scientific methods in research in its search for knowledge and truth¹⁰.

The controversial trend of artistic teaching becoming more academics-oriented is leading to artistic research being accepted as the primary mode of enquiry in art as in the case of other

disciplines¹¹. One of the characteristics of artistic research is that it must accept subjectivity as opposed to the classical scientific methods. As such, it is similar to the social sciences in using qualitative research and inter-subjectivity as tools to apply measurement and critical analysis¹². "Artistic research is to investigate and test with the purpose of gaining knowledge within and for our artistic disciplines. It is based on artistic practices, methods, and criticality. Through presented documentation, the insights gained shall be placed in a context"¹³. Artistic research aims to enhance knowledge and understanding with presentation of the arts. A simpler understanding is that artistic research is any kind of research employing the artistic mode of perception¹⁴.

There are two major types of empirical research design which are qualitative research and quantitative research. Researchers choose qualitative or quantitative methods according to the nature of the research topic they want to investigate and the research questions they aim to answer. Qualitative research involves understanding human behavior and the reasons that govern such behavior, by asking a broad question, collecting data in the form of words, images, video etc. that is analyzed, and searching for themes. This type of research aims to investigate a question without attempting to quantifiably measure variables or look to potential relationships between variables. It is viewed as more restrictive in testing hypotheses because it can be expensive and time-consuming and typically limited to a single set of research subjects¹⁵. Qualitative research is often used as a method of exploratory research as a basis for later quantitative research hypotheses¹⁶. Qualitative research is linked with the philosophical and theoretical stance of social constructionism. Social media posts are used for qualitative research¹⁷. Quantitative research involves systematic empirical investigation of quantitative properties and phenomena and their relationships, by asking a narrow question and collecting numerical data to

analyze it utilizing statistical methods. The quantitative research designs are experimental, correlational, and survey (or descriptive)¹⁸. Statistics derived from quantitative research can be used to establish the existence of associative or causal relationships between variables. Quantitative research is linked with the philosophical and theoretical stance of positivism. The quantitative data collection methods rely on random sampling and structured data collection instruments that fit diverse experiences into predetermined response categories¹⁹. These methods produce results that can be summarized, compared, and generalized to larger populations if the data are collected using proper sampling and data collection strategies. Quantitative research is concerned with testing hypotheses derived from theory or being able to estimate the size of a phenomenon of interest²⁰.

If the research question is about people, participants may be randomly assigned to different treatments (this is the only way that a quantitative study can be considered a true experiment)²¹. If this is not feasible, the researcher may collect data on participant and situational characteristics to statistically control for their influence on the dependent, or outcome, variable. If the intent is to generalize from the research participants to a larger population, the researcher will employ probability sampling to select participants²². In either qualitative or quantitative research, the researcher(s) may collect primary or secondary data²³. Primary data is data collected specifically for the research, such as through interviews or questionnaires. Secondary data is data that already exists, such as census data, which can be re-used for the research. It is good ethical research practice to use secondary data wherever possible²⁴.

Mixed-method research, i.e. research that includes qualitative and quantitative elements, using both primary and secondary data, is becoming more common. This method has benefits that using one method alone cannot offer. For example, a researcher may choose to conduct a

qualitative study and follow it up with a quantitative study to gain additional insights²⁵. Big data has brought big impacts on research methods so that now many researchers do not put much effort into data collection; furthermore, methods to analyze easily available huge amounts of data have also been developed.

Today, making research, problem solving, reflective thinking and critical thinking skills are important to be taught to students in the frame of constructive education. The most important qualification of students who want to continue graduate education is research competency. Research competency is mentioned as a component of research technics, statistics, assessment and evaluation and computer²⁶. There are a lot of students graduating from master degree without attending any conferences or panels, presenting any papers in scientific events or writing an article and publishing it. Studies shows that students participating in those kinds of scientific events or taking scientific research course have higher attitude scores towards making a research than others²⁷. They defined competence as the ability to successfully meet complex demands in a particular context. To meet this demand, it is necessary to mobilize knowledge, cognitive and practical skills, as well as social and behavioral components. These are attitudes, emotions, (ethical) values and motivations²⁸. They define competences as available and learnable cognitive skills and abilities of an individual, which are required to solve problems. They also add motivational volitional and social willingness and social skills to their definition. These aspects might be important, if the problem context varies and adaptations of the solution are necessary.

Competences is a construct which is based on skills, there is no genetic disposition²⁹. All required skills are learnable for a person who is willing. Idea of competences is the fact, that acquired competences stay relatively stable over a long time, but some components may vary and interact with others. This might have a dynamic influence on the competence and can affect

it in a positive or negative way. A competence is a relatively stable construct of different components, which is required in the process of problem solving³⁰. This concept can vary from domain to domain. Different domains may need different components, to overcome certain problems. It is important to point out that competences and skills are not the same³⁰. A component is formed by several skills and abilities. The skills and abilities are based on motivational, volitional and social willingness; therefore, competences are the base for successful acting in different domains³¹.

Competency is an underlying characteristic of a person which results in effective and superior performance of a job. Competency can also be defined as the ability to possess suitable and sufficient knowledge, skills and experience for carrying out a particular task³². Competency is the knowledge, skills and attitudes that are required for successful performance of a given task. Competency refers to a standardized requirements based on which an individual performs a task properly. Competency therefore means the knowledge, skills and attitudes required by students in research writing for production of a credible thesis³³. Competency is a term that is used both scientifically and in everyday language. Competency according to Organization for Economic Co-operation and Development can be “attributed to individuals, social groups or institutions, when they possess or acquire the conditions for achieving specific developmental goals and meeting important demands presented by the external environment”³⁴. Higher institutions especially university must educate, teach and prepare each student for lifelong learning, as a result, the review of the concept of competency in this particular study will focus on individual attribute of competency rather than the competence of a social group or institution.

Key competency according to European Commission, (2004) represents a transferable, multifunctional package of knowledge, skills and attitudes that all individuals need for personal

fulfillment and development, inclusion and employment which should have been developed by the end of compulsory schooling or training, and should act as a foundation for further learning as part of lifelong learning³⁵. Competency can be defined as a combination of knowledge, skills and attitudes appropriate to the context³⁶. On this regard, competency can be defined as an interrelated set of attitudes, skills and knowledge which are drawn upon and applied to a particular context for successful learning. The term competency and skills are often used interchangeably³⁶. As a broader concept, competency is not limited to cognitive elements (involving the use of theory, concept or tacit knowledge); it also encompasses functional aspects (involving technical skills) as well as interpersonal skills (example, social or organizational skills) and ethical values. A skill on the other hand, is ability to perform tasks and solve problems and can be acquired in a matter of months while competencies are acquired over a number of years³⁷. Competency is the ability, within a certain professional or academic domain, to make use of already learnt as well as new knowledge and skills across traditional subject areas to adequately solve real – life, poorly defined problems³⁸.

Competency has two dimensions; knowledge and skills: “Knowledge may be seen as understanding of how everyday world is constituted and how it works. Skills involve the ability to pragmatically apply, consciously or even unconsciously, our knowledge in practical settings³⁹. Competency is more than just knowledge and skills. It involves the ability to meet complex demands, by drawing on the mobilizing psychosocial resources (including the skills and attitudes) in a particular context. For example, the ability to communicate effectively is competency that may draw on an individual’s knowledge of language, practical information technology skills and attitudes towards those whom he or she is communicating⁴⁰. From the foregoing discussion, one can infer that competency is a combination of knowledge, skills and attitudes appropriate to the

context which are fundamental for each individual in knowledge based society. In other words, competency deals with an individual's demonstrated capacity to perform, that is, the possession of knowledge, skills, and attitudes needed to satisfy the special demands or requirements of a particular situation. Competency is developed over a time and demonstrated to a varying degree appropriate to the developmental age of learners and their learning needs⁴¹.

Research skills today must be developed in such a way that students in higher education will be enabled to make them their own for good. This type of competencies is given fundamentally in the aspects of methodological domain, information gathering and the management of document-writing norms and technological tools. Furthermore, the usefulness of the existence of mediating didactics is recognized⁴². The competencies considered by the Organization for Economic Cooperation and Development in its skills strategy are the following: the development of relevant competencies, the activation of those competencies in the labor market and the use of those competencies effectively for the economy and society⁴³. The research competences established from the implementation of a pedagogical research project are as follows: the acquisition of new knowledge, the identification of educational problems, synthesis and argumentation, metacognition, knowledge of new research methods, the possibility of developing research tools and the interpretation and dissemination of results⁴⁴. Research skills work for various disciplines and can even link them. Some studies have affirmed the value of facilitating interactions between researchers from different research fields within a discipline⁴⁵.

Therefore, research competencies are approached from distinct perspectives. In this study, the focus is on those that allow for the development of academic reading and writing, because it is an area that requires a boost because it is basic for postgraduate students to be able to understand texts of different kinds and to be able to write with academic rigor. Academic writing is one

aspect that has been focused on in the educational context. It is a multiple construction that unites such essential elements as the understanding of the scientific field and the understanding of scientific research methodology, statistical knowledge and the understanding of the culture of native and foreign languages⁴⁶. Currently, a change in expectations has emerged around academic writing, and it has become increasingly evident that a much longer and gradual orientation in the process of research and information gathering is desirable to better meet the needs of contemporary students⁴⁷. On the basis of historical emphasis on writing instruction, five approaches is illustrated, namely, skills, creative writing, process, social practice, and socio-cultural perspective⁴⁸. Academic writing is thus conceived as a way in which young people can construct their own according to elements that provide academic rigor through an efficient interaction with texts. Academic reading and writing are a fundamental part of the context of higher education. Academic reading and writing also includes the learning of foreign languages as the gender-based approach to the teaching of writing has been found to be useful in promoting the development of literacy through the explicit teaching of characteristics, functions, and options of grammar and vocabulary that are available to interpret and produce various specific genres⁴⁸.

Young university students come from a system of basic and upper secondary education in which the fundamental thing was to learn through the repetition of texts, but now their ideas, knowledge, capacity for analysis and critical thinking are a central aspect⁴⁹. Understanding reading practices and needs in the context of information seeking can refine our understanding of the choices and preferences of users for information sources (such as textbooks, articles, and multimedia content) and media (such as printed and digital tools used for reading⁵⁰). In this sense, it is useful to consider academic literacy, as given to teaching process that may (or may not) be

put in place to facilitate students' access to the different written cultures of the disciplines⁵¹. Currently, the many ways in which students perform the process of academic reading and writing must be addressed so that an improvement in the process can be attained. Within the study of research competencies for the development of academic reading and writing, theoretical–conceptual trends and methodological designs play an important role. Psychopedagogical, socio-cultural, use and development of technology, disciplinary and educational management studies as theoretical–conceptual trends was considered⁵².

For methodological analysis, the categories of experimental design, quasi-experimental design, pre-experimental design, and within quantitative methods are used, and for qualitative methods, phenomenological, narrative and case studies, grounded theory and ethnography are contemplated. Documentary research is also added because there are studies on this type related to the subject, which are considered to be excluded⁵³. In the research field, the findings and innovation that are increasingly present are a fundamental part. For the area of findings, the classification must be considered. Innovation can create a new process (organization, method, strategy, development, procedure, training, and technique), a new product (technology, article, instrument, material, device, application, manufacture, result, object, and prototype), a new service (attention, provision, assistance, action, function, dependence, and benefit) or new knowledge (transformation, impact, evolution, cognition, discernment, knowledge, talent, patent, model, and system)⁵⁴. Various types of innovation are available, which are: (a) continuous innovation: when small deviations in educational practices accumulate, they translate into profound changes; (b) systematic: it is methodical and ordered like the innovation of continuous improvement, but the scope and novelty of its changes may vary and even lead to substantial

changes; and (c) disruptive: they are new contributions to the world and generate fundamental changes in the activities, structure and functioning of organizations⁵⁵.

Another type of innovation is open innovation, which is defined as the deliberate use of knowledge inputs and outputs to accelerate internal innovation and expand it for the external use of innovation in markets⁵⁶. Educational purposes and divergent contexts can determine the type of innovation applied. Many factors converge in the development of academic reading and writing. Digital skills are essential elements in enriching academic reading and writing. In the framework for the development and understanding of digital competences, five areas of digital competences exist, namely, (a) information: judging its relevance and purpose through identifying, locating, retrieving, storing, organizing, and analyzing digital information; (b) communication: taking place in digital environments or using digital tools to link to others and interacting in networked communities; (c) content creation: some elements include creating and editing new content and enforcing intellectual property rights and licenses; (d) security: personal protection, protection of digital identity, and safe and sustainable use and (e) problem solving: some aspects include making informed decisions about which digital tools are best suited for which purpose or need, creatively using technologies and updating the skills of individuals⁵⁷.

The changing environment of higher education offers an uncertain information ecosystem that requires greater responsibility on the part of students to create new knowledge and to select and use information appropriately⁵⁸. The Association of College and Research Libraries 2016 includes some key information literacy concepts: information creation as a process, information as value, research as inquiry and search as strategic exploration. Academic literacy can be better developed if information literacy and digital competencies are considered. Research studies have presented challenges that must be considered for future research. Feasibility: Knowledge Sharing:

Research Opportunities and Skill Differences. Critical thinking and academic literacy are considered amongst the challenges for developing academic writing from research skills⁵⁹. The first is considered as the process that involves conceptualization, application, analysis, synthesis, and evaluation of the information collected from observation and experience as a guide for belief and action⁶⁰. Academic literacy grows within a competency-based educational model, in which competencies are recognized as the developments in the learners of informational behaviors and attitudes that make them expert evaluators of digital and virtual web contents to obtain knowledge and know-how. Reflection and critical thinking are basic elements for an adequate interaction in digital media. Several items were identified from mapping and systematic literature reviews related to the topics of research skills and academic literacy development⁶¹.

Designing strategies for the adequate development of research competencies with the purpose of training sufficiently qualified researchers is crucial⁶². Qualitative research with the purpose of establishing whether students are part of a degree module can demonstrate through their online textual publications their information literacy skills as a discursive competence and social practice. A study on reading strategies in relation to information-seeking stages, tasks and reading media in an academic setting was conducted⁶³. This study aims to determine how the three elements present in the quality criteria (research skills, academic reading and writing and innovation processes) of this systematic review of the literature can be linked so that they can serve as a basis for identifying which research skills can be used to develop academic reading and writing in higher education contexts through innovative models. Information literacy is presented as a fundamental competence because for the adequate development of academic reading and writing, university postgraduate students must be able to perform efficiently in the search, selection and treatment of information⁶⁴. The method followed for the present research

was the systematic review of literature, which considers within the phases to follow the review of a protocol to specify the research question. The search started with the articles that emerged from a systematic mapping of literature that was previously carried out; subsequently, quality criteria were defined that allowed refining the selection of articles for the systematic literature review, inclusion and exclusion criteria were also determined, and six research questions were also established for the analysis of the articles.

A review of the literature made, revealed the components of knowledge and research skills that a researcher should have to function as researcher. The importance of having information literacy skills are important in a technological and information rich environment. This will equipped them to explore reputable information sources in their field of study and to practice evaluating the value of what they read or found. They should be well prepared to explore the research literature of their field using proper data based. This will guide them to compose or build focused manageable research questions. In their working life they ought to be able to use. The research tools with the understanding of information literacy skills. Another component on the ability to conduct is the knowledge on research methods. A researcher should able to have the understanding of selecting and executing an appropriate method to conduct the study based on the research questions within the research environment they are in. Inclusive of the method is on the knowledge to use appropriate instrument for data collection including the knowledge and skills of the data analysis. The statistical knowledge and skills as measured on analysis of data forms another subcomponent. The above components formed the main construct in the questionnaire in this study which the main instrument for the study. The items of the questionnaire were Likert-type and grouped under five constructs, i.e.: a. Research capacity b.

Reflection skills c. Problem solving skills d. Communication skills e. Research methodology skills

The operations definitions of these construct are as follows: a. Research Capacity Analysis is the ability to gather relevant data and information and apply methods of synthesis, critical thinking and data reduction to locate and understand patterns or connections in that information. It might also involve in understanding and using statistical tests to examine differences between sets of data. Analysis required the background skills of data collection, data analysis, reflection and feedback, scientific experimentations. Research capacity is the ability to carry out data collection procedures involving planning and selecting appropriate data collecting tools or instruments, identifying an appropriate method (quantitative and qualitative) for interpreting and manipulating data and applying an appropriate statistical tools for test of significance besides understanding. The limitations of analysis techniques (for example, understanding the assumptions behind a statistical analysis, and examining whether your data fit these assumptions) and drawing and interpreting appropriate conclusion from results of analysis. b. Reflection Skills Reflection is the ability to look back. Thinking about what you have done, what you might have done alternatively, how you feel about it, and how you might change it to improve your research (for example, reflecting on the outcomes of a research study and recommending on a alternative course of action for next other researchers. T Using insight gained through reflection to improve for others who like to pursue similar research (for example, watching others perform and offering feedback on the way they are tackling a problem). c. Problem Solving Skills Problem solving is the ability to identify, define and analyze problems, to create solutions and evaluate then, and to choose the best solution for a particular context. It requires imaginative and innovative thinking to find new ways to approach a problem, analytical skills to examine the

consequences of a particular solution, and reasoning skills to weigh one solution against another. Problem solving involves the background skills of imaginative and creativity, logic and reasoning, data collection, conceptual thinking, reflection and feedback, and scientific experimentation. d. Communication Skills Communicating skills is the ability to write and present the research and its findings. It is communicating to others the purpose and outcomes of research. It the ability to summarise information, explain the purpose, objectives, conclusions of the research, and tailor the communication to the needs and knowledge level of a particular audiences. e. Research Methodology Skills; Identifying and designing appropriate research procedure understanding the limitations and scope of research design (for example, sample sizes and data type)⁶⁵.

The above definitions were gathered through literature reviews. An instrument was developed to measure the research competent of the doctoral students, ability to conduct research, the desired outcome of the doctoral programs that they have attended. The instrument has been validated and has a moderate high reliability. A convenient sample of successful doctoral candidates sponsored by the Ministry of Education was selected. The sample consists of local and overseas trained candidates. They were contacted from a list of PhD holders prepared by the Scholarship Division. Each of them was told the purpose of the study was to compare the outcome knowledge in terms knowledge and the ability to conduct research based on their doctoral students. The final, often neglected is the training ability to communicate the research and its findings. Academics and research practitioners are often insisted to write and publish their research. Doctoral students are often required to write and publish their theses in recognized journals in their field of study. These components form the ability conduct; research expected outcomes of the doctoral programmes, as part of a legacy of contributions to knowledge⁶⁶.

The role of ethical review is to ensure that ethical standards in research are met. In Australia this process is governed by the National Statement on the Ethical Conduct of Research Involving Humans⁶⁷. The National Statement (as it is called) provides both guidelines on ethical research conduct for those designing and conducting research, and guidelines for the process of ethical review. Discussions of research ethics often highlight issues such as participant consent, participant confidentiality, data security and so on, with a focus on minimising harms to participants. All go to the implementation and conduct of a project. Also essential to the ethical assessment of a research project is design, and the methodological competence of the researcher to adequately undertake the project. Research competence is an ethical requirement. Research competence is fundamental to the conduct of ethical human research. The Australian National Statement makes this explicit and requires Human Ethical Review Committees (HRECs) undertaking ethical review to consider if researchers have the appropriate research skills and experiences to conduct the research they propose to undertake. That is, is the research ‘conducted or supervised by persons or teams with experience, qualifications and competence that are appropriate for the research’⁶⁸. Judging research competence is part of the assessment of research merit that should occur within ethical committees. Particular issues of research merit mentioned in the National Statement that speak to research competence include whether the research is: ‘designed or developed using methods appropriate for achieving the aims of the proposal’, ‘designed to ensure that respect for the participants is not compromised by the aims of the research, by the way it is carried out, or by the results’, ‘conducted using facilities and resources appropriate for the research’.

Ethical frameworks outside of Australia evoke similar characteristics when outlining guidelines for review such as: posing an answerable and important question; using appropriate research

methods; and conducting research in a transparent and accountable manner⁶⁹. The Economic and Social Research Council Framework for Research Ethics framework from the UK allows research proposals to be rejected by reviewers if there are doubts about research competence⁷⁰. The Australian framework is explicit about the need for researchers to have research competence; although a request for a demonstration of technical research competence is not routinely sought beyond a declaration of qualifications. The National Ethics Application Form (NEAF) limits its focus to any students involved and asks: “What training has the student received in the relevant research methodology”. Explicit request for evidence of the research competence of all researchers is found in review guidelines for clinical trial studies. For example, ‘training, experience and other indicators of competency that demonstrate each person’s [investigator’s] ability to perform their tasks on the clinical trial’ is sought by some institutions⁷¹.

With respect to qualitative research competence, the requirement for an explicit declaration of capability is often overlooked by ethical review committees. Yet, it is difficult to consider, describe or address ethical issues particular to qualitative research without experience and understanding of the principles and technicalities of qualitative methodologies. As members of (different) ethical review committees and experienced qualitative researchers we see many applications involving qualitative research. We are interested in two issues related to assessment of research competence in ethical review. First, applications involving qualitative research rarely include specific claims about qualitative skills and experience so it is not clear how judgments of research competence can be made (assuming they are). Second, it is not clear that ethical review committees always have members with sufficient qualitative expertise to make such judgments. For example, a properly constituted HREC in Australia is only required to have ‘at least two people with current research experience that is relevant to research proposals to be considered at

the meetings they attend'. Although the HREC may have a 'pool of inducted members with relevant expertise' there is no particular requirement for experts in specific methodologies. In practice, ethical review committees have members who call themselves qualitative researchers, members who have done some qualitative research, members who have some knowledge about qualitative research and members whose only exposure may be through sitting on an ethical review committee. Committees that review few qualitative research proposals may not have access to any expertise⁷².

Moreover, the broad array of methodologies and methods of data collection and analysis in qualitative research can create confusion and controversy related to appropriate use in different contexts (even among qualitative researchers). This very diversity underscores the importance of a competent researcher explaining and rationalising their chosen approach through their ethics application. How then can ethical review committees make the required judgment about appropriate qualitative experience, qualifications and competence? While previous articles (including in this journal) have examined the ethical issues arising in qualitative research practice none address the specific issue of research competence⁷³. Ascertaining research competence, some research methodologies or disciplines have established sets of core competencies, recognised qualifications or accreditation processes. For example, the Statistical Society of Australia provides accreditation for statisticians based on formal qualifications, practical experience and professional competence. Completing an accredited degree gives access to recognition as a Graduate Statistician⁷⁴. There is no accreditation process for qualitative researchers in most countries and no set of agreed core competencies (nor are we aware of successful attempts to develop any nationally or internationally). That is not to say there is not

much discussion about a curriculum for qualitative research or the qualities of a good qualitative researcher⁷⁵.

The broad range of methodologies and methods encompassed by the term qualitative research likely makes any attempt to identify core competencies very challenging (just as the characteristics of good quality qualitative research are highly contested). There are three ways that ethical review committees can ascertain qualitative research competence: formal qualifications; explicit claims to competence; and markers of in/competence. There are several ways researchers can gain qualitative research training. A few universities offer specialist degrees in qualitative research; a simple declaration of having achieved this qualification demonstrates a researcher has undertaken a formal, structured high-level program of theoretical and practical training and been assessed as competent. More common are embedded units on qualitative research (or research methods) as part of undergraduate or postgraduate programs⁷⁶. Ethical review committees should bear in mind that curriculum coverage may have been as little as a single lecture or as much as a whole semester. Researchers can demonstrate these qualifications by declaring, for example, that their degree included a full semester unit in qualitative research methods. They may wish to mention specific content relevant to the proposed research, such as interviewing theory and skills. Completion of a large project, such as a PhD program, is perhaps the most advanced of the formal qualifications⁷⁷.

Many higher education institutions and professional bodies offer professional development opportunities in qualitative research. Finally, peer networks regularly offer seminars and informal mentoring. Professional development opportunities such as these are a valid way for researchers to gain practical skills in qualitative research (although they rarely gain a thorough grounding in theoretical underpinnings). Any of the above indicates a researcher has engaged in

some structured learning in qualitative research. However, just as an ethical review committee should be cautious about relying on a degree in statistics as the sole indicator of competence, certification of qualitative-related study has limitations. A formal program that involves assessment of skills and knowledge a research degree, a research methods unit of study is significantly more reliable than professional development opportunities where researchers merely attended brief, unassessed classes/seminars⁷⁸.

Moreover, just because an individual has acquired formal knowledge it does not mean they are able to translate this into practice. Lack of methodological experience or skills can become apparent in the design of the project under review. Competence might also be developed through research practice as a research assistant, PhD candidate or professional researcher. A researcher may experience informal learning and mentoring from a supervisor or other experienced qualitative researcher. More advanced competence may be developed (and demonstrated) through teaching qualitative research, recognition as a qualitative methodologist (e.g. publishing on methodology), supervising PhD candidates, or running qualitative research projects. An experienced researcher with no formal qualifications might convince a HREC of her qualitative research competence by saying something like: I have over 20-years of experience in the development and use of qualitative research in health and psychology, including in my PhD research. I have employed several qualitative methodologies across funded projects, and conducted research with a range of populations and on sensitive topics. I have taught qualitative research methods to postgraduate students for five years and supervised students undertaking qualitative methods from Honours to PhD level.

A researcher may wish to draw attention to a specific area of competence that is relevant to the proposed research project by saying something like: The proposed study employs narrative

analysis. I have used this analytical approach in earlier studies employing interview data and online blogs; this work has been published in several peer reviewed papers. Explicit claims of competence will likely be found on applications for ethical review under the heading of qualifications or expertise. However, ethical review committees may also notice researchers claiming competence in other sections by referring to previous research experience and how it has informed their practice.

Finally, regardless of formal qualifications, training and claimed competence, applications for ethical review will hold other clues as to qualitative research competence. Indeed, a qualification may be decades old and the skills rusty. A researcher may be competent in one qualitative methodology; this does not mean they are competent in them all; each methodology ethnography, narrative inquiry, grounded theory has its own specific competencies. Moreover, a claimed competence may be contradicted by the quality of the proposed project presented through the application. A badly written application does not necessarily mean a lack of qualitative research competence but it certainly raises concerns about competence. Markers of in/competence will be spread throughout the application but likely concentrated in sections on sampling, recruitment, protecting participant privacy and confidentiality, risks to participants and of course, research methodology, tools and analysis. The National Statement provides a framework for reviewers and researchers to help them think through the ethical issues facing a proposed piece of research⁷⁹. We have used these guidelines to categorise the specific questions we consider when looking for markers of in/competence in qualitative research. To be clear, these are our rules-of-thumb not a check list for an exhaustive set of criteria for qualitative research competence. While all the questions work on a general level across qualitative methodologies there will be additional markers of in/competence for specific methodologies.

Researchers do not need to use an extant methodology, simply present an underlying logic for their actions, a coherent justification that ties the research aims/questions to the methodology and the methods⁸⁰. Indicators of this kind of logic include statements like: In line with the ethnographic methodology adopted for this project we propose to conduct observations in three sites. For example, there is no single Ground Theory methodology, so we would expect to see a reference to Constructivist Grounded Theory or to 'Straussian' Grounded Theory^{81,82}. Are the methods and language consistent with the claimed methodology? Does the researcher make appropriate claims about methods such as sampling, data collection and analysis? In terms of sampling, is the researcher making claims about representative sampling or generalisable findings where we would expect discussion of purposive or criterion sampling? Qualitative samples are designed to facilitate investigation of meaning, understanding, experience, or process; that is, understanding rather than determining the extent of a phenomenon. In terms of data collection, how is data being generated and is this approach coherent and consistent with the research aims/questions and methodology? For example, a narrative study that relies only on focus groups would raise a flag for us as this method tends not to generate individual stories. Or that uses an interview schedule containing heavily structured and/or mainly closed-ended questions rather than open, exploratory questions that encourage story telling. Finally, is the method of data analysis described and is it consistent with the methodology and methods? We are looking for evidence that the researcher has developed an analytic strategy and considered how analysis will produce knowledge that addresses the stated aims or research questions.

Ethically conducted qualitative research can only be undertaken by researchers with the appropriate experience, qualifications and competence. It is difficult to consider, describe or address the ethical issues particular to qualitative research design without a thorough

understanding of the technicalities of qualitative methodologies. Researchers have a responsibility to demonstrate their research competence, while ethical review committees have a responsibility to judge it. Yet qualitative research competence is a rarely discussed ethical issue, it is either not assessed or the criteria are opaque. We anticipate resistance from some social scientists who may feel that ethical review committees cannot undertake this work. Or that only a qualitative researcher can make these judgments. We echo calls for the development of ethical review committee skills in assessing the rigor of qualitative applications. We endorse calls for more qualitative expertise to be available to review panels, either through permanent or co-opted members⁸³.

2.1.2 Overview of Information Literacy Skills

The term "information literacy" (IL) was coined outside of academia in 1974 by a lawyer named Zurkowski, who was interested in intellectual property and industries⁸⁴. The term was first used in a proposal submitted to the National Commission on Libraries and Information Science (NCLIS): in which Zurkowski stated: "People trained in the application of information resources so their work can be called information literates. They have learned techniques and skills for utilizing the wide range of information tools as well as primary resources in molding information-solutions to their problems,"⁸⁵. Zurkowski's emphasis was on the private sector and his concern was using information skills as a problem-solving approach for workplace contexts⁸⁶. The evolution of information literacy, however, has occurred mostly within the public sector, mainly in the field of library sciences. Librarians and academics have set information literacy as one of their major goals⁸⁷. Accordingly, this phase of the evolution of information literacy is

associated and mixed with library user education and bibliographic instruction programmes in the form of short orientations on how to use library and information resources⁸⁸.

Information literacy gradually began to evolve from the user-education concept of the library environment. Theoretically, the concept began to shift from teaching tools to teaching competencies that were not limited to particular tools or contexts⁸⁹. In practice, however, the view is that the transformation was very gradual because the users were still viewed as passive information consumers. With the advent of digital technology in the 1980s, information literacy expanded to include more than library resources, and it started to be associated with technological literacy, information and communication technology (ICT) literacy, digital literacy, and computer literacy. Information literacy at this stage was viewed as tool based, but with a focus on technology⁹⁰. Constant advancement in information technology led to an increase in information resources and complexity in the digital information environment. It has become obvious that knowing how to use computers and access information is not sufficient for locating and extracting relevant information in such a complex environment. Therefore, the need for underlying competencies such as critical thinking and evaluation skills as well as socio-cultural support, have become more prominent. The emotional or affective nature of information literacy has also been taken into consideration as an essential requirement⁹¹.

Studies on emotional, or affective, aspects of information began with and continued with several others. In recent years, Web 2.0 technology has begun to play an important role in information literacy, leading to a drastic change in the way we collaborate, communicate, and share information. A scholar interprets this change as advancement in the social dimension of information literacy⁹². Web 2.0 is significant enough to provide us with a new definition of information literacy. Another important influence on the evolution of information literacy is

educational practice. There is presence of a strong tie between education and information literacy. They refer to the impact of constructivism on providing new arguments for information literacy, which led to the promotion creative and reflective users of information, particularly now that users have access to Web 2.0 tools that can allow them to be both reflective and creative⁹³.

Similarly, how social constructivism and connectivism can facilitate a teaching approach in accordance with current participatory technology, or Web 2.0 was noted⁹⁴. In a broader perspective, information literacy as an extension of the notion of literacy that directs us towards a future “learning society” and away from the current information society was reviewed⁹⁵. Whilst there is a strong relation between information literacy and educational practice, information literacy are not limited to academic contexts. It goes far beyond these contexts to lifelong learning and our identities. Information literacy is viewed as critical for lifelong learning, which empowers us both personally and economically. To sum up, information literacy has been approached in different ways over time. First it was viewed as a problem-solving approach within the context of the private sector. Then, it underwent the influence of the library sector, and it was mostly viewed as learning about the collection of information resources that libraries offer. It later became associated with information technology, technical skills, and databases. Information literacy has also been viewed through different lenses: as critical thinking skills, as a social practice, as affective competencies, and in terms lifelong learning⁹⁶.

As stated above, information literacy evolved in the domain of library sciences and as a result, a number of popular definitions have come from library associations. For example, according to the American Library Association, information literacy is “a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information”⁹⁷. Similar frameworks and models have also been developed

by the Council of Australian University Librarians (CAUL), the Library and Information Association of New Zealand Aotearoa (LIANZA), and the Standing Conference of National and University Libraries (SCONU), and The National Institute of Library & Information Science (NILIS)⁹⁸. Information literacy has also been defined by individual scholars. It is defined as "the set of skills and knowledge that allows us to find, evaluate, and use the information we need, as well as to filter out the information we don't need"⁹⁹. This definition is very similar to previous ones, but his emphasis is more on filtering out irrelevant information due to advancements in information technology and the complexity of the information environment. Both of the above definitions are limited in their perspectives viewing information literacy merely as set of skills that can be achieved individually¹⁰⁰.

Bruce's relational model, formulated in 1997, offers a new approach to information literacy¹⁰¹. Bruce highlighted the importance of the ways in which information literacy is perceived by the information users. In other words, information literacy entails being aware of various ways of experiencing information use, through pertinent practices and reflections¹⁰¹. Rather than offering a set of skills or processes, he offers seven ways, or faces, in which one experiences information literacy: information technology, information sources, information process, information control, knowledge construction, knowledge extension, and wisdom experience. To be effectively information literate, according him, one needs to experience and relate to information in these various ways. The concept of variation is significant because learning happens when we identify and act upon various ways of experiencing something¹⁰². The Bruce definition by his colleagues relies on a learner's behaviour and perception, and, thus, is more conceptual than practical. Information literacy is a sociotechnical practice. Information literacy is embedded in the actions

of specific communities that use adequate technologies. Their idea of socio-technical practice is built upon concepts such as collaboration, sharing, technological artefacts, and contexts.

Furthermore, in the education sector, information literacy has been generally seen as an understanding and a set of abilities enabling individuals to recognize when information is needed, and to have the capacity to locate, evaluate and use efficiently the needed information. Despite some similarities among various definitions, there is no real consensus on how to define information literacy. It was argued that the current definitions are not comprehensive enough¹⁰². Information literacy contains various perspectives and practices, and that we are not yet able to fully capture its depth and breadth. Specifically, information literacy has been defined mostly through a textual practice (where the interaction is between an individual and a text he or she reads), rather than a social practice¹⁰³. The shift in emphasis on what is important in information literacy continues due to our new understanding of the concept, our involvement in different contexts, or the changes we face in our information environment, particularly due to the rapid advancement in information technology. Therefore, defining information literacy is similar to aiming at a moving target.

It is imperative for information users to acquire the information literacy skills and knowledge, because in the present global arena, the competitive use of information is vital to gaining competitive advantage in one's field of work¹⁰⁴. The benefits of thorough knowledge and skills in information literacy can be endless. It is through the use of information literacy that lifelong learning skills can be acquired. A comparative study of credit earning information literacy skills courses at three African universities was performed and found that information literacy is often neglected in most universities in Sub-Saharan African states in favour of computer literacy¹⁰⁵. The evidence of these findings can be found in the largely outdated and mostly irrelevant

writings on the subject that are kept in school libraries and journals. Information literacy is insufficiently acknowledged in school curricula in most African countries. Information literacy skills acquired, especially during the tertiary education training, are very useful for knowledge-based development and lifelong learning, even long after they would have left school¹⁰⁶.

A study identified many challenges facing user education programmes in tertiary educational institutions in Ghana like the Kwame Nkrumah University of Science and Technology (KNUST) Library¹⁰⁷. The challenges he identified were apparent apathy of students regarding user-education programmes, a lack of adequate staffing in libraries, a lack of training for librarians, a lack of reliable internet connectivity in libraries and debilitating financial constraints. Similarly in a study titled “Information Literacy: Assessing the Readiness of Ghanaian Universities” a scholar identified some challenges that hinder effective implementation of information literacy programmes in Ghanaian universities¹⁰⁸. These identified challenges included a lack of management commitment to information literacy programmes/projects, a lack of adequate information regarding information literacy, and staff and departments who are unwilling to handle information literacy skill acquisition.

A similar study examined information literacy skills at the Chancellor College, University of Malawi, in an effort to ascertain whether information literacy skills at the university were adequate in equipping students with the required skills¹⁰⁹. The study showed that the level of information literacy offered to students at the university were inadequate and did not go far enough to equip students with the requisite computer skills or data searching skills. In addition to curricular and financial challenges, other challenges such as electricity failure, high internet charges, and inadequate infrastructure were cited. In a study on the “User education programme

at the University of Ghana”, a number of challenges were identified that stifled the success of information literacy¹¹⁰. Key among these challenges were the inadequate number of teaching staff to facilitate information literacy skills, lack of sufficient orientation for students on the subject and practice of information literacy and inadequate time allocated to the skill. Similarly, a study revealed a lack of clear information literacy policy in most Tanzanian universities¹¹¹.

A study observed that librarians in most educational libraries in Kenya do not commit to pushing information literacy skills to the fore, and therefore these skills acquisition are neglected as a function of the library¹¹². The University of Fort Hare Library in South Africa was subject to a study where it was revealed that students in the University of Fort Hare still faced difficulty in finding requisite information both online and in libraries¹¹³. The study also showed that a significant percentage of students did not possess skills that would enable them engage in critical evaluation and usage of information. Librarians and other academics in the educational institutions of various countries have introduced information literacy that are intended to impart the needed information literacy skills that would enable students to become effective and efficient information users. However, in many African countries, information literacy interventions have not yet been seriously considered or implemented¹¹⁴. A study approaches information literacy acquisition in Nigeria and stated that, the major factor militating against promoting higher levels of information literacy is lack of a concerted effort by academic libraries in the pursuit of a programme¹¹⁵. Reasons given for this on the library’s part are: lack of funding, inadequate staffing, disruptions in the academic calendar, and inadequate support from the parent institution.

Information literacy studies in Nigeria have revealed that there is high level of computer illiteracy among Nigerian librarians, thereby, leading to a shortage of personnel for IT-supported

information literacy training¹¹⁶. For example, a researcher studied the information literacy skills among librarians in Delta State University, Abraka, Nigeria, and reported that the librarians are handicapped in trying to keep abreast with the new trend of librarianship¹¹⁷. Her study revealed that the librarians lack computers to work and even where they are available have no Internet connectivity. She recommended that universities in Nigeria should have information literacy policies just like universities in the developed world. In a study on Internet connectivity in university libraries in Nigeria stated that, for university libraries to deliver effective and efficient services to its clients including information literacy programmes, they must all have stable Internet connectivity in their libraries¹¹⁸. In a study on information literacy education in library schools in Africa to ascertain whether librarianship education is taking a leading role in the development of information literacy in our universities. The study revealed that only a few library schools have successfully integrated an information literacy course as a stand-alone course in their curriculum.

Writing on information literacy in four Tanzanian universities, it was revealed that information literacy is still new in university curricula¹¹⁹. They identified challenges hindering the effectiveness of information literacy practice, such as: lack of adequate resources; lack of an information literacy policy; lack of proactive solutions among librarians; the need for adequate library staffing and training; and collaboration between librarians and teaching staff in information literacy activities. Information literacy in developing countries needs to be developed to suit specific needs and the local environment. The goal of an information literacy programme in Africa should be to help inculcate a lifelong habit of identifying an information need and efficiently searching for, and using, indigenous, oral, print, electronic and other sources of information to satisfy that need and thereby enhance personnel, community and national

socio-economic interest¹²⁰. The students in the College of Health Sciences in Niger Delta University lack the information literacy skills needed to use information resources effectively both in print and electronic formats¹²¹. The researchers recommended collaboration among librarians in medical libraries and faculty members to develop information literacy programmes to equip students in the medical field with the needed skills in this digital age.

In Ghana, a study on the user education programme at the University of Ghana identified challenges such as an inadequate number of qualified staff to instruct students during orientation, and inadequate time allocated to the programme¹²². Similarly, in a study on assessing the readiness of Ghanaian universities for information literacy, identified a number of problems hindering the implementation of information literacy programmes at the University of Ghana and the University of Cape Coast. They are: lack of university commitment to the project; inadequate information about what information literacy is; unwillingness of the various departments already handling components of the information literacy programmes to collaborate with each other to form a campus-wide project; unwillingness to accept innovations in curriculum planning; inadequate technological infrastructure/computers, inadequate electronic resources; and inadequate human resources.

Lack of an explicit information literacy policy providing guidance and directives on how information literacy activities should be conducted, has resulted in some existing information literacy programmes not being allocated official time within university timetables¹²³. A success story from the University of Botswana library on information literacy intervention is that the former information skills programme which was provided at an informal level has now changed into a formal, examinable two-credit module, integrating information literacy skills with computer skills, under the General Education Course (Computing and Information Skills) course,

and was made mandatory for all first year students¹²⁴. Higher education librarians in South Africa are moving towards inculcating skills of 'graduateness' in addition to traditional bibliographic skills, thereby accepting some of the responsibility for meeting the demands of the twenty-first century graduates¹²⁵. In spite of scattered efforts, majority of students are forced to pass through the university system without ever mastering the art of information retrieval and use. In a world so dominated by information needs, issues and considerations that information literacy is required for a person to function effectively as an individual in an increasingly global society seems axiomatic. Information literacy has been described as the umbrella literacy, and thus it seems logical that all international, national and local governments should have formalized information policies and strategies with information literacy at the core. It also seems axiomatic that teachers, academics and educational administrators should by now have accorded information literacy the highest pedagogical and resource investment priority. The issue of the information divide at the local and global levels is much more complex than to be susceptible to one technological solution. The real issue is the information literacy divide. In an information intensive society, the most critical divide will be between those who have the understanding, skills and knowledge to operate effectively in that society and those who do not. This constitutes the information literacy divide. Information literacy creates awareness among people in terms of information practices that are effective in personnel, business and political life. It also empowers people to learn outside the formal structures of an academic environment¹²⁶.

Information literacy is a broad term that combines a number of literacies that include library literacy, media literacy, computer literacy, Internet literacy, research literacy and critical thinking skills¹²⁷. Emphasizing the importance of information literacy, it was stated that information literacy is fundamental to the success of learners in discharging their academic responsibilities.

In a study on information literacy practices among librarians employed in Technical and Further Education in Australia, it was revealed that librarians are providing programmes that focus on the training of information skills relating to the use of libraries, the Internet and databases. In a survey of strategic engagement with information literacy in universities in UK revealed that information literacy teaching is embedded within 75 percent of the undergraduate and postgraduate taught course curricula and the aim is to achieve 100 percent penetration¹²⁸. Writing on information literacy skills among female students in Kuwaiti high schools, the majority of Kuwaiti high school students are deficient in their information skills¹²⁹. According to these scholars, “a clear majority of the students did not have the basic skills such as catalogue searching and use, the selection and use of information sources was also found to be weak”¹³⁰. Information literacy cannot be taught only once; it must be taught and practiced in multiple ways. Students need to repeat seeking, evaluation, and gathering information from multiple sources. Information literacy in the educational environment supports, promote and enhances teaching and research as well as creating a learning culture that encourages institutions to produce graduates with the capacity and desire for lifelong learning¹³¹.

The idea of library instruction or bibliographic instruction has been one of the concepts and tasks associated with librarians for many years. The term bibliography instruction is used here to represent library instruction of various types, excluding the more recent term “information literacy instruction” to which it is compared¹³². Bibliography instruction has usually referred to learning the tools and skills required to successfully use a library for finding information. With the increasing amount of information from different sources and the growing complexity associated with retrieving information in the 1980s and 1990s, librarians were frequently asked by college faculty to provide specific instruction on how to do this¹³³. While bibliography

instruction tended to focus on library activities and the use of tools to get information, it lacked the larger consideration of critical thinking and broader tasks needed to do research. The broader concept of information skills and library instruction may be divided into two parts: lower-order competencies, like information-seeking and retrieval; and higher-order understanding, extending the lower-order skills to include evaluating information search results as to quality, relevance and validity and determining how to use the information¹³⁴. The first is associated with bibliography instruction, while the second refers to information literacy, which was developed by librarians to meet the need for such understanding.

Information literacy represents a change in scope from previous library instruction, with a shift from teaching tools for finding information in a library to a focus on broader concepts by all information users and not only library users. Information literacy builds upon the library instruction of the past to extend its breadth¹³⁵. The public library is a place which supports adult education and lifelong learning and has the capability of narrowing the digital divide by providing free computer and Internet access and offering training courses to improve people's information literacy skills. Governments around the world have recognized the critical role of public libraries in developing information literacy skills of their citizens. As a result, funds have been allocated to public libraries to purchase computers and establish Internet connections, and a variety of information literacy approaches have been used¹³⁶. Although the role of public libraries has been acknowledged as a valuable provider of information literacy development, existing literature primarily focuses on addressing the role of public libraries and their information literacy activities. There is still a lack of relevant study investigating information literacy training in public libraries, especially in the quality and organization of information literacy courses and the information literacy skills of public librarians.

As information literacy competencies have been identified as a crucial element to foster lifelong learning and keep up with the fast-changing world, integrating information literacy learning into education at all levels should be a priority concern¹³⁷. It was emphasized that even though people claim that they have a high degree of confidence in using computers, their information literacy skills might be disgraceful. In public libraries, information, in most cases, can be easily retrieved from the Internet, but users waste so much valuable time because of a lack of adequate skills to find appropriate resources, evaluate information and use the information effectively in solving problems. Recent studies have revealed that users' information literacy skills need to be enhanced, and careful attention needs to be paid to these skills in primary, secondary and even in higher education sectors. Public libraries are primarily driven bottom up, by the customers' agenda and far less by top down curricula. Public library service provision is by definition very broad, as it is driven by the information and cultural requirements of the general public. This has a number of challenges for developing information literacy programmes for customers, which need to be considered when deciding approaches to information literacy. This study adopted Christine Bruce's seven faces model of information literacy.

A scholar examines information literacy using phenomenographic methods to determine how individuals experience information. The model frames information literacy into seven different ways of experiencing information use through active and reflective engagement with the relevant information practices. Bruce's seven ways or faces model of information literacy is applicable in this study because it promotes critical thinking skills and also assists users to understand how to access, use and utilize information¹³⁸.

Evaluation as a process of improvement and betterment must be linked to quality. It must also have the necessary tools to measure the process of qualification. These tools need to be effective,

objective, and useful for statistical processing purposes, enabling results to be effectively interpreted for decision-making processes. The problem arises when evaluation has to be transferred to an object like information literacy, which is generic and competency based, and does not refer to a knowledge area. Further complication is caused by a number of other issues, such as not defining whether certification or accreditation is required for the attainment of competencies, and not clearly affiliating them to a department for curricular design (affiliated to the library, without any impact on the academic curriculum). As a consequence of the latter, there is no preparatory instruction or progression function in a student's degree curriculum, despite the imperative need for integrated cooperation between the subjects and educational goals of the organisation in which information literacy is offered. However, more and more organisations should incorporate information literacy programmes. There is, therefore, a need to develop evaluation methods and tools to assess their positive impact. In Spain, this need is becoming peremptory in libraries in educational settings, such as university, school and public libraries. It is also becoming patently clear in recommendations and documents issued by international bodies like the IFLA (International Federation of Library Associations and Institutions) and UNESCO, as well as in the activities of other countries' associations like the IIL (Institute for Information Literacy) and the NFIL (National Forum on Information Literacy) in the United States, the ILCOPUSU (Information Literacy Community of Practice at Staffordshire), the SCOUNL (Society of College, National and University Libraries) and the JISC (Joint Information Systems Committee) in the United Kingdom, NordINFOLIT in Scandinavia and ANZIIL (Australian and New Zealand Information Literacy).

Many of these organisations have proposed evaluation models allowing questionnaires and surveys to be developed, which have been applied to information literacy actions in various areas

and institutions. This is a logical trend, since evaluation is a constituent, essential part of information literacy¹³⁹. Nevertheless, these initiatives fluctuate between proposals based on models and methods, and their immediate application in the form of questionnaires and surveys. However, this raises two questions: How can students on a literacy programme be evaluated? And how can the institution they are studying at be evaluated? As has been pointed out, the referential element of evaluation is quality. Although this has caused some controversy, many of them consider that these indicators can have a very positive impact on academic outcomes and bestow prestige on an institution¹⁴⁰. Evidence of this is what has been termed the “managerial university”. This type of university focuses on adopting business management values, techniques and approaches¹⁴¹. This approach means that all the activities of public institutions, and educational institutions at all levels (including their libraries), should engage in a commitment to quality, for which the EFQM (European Foundation for Quality Management) model is followed. From this point of view, an information literacy programme, as a service, has an evaluation model. Attaching quality and evaluative scope to an information literacy programme as a service raises the question as to whether or not accreditation or certification is worthwhile, even though it is a well-refined process in libraries, which have their own methods, ways and documents¹⁴².

The creation of evaluation and accreditation agencies as part of this whole movement, such as ANECA in Spain and its counterparts in the regional context, have raised the stakes of the phenomenon. Accreditation seeks expert, public recognition of the fact that an institution possesses the necessary standards, through verifiable evidence, to provide a quality service through a standardised process. Certification aims to verify that the institution contemplates an evaluation and revision system to ensure that the services the institution provides are programmed; these services are the ones that its users demand, and the institution must assure

both service quality and user satisfaction. The debate on the best system for evaluating information literacy has existed and been evidenced in IFLA's Information Literacy Section. Elsewhere, there are initiatives on best practices for information literacy programmes, such as those published by the IIL, the AASL (American Association of School Librarians), the ARL (Association of Research Libraries) and the ACRL (Association of College and Research Libraries), and accreditation agencies have not taken long to emerge. Among others, we find the Middle States Commission on Higher Education¹⁴³.

However, information literacy is a competency-based specialty for knowledge and know-how, meaning that an "interpretation" of both accreditation and certification is required. In its evaluative expression, it would seem very plausible that an information literacy programme should have accredited recognition by bodies and/or associations specialising in information literacy. The aim of such accredited recognition would be to ensure that the programme is capable of offering quality competency training. Evidence of this would come by way of a certificate for students, demonstrating that they have attained the competencies stipulated in the competency objectives of the programme's instructional design. This accredited and/or certified competency-based expression should, however, respond to an evaluation design that is appropriate and particular to information literacy. In order to provide an appropriate response, it is necessary to make another conceptual clarification: evaluation is understood as a means to determine how effective an information literacy programme is in terms of developing students' knowledge and competencies in accordance with its objectives, and also as a means to improve the programme itself; assessment is an evaluation scheme that considers not only knowledge and competencies, but also attitudes, values, and skills acquired throughout the programme. In the

same way as for evaluation documentation (accreditation or certification), an information literacy programme should not be selective about either design.

Rather, it should incorporate both. Indeed, the tools for evaluating information literacy programmes should have a dual dimension: first, it should be programme-related evaluation for the institution (evaluation), using indicators; second, it should be educational evaluation for the students (assessment), using diagnostic questionnaires at the start of the programme, and competency questionnaires at the end. Both evaluations should be incorporated into an evaluation of results. Elements applicable to evaluation include parameters or categories. These serve as a framework for a more effective interpretation of the data supplied by the indicators. Evaluation also requires procedures, whose methods are consistent in terms of the way they are applied to categories and their indicators. It would seem clear that, in an information literacy programme, the categories should be structured on a scale that progressively articulates skills, abilities and competencies, each with their own indicators, to measure and evaluate a student's level of expertise in each of these categories. The procedure, based on a method, deserves some thought because, even though quantitative methods are very well developed (and particularly so for ICT penetration), qualitative methods are much more expedient due to their competency-based nature. Indeed, qualitative methods are very useful for evaluating attitudes, assessments and motivations; they allow trends to be diagnosed and, moreover, they get the population to which they are applied much more involved¹⁴⁴.

Furthermore, the evaluation of information literacy programmes should have a clear reference to an educational approach; that is to say, face-to-face, blended or e-learning. The competency-based nature of information literacy in digital environments advocates their application to LMSs, meaning that evaluation approaches to e-learning are useful: socioeconomically, to evaluate the

benefits of a programme; technologically, to evaluate the excellence of an LMS; educationally, to evaluate the effectiveness of learning construction by a student as a consequence of interaction with the content. These approaches are expressed in a number of evaluation principles, including interiorisation (mastery of the technologies), prioritisation (ability to select the ideal ICT for learning) and reintegration (the ability to master the language of ICTs to make the best use of them). These principles could become suitable indicators¹⁴⁵.

There have naturally been a number of proposals for evaluating information literacy. These include the classification proposed by the IFLA (diagnostic, formative and summative evaluation), the most relevant aspects that need to be evaluated for the ACRL (programme and teaching staff evaluation, student outcome evaluation and good practice transferability), and the evaluation criteria for good practices of the IIL (programmes, attainment and attainment programmes). There have also been some very interesting reflections on the topic, like the one made by B. G. Lindauer, with three areas particular to information literacy evaluation: the learning environment for both formal education curricula and non-formal and informal training courses; programme components referring to the existence of opportunities, their scope, curricula and evaluation; learning outcomes for student performance, evaluating their products throughout the programme¹⁴⁶. A number of other appropriate methods for evaluating information literacy have been pointed out¹⁴⁶.

On the basis of the evaluation design, as mentioned earlier, there are two ideal tools for evaluating and assessing an information literacy programme: questionnaires for assessment, to effectively process trends and perceptions; indicators to effectively process statistical factors. We should recall that each tool is based on quantitative and qualitative processing methods. Indicators are understood as being a metric for measuring specific variables or conditions in

order to analyse a phenomenon and its evolution, in that it processes data that contain a great deal of information, with reference to a general interpretation structure. When applying indicators, the approach and perspective taken to measure and evaluate the phenomenon are very important. For educational environments, the perspectives for information literacy pointed out by the OECD therefore appear to be appropriate: context of reference (strategic position of programme accreditation or certification), system potential (quantity and quality of programme resources), processes (planning, methodology, and plan design and programme management), outcomes (attaining the objectives of the competency and its benefits). The application of indicators requires a classification of several categories to establish effectiveness criteria: Situation and diagnostic indicators: for evaluating the planning of programme implementation, identifying deficiencies and dysfunctions in order to improve the design. Monitoring indicators: for evaluating the effectiveness and efficiency of programmes in order to improve the process. Infrastructure quantity, quality and effectiveness are relevant criteria. Outcomes/Results indicators: for verifying the fulfilment of the objectives and evaluating their benefits. Efficiency, coverage and impact are relevant criteria.

The gradual definition of measurement initiatives, methods and models for evaluating information literacy has given rise to a proposal for specific evaluation tools with its own methodology¹⁴⁷. In 1997, and inspired by a Wisconsin Ohio evaluation programme, SAILS (Standardized Assessment of Information Literacy Skills) began to be developed. It was based on ACRL and AASL standards for evaluating information literacy programmes by level. For its part, the company Educational Testing Services developed the iSkills test, comprising a set of questions aimed at demonstrating a student's mastery of ICTs and information literacy by solving specific problems. In Australia, R. Catts has promoted the CAUL (Council of Australian

University Librarians) Information Skills Survey (based on CAUL/ ANZIIL standards), whose aim is to identify students' competency levels in specific academic areas, so that they can be used for decision-making purposes by universities and faculties, in their training programmes, as an indicator of the institution's quality. In the Spanish setting, worthy of note is the ALFIN-HUMA project led by M. Pinto, which is clearly applicable to the higher education environment¹⁴⁸.

As a global response to these initiatives, account should be taken of R. Catts & J. Lau's conceptual framework paper entitled *Towards Information Literacy Indicators*, published by UNESCO¹⁴⁹. The project was put forward as a conceptual framework with a list of indicators for measuring information skills on the basis of indicators that had already been designed and had shown themselves to have a certain evaluative worth, such as the LAMP and PISA programmes, and the questionnaires of the UNESCO Institute for Statistics, the OECD, the DHS and the ILO. The orientation proposed for the indicators is significant, since they are directly related with the benefits expected from information literacy competencies, such as development, health and welfare, civil society, higher education and employability. Also very interesting are the generic indicators such as oral tradition, ethics and equality (gender, language, economic and political impact and constraints). This set of initiatives for designing models, applying methods and managing systems of indicators, and for information literacy programmes also, has begun to consider the possibility of coherent analysis and interpretation problems. This has led to the creation of indicator model convergence bodies, such as the Partnership on Measuring ICT for Development, whose aim is to publish standards for indicators that allow them to be compared. Emphasis is placed on their international scope, reliability and comprehensibility, in order to ensure that they have greater analysis and interpretation power.

The scope and relevance of information literacy has become so clear for political, administrative and academic authorities that turning it into a subject for formal education (it has already been incorporated into the higher education curriculum and not only in the documentation discipline) is now a reality in Spain. In 2001, Johnston & Webber offered the following classification, which corresponds to information literacy as an academic discipline according to Becher & Trowler's model: a soft applied discipline, in that it is grounded in theories that come from other sciences, of which it is an auxiliary part; its aim is to prepare citizens for managing and taking action in society; its methods are qualitative. Without a shadow of a doubt, the scientific principles, laws, standards, object, objectives, field, methods, methodology and research lines and paths have now been defined for information literacy as an academic discipline. Research teams and projects, conferences and scientific publications are evidence of this unstoppable advance. Given this situation, it would seem useful to put forward an evaluation proposal for an information literacy programme. The programme arises from cooperative endeavours between the company Baratz and several lecturers in documentation at Carlos III University in Madrid¹⁵⁰.

The context for this cooperation is one of the lines of research of the ACRÓPOLIS research team at the mentioned university, focusing on information literacy and the development of the Baratz Absys.edu platform. This is an attempt to incorporate the social networks of library 2.0 and the semantic tagging of educational web resources into educational digital libraries (CRAI-Learning and Research Resources Centre and CREA-Learning and Teaching Resources Centre), with their content management tools. The instructional context elements of the information literacy programme are: a blended educational approach (Moodle platform); an educational space, educational libraries (university, school and public libraries); a competency model, Tuning; information literacy standards, ANZIIL; target audience, e.g., teaching staff, librarian lecturers

with information literacy responsibilities and students (formal and non-formal education); teaching duration, six weeks¹⁵¹.

The instructional design of the programme is neither projected as an e-learning course or a tutorial, nor as a web resource on an educational “site”. The programme has been designed on the basis of arguments associated with educational hyper-document principles (interactivity, associativity, multi-sequentiality, virtuality, dynamicity) and, essentially, in accordance with the properties, characteristics and elements of learning objects. The programme structure is divided into five training modules: module 1, basic competencies, for skills and abilities to search for and retrieve ideal resources for knowledge generation and, above all, for collaborative learning; module 2, digital reading, for abilities to use content management tools and to evaluate educational digital content; module 3, content assimilation, through the edition of concept maps and their application to web environments; module 4, knowledge generation, through the edition of knowledge and content using Web 2.0 tools; module 5, digital writing, which demonstrates know-how through the edition of learning objects.

Given its paramount importance, the programme incorporates evaluation as a substantial component, both programme-related evaluation for the institution and educational and diagnostic evaluation for the students, applying indicators to the former and questionnaires to the latter. The programme incorporates a module 0, competency recognition, with a diagnostic questionnaire to identify information literacy competency deficiencies. The purpose of this is to ensure that the programme does not conclude with a qualification, as in academic areas referring to knowledge and thought, but with questionnaires about competency attainment, evidencing that excellence in information literacy has been reached on completing module 5. Finally, the programme incorporates an impacts and benefits indicator for the programme at the institution, for the

purposes of programme improvement and implementation, and educational strategy decisionmaking. The questionnaires and indicators are the outcome of a research project on editing and publishing teaching materials, approved and funded by the Spanish Ministry of Education¹⁵².

The project had three phases: the creation of an indicator model for information literacy competencies; the development of questionnaires based on the indicator model, referring to the indicators, for effective competency processing and the effectiveness of educational analysis and interpretation; the application of questionnaires to Spanish primary and secondary schools in Asturias, Madrid and Navarre. The indicator model was structured into three parts, in accordance with a scheme of capacities: skill indicator category, basically referring to a reader's capacities in terms of accessing and using technologies of resources that are read, meaning that the protagonism lies in the interaction of the reader with the resource; ability indicator category, referring to a reader's capacities to acquire knowledge and know-how through a grammatical mastery of the discourse, meaning that the protagonism lies in the reader's mastery of the inferential process of reading to generate knowledge, a procedural protagonism; competency indicator category, referring to the reader's capacities resulting from a mastery of information literacy standards, corresponding to the protagonism of a user-student, given that his/her competencies are evaluated in terms of lifelong learning autonomy, with inherent mechanisms, values and ethics¹⁵³.

The structure of each indicator was designed so that each indicator was classified within its category. Each one has a label, a definition, definition milestones, objectives and source data, which, at all times, correspond to the data obtained after applying the questionnaire, which led to phase two of the project. The structural design was inspired by the indicators of the UNESCO

Institute for Statistics, Guide to Measuring Information and Communication Technologies in Education. The aim of these indicators is, therefore, to serve as a basis for decision-making and for the evaluation of monitoring. After consulting information literacy evaluation methods, model and tools, the questionnaires gave rise to the creation of a template reflecting the competency objectives that should be evaluated by the indicator model. These were categorised into skills, abilities and competencies. On the basis of the competency objective template, the competency questionnaires were designed, as a tool, in such a way that each objective led to several questions, in accordance with the interests and intellectual maturity of the institution and the students¹⁵⁴.

Consequently, the model is scalable. A series of questions that vary in number and difficulty can be designed for each “course” of the programme, always in accordance with a competency template and an interpretation provided by an indicator. In any event, the definition of principles conditioning the evaluation model is based on an insistence on generic aspects for the particular measurement of each object of the indicator, an object of the indicator being understood as a phenomenon on which action is taken. These generic aspects, which give a generic bias to the indicator model, are the insistence of the training function and the evaluative measurement. Moreover, it should deal with the intensity of the evaluable phenomenon as a means of highlighting priority actions that need to be taken. The properties of the indicators should not, therefore, simply focus on measuring the degree of competency fulfillment and success, but rather on the transfer of the results of these actions to the educational community, which is a basic element of effectiveness and progress.

Information literacy practitioners have worked through professional associations to promote the concept and its application, by developing definitions, models and standards. The American

Library Association led the way; The American Library Association has of course issued many materials on information literacy including its 2001 'A library advocate's guide to building information literate communities'¹⁵⁵. However, Australian and British organizations also now have high profiles in the field. International organizations within and beyond the information profession are also involved. The International Federation of Library Associations and Institutions (IFLA) produced guidelines on assessment of information literacy and on its role in lifelong learning¹⁵⁶. More significantly, UNESCO has sponsored two meetings of experts in 2003 and 2005, which issued important statements known as the Prague Declaration and Alexandria Proclamation. The second meeting emphasized the developments of relevant strategies, at national, regional and local levels, urging governments and others to support 'vigorous investment in information literacy and lifelong learning strategies' to promote the development of the information society¹⁵⁷.

One library association which seems to have addressed information literacy in a national information policy context is the Library and Information Association of New Zealand¹⁵⁸. It has, significantly, also addressed it in an indigenous Maori context, Maori representing about 16 percent of the now multinational New Zealand population. What LIANZA has achieved through identification of the issues, the explication of a library-led national information strategy and political connections and adroitness, is something of a model for other library associations. The LIANZA position paper on information literacy which informs the knowledge equity element of the national information strategy notes that: information literacy the ability to access, process and use information effectively is a key enabler for New Zealand society as a whole. Information literacy provides the foundation for the following: effective participation in democracy; achievement in all areas and levels of formal education and lifelong learning; the development of

an innovative, knowledge-based economy and the production of new knowledge; social and cultural inclusion; community and individual employment; and individual capability to manage the challenges of information complexity and information overload¹⁵⁹.

Application of information literacy skill programme differs from one university to another and from one library to another which may culminate into barrier or success to information utilization. Lack of requisite skills on the use of the library was an impediment inhibiting accessibility of information resources of library. Less than 8% of the respondents in a study carried out in some selected University Libraries in South West Nigeria have the skills to use chat and discussion, news and teleconferencing¹⁶⁰. Another study indicated that 91.8% of a total respondents of 291 rated library and literary skills instructions applied by University of Calabar highly as the library seems to be more interested in teaching literary concepts that helped the students ability to evaluate, identify, and access information resources with ease¹⁶¹. The library and information managers have at present played a significant role towards promoting information literacy in Nigeria, but the fact still remains that a lot still need to be done to advance the course of information literacy in Nigeria¹⁶². Despite the success of adult literacy to promote rural development, Nigeria is still plagued by a number of constraints. He lamented that literacy efforts in Nigeria have been hampered by insufficient fund as government is unable to provide follow-up reading materials for new literate persons¹⁶³.

However, regardless of the setbacks, a scholar also affirms that the role of adult literacy in the development of rural communities in Nigeria was well documented¹⁶⁴. Such documentation helps the government and agencies concerned to improve on the programmes outlined for the achievement of set goals and objectives and to ensure its impact on the citizenry. Low level of information literacy is a barrier to the efficient utilization of ICT in developing countries. Lack

of information literacy skills among librarians is a bane to impacting information literacy to library users. A researcher opined that since librarians are good at instruction, and because of rapid changes in the way information is presented and used, they need to become more skilled at information-literacy instruction¹⁶⁵. Information literacy competencies among school librarians in Malaysia found out that the respondents were information literate, but needed further training and exposure to information literacy. Their finding further shows that school librarians are in dear need of information literacy training¹⁶⁶. Of the 120 respondents in their study, 81 (67.5%) school librarians had not attended any information literacy courses while 100 (83.3%) indicated they require some kind of information literacy training. Indeed, to achieve development through ICT is not just a matter of providing access to ICT tools, rather, efforts must be made to enhance information literacy, which provide the ability to manipulate and use information effectively¹⁶⁷. A report on the features wanted by academic library clients shows that majority of the students feel familiar with the OPAC but not with the powerful portal interface. The report highlights that 25% who used the OPAC were trained through usage¹⁶⁸.

The skills-based view holds that IL is a set of skills, abilities, or behaviours exhibited by individuals in their information seeking within digital environments¹⁶⁹. A characteristic of this approach is the view that information literacy is quantifiable and can be measured based on the individual's performance in relation to the experts, i.e., information professionals such as librarians. For much of ILI within U.S. higher education, the primary definition of information literacy has been the Standards, which describes the information literate individual as successfully performing a set of skills: Determine the extent of information needed; Access the needed information effectively and efficiently; Evaluate information and its sources critically; Incorporate selected information into one's knowledge base; Use information effectively to

accomplish a specific purpose; Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally¹⁷⁰. Given the background of the national discourse from which the Standards emerged, it is not surprising the Standards developed as a set of skills. As the dominant skills-based definition for U.S. higher education, the Standards shaped information literacy pedagogy in American undergraduate education since adoption in 2000. Although rescinded June 25, 2016, there are adherents who continue to base ILI on the competencies and outcomes provided within the Standards, as a readily available foundation for lesson content and assessment measures.

One of the greatest advantages of the skills-based view is its facility of assessment. This ease of assessment affords libraries and ILI librarians a straightforward means of communicating value to various shareholders. In addition, skills-based definitions offer a clearly identifiable set of outcomes for teaching. These strengths are also weaknesses to the skills-based conceptualization of information literacy. A common approach to the Standards' skills has been to divide them into lower- and higher-order thinking skills based on Bloom's Taxonomy. Determining the extent of information needed and searching and accessing that information ranked as lower-order cognitive skills, and positioning evaluation and incorporation of information as higher-order skills¹⁷¹. The view that searching is a lower-order skill has been challenged by those who maintain that "the act of 'searching' is not the subordinate, lower-order operation or activity it is often reduced to" but rather "is an integral, concurrent component of a situated whole"¹⁷². Significant drawbacks stem in part from the conceptualization of information literacy as a linear sequence of acts based on the ordering of the Standards, but may also have roots in development of instruction by librarians from bibliography instruction to ILI. Although it is beyond the scope of this review to discuss fully the implications of this shift from bibliography instruction to ILI

have had for conceptualizations of information literacy, one consequence may be the perception of research as a set of steps, or for others teaching information literacy skills, the linear approach to research often presented in ILI.

The sequential view of the process of research based on the ordering of the Standards has been challenged by those who see research and writing as an iterative process. The ordering of the first four Standards suggests a temporal sequence that is simpler than the reality of research-writing. If one imagines these intellectual operations unfolding in real time, it is easy to see how such delineations begin to fail. Determining “the extent of information needed,” accessing “the needed information,” evaluating “information and its sources critically,” and using “information effectively” are not discrete and sequential, but cyclical, often simultaneous, and mutually influencing¹⁷³. This view of research as a sequential and discrete set of steps results in several negative effects. When research is viewed as a series of sequential steps, those steps are often taught in order. However, librarians seldom have time to teach information literacy concepts beyond searching and accessing information; thus, skills such as evaluation of resources and the ethical use of information are infrequently taught by ILI librarians in one-shot sessions, the most common venue of instruction. The application of information skills, including incorporation of information into the individual's knowledge base, the effective use of information, and critical thinking skills are even more infrequently covered by ILI oneshot sessions¹⁷⁴.

Viewing research as a set of sequential information literacy skills leads to other issues. Several have observed that conceptualizing information literacy as a set of generic skills easily transferable to all other information-seeking contexts lacks solid basis. Information literacy as a set of generic skills is not fully supported by studies, and undermined by the creation of subject-specific disciplinary standards¹⁷⁵. While scholars note students' failure to transfer information

literacy skills may be due to ILI librarians trying to cover as much material as possible in one-shot sessions, others contend the lack of transferability results from teaching IL skills as generic, rather than contextual or disciplinary. Several scholars suggested that transfer is better supported by students' engagement in the research process. Others, seeing the lack of instruction on higher-order skills, have proposed alternatives such as teaching the use of discovery tools in order to allow librarian instructions to “move beyond simply teaching techniques for retrieving information to teaching critical thinking skills”¹⁷⁶.

Although many may agree with the importance of communicating to “students the authority of librarians with whom they may interact”, teaching information literacy as a set of skills “both reinforces the authority of librarians and also undermines it”¹⁷⁷. An objection to librarians' authority is a view instruction librarians' lack subject or disciplinary expertise, which many perceive as critical to conducting research in subject-specific knowledge domains. Wilder also observed along outsiders' views of librarians' authority, the fallacy of teaching information literacy skills apart from disciplinary research: information literacy would have librarians teach students to be more like them. The problem with that approach is that librarians are alone in harboring such aspirations for students. Any educational philosophy is doomed to failure if it views students as information seekers in need of information-seeking training. Information-seeking skills are undeniably necessary. However, librarians should view them in the same way that students and faculty members do: as an important, but ultimately mechanical, means to a much more compelling end. Information literacy instead segregates those skills from disciplinary knowledge by creating separate classes and curricula for them¹⁷⁸.

There is no better way to marginalize academic librarianship. In this view, students are mistakenly perceived as information seekers in the information literacy-as-skills approach when

the appropriate approach would be to see them as involved in subject-specific scholarly discourse; proponents of information literacy-as-a-way-of-thinking and information literacy-as-a-social-practice agree with this perspective. Another problem with the information literacy-as-skills approach is that the student is invariably seen as deficient in information literacy skills¹⁷⁹. Students unaware of the contextual, iterative nature of research may feel information illiterate when research is not accomplished easily on following the steps, and may have no idea how to remedy. This lack of awareness of the iterative nature of research may be one culprit contributing to the superficial research conducted by students, often lamented in the literature, as students may believe research is and should be completed upon one iteration of the steps. Addison and Meyers observed the perception of students as inherently deficient in information literacy skills arises from the view that information literacy is measurable, which in turn leads to a number of other problems. For example, when students are seen as deficient in information literacy skills, the natural progression is that the deficiency can only be remedied through instruction “from experts, namely librarians.

However, because these experts' skills are often based in bibliographic information systems, it is not surprising that the skills assessed and taught are most often limited to tests of Boolean logic, construction of search queries, and the like. Furthermore: skills instruction, particularly when it is rooted in specific behaviours rather than conceptual structures, may fail to account for the rapid changes in digital technologies. It may also lead to information literacy instruction as a series of platitudes in practice contexts, such as restrictions on the use of Wikipedia¹⁸⁰. There is also the tendency for adherents to skills-based definitions to conclude that students lack information literacy skills because “they lack the drive to attain them or, in some cases, they overestimate their abilities”¹⁸¹.

Information acquisition aims to satisfy the identified information needs. In previous literature, three key issues were highlighted during this step, i.e. where to collect, how to collect, and when to stop. 'Where to collect' concentrates on the source of the information. Information sources are divided into three categories: textual, online and human¹⁸². Information literate workers should realize that each kind of information source has its own advantages and disadvantages, and sources need to be matched with the information needs and strategic objectives as well as their 'accessibility' and 'reliability'¹⁸³. For example, textual sources are well suited to situations when the information is structured and formal, or when the transmission accuracy of information is highly demanding; online sources are especially useful when reasonably complete and up-to-date information needs to be gathered swiftly; human sources tend to be preferred when dealing with ambiguous, unstructured problem situations¹⁸⁴. 'How to collect' concerns the methods or techniques used for gathering information.

People could be routinely getting information through various media channels, like newspapers, market reports or television, or acquiring first-hand data through active research methodologies, for example questionnaires, interviews and participant observation or passively receiving information through subscribed alerting services provided by information vendors. With the number of methods and techniques available, people in charge of collection of environmental information should be able to select the most appropriate one, with consideration of the quality of information and the cost of collection. Moreover, possessing search skills and knowledge of search operators (e.g. Boolean operator, truncation, wildcard) is essential for formulating a proper search strategy to retrieve information from databases or through online search engines. Information literate workers would be able to formulate a suitable search strategy to find more

relevant and updated information. Last but not least, collectors should be aware that the methods and techniques hired should be based on legal collections of open source or public domain information, without involving immoral, unethical or illegal activities. 'When to stop' is about the judgment of 'enough' information, which could satisfy the identified information needs. Over-collection of information would result in information overload. Both qualitative and quantitative criteria are helpful for making rational choices to determine when the collected information is 'enough'¹⁸⁵. The personal judgment of experienced information workers would also help identify the quantity of collection.

Collected or created information should be organized and stored systematically in order to facilitate future information retrieval and sharing. Stored information reflects a significant and frequently consulted component of the organization's memory and its perception of the environment¹⁸⁶. In enterprises, information on paper could be stored in traditional filing systems, or digitized and archived on hard disks attached to file servers. No matter what format, the design and performance of the system, such as its creation of taxonomies, resource description and comprehensiveness, would greatly affect the accessibility and retrieval of stored information, especially when the majority of information is collected from electronic sources and the internet¹⁸⁷. On the organizational level, there is a need to have a clearly stated policy for information organization and storage. Individual employees should have the awareness and knowledge of proper organization and storage of information. Without employees possessing sufficient information literacy skills, organizations would not be able to categorize their knowledge base properly, which may result in various barriers for future retrieval and use.

The collected or generated information could be directly stored for future accessibility, or processed into information products or services through some sets of value added activities, such

as filtering, interpreting and repackaging. Analysing the collected information and extracting meaning from it is the most important part of environmental scanning and, moreover, today's complex and turbulent environment places a premium on the reliability and quality of information. The collected information should be analysed for issues and trends that may influence the organization, to assist users to acquire a better sense of situations and make better decisions, and hence facilitate the creation of a dynamic knowledge capability. The relevant information from each source should be extracted and information from multiple sources should be organized. The following questions need to be addressed during processing: which parts of the information collected would be used? What additional data are needed? How can information be best presented to enable situation understanding and problem solving? However, a 2005 study reports that knowledge workers are spending more time collecting information and less time analysing it¹⁸⁸. Inadequate filtering of information would result in information overload; with inadequate time for analysis, the collected information will provide either a recital of facts or a 'dump' of data with little advice or confirmation¹⁸⁹.

Without proper information processing skills, the gathered information would be underutilized as 'the organization does not know what it knows'¹⁹⁰. Moreover, there are more than 100 different analytical techniques which could be used to glean meaning from the collected data and information, such as blind spot analysis, competitor benchmarking and SWOT analysis and due to the rapid technological development, more advanced information systems equipped with enterprise decision support tools are available. However, these tools still rely heavily on human interpretation and cognition¹⁹¹. If students have insufficient knowledge of these techniques, and are without the ability to manage information flows for future utilizations and developments,

advances in information and communication technology may also impose immense challenges for people with handling the existing overly loaded information.

The processed environmental information, with potential effects on the organization, should be reported to the appropriate decision makers within the firm. Scholars suggest some points deserving special attention in information distribution. Firstly, to ensure that the correct information or intelligence makes its way to the correct destination, as the decision makers may be scattered throughout the organization; secondly, the information should be delivered through vehicles and in formats that mesh well with the user's information preferences and work habits; thirdly, the intelligence also must match the users' requirements of presentation, such as its orientation and content. Briefly, the real issue is getting the right information to the right person at the right time and in a usable form. The digital information era has brought incredible advances which have made the advent of new methods of communication, such as email, instant message tools and Web 2.0 tools, possible. To ensure those tools' effectiveness as information dissemination platforms, besides the essential operational knowledge, users should also be able to identify their respective strengths and weaknesses and make deliberate selections. The benefits of a wider distribution of information are also highlighted in earlier literature¹⁹².

From the perspective of decision-making theory, found that, when the same piece of information is distributed to many individuals, multiple interpretations could be resolved and a consensus would be reached. Multiple interpretations of the same information could improve the decisions by redefining the problem. A wider distribution of information may bring more broadly based and more frequent organizational learning, as retrieval efforts are more likely to succeed and individuals and units are more likely to be able to learn¹⁹³. However, in practice, it is found that organizations differ in the extent to which information is disseminated: some firms may allow a

wide distribution of all information; some may permit a sizeable amount of information to be accessible to all employees; there are also some firms which restrict the access to certain types of information due to its confidential nature¹⁹⁴. Although, as already suggested, key decision makers are not only at the top of the organization, in a highly centralized, while less information literate organization, information dissemination can be strictly limited to the top management only. Moreover, many employees narrow-mindedly focus only on what they or their divisions need, without considering the broader picture of sharing information with others.

On receiving the processed information, the end-users would evaluate and use it for assisting with decision making. In the current information intensive business environment, the utilization of information is indeed a critical factor in the achievement of organizational success¹⁹⁵. Information literate decision makers would be open-minded and objective, rely not merely on the guidance of instincts and their experiences, but use information from a variety of sources presenting different viewpoints. At this stage, various information literacy skills are required. For example, decision makers need information evaluation skills to make judgments about the quantity and quality of the received information in terms of reliability, accuracy, timeliness and so on. If they find the information insufficient or unqualified, they may initiate a new round of scanning; with sufficient and high-quality information, they may still need to process and synthesize it based on the real-time situation and different usage.

A review of studies measuring the information literacy, research, or library skills of graduate students revealed that few of the studies use standards as the basis for assessment and even fewer use the ACRL information literacy standards. Three notable exceptions are studies conducted at the University of Maryland, University of Kansas, and San Diego State University¹⁹⁶. While there is abundant literature on the information literacy skills of pre and in-service teachers, this

literature review focuses on skills of graduate education students rather than those of undergraduate education majors, in line with the aims of the study. A study that reported a positive relationship between graduate education students and information literacy was conducted¹⁹⁷. The research discussed incorporating information literacy into a doctoral program using the ACRL standards for information literacy, and evaluating the contents of existing courses to identify where the five standards were covered and to what degree of adequacy. Their findings showed that doctoral students in all courses engaged in activities corresponding to each standard. Similarly, a scholar discussed a librarian-created education doctoral level course that incorporates information literacy skills into its content. The course is constructed in such a way that students are expected to demonstrate that they are information literate through the searching, identifying, and evaluating of information collected for literature reviews. As students' progress in the program they build on those information literacy skills as they learn to use them in more specialized ways.

A research focused on an assessment tool design based on desired learning outcomes using the ACRL standards as a framework. When designing their assessment tool, they asked "Does the question asked provide a valid measure of what the instructor wants to know about the students' skills?"¹⁹⁸. The authors discerned that the strength of studies such as theirs lies in the formation of questions created to measure real problems that would be encountered in a graduate student's research. Thus questions used in their assessment tool, which was implemented during a one credit library instruction course for graduate students in Chemistry, used the ACRL standards to create activities or questions that would allow the student to demonstrate the desired learning outcome. Unfortunately, the authors did not enumerate their findings as they corresponded to the Standards. They generalized their findings by whether students passed or failed pre and post-tests.

A scholar surveyed graduate students' information literacy skills using a similar methodology to the study described below¹⁹⁹. The students first evaluated their own skills and then performed specific tasks in order to compare the two. It was revealed that 47% of the students accurately evaluated their skill level. More specifically, many students overestimated their internet searching skills. Based on students' performance they were provided with recommendations for further training to improve their skills; 64% of those students were advised to enroll in a bibliographic instruction course.

The information source preferences of education graduate students and concluded that graduate students prefer information that is easily accessible even if it may be unreliable; they prefer electronic access; and they are unaware of many library resources and services such as interlibrary loan²⁰⁰. These characteristics of student information seekers, whether graduate or undergraduate, are often shared throughout the disciplines. Unsurprisingly, doctoral students tended to be more diligent in their information seeking. It was reported that doctoral candidates stated that their faculty advisors expected them to possess advanced bibliographic skills that the advisors themselves did not have. An extension of the issue is illustrated where argument was made that because doctoral students in the field of education are accomplished professionals they may have difficulty admitting that they lack library search skills²⁰¹. Therefore, despite the acknowledged need by doctoral students of possessing advanced library research skills, it is up to the institution and its faculty to ensure that students get this training. Testing the library research skills of doctoral students of science education concluded that these students were not well equipped for doctoral-level research.

To improve Information Literacy (IL), it was stressed that the need to include online tutorials and advanced teaching methods with online learning objects is necessary. A study among the LIS

students of 15 universities in Nigeria using a self-assessed questionnaire and found that the students have a moderate level of information literacy skills was conducted. There is need for “Critical Information Literacy (CIL) in higher education.” Scholars observed that the difference between the highest and lowest citation and publication parameters among the students is more negligible in the group of not attending the information literacy class²⁰². A researcher conducted a study in the Open University of Hong Kong to evaluate the first-year undergraduate student’s information literacy skills and pointed out that information literacy should be included in their curriculum²⁰³.

Knowledge is power as the saying goes, this is very true because it is what we know that determines what we can do or cannot do. What we know determines whether we succeed or fail. The knowledge we possess can make or mar our destinies. This is why we make deliberate effort to learn and know whatever there is to know. We learn and become knowledgeable only if we possess the necessary information literacy skills that enable us acquire information when there is a need for it, search, locate and gather quality information. Information literacy skills are necessary for our daily living, a successful career life, as well as a successful educational pursuit. With information literacy skills, acquiring information on any issue of life become stress less. There is no subject under the sun that cannot be learnt once an individual possess these skills. Knowledge therefore becomes power when we are able to acquire information and effectively utilize it to meet our needs. Information literacy is no longer just a library issue. It is the critical campus wide issue for the twenty-first century²⁰⁴. It is of utmost importance to all stakeholders in the education sector, including administrators, faculty, librarians, media and information technologists, assessment coordinators, faculty development directors, service learning specialists, student affairs personnel, and career development professionals.

The knowledge of information literacy is even more critical in this age where knowledge is ever increasing. The advent of Information and Communication Technologies evolved an increasingly complex world of abundance of information sources e.g. print, electronic, image, spatial, sound, visual, and numeric. The issue is no longer one of not having enough information; it is just the opposite too much information, in various formats and not all of equal value²⁰⁵. The present information environment holds many pitfalls for college and university students that seem to multiply geometrically²⁰⁶. The challenge of educators is to help students make sense of a world described as information overload. Boyer commission on educating undergraduates in research noted that “undergraduate education should be designed as a continuum that prepares students’ for continued learning and professional work through development of their talents to formulate questions and seek answers”²⁰⁷. A sound foundation in information literacy knowledge helps students master the skill of searching, finding and effectively utilize information for purposes of school term papers, project and research articles.

2.2. Theoretical Review and Framework

2.2.1 Research Competency Theoretical Framework

Research is defined as the process of asking questions and answering them by survey or experiment in an organized way. Research is a process of scientific thinking that leads to the discovery or establishment of new knowledge or truth²⁰⁸. Research as a process involves problem identification, formulating research design, data collection, data analysis and interpretation and drawing of conclusions. In this study, research process includes conceptualization, operationalization, data collection, data processing and analysis, and research application. The study looked into the research competency of accountancy faculty in each of the five steps in the research process. Conceptualization of research is focused on identification of potential research

problem and identification of the research scope and boundaries. Operationalization involves choosing the appropriate unit of observation of the study, evaluating the advantages and disadvantages of the different methods of conducting research, constructing an operational framework based on related research components and proposing measurement methods for variables and their attributes. Data collection employs defining the population on which the research is to be conducted, calculating the sample size that is representative of the population, constructing an instrument for data gathering and employing a data gathering plan among others. Data processing and analysis includes demonstrating and understanding of several methods of data presentation, recognizing the different statistics that are appropriate for each kind of data, explaining the difference between data, facts and inferences, interpreting data gathered in relation to the research question, identifying relationships and differences in variables based on data gathered and composing research findings clearly and accurately. The quality of research output talks about the competencies of the researcher on the research process.

2.2.2 Big6 Model for Information Literacy

Michael Eisenberg and Bob Berkowitz introduced the Big6 approach in 1988²⁰⁹. It is an effective tool for helping students learn the research process which allows researchers to effectively find, use, apply, synthesize and evaluate information. It is an effective tool for helping students learn the research process as an inquiry process. Information overload can hinder timely and effective research, and the Big6 method teaches researchers to work smarter to improve research skills. The six stages of the Big6, Task Definition, Information Seeking Strategies, Location and Access, Use of Information, Synthesis, and Evaluation are designed to focus on process as well as content. The Big6 can be used by younger, novice researchers as well as seasoned researchers and can be applied to all subject areas while in as a researcher in university. Hence, the best way

for educators to teach the Big6 is to integrate it into the classroom curriculum by using Big6 terminology, by walking students through the process, and by focusing on specific Big6 actions to accomplish a given task²¹⁰. The Big6 is a six-stage model that develops students' literacy and information skills as they solve problems and make decisions using the resources that are available to them. In essence, the Big6 process can help students master the Common Core standards, because the process gives students a way to actually do each specified portion of the standards.

The Common Core Standards present a challenge for schools and educators to integrate the standards into existing curriculum and into classroom instruction to meet specific standards through information and technology literacy programs, and to raise the status and awareness of the information and technology literacy program. Big6 Process can also be attributed to Literary theory," sometimes designated "critical theory," or "theory," and now undergoing a transformation into "cultural theory" within the discipline of literary studies. Literary theory refers to any principles derived from internal analysis of literary texts or from knowledge external to the text that can be applied in multiple interpretive situations. All critical practice regarding literature depends on an underlying structure of ideas in at least two ways: theory provides a rationale for what constitutes the subject matter of criticism "the literary" and the specific aims of critical practice the act of interpretation itself. The first step in the information problem-solving of the Big6 is task definition where students classify the information needed such as e-conferencing, email, computer, brainstorming, and other online communication methods.

The first process which is task definition would be a motivating task to eager learners. Hence, students will classify the content objectives to be engaged by the students. For teachers to guide

their students using the Big6 Approach, the first task should be in accordance to the curriculum standards and should be cognitively appropriate in such that the questions must be in higher-order-thinking, then in small groups students discuss the nature of the specific task. Learning how to ask good question can help advance students' comprehension of the subject matter by means of focusing on the main ideas and making connections through asking questions. Asking good questions increases students' comprehension of the subject matter. Eisenberg described that information seeking strategies is a mind-expanding stage. This is the stage 2 in Big6 Approach. It motivates the students to think creatively and innovatively where students can do so much of brainstorming about all possible sources that may include generating all potential information sources, prints, electronic and human sources, technology sources such as database, news, and internet. Information seeking can be an internet search utilizing various search engine or mechanisms and determine which one is best. Stage 3 is location and access is about getting the needed sources in one's hand like getting sources from stacks of books, online databases, on the web or books, online databases, or from experts. What is important is knowing where to look and how to find the needed source using indexes, card catalogs, or checking out print sources in the library media center or digital sources. Location and access leads students go through the process needed to complete an assignment or task. A major shift in information problem solving process is the use of information. This is the 4th stage and heart of the process where critical thinking and extracting which, in an efficient way through some form of note taking, is undertaken. This is all about literacy. It talks about learning or utilizing skimming and scanning technique to help students gather effectively relevant information. Stage 5 or synthesis is the end result, the outcome, or the conclusion. However, this approach does not always involve a report, paper, or project. Synthesis varies depending on the original tasks in which the focus is to make choices or

decisions that make a difference. The product of the synthesis merely depends on the information problem solving situations like writing an essay, creating a poster, writing research paper or report, making a decision, communicating in person, telephone conversation, email, chat or video conferencing. Synthesis is certainly a big part of the society when people speak about information explosion. Evaluation is the final stage or the culmination of the Big6 information problem-solving process. Yet, this is not a linear, lockstep process. In this stage, deciding help is needed to organize and present the output. It's helpful for the students to know where they are in the process, how well they are doing, and what help they need in life. This self-awareness and understanding is all part of the evaluation stage.

When students engage in evaluation during their information problem-solving process, it's called formative evaluation and the end of an output, also called summative evaluation which is a type that is crucial to long-term student success. Moving on, there are four types of questions which can aid in increasing students' comprehension. The first is memory level question where answers are found in books, web sites, and other reference materials. This question provides background for the subject. The next level is convergent thinking question that are representing the analysis and integration of given or remembered information. These are answerable by explaining, stating relationship, and comparing and contrasting. 3rd level is divergent thinking questions that are representing intellectual operation to generate independently over ideas, or take new direction or perspective on a given topic as predicting, hypothesizing, inferring, or reconstructing. The last one is evaluative thinking questions which deal with matters of judgment, value and choice which are characterized by students' judgmental quality like valuing, defending, or justifying choices. One of the most useful things a student can learn in Big6 is the Information Seeking Strategies where brain storming is considered the most interesting part.

Cluster diagram is utilized also along with graphics organizer which is flexible and appealing to both visual and textual learners. In information seeking strategies, searching for information can be an involved process, with multiple searchers using multiple keywords, synonyms, and related words; hence students begin to understand that a subject specific encyclopedia can assist them to narrow a topic, identify important names, dates, keywords, or subjects, and then proceed to help with the entire research process. In the process, students can learn become more aware of resources for information, including the services where Big6 is a tool for development. Location and access is the most widely used approach to information problem-solving in the world²¹¹. This approach allows students go through the Big6 stages conscientiously or not when they seek or apply information to solve a problem or make a decision. Thus, Big6 can be viewed as a set of essential skills that can be applied across situations school, personal, and work settings. This is getting the needed source that involves online databases, on the web or from experts. In this stage students find sources they need, use indexes, table of contents, and locate and check needed print sources among others. This leads students through the process required to get the desired source needed to complete an assignment. In an effort to better understand the research process or the information problem-solving process, the thoughts, feelings, and actions associated with various activities within the process was examined. The search process details the changes that occur for searchers while progressing from seeking relevant to pertinent information. This shift describes feelings that ebb and flow between more negative emotions such as uncertainty, confusion, frustration, and doubt, to more positive emotions such as optimism, clarity, confidence and relief. Searchers was examined as information is sought in a variety of situations, other authors focused on research paper writing in order to better understand the information search process. For example, the model was described as a thinking frame for research. This ten-

step process emphasizes a thinking framework that can be adapted for any age level and any curricular subject. The authors maintain that, most students do not automatically think about research in an explicit manner.

Therefore, by prescribing the method in which to write research papers, the authors hope to improve student thought about the research process. The ten steps of the search process model are organized around the major activities performed in writing a coherent research paper: topic selection, planning the information search, locating and accessing materials, and creating a final product. Throughout the model, students have several reflection points that allow them to make judgments about their progress. Similarly, this study applied Big6 in searching information to come up with good quality essays with science themes. Two groups were formed, the controlled and the experimental group and yielded a significant result. Researchers examined the search process from the point of view of the searchers. By formulating a model that can be used by students to guide their thinking and research activities and by teachers to guide their planning and implementation of classroom instructional activities, a scholar provided school library media specialists, students, and classroom teachers with a model that could be used in a variety of settings for a variety of activities. Big6 provides support in the activities required to solve information-based problems: task definition, information seeking strategies, location and access, use of information, synthesis, and evaluation.

A researcher conducted a research to determine how information synthesis skills can be taught effectively, and to discover how the level of synthesis in student writing can be effectively measured. The intervention utilized was an information synthesis lesson that broke down the synthesis process into sequenced tasks. A rubric was created and used to assess students' levels of information synthesis demonstrated in their final research essays. A form of counting analysis

was also created to see if other methods could help in measuring synthesis. Findings from the rubric analysis revealed that students appear to benefit from the synthesis lesson. The level of synthesis, however, remains low overall. In addition, the study showed that the different measures of synthesis established were able to identify different levels of information integration. Discovering effective ways to measure and teach synthesis continues to be essential in helping students become information literate. Several researchers have examined behaviors & skills associated with information use. From the rich and empirical and rational empirical body of knowledge, three prominent models of the research process have been developed such as process model, the research process model.

A case study conducted on the Big Six Information Skills as a Metacognitive Scaffold examined the effect of Big6 on grade 8 students who were asked to write about the events surrounding the African American Civil Right Movement. Results showed that Big6 act as a metacognitive scaffold during the problem-solving process. Likewise, it was found out that Big6 may provide an overarching process that students can employ in a variety of learning situations. On another study conducted, it was noted that one of the essential skills that students must possess to become successful in problem based learning activities is metacognition.

2.2.3 Theoretical Framework on Information Literacy

Several frameworks and models have since been developed on information literacy in different countries. Some of them are: the Standing Conference of National and University Libraries (SCONUL) (1999) in the UK, the Association of College and Research Libraries in the USA, the Council of Australian University Librarians (CAUL) (2001), the Library and Information Association of New Zealand Aotearoa (LIANZA), and the National Institute of Library and Information Science (NILIS) in Sri Lanka²¹². This study focuses on the five information literacy

standards reviewed by the Association of College and Research Libraries (ACRL) and approved by the Board of Directors of the ACRL. They are: Standard One: The information literate student determines the nature and extent of the information needed. Standard Two: The information literate student accesses needed information effectively and efficiently. Standard Three: The information literate student accesses needed information and its sources critically and incorporates selected information into his or her knowledge base and value system. Standard Four: The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose. Standard Five: The information literate student understands many of the economic, legal, and social issues surrounding the use of information and uses information ethically and legally.

2.3 Review of Empirical Studies

2.3.1 Information Literacy Skills and Research Competency

A recent study found out that 96% of the respondents agreed that user education class helped them to increase their searching skills while 100% of the respondents agreed that user education program helped them to better use the Library Online Public Access Catalog (OPAC)²¹³. The study further reveal that 55% of the respondents agreed that to obtain strong skills libraries should provide many classes of user education. A research on the role of academic libraries in the enhancement of information literacy: a study of Fort Hare Library found out that majority of the respondents (53%) has not attended library orientation, which was compulsory²¹⁴. However, a study shows that most of the respondents (53.3%) indicated that they learnt about electronic resources through workshops and seminars²¹⁵. Another research indicates that all the respondents were involved in the training programme on information literacy²¹⁶. The result also shows that 52% of the respondents suggested that the campus library should provide practical training on

searches in the library, while 20% indicated that the library should develop an information literacy program in the University. It can be deduced here that information literacy skill training in all library across the world is at different stage. While some libraries have made significant effort, others are tackling issues of users' ability to identify, access, retrieve information and to use ICT tools in the library. Again, a process that may be effective in one library may be difficult to apply in another. This kind of situation may hamper desired objectives. In such complex situation, survey could be carried out to identify the best suitable method in order to ensure successful literacy skill.

A comparatively larger number of studies conducted self-perception-based surveys of students. A scholar used a 10-item self-perception information competency scale (based on the ACRL standards) at a large public university in the southwestern United States²¹⁷. Another researcher used an online questionnaire through Survey Monkey to assess perceived confidence in online searching of graduate students of at the University of Florida²¹⁸. Several used a self-assessing questionnaire to find out information literacy skills (mapped to the ALA standards) of undergraduate students of a college of agriculture in India²¹⁹. Although the surveys of perceptions have been most popular many authors have mentioned limitations of this assessment technique. The researchers, who used other techniques in addition to perception surveys to the same groups of students, claimed that students had over-estimated their self-assessed information abilities than their actual level of skills. Only a few studies proved a significant correlation between students' perceived information literacy skills and their actual score on an achievement test. Many authors have explored the relationship between information literacy skills and various personal and academic variables of students. In a study at Kuwait University, a scholar compared library skills with students' age, gender, type of high school the students had attended, class level,

student GPA, and level of English proficiency²²⁰. Several researchers found differences in information literacy skills based on students' gender.

A scholar explored relationship of the internet facility at home with the students' information literacy skills²²¹. Pakistani literature of the LIS field failed to report any diagnostic surveys to determine information literacy skills of students. In a survey of the university libraries in a scholar found that most of them offered ill-planned and informal user education programs without a survey of user needs²²². Based on some studies conducted at the University of the Punjab on the use of online databases and digital libraries a scholar inferred that the use of these resources was low for a variety of reasons. They claimed that the community was "unable to use and/or unaware of the databases and digital services available through the HEC, and this state of information and digital illiteracy (IDI) is responsible for a significant loss of resources"²²³. Inadequate assessment of library users' needs and information seeking behaviour was among the inhibiting factors for successful implementation of information literacy instruction programs in Pakistani universities²²⁴.

In a study conducted by the Educause Center for Analysis and Research (ECAR), 80.7% of students rated themselves as expert or very skilled in searching the internet effectively and efficiently, although students rated themselves slightly lower in their ability to evaluate the credibility of online information and their understanding of related ethical and legal issues²²⁵. A 2011 ECAR study found that while 88% of students use their institution's library website, only 27% do not believe their skills meet their needs for searching the library site effectively. A Credo Student survey also revealed that 'students feel reasonably capable of doing the research necessary for assignments'²²⁶. These studies indicate that students seem confident in their research skills, but does faculty concur with students' assessment of their skills? Are students

developing information literacy skills that enable them to complete research assignments effectively and efficiently? The majority of the library literature assessing college students' information literacy skills is on pre- and/or postlibrary instructional session assessment. But assessment of instruction does not typically measure competency levels of all five Association of College and Research Libraries (ACRL) information literacy skills²²⁷. As the evaluators of student research assignments, faculty should have a more comprehensive picture of information literacy skills, as compared to instructional session assessment.

However, fewer studies have been conducted on faculty assessments of students' IL competencies. A review of the literature on faculty views of information literacy reveals inconsistencies among faculty regarding how and by whom information literacy should be addressed, but also shows that academic faculty overwhelmingly believe that IL is important for their students²²⁸. 'It appears that the goals of the IL professional and the subject faculty member are at least somewhat in sync' regarding the need to improve students' skills²²⁹. However, the focus of faculty is primarily on the subject matter, while librarians' expertise lies in the process of conducting research²³⁰. A scholar suggests that faculty culture places more of an emphasis on research and content and less on teaching and process, which can hinder collaboration with librarians regarding information literacy education²³¹. Several scholars found that science and engineering faculty 'perceive that more self-directed learning is useful, for both themselves and their students, suggesting that more how-to guides, electronic help screens for various resources, and print and online pathfinders are desirable'²³². In her study of sociology and civil engineering faculty, a scholar exposed faculty members' belief that information literacy is dependent on personal interest and individual motivation, and improves according to the 'law of exposure' as students repeatedly encounter situations requiring their information literacy skills²³³.

A scholar suggests that there can be an ad-hoc approach to information literacy by faculty, depending on whether a course requires a research paper. Although faculty believe that IL skills are very important, many do not utilise library instruction sessions to improve those skills²³⁴. A researcher found that journalism and mass communication faculty require students to conduct research for their courses, are aware that their students are not as information literate as they could be and understand that library instruction improves research skills, and yet faculty do not consistently integrate instruction into their courses²³⁶. Research conducted in the UK revealed that there was a high level of enthusiasm amongst faculty for IL, but that few academic staff teach or assess information skills or even develop them through student-centered learning. In a subsequent study she confirmed these findings with supportive data from United States (US) faculty that ‘there is an apparent gap between the IL skills that faculty want their students to have and those that they actively support and develop’²³⁷. A scholar found ‘that the large majority of faculty believes that information literacy education should be undertaken collaboratively by faculty and librarians’²³⁸.

While information literacy skills were considered important, a scholar discovered that ‘there was not a lot of agreement on the academic level at which information literacy outcomes are expected by faculty’²³⁹. In order to remedy these inconsistencies in delivering information literacy instruction to students, librarians need to take a proactive approach in meeting with faculty and managers to determine collectively how to successfully infuse information literacy into the curriculum. All US two-year and four-year institutions of higher education undergo a process of accreditation using a set of standards developed by peers to assure and improve the quality of education. Reviews of regional accreditation standards and programmatic accreditation processes suggest that alignment of information literacy instruction programmes to student learning

outcomes required by accreditation organisations can be drivers for institutional focus on information literacy. The primary goal is for librarians to work in concert with faculty in order to graduate information literate students who can effectively utilise information literacy skills in the workplace, as well as to make informed decisions in their personal lives.

Osmosis does not work for the development of information literacy, but neither does it work for effective collaboration between librarians and faculty²⁴⁰. The ERIAL (Ethnographic Research in Illinois Academic Libraries) Project offers unique perspectives from faculty interviewed during the two-year study of the student research process, on how research skills can be taught and supported by librarians. The interviews revealed that some faculty view teaching as within their domain and seek assistance from librarians to augment their own research instruction, others schedule one-shot instructional sessions and still another segment embed librarians into their courses with multiple visits to the class to establish a better rapport²⁴¹. A number of learning theories have been utilised by librarians delivering information literacy instruction, including: behaviourism, cognitivism and constructivism. In a behavioural approach, instruction is teachercentered information is presented by the instructor and students acquire skills through drills and practice and then demonstrate their understanding of the material through assessment²⁴².

By comparison, cognitive learning is a process of relating new information to previous knowledge the individual has collected. A scholar builds on this theory by advancing social constructivism, a student-centered approach where environment comes into play and individuals learn not only from their own experiences, but also learn from the experiences of others. Technology has also had a significant impact on information literacy education, with Web 2.0 tools (e.g. wikis, blogs, podcasts, RSS, Twitter, Facebook, YouTube, Flickr and social

bookmarking) being used to retrieve and produce information. ‘Given that Web 2.0 tools support the constructivist ideas upon which the ACRL standards are at least partially based, it should be possible to find ways that the tools can be used to promote the various outcomes’²⁴³. Several scholars discuss new applications of technology that can help students navigate the ever-changing information environment²⁴⁴. However, some caution needs to be taken when introducing Web 2.0 tools since not all students possess the necessary skills to use them. In addition, a recent ECAR study found that although students agree that technology can help them achieve academic outcomes, they are sensitive to the boundaries that technology plays in their personal and academic lives²⁴⁵.

2.4 Conceptual Framework

Independent Variable

Dependent Variable

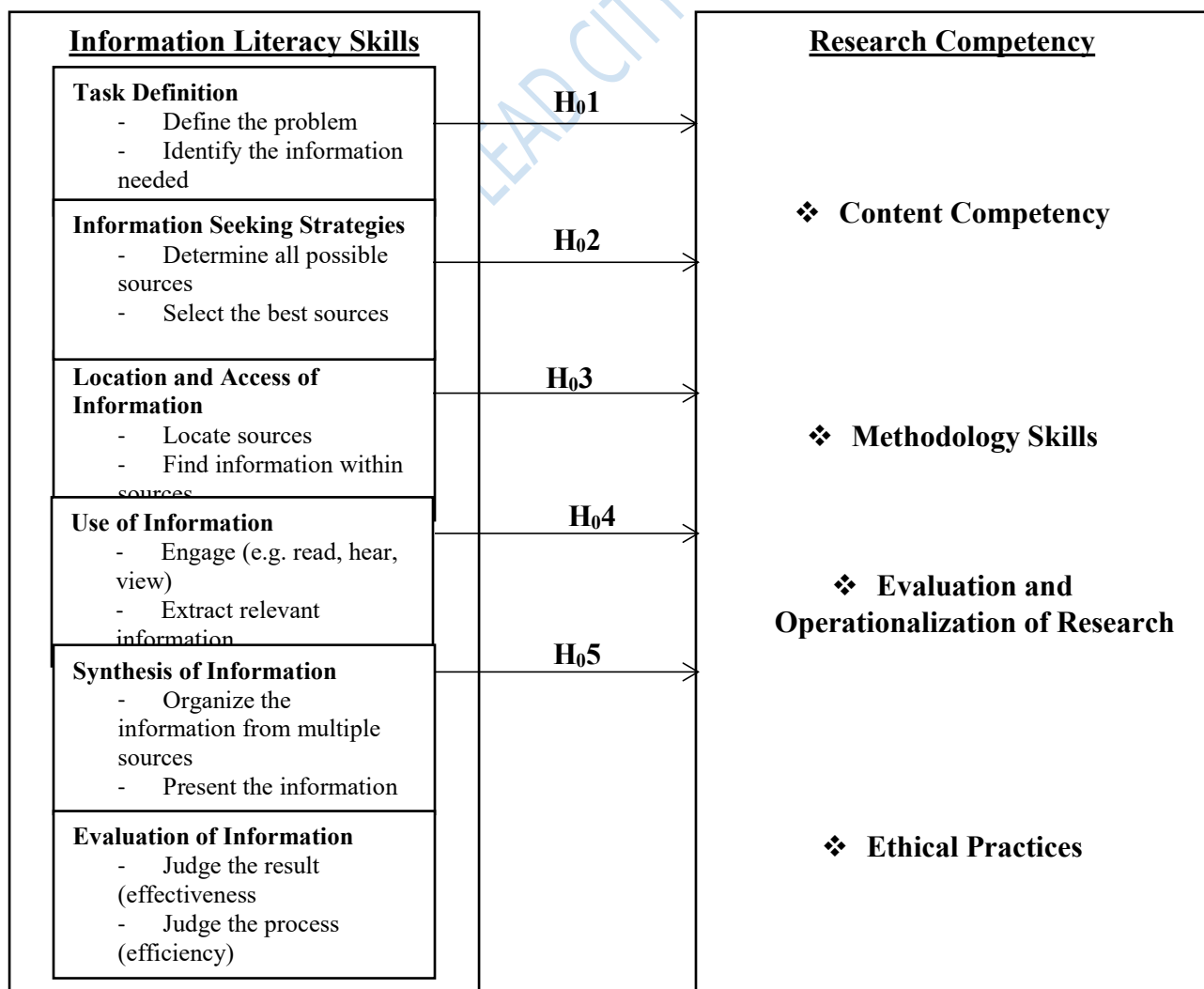


Figure 2.1: Conceptual Framework Showing Information Literacy Skills and Research Competence

Source: Researcher's Conceptual Framework, (2022)

The dependent variable is research competency, as depicted in the diagram above, and four measures were used to assess it: content competency, methodology skills, evaluation and operationalization of research and ethical practices as adapted from literature²⁰⁸. Information Literacy Skills is the independent variable. Task definition, information seeking strategies, location and access to information, use of information, synthesis of information and evaluation of information were used to measure information literacy skills as adopted from literature²⁰⁹. As shown in the diagram above, each of the measures of information literacy skills will be used to test research competency of postgraduate students of universities in Lagos State.

2.5 Summary of Literature Reviewed

The impact of information literacy skills on research competency of postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria is the subject of this chapter, which presents scholars' perspectives on the topic of this research. The study demonstrates the value of information literacy skills on research competency, particularly among doctoral and masters students. The concepts have been clarified due to the assessment of the conceptual framework (information literacy skills on research competency). It depicts the link between the independent variable and dependent variable.

This section highlight the gaps found in the literature reviewed in their 2017 study on research competency of students, Moltick J. and Hauser F. elucidated certain determinant they modified

in the course of their study which included content competency, methodology skills, evaluation and operationalization of research and ethical research, among others whereas the finding of the study reinforces the basic component of research competency and gave an understanding of the reasons for going through information literacy. The research was unable to indicate the essence of information literacy in research writing and evaluation.

Pete J. O. Conner, Andrew Hill, Mana Kaya, and Bret Martin, in 2019, wrote on “The measurement of Information Literacy: A Critical Review of the Literature and Recommendation for Researchers and Practitioners. The authors distilled the six widely used measures of information literacy and clarified the importance of information literacy programmes.

Apparently, the authors only reviewed available ‘Literature but were unable to give an in-depth understanding of the key studies underlying the various measures they presented.

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Chapter Three

Methodology

The method employed in this investigation is presented in this chapter. It covers the research design, population, sample and sampling technique, research instrument, validity, reliability and method of data collection.

3.1 Research Design

This study used descriptive and cross-sectional survey research to examine a subset of the population at a specific point in time and analyze the influence of information literacy skills on the research competency of postgraduate students in selected tertiary institution in Lagos State.

The design's benefit:

- i) Its resilience in terms of data distribution.
- ii) Simple to compute the detailed information gathered from the test;
- iii) Utilized in studies where parametric assumptions can't be met,
- iv) Flexibility in the data processing.

3.2 Population of the Study

The population of this study is made up of 10,000 postgraduate students of Universities in Government-Owned Universities in Lagos State, Nigeria, which are Lagos State University and University of Lagos.

Table 3.1 Population of Postgraduates Students in the Two Universities

S/N	Name of Institution	Number in each Institution
1.	Lagos State University	5000
2.	University of Lagos	5000
Total		10,000

3.3 Sample and Sampling Technique

The sample size for this study comprise three hundred and seventy (370) students, all of whom are postgraduate students of the two public universities Lagos State. Krejcie and Morgan provided the used to arrive at the sample size (1970)¹ table of sample sizes (as indicated below);

Table 3.2: Table for determining sample size of a known population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357

40	36	160	113	380	191	1200	291	6000	302
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	100000	384

Source: Krejcie and Morgan (1970) Sample Size Determinant

From the above table, the researcher collected demographic information from the respondents and it contain the population of study.

Table 3.3 Stratified Sampling Calculation for the study³

S/N	Name of Ministry	% of total population	Calculated no for each sample
1.	Lagos State University	$\frac{305}{737} \times 100 = 41\%$	$\frac{41 \times 254}{100} = 185$
2.	University of Lagos	$\frac{432}{737} \times 100 = 59\%$	$\frac{59 \times 254}{100} = 185$

3.4 Description of Research Instrument (s)

The instrument used is a structured questionnaire, which makes collected data easier from respondents because it allowed researcher to assess the structured questions to meet the required goal. The Likert Type scale design was used in this study, which allowed the researcher to give options for respondents to choose from. This study's instrument is divided into four sections.

Section A: The researcher created this section to collect demographic information from respondents, and it contains biographical information about them based on five factors: gender, age, educational qualifications, and year of experience.

Section B: Research Competency scale (of four points) that indicates the level of research competency: Very high = 4, High = 3, Low = 2, Very low = 1 with 20 items. The study instrument will be broken into several components, each of which will be designed to elicit responses on the subject at hand, example of question is: Ability to formulate and justify morally acceptable solutions².

Section C: Information Literacy Skills scale showed how efficient and effective the students are in information evaluation and operationalization with 16 items. The scale consists of the followings: Strongly Agree = 4, Agree = 3, Disagree = 2, and Strongly Disagree = 1 are the four points on the scale.

3.5 Validity of Research Instrument

The instrument's items were acquired through a survey of related literature and adaptations of questionnaires used by other researchers. The supervisor and other specialists in information management provided input on both the face and content product validity. Corrections were integrated into the final questionnaire, which was distributed to the study participants.

3.6 Reliability of the Instrument

The researcher samples the questionnaire through a reliability test to ensure that all items assessing each variable in the study are consistent. The instrument's reliability was tested in a

pilot study with roughly 30 copies of the questionnaire given to postgraduate students of Augustine University, which is not part of the study.

3.7 Distribution of Research Instrument

Primary data were collected through a structured questionnaire following existing research to address the study's objectives. This instrument works well with descriptive survey research because it allows for collecting data on respondents' opinions and perceptions on current events at a specific point in time. The Department of Information Administration, Lead City University, provided a letter of introduction and a project attestation form, which were utilized to get authorization to survey the postgraduate students of the two public universities in Lagos State. A two-day training session were held for five (5) research assistants to help with questionnaire administration, retrieval, and initial sorting. The researcher and research assistants worked with management help to ensure the anonymity of their responses while also advising them on the importance of adequate responses and the benefits embedded in the study's findings. The surveys were distributed to postgraduate students in total.

3.8 Methods of Data Analysis

The data will be analyzed using descriptive and inferential statistics by the researcher. For study questions, one through three, descriptive statistics (mean, frequency distribution, standard deviation, and percentage) was used. The first two null hypotheses were investigated using inferential analysis, while the third was analyzed using multiple regression analysis. All hypotheses in the study were assessed at a significance level of 0.05. Statistical Product and Service Solution (SPSS) Version 24 were used to analyze the data collected for the project.

3.8 Ethical Consideration

Ethical considerations were taken into account to ensure that the study was conducted in proper way. To comply with ethical considerations in conducting research all respondents provided with questionnaire to participate in the research. The respondents willingly participated in the study after they were approached and the research purpose and process were explained to them. The respondents were later assured that the information provided would remain confidential.

Endnotes

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Chapter Four

Results and Discussion of Findings

This chapter presents the results of the analysis of data collected from the respondents in the study area and discussions of findings arising from the study. The chapter consists of data presentation, analysis of research questions, test of hypotheses, and discussion of findings. Table 4.1 shows the response rate of the study.

Table 4.1: Response Rate

Response	Frequency	Percent
Returned and used	347	93.8
Not returned	15	4.1
Returned but not used	8	2.2
Distributed Questionnaires	370	100.0

Source: Field Survey, 2022

4.1 Demographic Data of Respondents

This section presents the results of demographic characteristics of respondents using frequency distribution tables. For gender profile, Table 4.2 shows that there are 199 males who accounted for 60% of the respondents and 144 females who accounted for 40% of the respondents. The table also shows 4 respondents (1.2%) who did not disclose their gender. The result shows that more males participated in this study.

Also, for age profile, Table 4.2 shows that there are 43 respondents between the age of 20 and 25, which accounted for 12.4%; 102 respondents between the age of 26 and 30, which accounted for 29.4%; 133 respondents between the age of 31 and 35, which accounted for 38.3%; 61 respondents between the age of 36 and 40, which accounted for 17.6%; 4 respondents between the age of 41 and 45, which accounted for 1.2%; and 2 respondents who were 46 and above years

old, which accounted for 0.6%. The table also shows 2 respondents (0.6%) who did not disclose their age. The result shows that majority of the respondents are between the age of 26 and 35 years.

Table 4.2 Demographic Characteristics of Respondents

Variables	Category	Frequency	Percent
Gender	No response	4	1.2
	Male	199	57.3
	Female	144	41.5
	Total	347	100.0
Age	No response	2	0.6
	20 – 25	43	12.4
	26 – 30	102	29.4
	31 – 35	133	38.3
	36 – 40	61	17.6
	41 – 45	4	1.2
	46 and above	2	0.6
	Total	347	100.0
Educational level	No response	5	1.4
	PGD degree	163	47.0
	Master's degree	123	35.4
	PhD	56	16.1
	Total	347	100.0
Years of experience	No response	5	1.4
	5 – 10	109	31.4
	11- 15	212	61.1
	16 – 20	10	2.9
	21 – 25	10	2.9
	26 – 30	1	0.3
	Total	347	100.0

Source: Field Survey, 2022

According to Table 4.2, for educational level, there are 163 respondents who had PGD degree, which accounted for 47.0%; 123 respondents who had Master's degree, which accounted for 35.4%; and 56 respondents who had PhD degree, which accounted for 16.1%. There were also 5

respondents (1.4%) who did not disclose their educational level. This result suggests that most of the participants of this study held PGD and Master's degree.

For years of experience, Table 4.2 shows that there are 109 respondents who had between 5 and 10 years of experience, which accounted for 31.4%; 212 respondents who had between 11 and 15 years of experience, which accounted for 61.1%; 10 respondents who had between 16 and 20 years of experience, which accounted for 2.9%; another 10 respondents who had between 21 and 25 years of experience, which accounted for 2.9%; and a respondent who had between 26 and 30 years of experience, which accounted for 0.3%. Also, there were 5 respondents (1.4%) who did not disclose their years of experience. This result shows that majority of the participants of this study have had between 5 and 15 years of work experience. This also implies that very few of the respondents had between 16 and 30 years of experience.

4.2 Analysis of Research Questions

Research Question One: What is the level of research competency among postgraduate students of universities in Lagos State, Nigeria?

Table 4.3: Responses on Level of Research Competency among Postgraduate Students of Universities in selected tertiary institutions in Lagos State, Nigeria

Content Competency	VH	H	L	VL	Mean
Ability to use open digital scientific and educational systems to search and store information	31 (8.9%)	264 (76.1%)	49 (14.1%)	3 (0.9%)	2.93
Ability to select optimal digital technologies at each stage of scientific research	169 (48.7%)	125 (36.0%)	50 (14.4%)	3 (0.9%)	3.33
Ability to search for like-minded people on scientific ideas	203 (58.5%)	104 (30.0%)	40 (11.5%)	0 (0.0%)	3.47
Skills to carry out scientific communication with the use of digital technologies	136 (39.2%)	163 (47.0%)	48 (13.8%)	0 (0.0%)	3.25
Ability to understand how to add to a scholarly or professional conversation through research and writing	134 (38.6%)	164 (47.3%)	48 (13.8%)	1 (0.3%)	3.24
Weighted Mean					3.24

Methodology Skills	VH	H	L	VL	Mean
Self-assessment of own research activity and received scientific results	165 (47.6%)	125 (36.0%)	56 (16.1%)	1 (0.3%)	3.31
Ability to match a scholarly question to the appropriate theories and methods	157 (45.2%)	133 (38.3%)	56 (16.1%)	1 (0.3%)	3.29
Ability to analyze data or information relevant to the project	218 (62.8%)	117 (33.7%)	10 (2.9%)	2 (0.6%)	3.59
Ability to organize and synthesis information in the required format from multiple sources	105 (30.3%)	188 (54.2%)	52 (15.0%)	2 (0.6%)	3.14
Ability to develop cognitive and creative abilities of the individual	152 (43.8%)	140 (40.3%)	54 (15.6%)	1 (0.3%)	3.28
Weighted Mean					3.32
Evaluation and Operationalization of Research	VH	H	L	VL	Mean
Ability to analyse current research	217 (62.5%)	70 (20.2%)	11 (3.2%)	49 (14.1%)	3.31
Ability to use digital technologies for research planning	218 (62.8%)	71 (20.5%)	53 (15.3%)	5 (1.4%)	3.45
Skills mastery in working with scientific literature and ability to compile bibliographic lists	171 (49.3%)	119 (34.3%)	57 (16.4%)	0 (0.0%)	3.33
Skills to apply digital technologies to solve a specific research problem	219 (63.1%)	69 (19.9%)	10 (2.9%)	49 (14.1%)	3.32
Choice of actual directions of further scientific researches	22 (6.3%)	311 (89.6%)	10 (2.9%)	4 (1.2%)	3.01
Weighted Mean					3.28
Ethical Practices	VH	H	L	VL	Mean
Knowledge of ethical use of information	221 (63.7%)	71 (20.5%)	55 (15.9%)	0 (0.0%)	3.48
Knowledge about plagiarism	41 (11.8%)	245 (70.6%)	56 (16.1%)	5 (1.4%)	2.93
Ability to apply information ethics by citing sources appropriately and observing copyright	168 (48.4%)	168 (48.4%)	8 (2.3%)	3 (0.9%)	3.44
Ability to explain the ethical dimension of a case to those involved and to others	268 (77.2%)	67 (19.3%)	12 (3.5%)	0 (0.0%)	3.74
Ability to formulate and justify morally acceptable solutions	244 (70.3%)	95 (27.4%)	6 (1.7%)	2 (0.6%)	3.67
Weighted Mean					3.45
Grand Mean					3.32

Decision rule: 1.00 – 1.49= very low, 1.50 – 2.49= low, 2.50 – 3.49 = high, 3.50-4.00= very high

Note: VH - Very High (4), H - High (3), L - Low (2), VL – Very Low (1)

Source: Field Survey Results, 2022

According to the result on content competency in Table 4.3, 31 respondents (8.9%) had ability to use open digital scientific and educational systems to search and store information to a very high extent; 264 respondents (76.1%) to a high extent; 49 respondents (14.1%) to a low extent; and 3 respondents (0.9%) to a very low extent. On average, the respondents reported ability to use open digital scientific and educational systems to search and store information with a mean of 2.93. Also, 169 respondents (48.7%) had ability to select optimal digital technologies at each stage of scientific research to a very high extent; 125 respondents (36.0%) to a high extent; 50 respondents (14.4%) to a low extent; and 3 respondents (0.9%) to very low extent. On average, the respondents reported ability to select optimal digital technologies at each stage of scientific research with a mean of 3.33.

In addition, 203 respondents (58.5%) had ability to search for like-minded people on scientific ideas to a very high extent; 104 respondents (30.0%) to a high extent; 40 respondents (11.5%) to a low extent; and none to very low extent. On average, the respondents reported ability to search for like-minded people on scientific ideas with a mean of 3.47. Also, 136 respondents (39.2%) had skills to carry out scientific communication with the use of digital technologies to a very high extent; 163 respondents (47.0%) to a high extent; 48 respondents (13.8%) to a low extent; and none to very low extent. On average, the respondents had skills to carry out scientific communication with the use of digital technologies with a mean of 3.25.

Table 4.3 also shows that 134 respondents (38.6%) had ability to understand how to add to a scholarly or professional conversation through research and writing to a very high extent; 164 respondents (47.3%) to a high extent; 48 respondents (13.8%) to a low extent; and a respondent (0.3%) had the ability to very low extent. On average, the respondents had ability to understand how to add to a scholarly or professional conversation through research and writing with a mean

of 3.24. The weighted mean for content competency is 3.24 which indicates that content competency among postgraduate students of universities in Lagos State is high.

For methodological skills, 165 respondents (47.6%) accepted self-assessment of own research activity and received scientific results to a very high extent; 125 respondents (36.0%) to a high extent; 56 respondents (16.1%) to a low extent; and a respondent (0.3%) very low extent. On average, the respondents accepted self-assessment of own research activity and received scientific results with a mean of 3.31. Also, 157 respondents (45.2%) accepted ability to match a scholarly question to the appropriate theories and methods to a very high extent; 133 respondents (38.3%) to a high extent; 56 respondents (16.1%) to a low extent; and a respondent (0.3%) very low extent. On average, the respondents accepted ability to match a scholarly question to the appropriate theories and methods with a mean of 3.29.

Table 4.3 also shows that 218 respondents (62.8%) accepted ability to analyze data or information relevant to the project to a very high extent; 117 respondents (33.7%) to a high extent; 10 respondents (2.9%) to a low extent; and 2 respondents (0.6%) very low extent. On average, the respondents accepted ability to analyze data or information relevant to the project with a mean of 3.59. In addition, 105 respondents (30.3%) accepted ability to organize and synthesis information in the required format from multiple sources to a very high extent; 188 respondents (54.2%) to a high extent; 52 respondents (15.0%) to a low extent; and 2 respondents (0.6%) very low extent. On average, the respondents accepted ability to organize and synthesis information in the required format from multiple sources with a mean of 3.14.

Also, 152 respondents (43.8%) accepted ability to develop cognitive and creative abilities of the individual to a very high extent; 140 respondents (40.3%) to a high extent; 54 respondents (15.6%) to a low extent; and a respondent (0.3%) very low extent. On average, the respondents

accepted ability to develop cognitive and creative abilities of the individual with a mean of 3.28. Likewise, the weighted mean for methodological skills is 3.32 which reveals that methodological skills among postgraduate students of universities in Lagos State is high.

For evaluation and operationalization of research, 217 respondents (62.5%) had ability to analyse current research to a very high extent; 70 respondents (20.2%) to a high extent; 11 respondents (3.2%) to a low extent; and 49 respondents (14.1%) to very low extent. On average, the respondents accepted ability to analyse current research with a mean of 3.31. Also, 218 respondents (62.8%) had ability to use digital technologies for research planning to a very high extent; 71 respondents (20.5%) to a high extent; 53 respondents (15.3%) to a low extent; and 5 respondents (1.4%) to a very low extent. On average, the respondents accepted ability to use digital technologies for research planning with a mean of 3.45.

In addition, 171 respondents (49.3%) accepted skills mastery in working with scientific literature and ability to compile bibliographic lists to a very high extent; 119 respondents (34.3%) to a high extent; 57 respondents (16.4%) to a low extent; and none to a very low extent. On average, the respondents accepted skills mastery in working with scientific literature and ability to compile bibliographic lists with a mean of 3.33. More so, 219 respondents (63.1%) accepted skills to apply digital technologies to solve a specific research problem to a very high extent; 69 respondents (19.9%) to a high extent; 10 respondents (2.9%) to a low extent; and 49 respondents (14.1%) to a very low extent. On average, the respondents accepted skills to apply digital technologies to solve a specific research problem with a mean of 3.32.

Also, 22 respondents (6.3%) accepted choice of actual directions of further scientific researches to a very high extent; 311 respondents (89.6%) to a high extent; 10 respondents (2.9%) to a low extent; and 4 respondents (1.2%) to a very low extent. On average, the respondents accepted

choice of actual directions of further scientific researches with a mean of 3.01. The weighted mean for evaluation and operationalization of research is 3.28 showing evaluation and operationalization of research among postgraduate students of universities in Lagos State as high. For ethical practices, 221 respondents (63.7%) accepted knowledge of ethical use of information to a very high extent; 71 respondents (20.5%) to a high extent; 55 respondents (15.9%) to a low extent; and none to very low extent. On average, the respondents accepted knowledge of ethical use of information with a mean of 3.48. Also, 41 respondents (11.8%) accepted knowledge about plagiarism to a very high extent; 245 respondents (70.6%) to a high extent; 56 respondents (16.1%) to a low extent; and 5 respondents (1.4%) to very low extent. On average, the respondents accepted knowledge about plagiarism with a mean of 2.93.

Table 4.3 also shows that 168 respondents (48.4%) accepted ability to apply information ethics by citing sources appropriately and observing copyright to a very high extent; another 168 respondents (48.4%) to a high extent; 8 respondents (2.3%) to a low extent; and 3 respondents (0.9%) to very low extent. On average, the respondents accepted ability to apply information ethics by citing sources appropriately and observing copyright with a mean of 3.44. In addition, 268 respondents (77.2%) accepted ability to explain the ethical dimension of a case to those involved and to others to a very high extent; 67 respondents (19.3%) to a high extent; 12 respondents (3.5%) to a low extent; and none to very low extent. On average, the respondents accepted ability to explain the ethical dimension of a case to those involved and to others with a mean of 3.74.

Also, 244 respondents (70.3%) accepted ability to formulate and justify morally acceptable solutions to a very high extent; 95 respondents (27.4%) to a high extent; 6 respondents (1.7%) to a low extent; and 2 respondents (0.6%) to very low extent. On average, the respondents accepted

ability to formulate and justify morally acceptable solutions with a mean of 3.67. The weighted mean is 3.45 showing ethical practices among postgraduate students of universities in Lagos State as high. The grand mean for research competency is 3.32 which indicates that the level of research competency among postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria is high.

Research Question Two: What are the different information literacy skills available for postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria?

Table 4.4: Responses on Different Information Literacy Skills Available for Postgraduate Students of Universities in Lagos State, Nigeria

Task Definition	SA	A	D	SD	Mean
I am able to determine the information search topic	230 (66.3%)	115 (33.1%)	2 (0.6%)	0 (0.0%)	3.66
I am able to determine the information related to leaving results	223 (64.3%)	116 (33.4%)	8 (2.3%)	0 (0.0%)	3.62
I am able to discuss with friends	282 (81.3%)	64 (18.4%)	1 (0.3%)	0 (0.0%)	3.81
I am able to discuss with the lecturer about learning resources information	269 (77.5%)	73 (21.0%)	5 (1.4%)	0 (0.0%)	3.76
Weighted Mean					3.71
Information Seeking Strategies	SA	A	D	SD	Mean
I can use keywords in finding information	199 (57.3%)	141 (40.6%)	6 (1.7%)	1 (0.3%)	3.55
I read books as learning resources	319 (91.9%)	24 (6.9%)	3 (0.9%)	1 (0.3%)	3.90
I read information over the internet	222 (64.0%)	121 (34.9%)	3 (0.9%)	1 (0.3%)	3.63
I take notes of the material provided	262 (75.5%)	81 (23.3%)	2 (0.6%)	2 (0.6%)	3.74
Weighted Mean					3.71
Location and Access	SA	A	D	SD	Mean
I can search for information in the library	212 (61.1%)	134 (38.6%)	1 (0.3%)	0 (0.0%)	3.61
I can search for information via the internet	210 (60.5%)	129 (37.2%)	8 (2.3%)	0 (0.0%)	3.58

I can search for information using other sources (newspaper, magazines etc.)	222 (64.0%)	124 (35.7%)	1 (0.3%)	0 (0.0%)	3.64
I can determine the information I am looking for	155 (44.7%)	184 (53.0%)	7 (2.0%)	1 (0.3%)	3.42
Weighted Mean					3.56
Use of Information	SA	A	D	SD	Mean
I read information in the form of charts, diagrams and article	60 (17.3%)	283 (81.6%)	3 (0.9%)	1 (0.3%)	3.16
I can compare information	221 (63.7%)	125 (36.0%)	1 (0.3%)	0 (0.0%)	3.63
I can keep information neatly	313 (90.2%)	28 (8.1%)	6 (1.7%)	0 (0.0%)	3.88
Weighted Mean					3.56
Information Synthesis	SA	A	D	SD	Mean
I can logically organize information	212 (61.1%)	126 (36.3%)	6 (1.7%)	3 (0.9%)	3.58
I can combine information	317 (91.4%)	20 (5.8%)	10 (2.9%)	0 (0.0%)	3.88
I can make conclusions in my own language	265 (76.4%)	71 (20.5%)	6 (1.7%)	5 (1.4%)	3.72
I can edit the information to be presented	233 (67.1%)	70 (20.2%)	44 (12.7%)	0 (0.0%)	3.54
Weighted Mean					3.68
Information Evaluation	SA	A	D	SD	Mean
I can complete assignments and exercises well	276 (79.5%)	67 (19.3%)	4 (1.2%)	0 (0.0%)	3.78
I can understand the information obtained	273 (78.7%)	74 (21.3%)	0 (0.0%)	0 (0.0%)	3.79
I actively search for information	320 (92.2%)	23 (6.6%)	4 (1.2%)	0 (0.0%)	3.91
Weighted Mean					3.83
Grand Mean					3.68

Decision rule: 1.00 – 1.49= very low, 1.50 – 2.49= low, 2.50 – 3.49 = high, 3.50-4.00= very high

Note: SA – Strongly Agree (4), A - Agree (3), D - Disagree (2), SD – Strongly Disagree (1)

Source: Field Survey Results, 2022

Table 4.4 reveals the responses on different information literacy skills available for postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria. For task definition, 230 respondents (66.3%) accepted they were able to determine the information search topic to a

very high extent; 115 respondents (33.1%) to a high extent; 2 respondents (0.6%) to a low extent; and none to very low extent. On average, the respondents accepted they were able to determine the information search topic with a mean of 3.66. Also, 223 respondents (64.3%) accepted they were able to determine the information related to leaving results to a very high extent; 116 respondents (33.4%) to a high extent; 8 respondents (2.3%) to a low extent; and none to very low extent. On average, the respondents accepted they were able to determine the information related to leaving results with a mean of 3.62.

Table 4.4 also shows that 282 respondents (81.3%) accepted they were able to discuss with friends to a very high extent; 64 respondents (18.4%) to a high extent; a respondent (0.3%) to a low extent; and none to very low extent. On average, the respondents accepted they were able to discuss with friends with a mean of 3.81. In addition, 269 respondents (77.5%) accepted they were able to discuss with the lecturer about learning resources information to a very high extent; 73 respondents (21.0%) to a high extent; 5 respondents (1.4%) to a low extent; and none to very low extent. On average, the respondents accepted they were able to discuss with the lecturer about learning resources information with a mean of 3.76. The weighted mean for task definition is 3.71 which indicates that task definition skills of postgraduate students of universities in Lagos State is very high.

For information seeking strategies, Table 4.4 shows that 199 respondents (57.3%) accepted they could use keywords in finding information to a very high extent; 141 respondents (40.6%) to a high extent; 6 respondents (1.7%) to a low extent; and a respondent (0.3%) to very low extent. On average, the respondents accepted they could use keywords in finding information with a mean of 3.55. Also, 319 respondents (91.9%) accepted they read books as learning resources to a very high extent; 24 respondents (6.9%) to a high extent; 3 respondents (0.9%) to a low extent;

and a respondent (0.3%) to very low extent. On average, the respondents accepted they read books as learning resources with a mean of 3.90.

In addition, 222 respondents (64.0%) accepted they read information over the internet to a very high extent; 121 respondents (34.9%) to a high extent; 3 respondents (0.9%) to a low extent; and a respondent (0.3%) to very low extent. On average, the respondents accepted they read information over the internet with a mean of 3.63. Also, 262 respondents (75.5%) accepted they took notes of the material provided to a very high extent; 81 respondents (23.3%) to a high extent; 2 respondents (0.6%) to a low extent; and another 2 respondents (0.6%) to very low extent. On average, the respondents accepted they took notes of the material provided with a mean of 3.74. The weighted mean for information seeking strategies is 3.71 which indicates that information seeking strategies skills of postgraduate students of universities in Lagos State is very high.

For location and access of information, Table 4.4 shows that 212 respondents (61.6%) accepted they could search for information in the library to a very high extent; 134 respondents (38.6%) to a high extent; a respondent (0.3%) to a low extent; and none to very low extent. On average, the respondents accepted they could search for information in the library with a mean of 3.61. Also, 210 respondents (60.5%) accepted they could search for information via the internet to a very high extent; 129 respondents (37.2%) to a high extent; 8 respondents (2.3%) to a low extent; and none to very low extent. On average, the respondents accepted they could search for information via the internet with a mean of 3.58.

In addition, 222 respondents (64.0%) accepted they could search for information using other sources (newspaper, magazines etc.) to a very high extent; 124 respondents (35.7%) to a high extent; a respondent (0.3%) to a low extent; and none to very low extent. On average, the respondents accepted they could search for information using other sources (newspaper,

magazines etc.) with a mean of 3.64. Also, 155 respondents (44.7%) accepted they could determine the information they were looking for to a very high extent; 184 respondents (53.0%) to a high extent; 7 respondents (2.0%) to a low extent; and a respondent (0.3%) to very low extent. On average, the respondents accepted they could determine the information they were looking for with a mean of 3.42. The weighted mean for location and access of information is 3.56 which indicates that locating and accessing information skills of postgraduate students of universities in Lagos State is very high.

According to Table 4.4, for use of information, 60 respondents (17.3%) accepted they read information in the form of charts, diagrams and article to a very high extent; 283 respondents (81.6%) to a high extent; 3 respondents (0.9%) to a low extent; and a respondent (0.3%) to very low extent. On average, the respondents accepted they read information in the form of charts, diagrams and article with a mean of 3.16. Also, 221 respondents (63.7%) accepted they could compare information to a very high extent; 125 respondents (36.0%) to a high extent; a respondent (0.3%) to a low extent; and none to very low extent. On average, the respondents accepted they could compare information with a mean of 3.63.

Table 4.4 also shows that 313 respondents (90.2%) accepted they keep information neatly to a very high extent; 28 respondents (8.1%) to a high extent; 6 respondents (1.7%) to a low extent; and none to very low extent. On average, the respondents accepted they could keep information neatly with a mean of 3.88. The weighted mean for use of information is 3.56 which reveals that use of information skills of postgraduate students of universities in Lagos State is very high.

For information synthesis, Table 4.4 shows that 212 respondents (61.1%) accepted that they could logically organize information to a very high extent; 126 respondents (36.3%) to a high extent; 6 respondents (1.7%) to a low extent; and 3 respondents (0.9%) to very low extent. On

average, the respondents accepted they could logically organize information with a mean of 3.58. Also, 317 respondents (91.4%) accepted that they could combine information to a very high extent; 20 respondents (5.8%) to a high extent; 10 respondents (2.9%) to a low extent; and none to very low extent. On average, the respondents accepted they could combine information with a mean of 3.88.

Table 4.4 also reveals that 265 respondents (76.4%) accepted that they could make conclusions in their own language to a very high extent; 71 respondents (20.5%) to a high extent; 6 respondents (1.7%) to a low extent; and 5 respondents (1.4%) to very low extent. On average, the respondents accepted they could make conclusions in their own language with a mean of 3.72. Also, 233 respondents (67.1%) accepted that they could edit the information to be presented to a very high extent; 70 respondents (20.2%) to a high extent; 44 respondents (12.7%) to a low extent; and none to very low extent. On average, the respondents accepted they could edit the information to be presented with a mean of 3.54. The weighted mean for information synthesis is 3.68 which reveals that the information synthesis skills of postgraduate students of universities in Lagos State is also very high.

For information evaluation, Table 4.4 shows that 276 respondents (79.5%) accepted that they could complete assignments and exercises well to a very high extent; 67 respondents (19.3%) to a high extent; 4 respondents (1.2%) to a low extent; and none to very low extent. On average, the respondents accepted they could complete assignments and exercises well with a mean of 3.78. Also, 273 respondents (78.7%) accepted that they could understand the information obtained to a very high extent; 74 respondents (21.3%) to a high extent; none to a low extent; and none to very low extent. On average, the respondents accepted they could understand the information obtained with a mean of 3.79.

Table 4.4 also indicates that 320 respondents (92.2%) accepted that they actively searched for information to a very high extent; 23 respondents (6.6%) to a high extent; 4 respondents (1.2%) to a low extent; and none to very low extent. On average, the respondents accepted they actively searched for information with a mean of 3.91. The weighted mean for information evaluation is 3.83 which reveals that information evaluation skills of postgraduate students of universities in Lagos State is very high. The grand mean for the different information literacy skills available is 3.68 which indicates that the different information literacy skills available for postgraduate students of universities in Lagos State, Nigeria is very high.

H₀₁: There will be no significant influence of task definition on research competency of postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria.

Table 4.5: Regression Analysis for Influence of Task Definition on Research Competency of Postgraduate Students of Universities in selected tertiary institutions in Lagos State, Nigeria.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.719 ^a	.517	.516	.34502

a. Predictors: (Constant), Task definition

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	43.988	1	43.988	369.527	.000 ^a
	Residual	41.069	345	.119		
	Total	85.057	346			

a. Predictors: (Constant), Task definition

b. Dependent Variable: Research competency

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.553	.203		-2.728	.007
	Task definition	1.045	.054	.719	19.223	.000

a. Dependent Variable: Research competency

Source: Field Survey, 2022

According to the results displayed on Table 4.5, task definition has a positive and high relationship with research competency ($R = 0.719$). The coefficient of determination (Adj. R^2) of 0.516 shows that task definition explained 51.6% of the variation in research competency of postgraduate students in universities in Lagos State under investigation. Therefore, the remaining 48.4% is explained by other exogenous variable different from task definition.

Also, Table 4.5 presents the results of the overall model significance of regression test (ANOVA) which revealed that task definition has a significant influence on research competency of postgraduate students in universities in Lagos State ($F(1, 345) = 369.527, p < 0.05$). Furthermore, the results of the regression coefficients revealed that at 95% confidence level, a unit change in task definition will lead to 1.045 increase in research competency of postgraduate students in universities in Lagos State ($B = 1.045, p < 0.05$). On the strength of the result of regression analysis in Table 4.5, this study rejects the null hypothesis one (H_01) which states that there will be no significant influence of task definition on research competency of postgraduate students in universities in Lagos State, Nigeria.

H₀₂: There will be no significant influence of information seeking strategies on research competency of postgraduate students of universities selected tertiary institutions in Lagos State, Nigeria.

Table 4.6: Regression Analysis for Influence of Information Seeking Strategies on Research Competency of Postgraduate Students of Universities in selected tertiary institutions in Lagos State, Nigeria.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.217 ^a	.047	.044	.48467

a. Predictors: (Constant), Information seeking strategies

ANOVA^b

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4.015	1	4.015	17.094	.000 ^a
	Residual	81.041	345	.235		
	Total	85.057	346			

a. Predictors: (Constant), Information seeking strategies

b. Dependent Variable: Research competency

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients		t	Sig.
		B	Std. Error	Beta			
1	(Constant)	1.952	.333			5.858	.000
	Information seeking strategies	.371	.090	.217		4.134	.000

a. Dependent Variable: Research competency

Source: Field Survey, 2022

From the results displayed on Table 4.6, information seeking strategies have a positive and low relationship with research competency ($R = 0.217$). The coefficient of determination (Adj. R^2) of 0.044 shows that information seeking strategies explained 4.4% of the variation in research competency of postgraduate students in universities in Lagos State under investigation. Hence, the remaining 95.6% is explained by other exogenous variable different from information seeking strategies.

Furthermore, Table 4.6 presents the results of the overall model significance of regression test (ANOVA) which revealed that information seeking strategies have a significant influence on research competency of postgraduate students in universities in Lagos State ($F(1, 345) = 17.094$, $p < 0.05$). Also, the results of the regression coefficients revealed that at 95% confidence level, a unit change in information seeking strategies will lead to 0.371 increase in research competency of postgraduate students in universities in Lagos State ($B = 0.371$, $p < 0.05$). On the strength of the result of regression analysis in Table 4.6, this study rejects the null hypothesis two (H_02) which states that there will be no significant influence of information seeking strategies on research competency of postgraduate students in universities in Lagos State, Nigeria.

H₀₃: There will be no significant influence of locating and accessing information on research competency of postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria.

Table 4.7: Regression Analysis for Influence of Locating and Accessing Information on Research Competency of Postgraduate Students on Universities in selected tertiary institutions in Lagos State, Nigeria.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.527 ^a	.277	.275	.42209

a. Predictors: (Constant), Location and access

ANOVA^b

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	23.590	1	23.590	132.409	.000 ^a
	Residual	61.466	345	.178		
	Total	85.057	346			

a. Predictors: (Constant), Location and access

b. Dependent Variable: Research competency

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	-.720	.352		-2.044	.042
	Location and access	1.136	.099	.527	11.507	.000

a. Dependent Variable: Research competency

Source: Field Survey, 2022

Based on the results displayed on Table 4.7, locating and accessing information has a positive and moderate relationship with research competency ($R = 0.527$). The coefficient of determination ($Adj. R^2$) of 0.275 shows that locating and accessing information explained 27.5%

of the variation in research competency of postgraduate students in universities in Lagos State under investigation. Therefore, the remaining 72.5% is explained by other exogenous variable apart from information location and access.

Also, Table 4.7 presents the results of the overall model significance of regression test (ANOVA) which revealed that locating and accessing information has a significant influence on research competency of postgraduate students in universities in Lagos State ($F(1, 345) = 132.409, p < 0.05$). Furthermore, the results of the regression coefficients revealed that at 95% confidence level, a unit change in locating and accessing information will lead to 1.136 increase in research competency of postgraduate students in universities in Lagos State ($B = 1.136, p < 0.05$). On the strength of the result of regression analysis in Table 4.7, this study rejects the null hypothesis three (H_03) which states that there will be no significant influence of locating and accessing information on research competency of postgraduate students in universities in Lagos State, Nigeria.

H₀₄: There will be no significant influence of use of information on research competency of postgraduate students in universities in Lagos State, Nigeria.

Table 4.8: Regression Analysis for Influence of Use of Information on Research Competency of Postgraduate Students in Universities in Lagos State, Nigeria.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.679 ^a	.461	.459	.36459

a. Predictors: (Constant), Use of information

ANOVA ^b						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	39.198	1	39.198	294.886	.000 ^a
	Residual	45.859	345	.133		
	Total	85.057	346			

a. Predictors: (Constant), Use of information

b. Dependent Variable: Research competency

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-1.404	.276		-5.084	.000
	Use of information	1.329	.077	.679	17.172	.000

a. Dependent Variable: Research competency

Source: Field Survey, 2022

From the results displayed on Table 4.8, use of information has a positive and high relationship with research competency ($R = 0.679$). The coefficient of determination (Adj. R^2) of 0.459 shows that use of information explained 45.9% of the variation in research competency of postgraduate students in universities in Lagos State under investigation. Hence, the remaining 54.1% is explained by other exogenous variable different from use of information.

Furthermore, Table 4.8 presents the results of the overall model significance of regression test (ANOVA) which revealed that use of information has a significant influence on research competency of postgraduate students in universities in Lagos State ($F(1, 345) = 294.886, p < 0.05$). Also, the results of the regression coefficients revealed that at 95% confidence level, a unit change in use of information will lead to 1.329 increase in research competency of postgraduate students in universities in Lagos State ($B = 1.329, p < 0.05$). On the strength of the result of regression analysis in Table 4.8, this study rejects the null hypothesis four (H_04) which states that there will be no significant influence of use of information on research competency of postgraduate students in universities in Lagos State, Nigeria.

H₀₅: There will be no significant influence of synthesizing information on research competency of postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria.

Table 4.9: Regression Analysis for Influence of Synthesizing Information on Research Competency of Postgraduate Students of Universities in selected tertiary institutions in Lagos State, Nigeria.

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.717 ^a	.514	.512	.34618		
a. Predictors: (Constant), Synthesis						
ANOVA^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	43.711	1	43.711	364.736	.000 ^a
	Residual	41.346	345	.120		
	Total	85.057	346			
a. Predictors: (Constant), Synthesis						
b. Dependent Variable: Research competency						
Coefficients^a						
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	.346	.157		2.200	.028
	Synthesis	.809	.042	.717	19.098	.000

a. Dependent Variable: Research competency

Source: Field Survey, 2022

According to the results displayed on Table 4.9, synthesizing information has a positive and high relationship with research competency ($R = 0.717$). The coefficient of determination ($Adj. R^2$) of 0.512 shows that information synthesis explained 51.2% of the variation in research competency

of postgraduate students in universities in Lagos State under investigation. Therefore, the remaining 48.8% is explained by other exogenous variable apart from information synthesis.

Also, Table 4.9 presents the results of the overall model significance of regression test (ANOVA) which revealed that synthesizing information has a significant influence on research competency of postgraduate students in universities in Lagos State ($F(1, 345)=364.736, p < 0.05$). Furthermore, the results of the regression coefficients revealed that at 95% confidence level, a unit change in synthesizing information will lead to 0.809 increase in research competency of postgraduate students in universities in Lagos State ($B = 0.809, p < 0.05$). On the strength of the result of regression analysis in Table 4.9, this study rejects the null hypothesis five (H_{05}) which states that there will be no significant influence of synthesizing information on research competency of postgraduate students in universities in Lagos State, Nigeria.

H₀₆: There will be no significant influence of information evaluation on research competency of postgraduate students of universities in selected institutions in Lagos State, Nigeria.

Table 4.10: Regression Analysis for Influence of Information Evaluation on Research Competency of Postgraduate Students of in selected institutions Universities in Lagos State, Nigeria.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.285 ^a	.081	.078	.47598

a. Predictors: (Constant), Information evaluation

ANOVA^b						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6.894	1	6.894	30.431	.000 ^a
	Residual	78.162	345	.227		
	Total	85.057	346			

a. Predictors: (Constant), Information evaluation

b. Dependent Variable: Research competency

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.738	.289		6.014	.000
	Information evaluation	.415	.075	.285	5.516	.000

a. Dependent Variable: Research competency
Source: Field Survey, 2022

From the results displayed on Table 4.10, information evaluation has a positive and low relationship with research competency ($R = 0.285$). The coefficient of determination (Adj. R^2) of 0.078 shows that information evaluation explained 7.8% of the variation in research competency of postgraduate students in universities in Lagos State under investigation. Hence, the remaining 92.2% is explained by other exogenous variable different from information evaluation.

Furthermore, Table 4.10 presents the results of the overall model significance of regression test (ANOVA) which revealed that information evaluation has a significant influence on research competency of postgraduate students in universities in Lagos State ($F(1, 345) = 30.431, p < 0.05$). Also, the results of the regression coefficients revealed that at 95% confidence level, a unit change in use of information will lead to 0.415 increase in research competency of postgraduate students in universities in Lagos State ($B = 0.415, p < 0.05$). On the strength of the result of regression analysis in Table 4.10, this study rejects the null hypothesis six (H_06) which states that there will be no significant influence of information evaluation on research competency of postgraduate students in universities in Lagos State, Nigeria.

4.3 Discussion of Findings

This section discusses the findings of this study in relation to past studies. Research findings are discussed and organized according to earlier stated hypothesis and in relation with past studies.

Hypothesis one results while examined the influence of task definition on research competency of postgraduate students in universities in Lagos State, Nigeria, revealed that task definition has a significant positive influence on research competency under investigation. The findings of this study have support in empirical literature. A recent study found out that 96% of the respondents agreed that user education class helped them to increase their searching skills while 100% of the respondents agreed that user education program helped them to better use the Library Online Public Access Catalog (OPAC)¹. The study further reveal that 55% of the respondents agreed that to obtain strong skills libraries should provide many classes of user education. A research on the role of academic libraries in the enhancement of information literacy: a study of Fort Hare Library found out that majority of the respondents (53%) has not attended library orientation, which was compulsory². However, a study shows that most of the respondents (53.3%) indicated that they learnt about electronic resources through workshops and seminars³. Another research indicates that all the respondents were involved in the training programme on information literacy⁴. The result also shows that 52% of the respondents suggested that the campus library should provide practical training on searches in the library, while 20% indicated that the library should develop an information literacy program in the University. It can be deduced here that information literacy skill training in all library across the world is at different stage. While some libraries have made significant effort, others are tackling issues of users' ability to identify, access, retrieve information and to use ICT tools in the library. Again, a process that may be effective in one library may be difficult to apply in another. This kind of situation may hamper

desired objectives. In such complex situation, survey could be carried out to identify the best suitable method in order to ensure successful literacy skill.

A comparatively larger number of studies conducted self-perception-based surveys of students. A scholar used a 10-item self-perception information competency scale (based on the ACRL standards) at a large public university in the southwestern United States⁵. Another researcher used an online questionnaire through Survey Monkey to assess perceived confidence in online searching of graduate students of at the University of Florida. Several used a self-assessing questionnaire to find out information literacy skills (mapped to the ALA standards) of undergraduate students of a college of agriculture in India⁷. Although the surveys of perceptions have been most popular many authors have mentioned limitations of this assessment technique. The researchers, who used other techniques in addition to perception surveys to the same groups of students, claimed that students had over-estimated their self-assessed information abilities than their actual level of skills. Only a few studies proved a significant correlation between students' perceived information literacy skills and their actual score on an achievement test. Many authors have explored the relationship between information literacy skills and various personal and academic variables of students. In a study at Kuwait University, a scholar compared library skills with students' age, gender, type of high school the students had attended, class level, student GPA, and level of English proficiency⁸. Several researchers found differences in information literacy skills based on students' gender.

A scholar explored the relationship of the internet facility at home with the students' information literacy skills⁹. Pakistani literature of the LIS field failed to report any diagnostic surveys to determine information literacy skills of students. In a survey of the universities offered ill-planned and informal user education programs without a survey of user needs¹⁰. Based on some

studies conducted at the University of the Punjab on the use of online databases and digital libraries, a scholar inferred that the use of these resources was low for a variety of reasons. They claimed that the community was “unable to use and/or unaware of the databases and digital services available through the HEC, and this state of information and digital illiteracy (IDI) is responsible for a significant loss of resources”¹¹. Inadequate assessment of library users’ needs and information seeking behaviour was among the inhibiting factors for successful implementation of information literacy instruction programs in Pakistani universities¹².

In a study conducted by the Educause Center for Analysis and Research (ECAR), 80.7% of students rated themselves as expert or very skilled in searching the internet effectively and efficiently, although students rated themselves slightly lower in their ability to evaluate the credibility of online information and their understanding of related ethical and legal issues¹³. A 2011 ECAR study found that while 88% of students use their institution’s library website, only 27% do not believe their skills meet their needs for searching the library site effectively. A Credo Student survey also revealed that ‘students feel reasonably capable of doing the research necessary for assignments’¹⁴. These studies indicate that students seem confident in their research skills, but does faculty concur with students’ assessment of their skills? Are students developing information literacy skills that enable them to complete research assignments effectively and efficiently? The majority of the library literature assessing college students’ information literacy skills is on pre- and/or post-library instructional session assessment. But assessment of instruction does not typically measure competency levels of all five Association of College and Research Libraries (ACRL) information literacy skills¹⁵. As the evaluators of student research assignments, faculty should have a more comprehensive picture of information literacy skills, as compared to instructional session assessment.

Hypothesis two results for the influence of information seeking strategies on research competency of postgraduate students in universities in Lagos State, Nigeria, revealed that information seeking strategies has a significant influence on research competency of postgraduate students in universities in Lagos State. A review of the literature on faculty views of information literacy reveals inconsistencies among faculty regarding how and by whom information literacy should be addressed, but also shows that academic faculty overwhelmingly believe that IL is important for their students¹⁶. 'It appears that the goals of the IL professional and the subject faculty member are at least somewhat in sync' regarding the need to improve students' skills¹⁷. However, the focus of faculty is primarily on the subject matter, while librarians' expertise lies in the process of conducting research¹⁸. A scholar suggests that faculty culture places more of an emphasis on research and content and less on teaching and process, which can hinder collaboration with librarians regarding information literacy education¹⁹. Several scholars found that science and engineering faculty 'perceive that more self-directed learning is useful, for both themselves and their students, suggesting that more how-to guides, electronic help screens for various resources, and print and online pathfinders are desirable'²⁰. In her study of sociology and civil engineering faculty, a scholar exposed faculty members' belief that information literacy is dependent on personal interest and individual motivation, and improves according to the 'law of exposure' as students repeatedly encounter situations requiring their information literacy skills²¹.

A scholar suggests that there can be an ad-hoc approach to information literacy by faculty, depending on whether a course requires a research paper. Although faculty believe that IL skills are very important, many do not utilise library instruction sessions to improve those skills²². A researcher found that journalism and mass communication faculty require students to conduct

research for their courses, are aware that their students are not as information literate as they could be and understand that library instruction improves research skills, and yet faculty do not consistently integrate instruction into their courses²³. Research conducted in the UK revealed that there was a high level of enthusiasm amongst faculty for IL, but that few academic staff teach or assess information skills or even develop them through student-centered learning. In a subsequent study she confirmed these findings with supportive data from United States (US) faculty that 'there is an apparent gap between the IL skills that faculty want their students to have and those that they actively support and develop'²⁴. A scholar found 'that the large majority of faculty believes that information literacy education should be undertaken collaboratively by faculty and librarians'²⁵.

Hypothesis three results for the influence of locating and accessing information on research competency of postgraduate students in universities in Lagos State, Nigeria revealed that locating and accessing information has a significant influence on research competence under investigation. A study examined the influence of gender on cyberspace resources and services use and the expected competencies for research among postgraduates in federal universities in Southwest, Nigeria²⁶. This descriptive survey studied a purposive sample of 1008 postgraduates from five universities. For the analyses of data, the researchers used mean, standard deviation and t-test. The results indicate that postgraduate students pointed out the expected competencies that should be possessed for the effective utilization of cyberspace resources and services for research. The researchers note that there is a non-significant difference between male and female PG students' responses in view of accessing cyberspace resources and services for research. The researchers also found a non-significant gender influence on competencies expected of PG students for utilization of cyberspace resources and services for research.

Hypothesis four results for the influence of use of information on research competency of postgraduate students in universities in Lagos State, Nigeria, revealed that use of information has a positive significant influence on research competency of postgraduate students under investigation. While information literacy skills were considered important, a scholar discovered that ‘there was not a lot of agreement on the academic level at which information literacy outcomes are expected by faculty’²⁷. In order to remedy these inconsistencies in delivering information literacy instruction to students, librarians need to take a proactive approach in meeting with faculty and managers to determine collectively how to successfully infuse information literacy into the curriculum. All US two-year and four-year institutions of higher education undergo a process of accreditation using a set of standards developed by peers to assure and improve the quality of education. Reviews of regional accreditation standards and programmatic accreditation processes suggest that alignment of information literacy instruction programmes to student learning outcomes required by accreditation organisations can be drivers for institutional focus on information literacy. The primary goal is for librarians to work in concert with faculty in order to graduate information literate students who can effectively utilise information literacy skills in the workplace, as well as to make informed decisions in their personal lives.

Osmosis does not work for the development of information literacy, but neither does it work for effective collaboration between librarians and faculty²⁸. The ERIAL (Ethnographic Research in Illinois Academic Libraries) Project offers unique perspectives from faculty interviewed during the two-year study of the student research process, on how research skills can be taught and supported by librarians. The interviews revealed that some faculty view teaching as within their domain and seek assistance from librarians to augment their own research instruction, others

schedule one-shot instructional sessions and still another segment embed librarians into their courses with multiple visits to the class to establish a better rapport²⁹. A number of learning theories have been utilised by librarians delivering information literacy instruction, including: behaviourism, cognitivism and constructivism. In a behavioural approach, instruction is teacher-centered information is presented by the instructor and students acquire skills through drills and practice and then demonstrate their understanding of the material through assessment³⁰.

Hypothesis five results for the influence of synthesizing information on research competency of postgraduate students in universities in Lagos State, Nigeria revealed that synthesizing information has significant influence on research competency of postgraduate students under investigation. By comparison, cognitive learning is a process of relating new information to previous knowledge the individual has collected. A scholar builds on this theory by advancing social constructivism, a student-centered approach where environment comes into play and individuals learn not only from their own experiences, but also learn from the experiences of others. Technology has also had a significant impact on information literacy education, with Web 2.0 tools (e.g. wikis, blogs, podcasts, RSS, Twitter, Facebook, YouTube, Flickr and social bookmarking) being used to retrieve and produce information. 'Given that Web 2.0 tools support the constructivist ideas upon which the ACRL standards are at least partially based, it should be possible to find ways that the tools can be used to promote the various outcomes'³¹. Several scholars discuss new applications of technology that can help students navigate the ever-changing information environment³². However, some caution needs to be taken when introducing Web 2.0 tools since not all students possess the necessary skills to use them. In addition, a recent ECAR study found that although students agree that technology can help them achieve academic

outcomes, they are sensitive to the boundaries that technology plays in their personal and academic lives³³.

Hypothesis six results for the influence of information evaluation on research competency of postgraduate students in universities in Lagos State, Nigeria, revealed that information evaluation has significant influence on research competency of postgraduate students in universities under investigation. A study investigated the influence of information literacy skills on postgraduate students' use of electronic resources in private university libraries in Nigeria³⁴. The study adopted the survey research design. The study population comprised 2805 postgraduate students in five private universities offering postgraduate programmes in South-West, Nigeria. Multistage sampling technique was used in the selection process. A purposive selection of four faculties from each of the five universities was carried out. Proportionate sampling technique was used to select the sample size of 550 postgraduate students as the respondents for the study. Findings revealed that there was a significant positive correlation between information literacy skills and use of electronic resources ($r = 0.28, p < 0.05$). The study concluded that the utilization of electronic resources promoted access to current information among postgraduate students in the selected private universities in South-West, Nigeria.

Therefore, on the strength of the support found in prior conceptual, empirical and theoretical studies with this present study's result, the study posits that Information Literacy Skills has positive significant influence on Research Competency of Postgraduate Students in Lagos State, Nigeria.

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Chapter Five

Conclusion

This chapter presents and discusses the summary of findings, conclusions and provides useful recommendations, contributions to knowledge and suggestions for further studies.

5.1 Summary of Findings

The aim of this study is to examine the influence of Information Literacy Skills on Research Competency of Postgraduate Students in selected institutions in Lagos State, Nigeria. The study has five chapters so as to achieve its main objective. The chapter one presented the background to the study which established that the paradigm of the ultimate goal of education is changing: it is a competent professional and researcher with well-developed skills that make it possible to plan independent research activities. A great majority of students finish their education after undergraduate education or join in the business life or start graduate education to pursue . Literature review of existing relevant studies to the concept of Information Literacy Skills and Research Competency was done. Information Literacy Skills in this study included dimensions such as task definition, information seeking strategies, location and access to information, use of information, synthesis of information as well as evaluation of information which are used as measures of Information Literacy skills. Research Competency was measured with content competency, methodology skills, evaluation and operationalization of research and ethical practices. The empirical review was done to capture the interaction between Information Literacy skills and Research Competency.

The study reviewed three different theories which are of specific relevance to the study. These are; Big6 Model for Information Literacy and Research Competency Theory. This study is anchored on Big6 Model for Information Literacy. This theory serves as an effective tool for helping students learn the research process which allows researchers to effectively find, use,

apply, synthesize and evaluate information. It is an effective tool for helping students learn the research process as an inquiry process.

A cross sectional survey design was employed as it studied a subset of a population at a point in time and to investigate the influence of information literacy skills on research competency of postgraduate students of universities in Lagos State, Nigeria. The population of the study was ten thousand (10,000) postgraduate students of Universities in Government-Owned Universities in selected institutions in Lagos State, Nigeria, which are Lagos State University and University of Lagos.

Stratified random sampling was used for the study. Self-rated questionnaires were used to elicit response from 349 students of the sample Government-owned universities who returned the questionnaires. The study adopted descriptive and regression statistical analyses technique to explain the influence of Information Literacy skills on Research competency. Statistical Product and Service Solution (SPSS) Version 24 was used to test the hypotheses at 0.05 level of significance to determine the rejection or acceptance of the null hypotheses. The results were extensively discussed in the context of the current research as well as extant literature.

The findings of the study can be summarized as follows:

- i. Research competency among postgraduate students of universities in Lagos State, Nigeria is high; however, content competency is low compared with other measures of research competency.
- ii. Information literacy skills among post-graduate students are high, although location and access as well as use of information falls behind other measures of Information literacy skills investigated.

- iii. Task definition has a significant influence on research competency of postgraduate students in universities in Lagos State. This implies that ability to discuss with lecturers about learning resources information enhances postgraduate students' research competency.
- iv. There is significant positive influence of Information seeking strategies on research competency of postgraduate students in universities in Lagos State.
- v. Location and access to information has significant influence on research competency of postgraduate students in universities in Lagos State. This means been able to search for accurate information via the internet and other sources improves research competence of postgraduate students investigated.
- vi. Use of information has significant positive influence on research competency of postgraduate students in universities in Lagos State.
- vii. There is significant positive influence of Information synthesis on research competency of postgraduate students in universities in Lagos State. This reveals that logical organization of information propels research competency of postgraduate students in universities in Lagos State.
- viii. Information evaluation has significant influence on research competency of postgraduate students in universities in Lagos State. This implies that ability to understand the information obtained is very essential to research competency of postgraduate students in universities in Lagos State.

5.2 Conclusion

Emergence of knowledge based society with its challenges and demands has increased the urge for research in every sector of life endeavour. The main objective of the education system is to train competent and creative specialists that are able to plan their activities. Conventional skills are becoming less and less important, while non-standard and interdisciplinary skills are playing an increasingly important role. On the other hand, Information literacy is the ability to recognize when information is needed and to have the ability to locate, evaluate, and use effectively the needed information and “information literacy encompasses knowledge of one's information concerns and needs, and the ability to identify locate, evaluate, organize and effectively create, use and communicate information to address issues or problems on hand. Based on the empirical findings, this study concluded that there is statistically significant influence of Information literacy skills on research competency of postgraduate students in Government-owned universities in Lagos State, Nigeria.

5.3 Recommendations

The essence of any research activity is to advance the body of knowledge and boost overall development of the society by breeding new information that will either improve already existing status quo or create new ideas and methods of solving problems. In a bid to make such impact this study hereby recommends the following:

- i. Postgraduate students in universities in Lagos State should broaden their knowledge in the use of open digital scientific and educational systems to search and store information.
- ii. The management of the selected Government-owned universities should ensure that strategies are put in place for worthwhile research learning process for their postgraduate students.

- iii. Postgraduate students should be given adequate opportunity to discuss with lecturers about learning resources information as this will go a long way in enhancing optimal research competence by the future researchers.
- iv. Postgraduate student should develop the ability to locate and access information via diverse channels i.e. online, monographs, etc.
- v. Logical organization of information is very essential as far as research competence is concerned, hence postgraduate students in universities in Lagos State should widen their horizon as regards synthesizing information.

5.4 Contribution to Knowledge

This study offers significant contribution to literature conceptually, theoretically, and empirically. Conceptually, the study focused on identifying gaps in literature pertaining the Information Literacy skills and Research competency. The conceptual framework of this study equally offers conceptual contribution as it was constructed by the researcher to analyze the gaps identified in literature. The model also can be adapted to suite future studies.

From the theoretical stand point the Big6 Model of Information literacy was strengthened. This model serves as an effective tool for helping students learn the research process which allows researchers to effectively find, use, apply, synthesize and evaluate information.

Empirically, the study is able to add to recent literature on the interaction among Information literacy skills and research competency. Though, studies on Information literacy skills and Research competency abound in developed economy context, however empirical study from developing countries like Nigeria seems to be few in this regard, most especially within the context of Government-owned universities in Lagos State, Nigeria. Hence by the findings of the

six null hypotheses examined, the study becomes a basis for reference for future study on Information literacy skills and Research competency. Moreover, the study provides findings which scholars can use to buttress the empirical submissions in their study.

Overall, these above-mentioned points lay emphasis on the fact that this study offers significant contribution to knowledge and has practical implication for the postgraduate students Government-owned in universities in Lagos State, Nigeria that were investigated.

5.5 Suggestion for Further Research

This study focused on the influence of Information Literacy skills and Research Competency of postgraduate students in universities in Lagos State, Nigeria. Nevertheless, to further broaden the frontiers of knowledge, the following areas of studies are suggested for further research.

- i. The present study was carried out in Government-owned universities in Lagos State, further studies can be carried out in other tertiary institutions within the State so as to be able to extend the knowledge gained from this work to all tertiary institutions in the State.
- ii. This study investigated Information Literacy skills and Research competency of Postgraduate students in in selected institutions Lagos State, a comparative study with Private and Federal tertiary institutions in Nigeria may be considered in the nearest future.
- iii. Information Literacy skills dimensions can be tested on each of the measures of Research Competency in further studies.
- iv. A cross-sectional survey design was used in the course of the study, and this means evidence of causality cannot be established hence, further study may consider longitudinal survey design to explain causality over a long period of time.

- v. The present study was carried out using postgraduate students as respondents, future research work may examine the influence of information literacy skills on research competence of lecturers in tertiary institutions in Nigeria.
- vi. Other factors like employee onboarding, employee commitment, and organization culture can equally influence institution performance and hence becoming an interesting area for future study.
- vii. This study employed primary data for collection of information from the selected universities, same study may be carried out in the nearest future using the secondary data for collection of information.

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Lead City University

Faculty of Communication and Information Sciences (FCIS)

Department of Information Management

Dear Respondent,

I am a Master's student of the above named institution gathering data for the purpose of academic research on the topic "Influence of Information Literacy Skills on Research Competency of Postgraduate Students of Universities in Lagos State, Nigeria. To achieve this, your optimum cooperation is needed; there are no right or wrong answers. All your responses will be kept confidential and used for research purpose only.

Thank you.

Section A: Demographic Information

Gender: Male (), Female ()

Age: 20 – 25 (), 26 – 30 (), 31 – 35 (), 36 – 40 (), 41-45 (), 46 and above ()

Educational Level: Bachelor's degree () Master's degree () Ph. D ()

Years of experience: 5 – 10 (), 11 – 15 (), 16 – 20 (), 21 – 25 (), 26 - 30 ()

Section B: Level of Research Competency of Postgraduate Students of Universities in Lagos State, Nigeria.

The statement in this section concerns Research Competency as observed by the Postgraduate Students of Universities in Lagos State, Nigeria. Using the four-point Likert scale provided below. Please tick the appropriate choice that indicates your opinion on your level of research competency.

Very high = 4, High = 3, Low = 2, Very low = 1

S/N	In what way have you engaged in the following?	VH 4	H 3	L 2	VL 1
	Content Competency				
1	Ability to use open digital scientific and educational systems to search and store information.				
2	Ability to select optimal digital technologies at each stage of scientific research.				
3	Ability to search for like-minded people on scientific ideas.				
4	Skills to carry out scientific communication with the use of digital technologies.				
5	Ability to understand how to add to a scholarly or professional conversation through research and writing.				
	Methodology Skills				
6	Self-assessment of own research activity and received scientific results.				
7	Ability to match a scholarly question to the appropriate theories and methods.				
8	Ability to analyze data or information relevant to the project.				
9	Ability to organize and synthesis information in the required format from multiple sources.				
10	Ability to develops cognitive and creative abilities of the individual.				

Evaluation and Operationalization of Research					
11	Ability to analyze current research.				
12	Ability to use digital technologies for research planning.				
13	Skills mastery in working with scientific literature and ability to compile bibliographic lists.				
14	Skills to apply digital technologies to solve a specific research problem.				
15	Choice of actual directions of further scientific researches				
Ethical Practices					
16	Knowledge of ethical use of information				
17	Knowledge about plagiarism				
18	Ability to apply information ethics by citing sources appropriately and observing copyright.				
19	Ability to explain the ethical dimension of a case to those involved and to others.				
20	Ability to formulate and justify morally acceptable solutions				

Section C: Information Literacy Skills of Postgraduate Students of Universities in Lagos State, Nigeria.

The statement in this section concerns information literacy skills as observed in your institution. Using the four-point Likert Scale provided below. Please tick the appropriate choice that indicates your opinion.

S/N	Please indicate your level of agreement with the following	SA 4	A 3	D 2	SD 1
	Task definition				
1	The procedure for doing assigned tasks are good				
2	I feel comfortable with given priorities to do different tasks				
3	I experience personal growth such as updating skills and learning				

	different research skills				
	Information Seeking Strategies				
1	Using words with similar meaning to describe a concept				
2	Knowing when to refer to a journal				
3	Knowing the criteria of a scholarly journal				
4	Knowing when to use a database				
5	Knowing when to use a library catalogue				
	Synthesis of Information				
	Ability to define and articulate the need for information				
1	Ability to identify variety of types and formats of resources				
2	Working knowledge of literature				
3	Understanding of statement of problem				
	Locate and access information needs effectively and efficiently				
1	Understanding of the structure and content of the fields in a library catalogue/database in order to select the appropriate search index while executing the search.				
2	Ability to correspond to the words used to describe their own topic to those employed by the selected search tools such as identification of synonyms, related terms or descriptors used to represent a subject, etc.				
3	Understanding of controlled vocabulary				
4	Ability to develop relationship between the keywords by using Boolean logic/operators, etc.				
	Information Evaluation				
1	Ability to interpret a bibliographic reference				
2.	Ability to evaluate an internet site				
3.	Ability to evaluate library resources				
4.	Ability to interpret result				
	Use of information				

1	Ability to use of bibliometric analysis tools				
2	Ability to use freely available online research data, like open-access journals.				
3	Ability to use current awareness services like alerts, table of contents (TOCs), etc.				
4	Ability to use of blogs, really simple syndication feeds, social media				

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Bio-data

Names: Ayodele, Musbau Olajire

Designation: Librarian I

School Department/Unit: Lagos State University of Science and Technology,
Library Acquisition

Salary Grade Level: level 9/step 02

Name: Ayodele Musbau Olajire

Date of Birth: 20th June 1969

Place of Birth: Lagos Island

Nationality: Nigerian (By Birth)

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Marital Status: Married with Children

(i) Educational Institution (s) Attended with Dates

(a) Lead City University, Ibadan	2020 – 2022 (In view)
(b) Lagos State University, Ojo, Lasu	2010 – 2011
(c) University of Ibadan	1989 – 2001
(d) St. Andrews College of Education, Oyo (NCE)	1994-1996
(e) St. Timothy's College, Onike, Iwaya, Lagos	1987-1993

(ii) Academic and Professional Qualification Obtained with Dates

a. Master of Library and Information Science (MLIS)	2020-2022 (In View)
b. Master of Education in Sociology	2010-2011
c. Bachelor of Library and Information Studies (BLIS)	1989-2001
d. Accounting Education (NCE)	1994-1996
e. West African Secondary Certificate/GCE	1987-1993

Working Experience with Dates:

Lagos State University of Science and Technology (Formerly: Lagos State Polytechnic, Ikorodu, Lagos State	2017 – till date
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Academic Librarian 1

Lagos State Polytechnic, Ikorodu, Lagos: Part-Time Staff	2005-2017
Rio International Secondary School, School Librarian	2002-2004

Academic and Professional Qualification Obtained with Dates

1. Master of Library and Information Science (MLIS)	2020-2022 (In View)
2. Master of Education in Sociology	2010-2011
3. Bachelor of Library and Information Studies (BLIS)	1989-2001
4. Accounting Education (NCE)	1994-1996
5. West African Secondary Certificate/GCE	1987-1993

Details of Publication

A. Paper in Press

I, Oyebode, John Adeboye, Yusuf, Kuburat Folashade, Odeyemi, Taiwo Hope.
Talabi Adetutu Fatima. Makinde, Kehinde Joy. Salvador Yewande and Ayodele,
Musbau Olajire (2022). Effect of Library User Education and delinquent behaviours

of Polytechnic Students in Lagos State, Nigeria. A Chapter Contribution in contemporary issues in Honour of Professor David Folorunsho Elaturoti. CLN, FNLA. MNAE (Paper in Press)

B. Chapter Contribution in Books

- I. Azeez Adeoye and Musbau Olajire Ayodele (2022) Intellectual Property right and digital Library in Africa. Theory and Practice of Book Publishing in Nigeria: A Festschrift in Honour of Professor Oshote Andrew Okwilagwe.

C. Paper Published in Reputable Journals

- Salvador, M.Y., Ayodele M.O. Bamgbose : A.A. Ncha, J.O. (2017) Psychological Adjustment. Ethical issues in Information Management as a factor Affecting Work effectiveness of Library Personnel in Lagos State, Nigeria. Journal of Positive Psychology and Counselling 1 (2)./33.47
2. Adebawale Jeremy Adetayo Aishatu Ibrahim Sueliman, Musbau Olajire Ayodel (2022) Leveraging Digital Infor-preneurship for Financial Well – being of Academic Liberians. The Nigerian Perspective. University of Nebraska – Lincoln (e-journal) Library @ university of Nebraska – Lincoln
3. Librarianship Themes in Library Users Education Questions and Answers. 2010.
4. **Un-Published Work**
 1. **Musbau Olajire, Ayodele** (1996). The Administrative Management of Nigerian Bookstores and the problem facing them (A case study of Odusola Bookshop)
 2. **Musbau Olajire, Ayodele** (1991-1995). Petroleum Industries in Nigeria a Bibliography
 3. **Musbau Olajire, Ayodele** (2013). The Management of Nigeria Mobile Libraries and the problems facing them (A case study of Eti-Osa Local Government Mobile Library system Lagos State
 4. **Musbau Olajire, Ayodele** (2013). Impact of Media violence on student social interaction in School

5. **Musbau Olajire, Ayodele** (2021). Comparative analysis of information seeking behaviors among pupil in Public and Private Primary Schools in Lagos State a student of Holy Cross Catholic Primary School and Green Spring Primary School

Conference Attended

1. Nigeria Library Association: Information Technology Section, held at Ajayi Crowder University, Oyo - 4th – 8th October, 2021
2. Librarian's Registration Council of Nigeria (LRCN) – 27th November, 2018
3. Nigeria Library Association – 57th National Conference and AGM Libraries: Dialogue for Change. Held at Petroleum Training Institute (PTI) Effurun – Warri, Delta State 2nd August, 2019.
4. Marketing the west – African Library Association in the New Millennium, 11th – 13th October, 1999

Professional Body:

- Member: Librarian Registration Council of Nigeria (LRCN) 27th November, 2018
- Member: Lagos State Chapter, Nigeria Library Association (NLA)

Meritorious Service Awards

- Lagos State Polytechnic (Surulere Campus)
- Merit Awards 13th day of July 2012-2013
- National Association of Computer Science Students (NACOSS)

Award of Honour

Award of Appreciations for Meritorious and Recognition 2011 2010
(Accountancy) Abesan Annex
Lagos State Polytechnic (Agege Annex) National Association
of Polytechnic 2005-2006
Accountancy Students (NAPAS) Award of Excellence

Extra Curricular Activities

- **Reading**
- **Playing of Table Tennis**
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Referees:

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Signature

Date

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University Compliance Certification

This is to certify that this Thesis written by **Musbau Olajire AYODELE** with Matriculation No. **LCU/PG/002052** in the department of Information Management of the Faculty of Communication and Information Sciences, Lead City University, Ibadan is in full compliance with the approved University format and style.

Signature

Date

Chapter One

Introduction

1.2 Background to the Study

The national system of education is currently undergoing some changes in its organizational, substantive, and structural aspects. The changes are aimed at providing variability and personal orientation. The emerging education system requires a different attitude to the methods of obtaining knowledge by postgraduate students, i.e. a new type of thinking. It is not enough anymore for postgraduate students simply to learn prefabricated knowledge: postgraduate students have to master the methods of scientific knowledge that will help them to acquire and apply knowledge by themselves by using traditional or novel ways and means. The paradigm of the ultimate goal of education is changing as well: it is to be able to produce a competent professional and researcher with well-developed skills that make it possible to plan independent research activities. A great majority of students finish their education after undergraduate education or join in the business life or start graduate education to carry their education onward. Sometimes, students who join in business life before come back to graduate education and join in this process. Graduate education is a period which includes master degree, postgraduate diplomas, doctorate, proficiency in art, examinations for specialty in medicine, pharmaceuticals, dentistry and veterinarian.

Students enter into the process of postgraduate education either directly after undergraduate education or after some time, it depends on the effects of their research education and research culture. "To do research requires specialty at a certain level; getting benefit from studies done, impressed by them and helping them requires general research culture. The education which is regulated for these general knowledge and specialty activities to be acquired is called research competency"¹. At this level, it is expected in graduate education that students can do more comprehensive and more sound scientific studies than the ones during undergraduate education. Also it is expected that students can solve the problems by scientific ways, produce, analyze and

synthesize information, have necessary methods and skills to solve problems that they encounter during their profession and to become expert. Since, these skills are needed both in the scientific world and in the business world.

Today, graduate education has become important in that recruitment process in business world. Therefore, motivating graduate students, forming research culture, awareness and skill, shortly, train people having inquisitive manner and behaviors are some of the most important functions of this education process. “Undoubtedly, giving insight of research culture to students is a problem of education. Research education can be defined as an education which aims to form research consciousness in people and in society by making people gain scientific attitude and behavior and research competencies. Research competency can be stated as a component of research techniques, statistics, assessment and evaluation and computer domain².

In the context of this study, research competency is the possession of skills and methods of research activity at the level of technology in order to solve managerial problems, build own career in accordance with the values of modern society and the desired personal result. The main objective of the education system is to train competent and creative specialists that are able to plan their activities. Conventional skills are becoming less and less important, while interdisciplinary skills are playing an increasingly important role³. Research competency is defined as ability of a postgraduate student on the basis of acquired knowledge, skills, abilities and acquired experience to use information-digital technologies for organization, planning, conducting own research, as well as to evaluate and monitor implement their results⁴. Research competency is the readiness and ability of an individual on the basis of acquired knowledge, skills, abilities and acquired experience to carry out research, ability to search and select their transformation, storage and transmission using digital technologies, ability to critically evaluate

found information (check their accuracy, timeliness, feasibility), and ability to perform research (organization, planning, implementation)⁵. Although research oriented teaching is on the rise, there are only a few tools, measuring student's research competence. One of these tools is the modified German questionnaire F-Komp, which was developed by Böttcher and Thiel and modified by Hauser F., Reuter R. and Moltick J. and the measures are content competency, methodology skills, ethical practices and evaluation and operationalization of research⁶.

Content Competency is related to knowledge which focuses on theories, the scientific standards, literature research and reflection. Methodological skills are factors that cover knowledge about research methods, how the project is realized and how the results are prepared and presented. Evaluation and operationalization of research help the researcher to evaluate the research and projects of other authors. Furthermore, it deals with the creation of hypotheses while ethical issues reflect on ethical implications in the original version.

In Nigeria, the demand for tertiary education is so high because education is not only an investment in human capital, but also a pre-requisite for economic development⁷. Universities all over the world are regarded as engines of economic and sustainable national development; they transmit knowledge and train the human minds. The belief that education is an engine of growth rests on the quantity and quality of education in any country. In Nigeria, the universities are veritable tools for the realization of national development; the development of cultured citizens and the promotion of basic research. University education is therefore the most powerful and critical success factor for individuals and the society⁸. A major challenge to research output in Africa is the failure to consistently compete with international research. In developed nations like Europe and North America, there is a constant and continued quest for new avenues to ensure

that higher education is competitive and remains dynamic knowledge-based economy in the world through innovation and research⁹.

This could be due to a number of identified challenges including inadequately organized doctoral programmes which also fail to compete with those found in institutions in developed countries. Some countries and institutions have realized this gap and tried to solve it by introducing collaborative research. For instance, the African Economic Research Consortium (AERC), along with universities and other stakeholders within and outside Africa agreed that a collaborative PhD degree programme would be the optimum way to address the quality issues¹⁰. Another well-known challenge with doctoral research is the issue of funding. It is unfortunate that the ability of research students to act as engines of growth and development is being challenged by the long-standing problem of inadequate funding. Most public universities in Africa especially Nigeria are poorly funded by the national governments and quite often this translates to inadequate funding for research and research capacity development. In contrast, the United States, the Australia government and many countries in Europe and Asia expend hundreds of billions of dollars annually on funding research in academic institutions, as well research capacity building. Poor funding could in turn delay in the completion of research work¹¹. Developed countries have been able to tackle this challenge by providing financial support to doctoral education and researchers through fund raisers, government grants and various funds from industries. The issues identified with Nigeria education do not exempt postgraduate students in Lagos State, Nigeria. These issues could be resolved at least to a certain level by exposing postgraduate students and researchers to information literacy skills.

Information literacy is the ability to recognize when information is needed and to have the ability to locate, evaluate, and use effectively the needed information and “information literacy

encompasses knowledge of one's information concerns and needs, and the ability to identify locate, evaluate, organize and effectively create, use and communicate information to address issues or problems on hand”¹². It is a prerequisite for participating effectively in the information world. Information literacy embraces all kinds of information: electronic, non-electronic and verbal¹³. Research has shown that information users (students) often seek for information in libraries and through library databases without getting what they need¹³. To attain information literacy it is necessary for one to ask for assistance in acquiring information needed. The search for the information is what will bring the results. Information professionals are happy and poised to help with any questions information users may have and will always be ready to acquire the necessary skills to enhance information literacy¹⁴.

Information literacy skill means possessing knowledge as to which type of information is required, what type of resources is available for that information, have the knowledge on how to find the information and how to communicate the findings with others. Information literacy skill is the acquisition of skills used in communicating and sharing the results of the information problem-solving efforts accurately and creatively across the range of information format and evaluating how well the final product resolved the information problem and how appropriate and efficient the steps taken to reach the desired outcome¹⁵. The Big6 Model for information literacy, according to Michael Eisenberg and Bob Berkowitz, an information literate person must possess some characteristics like knowing how to locate and access needed information (locate sources and find information within sources), seek information at the right time with all strategies (determine all possible sources and select the best sources), evaluate information {judge the result (effectiveness) and judge the process (efficiency), synthesize available information (organize the information from multiple sources and present information), use information

effectively to accomplish specific purposes (engage e.g. read, hear, view as well as extracting relevant information) and to be able to define the task the information is to be used for (define the problem and identify the information needed); the above listed factors were adopted¹⁶. Such as Task Definition, information seeking strategies, location and access, use of information and synthesis and evaluation. In the context of this study, an information literate person must be able to make use of information skills for identification of information needed for research evaluation and analysis, must have the ability to determine the type and nature of information needed for research, must have the ability to access information needs effectively and efficiently, must have the ability to critically evaluate information needed for research, and must be able to use information effectively and efficiently.

D. Stentof “From Saying to Doing Interdisciplinary Learning: Is problem-Based Learning the Answer”, lack of requisite skills on the use of the library has been an impediment inhibiting accessibility of information resources of library for research among postgraduate students of universities in Lagos State. Despite the success of information literacy skill to promote access to information for research, these students are still plagued by a number of constraints such as information literacy skill. Information literacy skills among postgraduate students of universities in Lagos State have been hampered by insufficient fund as government is unable to provide follow-up reading materials for research. Lack of information literacy skills among students is a bane to impacting information literacy to researchers.

Many countries have recognized the importance of information literacy skills among their citizens and have implemented programs to inculcate the necessary competencies and skills among students at all levels. In the United States, the National Forum on Information Literacy, established in 1989, and the Institute for Information Literacy, established in 1998, have been

instrumental in formulating information literacy standards for the school and higher education sectors. The US Department of Education has included information literacy as one of the country's five goals in education since December 2000. Information literacy developments have also taken place in Canada, China, Japan, Mexico, Namibia, New Zealand, Singapore and South¹⁷.

1.2 Statement of the Problem

Research Competency is the ability of a researcher (postgraduate student) to select a researchable topic based on the standard requirement for solution of an identified problem. Postgraduate students are individuals who are furthering their studies in universities after obtaining the bachelor degree. Each student carries out a research into a problem area in their different fields of study. The postgraduate students are in two major groups which are masters and PhD although there are some students that are taking postgraduate diploma in different areas of education. Each of these groups of students carries out research writing which need certain research competencies. When the research competency skill of the postgraduate students is enhanced, they will be able to make use of acquired information skills to find solutions to identified problems both academically and in the corporate world. However, preliminary investigation, close observation and literature review has revealed a decline in the research competency of postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria. As a result, information are not effectively sourced, the little they could source for are not effectively and efficiently evaluated and synthesized. If care is not taken, the purpose of doing research will not be achieved and problems will remain in the case study without being solved which will eventually hinder development and innovations in the education sector. This may also affect Nigeria economy by preventing infrastructural development and innovations because education is the

bedrock of development in a nation and research is not promoted in an academic environment, it affects the nation economically and developmentally. Exposure of students to information literacy programmes to acquire information literacy skills has been identified to be influencing research competency among postgraduate students.

Postgraduate students of universities in Lagos State were perceived not to have the required information literacy skills. Therefore, their research work is negatively affected. Several studies have been conducted on information literacy programmes and information literacy skills on research competency but this topic is scarce among postgraduate students¹⁸. Hence, this study seems to investigate information literacy programmes, information literacy skills and research competency of postgraduate students of Universities in Lagos State, Nigeria.

1.3 Aim and Objectives of the study

The aim of the study is to examine information literacy skills and research competency of postgraduate students of Universities in selected tertiary institutions in Lagos State, Nigeria. The following objectives guided the study:

- i. examine the level of research competency among postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria.
 - ii. identify different information literacy skills available for postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria.
 - iii. determine the influence of task definition on research competency in universities of postgraduate students in selected tertiary institutions in universities in Lagos State, Nigeria
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- iv. determine the influence of information seeking strategies on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.
- v. ascertain the influence of locating and accessing information on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria
- vi. determine the influence of use of information on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.
- vii. investigate the influence of synthesizing information on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.
- viii. examine the influence of information evaluation on research competency of postgraduate students in universities in Lagos State, Nigeria.

1.4 Research Questions

The investigation directed by the following research questions.

- i. What is the level of research competency of postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria?
- ii. What are the different information literacy skills available to postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria?

1.5 Hypotheses

The following hypotheses have been developed and evaluated at a significance level of 0.05:

H₀₁: There is no significant influence of task definition on research competency in universities of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.

H₀₂: There is no significant influence of information seeking strategies on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.

H₀₃: There is no significant influence of locating and accessing information on research competency of postgraduate students in selected tertiary institutions in universities in Lagos State, Nigeria.

H₀₄: There is no significant influence of use of information on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.

H₀₅: There is no significant influence of synthesizing information on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.

H₀₆: There is no significant influence of information evaluation on research competency of postgraduate students in universities in selected tertiary institutions in Lagos State, Nigeria.

1.6 Significance of the Study

Postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria, Researchers, and the Government will significantly profit from this research. This study will focus on information literacy skills and research competency of postgraduate students. This

research work will serve as guideline for postgraduate students on how to acquire the right information literacy skills in writing and evaluating research. Because this study is based on current events that are still unfolding, it is expected that the research work will deliver pertinent and current data to scholars and students that would embark on researches about different phases of research writing and raise further questions for future researchers of information literacy.

1.7 Scope of the Study

This study concentrated on information literacy skills and research competency of postgraduate students in selected tertiary institutions in Lagos State, Nigeria. The measures of research competency are content competency, methodology skills, evaluation and operationalization of research and ethical practices. The measures used for information literacy skills are task definition, information seeking strategies, location and access of information, use of information, information synthesis and information evaluation. The geographical scope covers government owned universities in Lagos State which are University of Lagos (UNILAG), Akoka and Lagos State University (LASU), Ojo. The respondents will be postgraduate students of UNILAG and LASU while private universities are excluded.

1.8 Limitation of the Study

There are limitations faced with this study.

- i) One of it is the delay experienced during the gathering of data in the two University.
 - ii) Also, the ingenuity of respondents who filled the questionnaires for accurate data analysis, time factor for retrieval of information, and
 - iii) The financial implications of carrying out this study is limited to inability to meet some of the respondents.
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1.9 Operational Definitions of Terms

Research Competency: A combination of motivational, gnoseological, operational, and personal components, developed at such a level that allows one to successfully apply the acquired research skills and knowledge in practical tasks.

Content Competency: This is the capability of postgraduate students of universities in selected tertiary institutions in Lagos State to apply or use a set of related knowledge.

Methodology Skills: Evaluate and interpret evidence of different types, including documentary and other qualitative sources as well as statistical data.

Operationalization of Research: The process of turning abstract concepts into measurable observations..

Evaluation of Research: A form of disciplined and systematic inquiry that is carried out to arrive at an assessment or appraisal of an object, program, practice, activity, or system with the purpose of providing information that will be of use in decision making.

Ethical Practices: The branch of ethics or theology that studies the relation of general ethical principles to particular cases of conduct or conscience.

Information Literacy Skills: This is the process by which postgraduate students of universities in selected tertiary institutions in Lagos State are equip with the skill to evaluate, organize, and make use of information for research.

Task Definition: This is the ability of postgraduate students of universities in selected tertiary institutions in Lagos State to able to define their purpose of information literacy skills acquisition.

Information Seeking Strategies: These are the available channels or process through which postgraduate students of universities in selected tertiary institutions in Lagos State are able to seek information for research.

Information Synthesis: The process of analyzing and evaluating information from various sources, making connections between the information found, and combining the recently acquired information with prior knowledge to create something new.

Information Location and Access: This is the ability of postgraduate students in selected tertiary institution to locate information and have access to information needed for research.

Information Evaluation: This is the ability of postgraduate students of universities in selected tertiary institutions in Lagos State to analyze and decide information required for research.

Use of Information: This is the ability of postgraduate students of universities in selected tertiary institutions in Lagos State to make use of information as a solution to an identity problem for research at the right time.

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Chapter Two

Literature Review

This phase revised related literature that enabled the researcher broaden her understanding on the research problem. The chapter is presented under the following headings:

2.1 Conceptual Review

2.1.1 Overview of Research Competency

Emergence of knowledge based society with its challenges and demands has increased the urge for research in every sector of life endeavour. Research means a methodological investigation into a subject in order to discover facts about it¹. Research is the logical, systematic and objective collection, analysis, synthesis, evaluation and recording of accurate and controlled observations for the development of generalizations, principles or theories that are ultimately aimed at description, explanation, prediction and control of natural phenomena to meet specific needs of man². In the context of this study, research is a systematic, scientific investigation aimed at finding a solution to an identified problem. That is, it is an action directed towards collection, analysis and interpretation of data on competency needs of postgraduate students in research writing in Universities with a view to making them competent in thesis writing in their various institutions. Research is carried out in many areas of study including education. Educational research is a systematic scientific investigation involving identifying ways and means of solving problems relating to teaching and learning so that the goals of education can be attained³. Research writing involves creation, diffusion and utilization of new knowledge through processes or mechanisms with the aim to link it to its relevant use. Research writing is a pre-requisite for the award of a degree to postgraduate students in universities⁴.

Research is an activity aimed at a comprehensive study of an object, process or phenomenon, their structure and connections, as well as the obtaining and putting into practice of its results that are useful for humans. Its object is the material or ideal system, and the subject is the structure of the system, the interaction of its elements, various properties, patterns of development, etc.⁵. Research implies that one needs to know everything that has already been achieved in a particular area of knowledge and to be able to produce new knowledge by oneself; to be able to put into practice the methods of scientific research and obtain new scientific knowledge independently. Research is the search for new knowledge or a systematic investigation to establish facts. In a narrower sense, research is a scientific method (process) of studying something. Scientific research, based on the application of the scientific method, provides scientific information and theories to explain the nature and properties of the surrounding world. Such a study may have practical application⁶.

Research is a careful and detailed study into a specific problem, concern, or issue using the scientific method. It's the adult form of the science fair projects back in elementary school, where you try and learn something by performing an experiment. This is best accomplished by turning the issue into a question, with the intent of the research to answer the question. The primary purposes of basic research (as opposed to applied research) are documentation, discovery, interpretation, and the research and development (R&D) of methods and systems for the advancement of human knowledge⁷. Approaches to research depend on epistemologies, which vary considerably both within and between humanities and sciences. There are several forms of research: scientific, humanities, artistic, economic, social, business, marketing, practitioner research, life, technological, etc. The scientific study of research practices is known as meta-research. Scientific research is a systematic way of gathering

data and harnessing curiosity. This research provides scientific information and theories for the explanation of the nature and the properties of the world. It makes practical applications possible. Scientific research is funded by public authorities, by charitable organizations and by private groups, including many companies. Scientific research can be subdivided into different classifications according to their academic and application disciplines. Scientific research is a widely used criterion for judging the standing of an academic institution, but some argue that such is an inaccurate assessment of the institution, because the quality of research does not tell about the quality of teaching (these do not necessarily correlate)⁸.

Research in the humanities involves different methods such as for example hermeneutics and semiotics. Humanities scholars usually do not search for the ultimate correct answer to a question, but instead, explore the issues and details that surround it. Context is always important, and context can be social, historical, political, cultural, or ethnic. An example of research in the humanities is historical research, which is embodied in historical method. Historians use primary sources and other evidence to systematically investigate a topic, and then to write histories in the form of accounts of the past. Other studies aim to merely examine the occurrence of behaviours in societies and communities, without particularly looking for reasons or motivations to explain these. These studies may be qualitative or quantitative, and can use a variety of approaches, such as queer theory or feminist theory⁹. Artistic research, also seen as 'practice-based research', can take form when creative works are considered both the research and the object of research itself. It is the debatable body of thought which offers an alternative to purely scientific methods in research in its search for knowledge and truth¹⁰.

The controversial trend of artistic teaching becoming more academics-oriented is leading to artistic research being accepted as the primary mode of enquiry in art as in the case of other

disciplines¹¹. One of the characteristics of artistic research is that it must accept subjectivity as opposed to the classical scientific methods. As such, it is similar to the social sciences in using qualitative research and inter-subjectivity as tools to apply measurement and critical analysis¹². "Artistic research is to investigate and test with the purpose of gaining knowledge within and for our artistic disciplines. It is based on artistic practices, methods, and criticality. Through presented documentation, the insights gained shall be placed in a context"¹³. Artistic research aims to enhance knowledge and understanding with presentation of the arts. A simpler understanding is that artistic research is any kind of research employing the artistic mode of perception¹⁴.

There are two major types of empirical research design which are qualitative research and quantitative research. Researchers choose qualitative or quantitative methods according to the nature of the research topic they want to investigate and the research questions they aim to answer. Qualitative research involves understanding human behavior and the reasons that govern such behavior, by asking a broad question, collecting data in the form of words, images, video etc. that is analyzed, and searching for themes. This type of research aims to investigate a question without attempting to quantifiably measure variables or look to potential relationships between variables. It is viewed as more restrictive in testing hypotheses because it can be expensive and time-consuming and typically limited to a single set of research subjects¹⁵. Qualitative research is often used as a method of exploratory research as a basis for later quantitative research hypotheses¹⁶. Qualitative research is linked with the philosophical and theoretical stance of social constructionism. Social media posts are used for qualitative research¹⁷. Quantitative research involves systematic empirical investigation of quantitative properties and phenomena and their relationships, by asking a narrow question and collecting numerical data to

analyze it utilizing statistical methods. The quantitative research designs are experimental, correlational, and survey (or descriptive)¹⁸. Statistics derived from quantitative research can be used to establish the existence of associative or causal relationships between variables. Quantitative research is linked with the philosophical and theoretical stance of positivism. The quantitative data collection methods rely on random sampling and structured data collection instruments that fit diverse experiences into predetermined response categories¹⁹. These methods produce results that can be summarized, compared, and generalized to larger populations if the data are collected using proper sampling and data collection strategies. Quantitative research is concerned with testing hypotheses derived from theory or being able to estimate the size of a phenomenon of interest²⁰.

If the research question is about people, participants may be randomly assigned to different treatments (this is the only way that a quantitative study can be considered a true experiment)²¹. If this is not feasible, the researcher may collect data on participant and situational characteristics to statistically control for their influence on the dependent, or outcome, variable. If the intent is to generalize from the research participants to a larger population, the researcher will employ probability sampling to select participants²². In either qualitative or quantitative research, the researcher(s) may collect primary or secondary data²³. Primary data is data collected specifically for the research, such as through interviews or questionnaires. Secondary data is data that already exists, such as census data, which can be re-used for the research. It is good ethical research practice to use secondary data wherever possible²⁴.

Mixed-method research, i.e. research that includes qualitative and quantitative elements, using both primary and secondary data, is becoming more common. This method has benefits that using one method alone cannot offer. For example, a researcher may choose to conduct a

qualitative study and follow it up with a quantitative study to gain additional insights²⁵. Big data has brought big impacts on research methods so that now many researchers do not put much effort into data collection; furthermore, methods to analyze easily available huge amounts of data have also been developed.

Today, making research, problem solving, reflective thinking and critical thinking skills are important to be taught to students in the frame of constructive education. The most important qualification of students who want to continue graduate education is research competency. Research competency is mentioned as a component of research technics, statistics, assessment and evaluation and computer²⁶. There are a lot of students graduating from master degree without attending any conferences or panels, presenting any papers in scientific events or writing an article and publishing it. Studies shows that students participating in those kinds of scientific events or taking scientific research course have higher attitude scores towards making a research than others²⁷. They defined competence as the ability to successfully meet complex demands in a particular context. To meet this demand, it is necessary to mobilize knowledge, cognitive and practical skills, as well as social and behavioral components. These are attitudes, emotions, (ethical) values and motivations²⁸. They define competences as available and learnable cognitive skills and abilities of an individual, which are required to solve problems. They also add motivational volitional and social willingness and social skills to their definition. These aspects might be important, if the problem context varies and adaptations of the solution are necessary.

Competences is a construct which is based on skills, there is no genetic disposition²⁹. All required skills are learnable for a person who is willing. Idea of competences is the fact, that acquired competences stay relatively stable over a long time, but some components may vary and interact with others. This might have a dynamic influence on the competence and can affect

it in a positive or negative way. A competence is a relatively stable construct of different components, which is required in the process of problem solving³⁰. This concept can vary from domain to domain. Different domains may need different components, to overcome certain problems. It is important to point out that competences and skills are not the same³⁰. A component is formed by several skills and abilities. The skills and abilities are based on motivational, volitional and social willingness; therefore, competences are the base for successful acting in different domains³¹.

Competency is an underlying characteristic of a person which results in effective and superior performance of a job. Competency can also be defined as the ability to possess suitable and sufficient knowledge, skills and experience for carrying out a particular task³². Competency is the knowledge, skills and attitudes that are required for successful performance of a given task. Competency refers to a standardized requirements based on which an individual performs a task properly. Competency therefore means the knowledge, skills and attitudes required by students in research writing for production of a credible thesis³³. Competency is a term that is used both scientifically and in everyday language. Competency according to Organization for Economic Co-operation and Development can be “attributed to individuals, social groups or institutions, when they possess or acquire the conditions for achieving specific developmental goals and meeting important demands presented by the external environment”³⁴. Higher institutions especially university must educate, teach and prepare each student for lifelong learning, as a result, the review of the concept of competency in this particular study will focus on individual attribute of competency rather than the competence of a social group or institution.

Key competency according to European Commission, (2004) represents a transferable, multifunctional package of knowledge, skills and attitudes that all individuals need for personal

fulfillment and development, inclusion and employment which should have been developed by the end of compulsory schooling or training, and should act as a foundation for further learning as part of lifelong learning³⁵. Competency can be defined as a combination of knowledge, skills and attitudes appropriate to the context³⁶. On this regard, competency can be defined as an interrelated set of attitudes, skills and knowledge which are drawn upon and applied to a particular context for successful learning. The term competency and skills are often used interchangeably³⁶. As a broader concept, competency is not limited to cognitive elements (involving the use of theory, concept or tacit knowledge); it also encompasses functional aspects (involving technical skills) as well as interpersonal skills (example, social or organizational skills) and ethical values. A skill on the other hand, is ability to perform tasks and solve problems and can be acquired in a matter of months while competencies are acquired over a number of years³⁷. Competency is the ability, within a certain professional or academic domain, to make use of already learnt as well as new knowledge and skills across traditional subject areas to adequately solve real – life, poorly defined problems³⁸.

Competency has two dimensions; knowledge and skills: “Knowledge may be seen as understanding of how everyday world is constituted and how it works. Skills involve the ability to pragmatically apply, consciously or even unconsciously, our knowledge in practical settings³⁹. Competency is more than just knowledge and skills. It involves the ability to meet complex demands, by drawing on the mobilizing psychosocial resources (including the skills and attitudes) in a particular context. For example, the ability to communicate effectively is competency that may draw on an individual’s knowledge of language, practical information technology skills and attitudes towards those whom he or she is communicating⁴⁰. From the foregoing discussion, one can infer that competency is a combination of knowledge, skills and attitudes appropriate to the

context which are fundamental for each individual in knowledge based society. In other words, competency deals with an individual's demonstrated capacity to perform, that is, the possession of knowledge, skills, and attitudes needed to satisfy the special demands or requirements of a particular situation. Competency is developed over a time and demonstrated to a varying degree appropriate to the developmental age of learners and their learning needs⁴¹.

Research skills today must be developed in such a way that students in higher education will be enabled to make them their own for good. This type of competencies is given fundamentally in the aspects of methodological domain, information gathering and the management of document-writing norms and technological tools. Furthermore, the usefulness of the existence of mediating didactics is recognized⁴². The competencies considered by the Organization for Economic Cooperation and Development in its skills strategy are the following: the development of relevant competencies, the activation of those competencies in the labor market and the use of those competencies effectively for the economy and society⁴³. The research competences established from the implementation of a pedagogical research project are as follows: the acquisition of new knowledge, the identification of educational problems, synthesis and argumentation, metacognition, knowledge of new research methods, the possibility of developing research tools and the interpretation and dissemination of results⁴⁴. Research skills work for various disciplines and can even link them. Some studies have affirmed the value of facilitating interactions between researchers from different research fields within a discipline⁴⁵.

Therefore, research competencies are approached from distinct perspectives. In this study, the focus is on those that allow for the development of academic reading and writing, because it is an area that requires a boost because it is basic for postgraduate students to be able to understand texts of different kinds and to be able to write with academic rigor. Academic writing is one

aspect that has been focused on in the educational context. It is a multiple construction that unites such essential elements as the understanding of the scientific field and the understanding of scientific research methodology, statistical knowledge and the understanding of the culture of native and foreign languages⁴⁶. Currently, a change in expectations has emerged around academic writing, and it has become increasingly evident that a much longer and gradual orientation in the process of research and information gathering is desirable to better meet the needs of contemporary students⁴⁷. On the basis of historical emphasis on writing instruction, five approaches is illustrated, namely, skills, creative writing, process, social practice, and socio-cultural perspective⁴⁸. Academic writing is thus conceived as a way in which young people can construct their own according to elements that provide academic rigor through an efficient interaction with texts. Academic reading and writing are a fundamental part of the context of higher education. Academic reading and writing also includes the learning of foreign languages as the gender-based approach to the teaching of writing has been found to be useful in promoting the development of literacy through the explicit teaching of characteristics, functions, and options of grammar and vocabulary that are available to interpret and produce various specific genres⁴⁸.

Young university students come from a system of basic and upper secondary education in which the fundamental thing was to learn through the repetition of texts, but now their ideas, knowledge, capacity for analysis and critical thinking are a central aspect⁴⁹. Understanding reading practices and needs in the context of information seeking can refine our understanding of the choices and preferences of users for information sources (such as textbooks, articles, and multimedia content) and media (such as printed and digital tools used for reading⁵⁰). In this sense, it is useful to consider academic literacy, as given to teaching process that may (or may not) be

put in place to facilitate students' access to the different written cultures of the disciplines⁵¹. Currently, the many ways in which students perform the process of academic reading and writing must be addressed so that an improvement in the process can be attained. Within the study of research competencies for the development of academic reading and writing, theoretical–conceptual trends and methodological designs play an important role. Psychopedagogical, socio-cultural, use and development of technology, disciplinary and educational management studies as theoretical–conceptual trends was considered⁵².

For methodological analysis, the categories of experimental design, quasi-experimental design, pre-experimental design, and within quantitative methods are used, and for qualitative methods, phenomenological, narrative and case studies, grounded theory and ethnography are contemplated. Documentary research is also added because there are studies on this type related to the subject, which are considered to be excluded⁵³. In the research field, the findings and innovation that are increasingly present are a fundamental part. For the area of findings, the classification must be considered. Innovation can create a new process (organization, method, strategy, development, procedure, training, and technique), a new product (technology, article, instrument, material, device, application, manufacture, result, object, and prototype), a new service (attention, provision, assistance, action, function, dependence, and benefit) or new knowledge (transformation, impact, evolution, cognition, discernment, knowledge, talent, patent, model, and system)⁵⁴. Various types of innovation are available, which are: (a) continuous innovation: when small deviations in educational practices accumulate, they translate into profound changes; (b) systematic: it is methodical and ordered like the innovation of continuous improvement, but the scope and novelty of its changes may vary and even lead to substantial

changes; and (c) disruptive: they are new contributions to the world and generate fundamental changes in the activities, structure and functioning of organizations⁵⁵.

Another type of innovation is open innovation, which is defined as the deliberate use of knowledge inputs and outputs to accelerate internal innovation and expand it for the external use of innovation in markets⁵⁶. Educational purposes and divergent contexts can determine the type of innovation applied. Many factors converge in the development of academic reading and writing. Digital skills are essential elements in enriching academic reading and writing. In the framework for the development and understanding of digital competences, five areas of digital competences exist, namely, (a) information: judging its relevance and purpose through identifying, locating, retrieving, storing, organizing, and analyzing digital information; (b) communication: taking place in digital environments or using digital tools to link to others and interacting in networked communities; (c) content creation: some elements include creating and editing new content and enforcing intellectual property rights and licenses; (d) security: personal protection, protection of digital identity, and safe and sustainable use and (e) problem solving: some aspects include making informed decisions about which digital tools are best suited for which purpose or need, creatively using technologies and updating the skills of individuals⁵⁷.

The changing environment of higher education offers an uncertain information ecosystem that requires greater responsibility on the part of students to create new knowledge and to select and use information appropriately⁵⁸. The Association of College and Research Libraries 2016 includes some key information literacy concepts: information creation as a process, information as value, research as inquiry and search as strategic exploration. Academic literacy can be better developed if information literacy and digital competencies are considered. Research studies have presented challenges that must be considered for future research. Feasibility: Knowledge Sharing:

Research Opportunities and Skill Differences. Critical thinking and academic literacy are considered amongst the challenges for developing academic writing from research skills⁵⁹. The first is considered as the process that involves conceptualization, application, analysis, synthesis, and evaluation of the information collected from observation and experience as a guide for belief and action⁶⁰. Academic literacy grows within a competency-based educational model, in which competencies are recognized as the developments in the learners of informational behaviors and attitudes that make them expert evaluators of digital and virtual web contents to obtain knowledge and know-how. Reflection and critical thinking are basic elements for an adequate interaction in digital media. Several items were identified from mapping and systematic literature reviews related to the topics of research skills and academic literacy development⁶¹.

Designing strategies for the adequate development of research competencies with the purpose of training sufficiently qualified researchers is crucial⁶². Qualitative research with the purpose of establishing whether students are part of a degree module can demonstrate through their online textual publications their information literacy skills as a discursive competence and social practice. A study on reading strategies in relation to information-seeking stages, tasks and reading media in an academic setting was conducted⁶³. This study aims to determine how the three elements present in the quality criteria (research skills, academic reading and writing and innovation processes) of this systematic review of the literature can be linked so that they can serve as a basis for identifying which research skills can be used to develop academic reading and writing in higher education contexts through innovative models. Information literacy is presented as a fundamental competence because for the adequate development of academic reading and writing, university postgraduate students must be able to perform efficiently in the search, selection and treatment of information⁶⁴. The method followed for the present research

was the systematic review of literature, which considers within the phases to follow the review of a protocol to specify the research question. The search started with the articles that emerged from a systematic mapping of literature that was previously carried out; subsequently, quality criteria were defined that allowed refining the selection of articles for the systematic literature review, inclusion and exclusion criteria were also determined, and six research questions were also established for the analysis of the articles.

A review of the literature made, revealed the components of knowledge and research skills that a researcher should have to function as researcher. The importance of having information literacy skills are important in a technological and information rich environment. This will equipped them to explore reputable information sources in their field of study and to practice evaluating the value of what they read or found. They should be well prepared to explore the research literature of their field using proper data based. This will guide them to compose or build focused manageable research questions. In their working life they ought to be able to use. The research tools with the understanding of information literacy skills. Another component on the ability to conduct is the knowledge on research methods. A researcher should able to have the understanding of selecting and executing an appropriate method to conduct the study based on the research questions within the research environment they are in. Inclusive of the method is on the knowledge to use appropriate instrument for data collection including the knowledge and skills of the data analysis. The statistical knowledge and skills as measured on analysis of data forms another subcomponent. The above components formed the main construct in the questionnaire in this study which the main instrument for the study. The items of the questionnaire were Likert-type and grouped under five constructs, i.e.: a. Research capacity b.

Reflection skills c. Problem solving skills d. Communication skills e. Research methodology skills

The operations definitions of these construct are as follows: a. Research Capacity Analysis is the ability to gather relevant data and information and apply methods of synthesis, critical thinking and data reduction to locate and understand patterns or connections in that information. It might also involve in understanding and using statistical tests to examine differences between sets of data. Analysis required the background skills of data collection, data analysis, reflection and feedback, scientific experimentations. Research capacity is the ability to carry out data collection procedures involving planning and selecting appropriate data collecting tools or instruments, identifying an appropriate method (quantitative and qualitative) for interpreting and manipulating data and applying an appropriate statistical tools for test of significance besides understanding. The limitations of analysis techniques (for example, understanding the assumptions behind a statistical analysis, and examining whether your data fit these assumptions) and drawing and interpreting appropriate conclusion from results of analysis. b. Reflection Skills Reflection is the ability to look back. Thinking about what you have done, what you might have done alternatively, how you feel about it, and how you might change it to improve your research (for example, reflecting on the outcomes of a research study and recommending on a alternative course of action for next other researchers. T Using insight gained through reflection to improve for others who like to pursue similar research (for example, watching others perform and offering feedback on the way they are tackling a problem). c. Problem Solving Skills Problem solving is the ability to identify, define and analyze problems, to create solutions and evaluate then, and to choose the best solution for a particular context. It requires imaginative and innovative thinking to find new ways to approach a problem, analytical skills to examine the

consequences of a particular solution, and reasoning skills to weigh one solution against another. Problem solving involves the background skills of imaginative and creativity, logic and reasoning, data collection, conceptual thinking, reflection and feedback, and scientific experimentation. d. Communication Skills Communicating skills is the ability to write and present the research and its findings. It is communicating to others the purpose and outcomes of research. It the ability to summarise information, explain the purpose, objectives, conclusions of the research, and tailor the communication to the needs and knowledge level of a particular audiences. e. Research Methodology Skills; Identifying and designing appropriate research procedure understanding the limitations and scope of research design (for example, sample sizes and data type)⁶⁵.

The above definitions were gathered through literature reviews. An instrument was developed to measure the research competent of the doctoral students, ability to conduct research, the desired outcome of the doctoral programs that they have attended. The instrument has been validated and has a moderate high reliability. A convenient sample of successful doctoral candidates sponsored by the Ministry of Education was selected. The sample consists of local and overseas trained candidates. They were contacted from a list of PhD holders prepared by the Scholarship Division. Each of them was told the purpose of the study was to compare the outcome knowledge in terms knowledge and the ability to conduct research based on their doctoral students. The final, often neglected is the training ability to communicate the research and its findings. Academics and research practitioners are often insisted to write and publish their research. Doctoral students are often required to write and publish their theses in recognized journals in their field of study. These components form the ability conduct; research expected outcomes of the doctoral programmes, as part of a legacy of contributions to knowledge⁶⁶.

The role of ethical review is to ensure that ethical standards in research are met. In Australia this process is governed by the National Statement on the Ethical Conduct of Research Involving Humans⁶⁷. The National Statement (as it is called) provides both guidelines on ethical research conduct for those designing and conducting research, and guidelines for the process of ethical review. Discussions of research ethics often highlight issues such as participant consent, participant confidentiality, data security and so on, with a focus on minimising harms to participants. All go to the implementation and conduct of a project. Also essential to the ethical assessment of a research project is design, and the methodological competence of the researcher to adequately undertake the project. Research competence is an ethical requirement. Research competence is fundamental to the conduct of ethical human research. The Australian National Statement makes this explicit and requires Human Ethical Review Committees (HRECs) undertaking ethical review to consider if researchers have the appropriate research skills and experiences to conduct the research they propose to undertake. That is, is the research ‘conducted or supervised by persons or teams with experience, qualifications and competence that are appropriate for the research’⁶⁸. Judging research competence is part of the assessment of research merit that should occur within ethical committees. Particular issues of research merit mentioned in the National Statement that speak to research competence include whether the research is: ‘designed or developed using methods appropriate for achieving the aims of the proposal’, ‘designed to ensure that respect for the participants is not compromised by the aims of the research, by the way it is carried out, or by the results’, ‘conducted using facilities and resources appropriate for the research’.

Ethical frameworks outside of Australia evoke similar characteristics when outlining guidelines for review such as: posing an answerable and important question; using appropriate research

methods; and conducting research in a transparent and accountable manner⁶⁹. The Economic and Social Research Council Framework for Research Ethics framework from the UK allows research proposals to be rejected by reviewers if there are doubts about research competence⁷⁰. The Australian framework is explicit about the need for researchers to have research competence; although a request for a demonstration of technical research competence is not routinely sought beyond a declaration of qualifications. The National Ethics Application Form (NEAF) limits its focus to any students involved and asks: “What training has the student received in the relevant research methodology”. Explicit request for evidence of the research competence of all researchers is found in review guidelines for clinical trial studies. For example, ‘training, experience and other indicators of competency that demonstrate each person’s [investigator’s] ability to perform their tasks on the clinical trial’ is sought by some institutions⁷¹.

With respect to qualitative research competence, the requirement for an explicit declaration of capability is often overlooked by ethical review committees. Yet, it is difficult to consider, describe or address ethical issues particular to qualitative research without experience and understanding of the principles and technicalities of qualitative methodologies. As members of (different) ethical review committees and experienced qualitative researchers we see many applications involving qualitative research. We are interested in two issues related to assessment of research competence in ethical review. First, applications involving qualitative research rarely include specific claims about qualitative skills and experience so it is not clear how judgments of research competence can be made (assuming they are). Second, it is not clear that ethical review committees always have members with sufficient qualitative expertise to make such judgments. For example, a properly constituted HREC in Australia is only required to have ‘at least two people with current research experience that is relevant to research proposals to be considered at

the meetings they attend'. Although the HREC may have a 'pool of inducted members with relevant expertise' there is no particular requirement for experts in specific methodologies. In practice, ethical review committees have members who call themselves qualitative researchers, members who have done some qualitative research, members who have some knowledge about qualitative research and members whose only exposure may be through sitting on an ethical review committee. Committees that review few qualitative research proposals may not have access to any expertise⁷².

Moreover, the broad array of methodologies and methods of data collection and analysis in qualitative research can create confusion and controversy related to appropriate use in different contexts (even among qualitative researchers). This very diversity underscores the importance of a competent researcher explaining and rationalising their chosen approach through their ethics application. How then can ethical review committees make the required judgment about appropriate qualitative experience, qualifications and competence? While previous articles (including in this journal) have examined the ethical issues arising in qualitative research practice none address the specific issue of research competence⁷³. Ascertaining research competence, some research methodologies or disciplines have established sets of core competencies, recognised qualifications or accreditation processes. For example, the Statistical Society of Australia provides accreditation for statisticians based on formal qualifications, practical experience and professional competence. Completing an accredited degree gives access to recognition as a Graduate Statistician⁷⁴. There is no accreditation process for qualitative researchers in most countries and no set of agreed core competencies (nor are we aware of successful attempts to develop any nationally or internationally). That is not to say there is not

much discussion about a curriculum for qualitative research or the qualities of a good qualitative researcher⁷⁵.

The broad range of methodologies and methods encompassed by the term qualitative research likely makes any attempt to identify core competencies very challenging (just as the characteristics of good quality qualitative research are highly contested). There are three ways that ethical review committees can ascertain qualitative research competence: formal qualifications; explicit claims to competence; and markers of in/competence. There are several ways researchers can gain qualitative research training. A few universities offer specialist degrees in qualitative research; a simple declaration of having achieved this qualification demonstrates a researcher has undertaken a formal, structured high-level program of theoretical and practical training and been assessed as competent. More common are embedded units on qualitative research (or research methods) as part of undergraduate or postgraduate programs⁷⁶. Ethical review committees should bear in mind that curriculum coverage may have been as little as a single lecture or as much as a whole semester. Researchers can demonstrate these qualifications by declaring, for example, that their degree included a full semester unit in qualitative research methods. They may wish to mention specific content relevant to the proposed research, such as interviewing theory and skills. Completion of a large project, such as a PhD program, is perhaps the most advanced of the formal qualifications⁷⁷.

Many higher education institutions and professional bodies offer professional development opportunities in qualitative research. Finally, peer networks regularly offer seminars and informal mentoring. Professional development opportunities such as these are a valid way for researchers to gain practical skills in qualitative research (although they rarely gain a thorough grounding in theoretical underpinnings). Any of the above indicates a researcher has engaged in

some structured learning in qualitative research. However, just as an ethical review committee should be cautious about relying on a degree in statistics as the sole indicator of competence, certification of qualitative-related study has limitations. A formal program that involves assessment of skills and knowledge a research degree, a research methods unit of study is significantly more reliable than professional development opportunities where researchers merely attended brief, unassessed classes/seminars⁷⁸.

Moreover, just because an individual has acquired formal knowledge it does not mean they are able to translate this into practice. Lack of methodological experience or skills can become apparent in the design of the project under review. Competence might also be developed through research practice as a research assistant, PhD candidate or professional researcher. A researcher may experience informal learning and mentoring from a supervisor or other experienced qualitative researcher. More advanced competence may be developed (and demonstrated) through teaching qualitative research, recognition as a qualitative methodologist (e.g. publishing on methodology), supervising PhD candidates, or running qualitative research projects. An experienced researcher with no formal qualifications might convince a HREC of her qualitative research competence by saying something like: I have over 20-years of experience in the development and use of qualitative research in health and psychology, including in my PhD research. I have employed several qualitative methodologies across funded projects, and conducted research with a range of populations and on sensitive topics. I have taught qualitative research methods to postgraduate students for five years and supervised students undertaking qualitative methods from Honours to PhD level.

A researcher may wish to draw attention to a specific area of competence that is relevant to the proposed research project by saying something like: The proposed study employs narrative

analysis. I have used this analytical approach in earlier studies employing interview data and online blogs; this work has been published in several peer reviewed papers. Explicit claims of competence will likely be found on applications for ethical review under the heading of qualifications or expertise. However, ethical review committees may also notice researchers claiming competence in other sections by referring to previous research experience and how it has informed their practice.

Finally, regardless of formal qualifications, training and claimed competence, applications for ethical review will hold other clues as to qualitative research competence. Indeed, a qualification may be decades old and the skills rusty. A researcher may be competent in one qualitative methodology; this does not mean they are competent in them all; each methodology ethnography, narrative inquiry, grounded theory has its own specific competencies. Moreover, a claimed competence may be contradicted by the quality of the proposed project presented through the application. A badly written application does not necessarily mean a lack of qualitative research competence but it certainly raises concerns about competence. Markers of in/competence will be spread throughout the application but likely concentrated in sections on sampling, recruitment, protecting participant privacy and confidentiality, risks to participants and of course, research methodology, tools and analysis. The National Statement provides a framework for reviewers and researchers to help them think through the ethical issues facing a proposed piece of research⁷⁹. We have used these guidelines to categorise the specific questions we consider when looking for markers of in/competence in qualitative research. To be clear, these are our rules-of-thumb not a check list for an exhaustive set of criteria for qualitative research competence. While all the questions work on a general level across qualitative methodologies there will be additional markers of in/competence for specific methodologies.

Researchers do not need to use an extant methodology, simply present an underlying logic for their actions, a coherent justification that ties the research aims/questions to the methodology and the methods⁸⁰. Indicators of this kind of logic include statements like: In line with the ethnographic methodology adopted for this project we propose to conduct observations in three sites. For example, there is no single Ground Theory methodology, so we would expect to see a reference to Constructivist Grounded Theory or to 'Straussian' Grounded Theory^{81,82}. Are the methods and language consistent with the claimed methodology? Does the researcher make appropriate claims about methods such as sampling, data collection and analysis? In terms of sampling, is the researcher making claims about representative sampling or generalisable findings where we would expect discussion of purposive or criterion sampling? Qualitative samples are designed to facilitate investigation of meaning, understanding, experience, or process; that is, understanding rather than determining the extent of a phenomenon. In terms of data collection, how is data being generated and is this approach coherent and consistent with the research aims/questions and methodology? For example, a narrative study that relies only on focus groups would raise a flag for us as this method tends not to generate individual stories. Or that uses an interview schedule containing heavily structured and/or mainly closed-ended questions rather than open, exploratory questions that encourage story telling. Finally, is the method of data analysis described and is it consistent with the methodology and methods? We are looking for evidence that the researcher has developed an analytic strategy and considered how analysis will produce knowledge that addresses the stated aims or research questions.

Ethically conducted qualitative research can only be undertaken by researchers with the appropriate experience, qualifications and competence. It is difficult to consider, describe or address the ethical issues particular to qualitative research design without a thorough

understanding of the technicalities of qualitative methodologies. Researchers have a responsibility to demonstrate their research competence, while ethical review committees have a responsibility to judge it. Yet qualitative research competence is a rarely discussed ethical issue, it is either not assessed or the criteria are opaque. We anticipate resistance from some social scientists who may feel that ethical review committees cannot undertake this work. Or that only a qualitative researcher can make these judgments. We echo calls for the development of ethical review committee skills in assessing the rigor of qualitative applications. We endorse calls for more qualitative expertise to be available to review panels, either through permanent or co-opted members⁸³.

2.1.2 Overview of Information Literacy Skills

The term "information literacy" (IL) was coined outside of academia in 1974 by a lawyer named Zurkowski, who was interested in intellectual property and industries⁸⁴. The term was first used in a proposal submitted to the National Commission on Libraries and Information Science (NCLIS): in which Zurkowski stated: "People trained in the application of information resources so their work can be called information literates. They have learned techniques and skills for utilizing the wide range of information tools as well as primary resources in molding information-solutions to their problems,"⁸⁵. Zurkowski's emphasis was on the private sector and his concern was using information skills as a problem-solving approach for workplace contexts⁸⁶. The evolution of information literacy, however, has occurred mostly within the public sector, mainly in the field of library sciences. Librarians and academics have set information literacy as one of their major goals⁸⁷. Accordingly, this phase of the evolution of information literacy is

associated and mixed with library user education and bibliographic instruction programmes in the form of short orientations on how to use library and information resources⁸⁸.

Information literacy gradually began to evolve from the user-education concept of the library environment. Theoretically, the concept began to shift from teaching tools to teaching competencies that were not limited to particular tools or contexts⁸⁹. In practice, however, the view is that the transformation was very gradual because the users were still viewed as passive information consumers. With the advent of digital technology in the 1980s, information literacy expanded to include more than library resources, and it started to be associated with technological literacy, information and communication technology (ICT) literacy, digital literacy, and computer literacy. Information literacy at this stage was viewed as tool based, but with a focus on technology⁹⁰. Constant advancement in information technology led to an increase in information resources and complexity in the digital information environment. It has become obvious that knowing how to use computers and access information is not sufficient for locating and extracting relevant information in such a complex environment. Therefore, the need for underlying competencies such as critical thinking and evaluation skills as well as socio-cultural support, have become more prominent. The emotional or affective nature of information literacy has also been taken into consideration as an essential requirement⁹¹.

Studies on emotional, or affective, aspects of information began with and continued with several others. In recent years, Web 2.0 technology has begun to play an important role in information literacy, leading to a drastic change in the way we collaborate, communicate, and share information. A scholar interprets this change as advancement in the social dimension of information literacy⁹². Web 2.0 is significant enough to provide us with a new definition of information literacy. Another important influence on the evolution of information literacy is

educational practice. There is presence of a strong tie between education and information literacy. They refer to the impact of constructivism on providing new arguments for information literacy, which led to the promotion creative and reflective users of information, particularly now that users have access to Web 2.0 tools that can allow them to be both reflective and creative⁹³.

Similarly, how social constructivism and connectivism can facilitate a teaching approach in accordance with current participatory technology, or Web 2.0 was noted⁹⁴. In a broader perspective, information literacy as an extension of the notion of literacy that directs us towards a future “learning society” and away from the current information society was reviewed⁹⁵. Whilst there is a strong relation between information literacy and educational practice, information literacy are not limited to academic contexts. It goes far beyond these contexts to lifelong learning and our identities. Information literacy is viewed as critical for lifelong learning, which empowers us both personally and economically. To sum up, information literacy has been approached in different ways over time. First it was viewed as a problem-solving approach within the context of the private sector. Then, it underwent the influence of the library sector, and it was mostly viewed as learning about the collection of information resources that libraries offer. It later became associated with information technology, technical skills, and databases. Information literacy has also been viewed through different lenses: as critical thinking skills, as a social practice, as affective competencies, and in terms lifelong learning⁹⁶.

As stated above, information literacy evolved in the domain of library sciences and as a result, a number of popular definitions have come from library associations. For example, according to the American Library Association, information literacy is “a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information”⁹⁷. Similar frameworks and models have also been developed

by the Council of Australian University Librarians (CAUL), the Library and Information Association of New Zealand Aotearoa (LIANZA), and the Standing Conference of National and University Libraries (SCONU), and The National Institute of Library & Information Science (NILIS)⁹⁸. Information literacy has also been defined by individual scholars. It is defined as "the set of skills and knowledge that allows us to find, evaluate, and use the information we need, as well as to filter out the information we don't need"⁹⁹. This definition is very similar to previous ones, but his emphasis is more on filtering out irrelevant information due to advancements in information technology and the complexity of the information environment. Both of the above definitions are limited in their perspectives viewing information literacy merely as set of skills that can be achieved individually¹⁰⁰.

Bruce's relational model, formulated in 1997, offers a new approach to information literacy¹⁰¹. Bruce highlighted the importance of the ways in which information literacy is perceived by the information users. In other words, information literacy entails being aware of various ways of experiencing information use, through pertinent practices and reflections¹⁰¹. Rather than offering a set of skills or processes, he offers seven ways, or faces, in which one experiences information literacy: information technology, information sources, information process, information control, knowledge construction, knowledge extension, and wisdom experience. To be effectively information literate, according him, one needs to experience and relate to information in these various ways. The concept of variation is significant because learning happens when we identify and act upon various ways of experiencing something¹⁰². The Bruce definition by his colleagues relies on a learner's behaviour and perception, and, thus, is more conceptual than practical. Information literacy is a sociotechnical practice. Information literacy is embedded in the actions

of specific communities that use adequate technologies. Their idea of socio-technical practice is built upon concepts such as collaboration, sharing, technological artefacts, and contexts.

Furthermore, in the education sector, information literacy has been generally seen as an understanding and a set of abilities enabling individuals to recognize when information is needed, and to have the capacity to locate, evaluate and use efficiently the needed information. Despite some similarities among various definitions, there is no real consensus on how to define information literacy. It was argued that the current definitions are not comprehensive enough¹⁰². Information literacy contains various perspectives and practices, and that we are not yet able to fully capture its depth and breadth. Specifically, information literacy has been defined mostly through a textual practice (where the interaction is between an individual and a text he or she reads), rather than a social practice¹⁰³. The shift in emphasis on what is important in information literacy continues due to our new understanding of the concept, our involvement in different contexts, or the changes we face in our information environment, particularly due to the rapid advancement in information technology. Therefore, defining information literacy is similar to aiming at a moving target.

It is imperative for information users to acquire the information literacy skills and knowledge, because in the present global arena, the competitive use of information is vital to gaining competitive advantage in one's field of work¹⁰⁴. The benefits of thorough knowledge and skills in information literacy can be endless. It is through the use of information literacy that lifelong learning skills can be acquired. A comparative study of credit earning information literacy skills courses at three African universities was performed and found that information literacy is often neglected in most universities in Sub-Saharan African states in favour of computer literacy¹⁰⁵. The evidence of these findings can be found in the largely outdated and mostly irrelevant

writings on the subject that are kept in school libraries and journals. Information literacy is insufficiently acknowledged in school curricula in most African countries. Information literacy skills acquired, especially during the tertiary education training, are very useful for knowledge-based development and lifelong learning, even long after they would have left school¹⁰⁶.

A study identified many challenges facing user education programmes in tertiary educational institutions in Ghana like the Kwame Nkrumah University of Science and Technology (KNUST) Library¹⁰⁷. The challenges he identified were apparent apathy of students regarding user-education programmes, a lack of adequate staffing in libraries, a lack of training for librarians, a lack of reliable internet connectivity in libraries and debilitating financial constraints. Similarly in a study titled “Information Literacy: Assessing the Readiness of Ghanaian Universities” a scholar identified some challenges that hinder effective implementation of information literacy programmes in Ghanaian universities¹⁰⁸. These identified challenges included a lack of management commitment to information literacy programmes/projects, a lack of adequate information regarding information literacy, and staff and departments who are unwilling to handle information literacy skill acquisition.

A similar study examined information literacy skills at the Chancellor College, University of Malawi, in an effort to ascertain whether information literacy skills at the university were adequate in equipping students with the required skills¹⁰⁹. The study showed that the level of information literacy offered to students at the university were inadequate and did not go far enough to equip students with the requisite computer skills or data searching skills. In addition to curricular and financial challenges, other challenges such as electricity failure, high internet charges, and inadequate infrastructure were cited. In a study on the “User education programme

at the University of Ghana”, a number of challenges were identified that stifled the success of information literacy¹¹⁰. Key among these challenges were the inadequate number of teaching staff to facilitate information literacy skills, lack of sufficient orientation for students on the subject and practice of information literacy and inadequate time allocated to the skill. Similarly, a study revealed a lack of clear information literacy policy in most Tanzanian universities¹¹¹.

A study observed that librarians in most educational libraries in Kenya do not commit to pushing information literacy skills to the fore, and therefore these skills acquisition are neglected as a function of the library¹¹². The University of Fort Hare Library in South Africa was subject to a study where it was revealed that students in the University of Fort Hare still faced difficulty in finding requisite information both online and in libraries¹¹³. The study also showed that a significant percentage of students did not possess skills that would enable them engage in critical evaluation and usage of information. Librarians and other academics in the educational institutions of various countries have introduced information literacy that are intended to impart the needed information literacy skills that would enable students to become effective and efficient information users. However, in many African countries, information literacy interventions have not yet been seriously considered or implemented¹¹⁴. A study approaches information literacy acquisition in Nigeria and stated that, the major factor militating against promoting higher levels of information literacy is lack of a concerted effort by academic libraries in the pursuit of a programme¹¹⁵. Reasons given for this on the library’s part are: lack of funding, inadequate staffing, disruptions in the academic calendar, and inadequate support from the parent institution.

Information literacy studies in Nigeria have revealed that there is high level of computer illiteracy among Nigerian librarians, thereby, leading to a shortage of personnel for IT-supported

information literacy training¹¹⁶. For example, a researcher studied the information literacy skills among librarians in Delta State University, Abraka, Nigeria, and reported that the librarians are handicapped in trying to keep abreast with the new trend of librarianship¹¹⁷. Her study revealed that the librarians lack computers to work and even where they are available have no Internet connectivity. She recommended that universities in Nigeria should have information literacy policies just like universities in the developed world. In a study on Internet connectivity in university libraries in Nigeria stated that, for university libraries to deliver effective and efficient services to its clients including information literacy programmes, they must all have stable Internet connectivity in their libraries¹¹⁸. In a study on information literacy education in library schools in Africa to ascertain whether librarianship education is taking a leading role in the development of information literacy in our universities. The study revealed that only a few library schools have successfully integrated an information literacy course as a stand-alone course in their curriculum.

Writing on information literacy in four Tanzanian universities, it was revealed that information literacy is still new in university curricula¹¹⁹. They identified challenges hindering the effectiveness of information literacy practice, such as: lack of adequate resources; lack of an information literacy policy; lack of proactive solutions among librarians; the need for adequate library staffing and training; and collaboration between librarians and teaching staff in information literacy activities. Information literacy in developing countries needs to be developed to suit specific needs and the local environment. The goal of an information literacy programme in Africa should be to help inculcate a lifelong habit of identifying an information need and efficiently searching for, and using, indigenous, oral, print, electronic and other sources of information to satisfy that need and thereby enhance personnel, community and national

socio-economic interest¹²⁰. The students in the College of Health Sciences in Niger Delta University lack the information literacy skills needed to use information resources effectively both in print and electronic formats¹²¹. The researchers recommended collaboration among librarians in medical libraries and faculty members to develop information literacy programmes to equip students in the medical field with the needed skills in this digital age.

In Ghana, a study on the user education programme at the University of Ghana identified challenges such as an inadequate number of qualified staff to instruct students during orientation, and inadequate time allocated to the programme¹²². Similarly, in a study on assessing the readiness of Ghanaian universities for information literacy, identified a number of problems hindering the implementation of information literacy programmes at the University of Ghana and the University of Cape Coast. They are: lack of university commitment to the project; inadequate information about what information literacy is; unwillingness of the various departments already handling components of the information literacy programmes to collaborate with each other to form a campus-wide project; unwillingness to accept innovations in curriculum planning; inadequate technological infrastructure/computers, inadequate electronic resources; and inadequate human resources.

Lack of an explicit information literacy policy providing guidance and directives on how information literacy activities should be conducted, has resulted in some existing information literacy programmes not being allocated official time within university timetables¹²³. A success story from the University of Botswana library on information literacy intervention is that the former information skills programme which was provided at an informal level has now changed into a formal, examinable two-credit module, integrating information literacy skills with computer skills, under the General Education Course (Computing and Information Skills) course,

and was made mandatory for all first year students¹²⁴. Higher education librarians in South Africa are moving towards inculcating skills of 'graduateness' in addition to traditional bibliographic skills, thereby accepting some of the responsibility for meeting the demands of the twenty-first century graduates¹²⁵. In spite of scattered efforts, majority of students are forced to pass through the university system without ever mastering the art of information retrieval and use. In a world so dominated by information needs, issues and considerations that information literacy is required for a person to function effectively as an individual in an increasingly global society seems axiomatic. Information literacy has been described as the umbrella literacy, and thus it seems logical that all international, national and local governments should have formalized information policies and strategies with information literacy at the core. It also seems axiomatic that teachers, academics and educational administrators should by now have accorded information literacy the highest pedagogical and resource investment priority. The issue of the information divide at the local and global levels is much more complex than to be susceptible to one technological solution. The real issue is the information literacy divide. In an information intensive society, the most critical divide will be between those who have the understanding, skills and knowledge to operate effectively in that society and those who do not. This constitutes the information literacy divide. Information literacy creates awareness among people in terms of information practices that are effective in personnel, business and political life. It also empowers people to learn outside the formal structures of an academic environment¹²⁶.

Information literacy is a broad term that combines a number of literacies that include library literacy, media literacy, computer literacy, Internet literacy, research literacy and critical thinking skills¹²⁷. Emphasizing the importance of information literacy, it was stated that information literacy is fundamental to the success of learners in discharging their academic responsibilities.

In a study on information literacy practices among librarians employed in Technical and Further Education in Australia, it was revealed that librarians are providing programmes that focus on the training of information skills relating to the use of libraries, the Internet and databases. In a survey of strategic engagement with information literacy in universities in UK revealed that information literacy teaching is embedded within 75 percent of the undergraduate and postgraduate taught course curricula and the aim is to achieve 100 percent penetration¹²⁸. Writing on information literacy skills among female students in Kuwaiti high schools, the majority of Kuwaiti high school students are deficient in their information skills¹²⁹. According to these scholars, “a clear majority of the students did not have the basic skills such as catalogue searching and use, the selection and use of information sources was also found to be weak”¹³⁰. Information literacy cannot be taught only once; it must be taught and practiced in multiple ways. Students need to repeat seeking, evaluation, and gathering information from multiple sources. Information literacy in the educational environment supports, promote and enhances teaching and research as well as creating a learning culture that encourages institutions to produce graduates with the capacity and desire for lifelong learning¹³¹.

The idea of library instruction or bibliographic instruction has been one of the concepts and tasks associated with librarians for many years. The term bibliography instruction is used here to represent library instruction of various types, excluding the more recent term “information literacy instruction” to which it is compared¹³². Bibliography instruction has usually referred to learning the tools and skills required to successfully use a library for finding information. With the increasing amount of information from different sources and the growing complexity associated with retrieving information in the 1980s and 1990s, librarians were frequently asked by college faculty to provide specific instruction on how to do this¹³³. While bibliography

instruction tended to focus on library activities and the use of tools to get information, it lacked the larger consideration of critical thinking and broader tasks needed to do research. The broader concept of information skills and library instruction may be divided into two parts: lower-order competencies, like information-seeking and retrieval; and higher-order understanding, extending the lower-order skills to include evaluating information search results as to quality, relevance and validity and determining how to use the information¹³⁴. The first is associated with bibliography instruction, while the second refers to information literacy, which was developed by librarians to meet the need for such understanding.

Information literacy represents a change in scope from previous library instruction, with a shift from teaching tools for finding information in a library to a focus on broader concepts by all information users and not only library users. Information literacy builds upon the library instruction of the past to extend its breadth¹³⁵. The public library is a place which supports adult education and lifelong learning and has the capability of narrowing the digital divide by providing free computer and Internet access and offering training courses to improve people's information literacy skills. Governments around the world have recognized the critical role of public libraries in developing information literacy skills of their citizens. As a result, funds have been allocated to public libraries to purchase computers and establish Internet connections, and a variety of information literacy approaches have been used¹³⁶. Although the role of public libraries has been acknowledged as a valuable provider of information literacy development, existing literature primarily focuses on addressing the role of public libraries and their information literacy activities. There is still a lack of relevant study investigating information literacy training in public libraries, especially in the quality and organization of information literacy courses and the information literacy skills of public librarians.

As information literacy competencies have been identified as a crucial element to foster lifelong learning and keep up with the fast-changing world, integrating information literacy learning into education at all levels should be a priority concern¹³⁷. It was emphasized that even though people claim that they have a high degree of confidence in using computers, their information literacy skills might be disgraceful. In public libraries, information, in most cases, can be easily retrieved from the Internet, but users waste so much valuable time because of a lack of adequate skills to find appropriate resources, evaluate information and use the information effectively in solving problems. Recent studies have revealed that users' information literacy skills need to be enhanced, and careful attention needs to be paid to these skills in primary, secondary and even in higher education sectors. Public libraries are primarily driven bottom up, by the customers' agenda and far less by top down curricula. Public library service provision is by definition very broad, as it is driven by the information and cultural requirements of the general public. This has a number of challenges for developing information literacy programmes for customers, which need to be considered when deciding approaches to information literacy. This study adopted Christine Bruce's seven faces model of information literacy.

A scholar examines information literacy using phenomenographic methods to determine how individuals experience information. The model frames information literacy into seven different ways of experiencing information use through active and reflective engagement with the relevant information practices. Bruce's seven ways or faces model of information literacy is applicable in this study because it promotes critical thinking skills and also assists users to understand how to access, use and utilize information¹³⁸.

Evaluation as a process of improvement and betterment must be linked to quality. It must also have the necessary tools to measure the process of qualification. These tools need to be effective,

objective, and useful for statistical processing purposes, enabling results to be effectively interpreted for decision-making processes. The problem arises when evaluation has to be transferred to an object like information literacy, which is generic and competency based, and does not refer to a knowledge area. Further complication is caused by a number of other issues, such as not defining whether certification or accreditation is required for the attainment of competencies, and not clearly affiliating them to a department for curricular design (affiliated to the library, without any impact on the academic curriculum). As a consequence of the latter, there is no preparatory instruction or progression function in a student's degree curriculum, despite the imperative need for integrated cooperation between the subjects and educational goals of the organisation in which information literacy is offered. However, more and more organisations should incorporate information literacy programmes. There is, therefore, a need to develop evaluation methods and tools to assess their positive impact. In Spain, this need is becoming peremptory in libraries in educational settings, such as university, school and public libraries. It is also becoming patently clear in recommendations and documents issued by international bodies like the IFLA (International Federation of Library Associations and Institutions) and UNESCO, as well as in the activities of other countries' associations like the IIL (Institute for Information Literacy) and the NFIL (National Forum on Information Literacy) in the United States, the ILCOPUSU (Information Literacy Community of Practice at Staffordshire), the SCOUNL (Society of College, National and University Libraries) and the JISC (Joint Information Systems Committee) in the United Kingdom, NordINFOLIT in Scandinavia and ANZIIL (Australian and New Zealand Information Literacy).

Many of these organisations have proposed evaluation models allowing questionnaires and surveys to be developed, which have been applied to information literacy actions in various areas

and institutions. This is a logical trend, since evaluation is a constituent, essential part of information literacy¹³⁹. Nevertheless, these initiatives fluctuate between proposals based on models and methods, and their immediate application in the form of questionnaires and surveys. However, this raises two questions: How can students on a literacy programme be evaluated? And how can the institution they are studying at be evaluated? As has been pointed out, the referential element of evaluation is quality. Although this has caused some controversy, many of them consider that these indicators can have a very positive impact on academic outcomes and bestow prestige on an institution¹⁴⁰. Evidence of this is what has been termed the “managerial university”. This type of university focuses on adopting business management values, techniques and approaches¹⁴¹. This approach means that all the activities of public institutions, and educational institutions at all levels (including their libraries), should engage in a commitment to quality, for which the EFQM (European Foundation for Quality Management) model is followed. From this point of view, an information literacy programme, as a service, has an evaluation model. Attaching quality and evaluative scope to an information literacy programme as a service raises the question as to whether or not accreditation or certification is worthwhile, even though it is a well-refined process in libraries, which have their own methods, ways and documents¹⁴².

The creation of evaluation and accreditation agencies as part of this whole movement, such as ANECA in Spain and its counterparts in the regional context, have raised the stakes of the phenomenon. Accreditation seeks expert, public recognition of the fact that an institution possesses the necessary standards, through verifiable evidence, to provide a quality service through a standardised process. Certification aims to verify that the institution contemplates an evaluation and revision system to ensure that the services the institution provides are programmed; these services are the ones that its users demand, and the institution must assure

both service quality and user satisfaction. The debate on the best system for evaluating information literacy has existed and been evidenced in IFLA's Information Literacy Section. Elsewhere, there are initiatives on best practices for information literacy programmes, such as those published by the IIL, the AASL (American Association of School Librarians), the ARL (Association of Research Libraries) and the ACRL (Association of College and Research Libraries), and accreditation agencies have not taken long to emerge. Among others, we find the Middle States Commission on Higher Education¹⁴³.

However, information literacy is a competency-based specialty for knowledge and know-how, meaning that an "interpretation" of both accreditation and certification is required. In its evaluative expression, it would seem very plausible that an information literacy programme should have accredited recognition by bodies and/or associations specialising in information literacy. The aim of such accredited recognition would be to ensure that the programme is capable of offering quality competency training. Evidence of this would come by way of a certificate for students, demonstrating that they have attained the competencies stipulated in the competency objectives of the programme's instructional design. This accredited and/or certified competency-based expression should, however, respond to an evaluation design that is appropriate and particular to information literacy. In order to provide an appropriate response, it is necessary to make another conceptual clarification: evaluation is understood as a means to determine how effective an information literacy programme is in terms of developing students' knowledge and competencies in accordance with its objectives, and also as a means to improve the programme itself; assessment is an evaluation scheme that considers not only knowledge and competencies, but also attitudes, values, and skills acquired throughout the programme. In the

same way as for evaluation documentation (accreditation or certification), an information literacy programme should not be selective about either design.

Rather, it should incorporate both. Indeed, the tools for evaluating information literacy programmes should have a dual dimension: first, it should be programme-related evaluation for the institution (evaluation), using indicators; second, it should be educational evaluation for the students (assessment), using diagnostic questionnaires at the start of the programme, and competency questionnaires at the end. Both evaluations should be incorporated into an evaluation of results. Elements applicable to evaluation include parameters or categories. These serve as a framework for a more effective interpretation of the data supplied by the indicators. Evaluation also requires procedures, whose methods are consistent in terms of the way they are applied to categories and their indicators. It would seem clear that, in an information literacy programme, the categories should be structured on a scale that progressively articulates skills, abilities and competencies, each with their own indicators, to measure and evaluate a student's level of expertise in each of these categories. The procedure, based on a method, deserves some thought because, even though quantitative methods are very well developed (and particularly so for ICT penetration), qualitative methods are much more expedient due to their competency-based nature. Indeed, qualitative methods are very useful for evaluating attitudes, assessments and motivations; they allow trends to be diagnosed and, moreover, they get the population to which they are applied much more involved¹⁴⁴.

Furthermore, the evaluation of information literacy programmes should have a clear reference to an educational approach; that is to say, face-to-face, blended or e-learning. The competency-based nature of information literacy in digital environments advocates their application to LMSs, meaning that evaluation approaches to e-learning are useful: socioeconomically, to evaluate the

benefits of a programme; technologically, to evaluate the excellence of an LMS; educationally, to evaluate the effectiveness of learning construction by a student as a consequence of interaction with the content. These approaches are expressed in a number of evaluation principles, including interiorisation (mastery of the technologies), prioritisation (ability to select the ideal ICT for learning) and reintegration (the ability to master the language of ICTs to make the best use of them). These principles could become suitable indicators¹⁴⁵.

There have naturally been a number of proposals for evaluating information literacy. These include the classification proposed by the IFLA (diagnostic, formative and summative evaluation), the most relevant aspects that need to be evaluated for the ACRL (programme and teaching staff evaluation, student outcome evaluation and good practice transferability), and the evaluation criteria for good practices of the IIL (programmes, attainment and attainment programmes). There have also been some very interesting reflections on the topic, like the one made by B. G. Lindauer, with three areas particular to information literacy evaluation: the learning environment for both formal education curricula and non-formal and informal training courses; programme components referring to the existence of opportunities, their scope, curricula and evaluation; learning outcomes for student performance, evaluating their products throughout the programme¹⁴⁶. A number of other appropriate methods for evaluating information literacy have been pointed out¹⁴⁶.

On the basis of the evaluation design, as mentioned earlier, there are two ideal tools for evaluating and assessing an information literacy programme: questionnaires for assessment, to effectively process trends and perceptions; indicators to effectively process statistical factors. We should recall that each tool is based on quantitative and qualitative processing methods. Indicators are understood as being a metric for measuring specific variables or conditions in

order to analyse a phenomenon and its evolution, in that it processes data that contain a great deal of information, with reference to a general interpretation structure. When applying indicators, the approach and perspective taken to measure and evaluate the phenomenon are very important. For educational environments, the perspectives for information literacy pointed out by the OECD therefore appear to be appropriate: context of reference (strategic position of programme accreditation or certification), system potential (quantity and quality of programme resources), processes (planning, methodology, and plan design and programme management), outcomes (attaining the objectives of the competency and its benefits). The application of indicators requires a classification of several categories to establish effectiveness criteria: Situation and diagnostic indicators: for evaluating the planning of programme implementation, identifying deficiencies and dysfunctions in order to improve the design. Monitoring indicators: for evaluating the effectiveness and efficiency of programmes in order to improve the process. Infrastructure quantity, quality and effectiveness are relevant criteria. Outcomes/Results indicators: for verifying the fulfilment of the objectives and evaluating their benefits. Efficiency, coverage and impact are relevant criteria.

The gradual definition of measurement initiatives, methods and models for evaluating information literacy has given rise to a proposal for specific evaluation tools with its own methodology¹⁴⁷. In 1997, and inspired by a Wisconsin Ohio evaluation programme, SAILS (Standardized Assessment of Information Literacy Skills) began to be developed. It was based on ACRL and AASL standards for evaluating information literacy programmes by level. For its part, the company Educational Testing Services developed the iSkills test, comprising a set of questions aimed at demonstrating a student's mastery of ICTs and information literacy by solving specific problems. In Australia, R. Catts has promoted the CAUL (Council of Australian

University Librarians) Information Skills Survey (based on CAUL/ ANZIIL standards), whose aim is to identify students' competency levels in specific academic areas, so that they can be used for decision-making purposes by universities and faculties, in their training programmes, as an indicator of the institution's quality. In the Spanish setting, worthy of note is the ALFIN-HUMA project led by M. Pinto, which is clearly applicable to the higher education environment¹⁴⁸.

As a global response to these initiatives, account should be taken of R. Catts & J. Lau's conceptual framework paper entitled *Towards Information Literacy Indicators*, published by UNESCO¹⁴⁹. The project was put forward as a conceptual framework with a list of indicators for measuring information skills on the basis of indicators that had already been designed and had shown themselves to have a certain evaluative worth, such as the LAMP and PISA programmes, and the questionnaires of the UNESCO Institute for Statistics, the OECD, the DHS and the ILO. The orientation proposed for the indicators is significant, since they are directly related with the benefits expected from information literacy competencies, such as development, health and welfare, civil society, higher education and employability. Also very interesting are the generic indicators such as oral tradition, ethics and equality (gender, language, economic and political impact and constraints). This set of initiatives for designing models, applying methods and managing systems of indicators, and for information literacy programmes also, has begun to consider the possibility of coherent analysis and interpretation problems. This has led to the creation of indicator model convergence bodies, such as the Partnership on Measuring ICT for Development, whose aim is to publish standards for indicators that allow them to be compared. Emphasis is placed on their international scope, reliability and comprehensibility, in order to ensure that they have greater analysis and interpretation power.

The scope and relevance of information literacy has become so clear for political, administrative and academic authorities that turning it into a subject for formal education (it has already been incorporated into the higher education curriculum and not only in the documentation discipline) is now a reality in Spain. In 2001, Johnston & Webber offered the following classification, which corresponds to information literacy as an academic discipline according to Becher & Trowler's model: a soft applied discipline, in that it is grounded in theories that come from other sciences, of which it is an auxiliary part; its aim is to prepare citizens for managing and taking action in society; its methods are qualitative. Without a shadow of a doubt, the scientific principles, laws, standards, object, objectives, field, methods, methodology and research lines and paths have now been defined for information literacy as an academic discipline. Research teams and projects, conferences and scientific publications are evidence of this unstoppable advance. Given this situation, it would seem useful to put forward an evaluation proposal for an information literacy programme. The programme arises from cooperative endeavours between the company Baratz and several lecturers in documentation at Carlos III University in Madrid¹⁵⁰.

The context for this cooperation is one of the lines of research of the ACRÓPOLIS research team at the mentioned university, focusing on information literacy and the development of the Baratz Absys.edu platform. This is an attempt to incorporate the social networks of library 2.0 and the semantic tagging of educational web resources into educational digital libraries (CRAI-Learning and Research Resources Centre and CREA-Learning and Teaching Resources Centre), with their content management tools. The instructional context elements of the information literacy programme are: a blended educational approach (Moodle platform); an educational space, educational libraries (university, school and public libraries); a competency model, Tuning; information literacy standards, ANZIIL; target audience, e.g., teaching staff, librarian lecturers

with information literacy responsibilities and students (formal and non-formal education); teaching duration, six weeks¹⁵¹.

The instructional design of the programme is neither projected as an e-learning course or a tutorial, nor as a web resource on an educational “site”. The programme has been designed on the basis of arguments associated with educational hyper-document principles (interactivity, associativity, multi-sequentiality, virtuality, dynamicity) and, essentially, in accordance with the properties, characteristics and elements of learning objects. The programme structure is divided into five training modules: module 1, basic competencies, for skills and abilities to search for and retrieve ideal resources for knowledge generation and, above all, for collaborative learning; module 2, digital reading, for abilities to use content management tools and to evaluate educational digital content; module 3, content assimilation, through the edition of concept maps and their application to web environments; module 4, knowledge generation, through the edition of knowledge and content using Web 2.0 tools; module 5, digital writing, which demonstrates know-how through the edition of learning objects.

Given its paramount importance, the programme incorporates evaluation as a substantial component, both programme-related evaluation for the institution and educational and diagnostic evaluation for the students, applying indicators to the former and questionnaires to the latter. The programme incorporates a module 0, competency recognition, with a diagnostic questionnaire to identify information literacy competency deficiencies. The purpose of this is to ensure that the programme does not conclude with a qualification, as in academic areas referring to knowledge and thought, but with questionnaires about competency attainment, evidencing that excellence in information literacy has been reached on completing module 5. Finally, the programme incorporates an impacts and benefits indicator for the programme at the institution, for the

purposes of programme improvement and implementation, and educational strategy decisionmaking. The questionnaires and indicators are the outcome of a research project on editing and publishing teaching materials, approved and funded by the Spanish Ministry of Education¹⁵².

The project had three phases: the creation of an indicator model for information literacy competencies; the development of questionnaires based on the indicator model, referring to the indicators, for effective competency processing and the effectiveness of educational analysis and interpretation; the application of questionnaires to Spanish primary and secondary schools in Asturias, Madrid and Navarre. The indicator model was structured into three parts, in accordance with a scheme of capacities: skill indicator category, basically referring to a reader's capacities in terms of accessing and using technologies of resources that are read, meaning that the protagonism lies in the interaction of the reader with the resource; ability indicator category, referring to a reader's capacities to acquire knowledge and know-how through a grammatical mastery of the discourse, meaning that the protagonism lies in the reader's mastery of the inferential process of reading to generate knowledge, a procedural protagonism; competency indicator category, referring to the reader's capacities resulting from a mastery of information literacy standards, corresponding to the protagonism of a user-student, given that his/her competencies are evaluated in terms of lifelong learning autonomy, with inherent mechanisms, values and ethics¹⁵³.

The structure of each indicator was designed so that each indicator was classified within its category. Each one has a label, a definition, definition milestones, objectives and source data, which, at all times, correspond to the data obtained after applying the questionnaire, which led to phase two of the project. The structural design was inspired by the indicators of the UNESCO

Institute for Statistics, Guide to Measuring Information and Communication Technologies in Education. The aim of these indicators is, therefore, to serve as a basis for decision-making and for the evaluation of monitoring. After consulting information literacy evaluation methods, model and tools, the questionnaires gave rise to the creation of a template reflecting the competency objectives that should be evaluated by the indicator model. These were categorised into skills, abilities and competencies. On the basis of the competency objective template, the competency questionnaires were designed, as a tool, in such a way that each objective led to several questions, in accordance with the interests and intellectual maturity of the institution and the students¹⁵⁴.

Consequently, the model is scalable. A series of questions that vary in number and difficulty can be designed for each “course” of the programme, always in accordance with a competency template and an interpretation provided by an indicator. In any event, the definition of principles conditioning the evaluation model is based on an insistence on generic aspects for the particular measurement of each object of the indicator, an object of the indicator being understood as a phenomenon on which action is taken. These generic aspects, which give a generic bias to the indicator model, are the insistence of the training function and the evaluative measurement. Moreover, it should deal with the intensity of the evaluable phenomenon as a means of highlighting priority actions that need to be taken. The properties of the indicators should not, therefore, simply focus on measuring the degree of competency fulfillment and success, but rather on the transfer of the results of these actions to the educational community, which is a basic element of effectiveness and progress.

Information literacy practitioners have worked through professional associations to promote the concept and its application, by developing definitions, models and standards. The American

Library Association led the way; The American Library Association has of course issued many materials on information literacy including its 2001 'A library advocate's guide to building information literate communities'¹⁵⁵. However, Australian and British organizations also now have high profiles in the field. International organizations within and beyond the information profession are also involved. The International Federation of Library Associations and Institutions (IFLA) produced guidelines on assessment of information literacy and on its role in lifelong learning¹⁵⁶. More significantly, UNESCO has sponsored two meetings of experts in 2003 and 2005, which issued important statements known as the Prague Declaration and Alexandria Proclamation. The second meeting emphasized the developments of relevant strategies, at national, regional and local levels, urging governments and others to support 'vigorous investment in information literacy and lifelong learning strategies' to promote the development of the information society¹⁵⁷.

One library association which seems to have addressed information literacy in a national information policy context is the Library and Information Association of New Zealand¹⁵⁸. It has, significantly, also addressed it in an indigenous Maori context, Maori representing about 16 percent of the now multinational New Zealand population. What LIANZA has achieved through identification of the issues, the explication of a library-led national information strategy and political connections and adroitness, is something of a model for other library associations. The LIANZA position paper on information literacy which informs the knowledge equity element of the national information strategy notes that: information literacy the ability to access, process and use information effectively is a key enabler for New Zealand society as a whole. Information literacy provides the foundation for the following: effective participation in democracy; achievement in all areas and levels of formal education and lifelong learning; the development of

an innovative, knowledge-based economy and the production of new knowledge; social and cultural inclusion; community and individual employment; and individual capability to manage the challenges of information complexity and information overload¹⁵⁹.

Application of information literacy skill programme differs from one university to another and from one library to another which may culminate into barrier or success to information utilization. Lack of requisite skills on the use of the library was an impediment inhibiting accessibility of information resources of library. Less than 8% of the respondents in a study carried out in some selected University Libraries in South West Nigeria have the skills to use chat and discussion, news and teleconferencing¹⁶⁰. Another study indicated that 91.8% of a total respondents of 291 rated library and literary skills instructions applied by University of Calabar highly as the library seems to be more interested in teaching literary concepts that helped the students ability to evaluate, identify, and access information resources with ease¹⁶¹. The library and information managers have at present played a significant role towards promoting information literacy in Nigeria, but the fact still remains that a lot still need to be done to advance the course of information literacy in Nigeria¹⁶². Despite the success of adult literacy to promote rural development, Nigeria is still plagued by a number of constraints. He lamented that literacy efforts in Nigeria have been hampered by insufficient fund as government is unable to provide follow-up reading materials for new literate persons¹⁶³.

However, regardless of the setbacks, a scholar also affirms that the role of adult literacy in the development of rural communities in Nigeria was well documented¹⁶⁴. Such documentation helps the government and agencies concerned to improve on the programmes outlined for the achievement of set goals and objectives and to ensure its impact on the citizenry. Low level of information literacy is a barrier to the efficient utilization of ICT in developing countries. Lack

of information literacy skills among librarians is a bane to impacting information literacy to library users. A researcher opined that since librarians are good at instruction, and because of rapid changes in the way information is presented and used, they need to become more skilled at information-literacy instruction¹⁶⁵. Information literacy competencies among school librarians in Malaysia found out that the respondents were information literate, but needed further training and exposure to information literacy. Their finding further shows that school librarians are in dear need of information literacy training¹⁶⁶. Of the 120 respondents in their study, 81 (67.5%) school librarians had not attended any information literacy courses while 100 (83.3%) indicated they require some kind of information literacy training. Indeed, to achieve development through ICT is not just a matter of providing access to ICT tools, rather, efforts must be made to enhance information literacy, which provide the ability to manipulate and use information effectively¹⁶⁷. A report on the features wanted by academic library clients shows that majority of the students feel familiar with the OPAC but not with the powerful portal interface. The report highlights that 25% who used the OPAC were trained through usage¹⁶⁸.

The skills-based view holds that IL is a set of skills, abilities, or behaviours exhibited by individuals in their information seeking within digital environments¹⁶⁹. A characteristic of this approach is the view that information literacy is quantifiable and can be measured based on the individual's performance in relation to the experts, i.e., information professionals such as librarians. For much of ILI within U.S. higher education, the primary definition of information literacy has been the Standards, which describes the information literate individual as successfully performing a set of skills: Determine the extent of information needed; Access the needed information effectively and efficiently; Evaluate information and its sources critically; Incorporate selected information into one's knowledge base; Use information effectively to

accomplish a specific purpose; Understand the economic, legal, and social issues surrounding the use of information, and access and use information ethically and legally¹⁷⁰. Given the background of the national discourse from which the Standards emerged, it is not surprising the Standards developed as a set of skills. As the dominant skills-based definition for U.S. higher education, the Standards shaped information literacy pedagogy in American undergraduate education since adoption in 2000. Although rescinded June 25, 2016, there are adherents who continue to base ILI on the competencies and outcomes provided within the Standards, as a readily available foundation for lesson content and assessment measures.

One of the greatest advantages of the skills-based view is its facility of assessment. This ease of assessment affords libraries and ILI librarians a straightforward means of communicating value to various shareholders. In addition, skills-based definitions offer a clearly identifiable set of outcomes for teaching. These strengths are also weaknesses to the skills-based conceptualization of information literacy. A common approach to the Standards' skills has been to divide them into lower- and higher-order thinking skills based on Bloom's Taxonomy. Determining the extent of information needed and searching and accessing that information ranked as lower-order cognitive skills, and positioning evaluation and incorporation of information as higher-order skills¹⁷¹. The view that searching is a lower-order skill has been challenged by those who maintain that "the act of 'searching' is not the subordinate, lower-order operation or activity it is often reduced to" but rather "is an integral, concurrent component of a situated whole"¹⁷². Significant drawbacks stem in part from the conceptualization of information literacy as a linear sequence of acts based on the ordering of the Standards, but may also have roots in development of instruction by librarians from bibliography instruction to ILI. Although it is beyond the scope of this review to discuss fully the implications of this shift from bibliography instruction to ILI

have had for conceptualizations of information literacy, one consequence may be the perception of research as a set of steps, or for others teaching information literacy skills, the linear approach to research often presented in ILI.

The sequential view of the process of research based on the ordering of the Standards has been challenged by those who see research and writing as an iterative process. The ordering of the first four Standards suggests a temporal sequence that is simpler than the reality of research-writing. If one imagines these intellectual operations unfolding in real time, it is easy to see how such delineations begin to fail. Determining “the extent of information needed,” accessing “the needed information,” evaluating “information and its sources critically,” and using “information effectively” are not discrete and sequential, but cyclical, often simultaneous, and mutually influencing¹⁷³. This view of research as a sequential and discrete set of steps results in several negative effects. When research is viewed as a series of sequential steps, those steps are often taught in order. However, librarians seldom have time to teach information literacy concepts beyond searching and accessing information; thus, skills such as evaluation of resources and the ethical use of information are infrequently taught by ILI librarians in one-shot sessions, the most common venue of instruction. The application of information skills, including incorporation of information into the individual's knowledge base, the effective use of information, and critical thinking skills are even more infrequently covered by ILI oneshot sessions¹⁷⁴.

Viewing research as a set of sequential information literacy skills leads to other issues. Several have observed that conceptualizing information literacy as a set of generic skills easily transferable to all other information-seeking contexts lacks solid basis. Information literacy as a set of generic skills is not fully supported by studies, and undermined by the creation of subject-specific disciplinary standards¹⁷⁵. While scholars note students' failure to transfer information

literacy skills may be due to ILI librarians trying to cover as much material as possible in one-shot sessions, others contend the lack of transferability results from teaching IL skills as generic, rather than contextual or disciplinary. Several scholars suggested that transfer is better supported by students' engagement in the research process. Others, seeing the lack of instruction on higher-order skills, have proposed alternatives such as teaching the use of discovery tools in order to allow librarian instructions to “move beyond simply teaching techniques for retrieving information to teaching critical thinking skills”¹⁷⁶.

Although many may agree with the importance of communicating to “students the authority of librarians with whom they may interact”, teaching information literacy as a set of skills “both reinforces the authority of librarians and also undermines it”¹⁷⁷. An objection to librarians' authority is a view instruction librarians' lack subject or disciplinary expertise, which many perceive as critical to conducting research in subject-specific knowledge domains. Wilder also observed along outsiders' views of librarians' authority, the fallacy of teaching information literacy skills apart from disciplinary research: information literacy would have librarians teach students to be more like them. The problem with that approach is that librarians are alone in harboring such aspirations for students. Any educational philosophy is doomed to failure if it views students as information seekers in need of information-seeking training. Information-seeking skills are undeniably necessary. However, librarians should view them in the same way that students and faculty members do: as an important, but ultimately mechanical, means to a much more compelling end. Information literacy instead segregates those skills from disciplinary knowledge by creating separate classes and curricula for them¹⁷⁸.

There is no better way to marginalize academic librarianship. In this view, students are mistakenly perceived as information seekers in the information literacy-as-skills approach when

the appropriate approach would be to see them as involved in subject-specific scholarly discourse; proponents of information literacy-as-a-way-of-thinking and information literacy-as-a-social-practice agree with this perspective. Another problem with the information literacy-as-skills approach is that the student is invariably seen as deficient in information literacy skills¹⁷⁹. Students unaware of the contextual, iterative nature of research may feel information illiterate when research is not accomplished easily on following the steps, and may have no idea how to remedy. This lack of awareness of the iterative nature of research may be one culprit contributing to the superficial research conducted by students, often lamented in the literature, as students may believe research is and should be completed upon one iteration of the steps. Addison and Meyers observed the perception of students as inherently deficient in information literacy skills arises from the view that information literacy is measurable, which in turn leads to a number of other problems. For example, when students are seen as deficient in information literacy skills, the natural progression is that the deficiency can only be remedied through instruction “from experts, namely librarians.

However, because these experts' skills are often based in bibliographic information systems, it is not surprising that the skills assessed and taught are most often limited to tests of Boolean logic, construction of search queries, and the like. Furthermore: skills instruction, particularly when it is rooted in specific behaviours rather than conceptual structures, may fail to account for the rapid changes in digital technologies. It may also lead to information literacy instruction as a series of platitudes in practice contexts, such as restrictions on the use of Wikipedia¹⁸⁰. There is also the tendency for adherents to skills-based definitions to conclude that students lack information literacy skills because “they lack the drive to attain them or, in some cases, they overestimate their abilities”¹⁸¹.

Information acquisition aims to satisfy the identified information needs. In previous literature, three key issues were highlighted during this step, i.e. where to collect, how to collect, and when to stop. 'Where to collect' concentrates on the source of the information. Information sources are divided into three categories: textual, online and human¹⁸². Information literate workers should realize that each kind of information source has its own advantages and disadvantages, and sources need to be matched with the information needs and strategic objectives as well as their 'accessibility' and 'reliability'¹⁸³. For example, textual sources are well suited to situations when the information is structured and formal, or when the transmission accuracy of information is highly demanding; online sources are especially useful when reasonably complete and up-to-date information needs to be gathered swiftly; human sources tend to be preferred when dealing with ambiguous, unstructured problem situations¹⁸⁴. 'How to collect' concerns the methods or techniques used for gathering information.

People could be routinely getting information through various media channels, like newspapers, market reports or television, or acquiring first-hand data through active research methodologies, for example questionnaires, interviews and participant observation or passively receiving information through subscribed alerting services provided by information vendors. With the number of methods and techniques available, people in charge of collection of environmental information should be able to select the most appropriate one, with consideration of the quality of information and the cost of collection. Moreover, possessing search skills and knowledge of search operators (e.g. Boolean operator, truncation, wildcard) is essential for formulating a proper search strategy to retrieve information from databases or through online search engines. Information literate workers would be able to formulate a suitable search strategy to find more

relevant and updated information. Last but not least, collectors should be aware that the methods and techniques hired should be based on legal collections of open source or public domain information, without involving immoral, unethical or illegal activities. 'When to stop' is about the judgment of 'enough' information, which could satisfy the identified information needs. Over-collection of information would result in information overload. Both qualitative and quantitative criteria are helpful for making rational choices to determine when the collected information is 'enough'¹⁸⁵. The personal judgment of experienced information workers would also help identify the quantity of collection.

Collected or created information should be organized and stored systematically in order to facilitate future information retrieval and sharing. Stored information reflects a significant and frequently consulted component of the organization's memory and its perception of the environment¹⁸⁶. In enterprises, information on paper could be stored in traditional filing systems, or digitized and archived on hard disks attached to file servers. No matter what format, the design and performance of the system, such as its creation of taxonomies, resource description and comprehensiveness, would greatly affect the accessibility and retrieval of stored information, especially when the majority of information is collected from electronic sources and the internet¹⁸⁷. On the organizational level, there is a need to have a clearly stated policy for information organization and storage. Individual employees should have the awareness and knowledge of proper organization and storage of information. Without employees possessing sufficient information literacy skills, organizations would not be able to categorize their knowledge base properly, which may result in various barriers for future retrieval and use.

The collected or generated information could be directly stored for future accessibility, or processed into information products or services through some sets of value added activities, such

as filtering, interpreting and repackaging. Analysing the collected information and extracting meaning from it is the most important part of environmental scanning and, moreover, today's complex and turbulent environment places a premium on the reliability and quality of information. The collected information should be analysed for issues and trends that may influence the organization, to assist users to acquire a better sense of situations and make better decisions, and hence facilitate the creation of a dynamic knowledge capability. The relevant information from each source should be extracted and information from multiple sources should be organized. The following questions need to be addressed during processing: which parts of the information collected would be used? What additional data are needed? How can information be best presented to enable situation understanding and problem solving? However, a 2005 study reports that knowledge workers are spending more time collecting information and less time analysing it¹⁸⁸. Inadequate filtering of information would result in information overload; with inadequate time for analysis, the collected information will provide either a recital of facts or a 'dump' of data with little advice or confirmation¹⁸⁹.

Without proper information processing skills, the gathered information would be underutilized as 'the organization does not know what it knows'¹⁹⁰. Moreover, there are more than 100 different analytical techniques which could be used to glean meaning from the collected data and information, such as blind spot analysis, competitor benchmarking and SWOT analysis and due to the rapid technological development, more advanced information systems equipped with enterprise decision support tools are available. However, these tools still rely heavily on human interpretation and cognition¹⁹¹. If students have insufficient knowledge of these techniques, and are without the ability to manage information flows for future utilizations and developments,

advances in information and communication technology may also impose immense challenges for people with handling the existing overly loaded information.

The processed environmental information, with potential effects on the organization, should be reported to the appropriate decision makers within the firm. Scholars suggest some points deserving special attention in information distribution. Firstly, to ensure that the correct information or intelligence makes its way to the correct destination, as the decision makers may be scattered throughout the organization; secondly, the information should be delivered through vehicles and in formats that mesh well with the user's information preferences and work habits; thirdly, the intelligence also must match the users' requirements of presentation, such as its orientation and content. Briefly, the real issue is getting the right information to the right person at the right time and in a usable form. The digital information era has brought incredible advances which have made the advent of new methods of communication, such as email, instant message tools and Web 2.0 tools, possible. To ensure those tools' effectiveness as information dissemination platforms, besides the essential operational knowledge, users should also be able to identify their respective strengths and weaknesses and make deliberate selections. The benefits of a wider distribution of information are also highlighted in earlier literature¹⁹².

From the perspective of decision-making theory, found that, when the same piece of information is distributed to many individuals, multiple interpretations could be resolved and a consensus would be reached. Multiple interpretations of the same information could improve the decisions by redefining the problem. A wider distribution of information may bring more broadly based and more frequent organizational learning, as retrieval efforts are more likely to succeed and individuals and units are more likely to be able to learn¹⁹³. However, in practice, it is found that organizations differ in the extent to which information is disseminated: some firms may allow a

wide distribution of all information; some may permit a sizeable amount of information to be accessible to all employees; there are also some firms which restrict the access to certain types of information due to its confidential nature¹⁹⁴. Although, as already suggested, key decision makers are not only at the top of the organization, in a highly centralized, while less information literate organization, information dissemination can be strictly limited to the top management only. Moreover, many employees narrow-mindedly focus only on what they or their divisions need, without considering the broader picture of sharing information with others.

On receiving the processed information, the end-users would evaluate and use it for assisting with decision making. In the current information intensive business environment, the utilization of information is indeed a critical factor in the achievement of organizational success¹⁹⁵. Information literate decision makers would be open-minded and objective, rely not merely on the guidance of instincts and their experiences, but use information from a variety of sources presenting different viewpoints. At this stage, various information literacy skills are required. For example, decision makers need information evaluation skills to make judgments about the quantity and quality of the received information in terms of reliability, accuracy, timeliness and so on. If they find the information insufficient or unqualified, they may initiate a new round of scanning; with sufficient and high-quality information, they may still need to process and synthesize it based on the real-time situation and different usage.

A review of studies measuring the information literacy, research, or library skills of graduate students revealed that few of the studies use standards as the basis for assessment and even fewer use the ACRL information literacy standards. Three notable exceptions are studies conducted at the University of Maryland, University of Kansas, and San Diego State University¹⁹⁶. While there is abundant literature on the information literacy skills of pre and in-service teachers, this

literature review focuses on skills of graduate education students rather than those of undergraduate education majors, in line with the aims of the study. A study that reported a positive relationship between graduate education students and information literacy was conducted¹⁹⁷. The research discussed incorporating information literacy into a doctoral program using the ACRL standards for information literacy, and evaluating the contents of existing courses to identify where the five standards were covered and to what degree of adequacy. Their findings showed that doctoral students in all courses engaged in activities corresponding to each standard. Similarly, a scholar discussed a librarian-created education doctoral level course that incorporates information literacy skills into its content. The course is constructed in such a way that students are expected to demonstrate that they are information literate through the searching, identifying, and evaluating of information collected for literature reviews. As students' progress in the program they build on those information literacy skills as they learn to use them in more specialized ways.

A research focused on an assessment tool design based on desired learning outcomes using the ACRL standards as a framework. When designing their assessment tool, they asked "Does the question asked provide a valid measure of what the instructor wants to know about the students' skills?"¹⁹⁸. The authors discerned that the strength of studies such as theirs lies in the formation of questions created to measure real problems that would be encountered in a graduate student's research. Thus questions used in their assessment tool, which was implemented during a one credit library instruction course for graduate students in Chemistry, used the ACRL standards to create activities or questions that would allow the student to demonstrate the desired learning outcome. Unfortunately, the authors did not enumerate their findings as they corresponded to the Standards. They generalized their findings by whether students passed or failed pre and post-tests.

A scholar surveyed graduate students' information literacy skills using a similar methodology to the study described below¹⁹⁹. The students first evaluated their own skills and then performed specific tasks in order to compare the two. It was revealed that 47% of the students accurately evaluated their skill level. More specifically, many students overestimated their internet searching skills. Based on students' performance they were provided with recommendations for further training to improve their skills; 64% of those students were advised to enroll in a bibliographic instruction course.

The information source preferences of education graduate students and concluded that graduate students prefer information that is easily accessible even if it may be unreliable; they prefer electronic access; and they are unaware of many library resources and services such as interlibrary loan²⁰⁰. These characteristics of student information seekers, whether graduate or undergraduate, are often shared throughout the disciplines. Unsurprisingly, doctoral students tended to be more diligent in their information seeking. It was reported that doctoral candidates stated that their faculty advisors expected them to possess advanced bibliographic skills that the advisors themselves did not have. An extension of the issue is illustrated where argument was made that because doctoral students in the field of education are accomplished professionals they may have difficulty admitting that they lack library search skills²⁰¹. Therefore, despite the acknowledged need by doctoral students of possessing advanced library research skills, it is up to the institution and its faculty to ensure that students get this training. Testing the library research skills of doctoral students of science education concluded that these students were not well equipped for doctoral-level research.

To improve Information Literacy (IL), it was stressed that the need to include online tutorials and advanced teaching methods with online learning objects is necessary. A study among the LIS

students of 15 universities in Nigeria using a self-assessed questionnaire and found that the students have a moderate level of information literacy skills was conducted. There is need for “Critical Information Literacy (CIL) in higher education.” Scholars observed that the difference between the highest and lowest citation and publication parameters among the students is more negligible in the group of not attending the information literacy class²⁰². A researcher conducted a study in the Open University of Hong Kong to evaluate the first-year undergraduate student’s information literacy skills and pointed out that information literacy should be included in their curriculum²⁰³.

Knowledge is power as the saying goes, this is very true because it is what we know that determines what we can do or cannot do. What we know determines whether we succeed or fail. The knowledge we possess can make or mar our destinies. This is why we make deliberate effort to learn and know whatever there is to know. We learn and become knowledgeable only if we possess the necessary information literacy skills that enable us acquire information when there is a need for it, search, locate and gather quality information. Information literacy skills are necessary for our daily living, a successful career life, as well as a successful educational pursuit. With information literacy skills, acquiring information on any issue of life become stress less. There is no subject under the sun that cannot be learnt once an individual possess these skills. Knowledge therefore becomes power when we are able to acquire information and effectively utilize it to meet our needs. Information literacy is no longer just a library issue. It is the critical campus wide issue for the twenty-first century²⁰⁴. It is of utmost importance to all stakeholders in the education sector, including administrators, faculty, librarians, media and information technologists, assessment coordinators, faculty development directors, service learning specialists, student affairs personnel, and career development professionals.

The knowledge of information literacy is even more critical in this age where knowledge is ever increasing. The advent of Information and Communication Technologies evolved an increasingly complex world of abundance of information sources e.g. print, electronic, image, spatial, sound, visual, and numeric. The issue is no longer one of not having enough information; it is just the opposite too much information, in various formats and not all of equal value²⁰⁵. The present information environment holds many pitfalls for college and university students that seem to multiply geometrically²⁰⁶. The challenge of educators is to help students make sense of a world described as information overload. Boyer commission on educating undergraduates in research noted that “undergraduate education should be designed as a continuum that prepares students’ for continued learning and professional work through development of their talents to formulate questions and seek answers”²⁰⁷. A sound foundation in information literacy knowledge helps students master the skill of searching, finding and effectively utilize information for purposes of school term papers, project and research articles.

2.2. Theoretical Review and Framework

2.2.1 Research Competency Theoretical Framework

Research is defined as the process of asking questions and answering them by survey or experiment in an organized way. Research is a process of scientific thinking that leads to the discovery or establishment of new knowledge or truth²⁰⁸. Research as a process involves problem identification, formulating research design, data collection, data analysis and interpretation and drawing of conclusions. In this study, research process includes conceptualization, operationalization, data collection, data processing and analysis, and research application. The study looked into the research competency of accountancy faculty in each of the five steps in the research process. Conceptualization of research is focused on identification of potential research

problem and identification of the research scope and boundaries. Operationalization involves choosing the appropriate unit of observation of the study, evaluating the advantages and disadvantages of the different methods of conducting research, constructing an operational framework based on related research components and proposing measurement methods for variables and their attributes. Data collection employs defining the population on which the research is to be conducted, calculating the sample size that is representative of the population, constructing an instrument for data gathering and employing a data gathering plan among others. Data processing and analysis includes demonstrating and understanding of several methods of data presentation, recognizing the different statistics that are appropriate for each kind of data, explaining the difference between data, facts and inferences, interpreting data gathered in relation to the research question, identifying relationships and differences in variables based on data gathered and composing research findings clearly and accurately. The quality of research output talks about the competencies of the researcher on the research process.

2.2.2 Big6 Model for Information Literacy

Michael Eisenberg and Bob Berkowitz introduced the Big6 approach in 1988²⁰⁹. It is an effective tool for helping students learn the research process which allows researchers to effectively find, use, apply, synthesize and evaluate information. It is an effective tool for helping students learn the research process as an inquiry process. Information overload can hinder timely and effective research, and the Big6 method teaches researchers to work smarter to improve research skills. The six stages of the Big6, Task Definition, Information Seeking Strategies, Location and Access, Use of Information, Synthesis, and Evaluation are designed to focus on process as well as content. The Big6 can be used by younger, novice researchers as well as seasoned researchers and can be applied to all subject areas while in as a researcher in university. Hence, the best way

for educators to teach the Big6 is to integrate it into the classroom curriculum by using Big6 terminology, by walking students through the process, and by focusing on specific Big6 actions to accomplish a given task²¹⁰. The Big6 is a six-stage model that develops students' literacy and information skills as they solve problems and make decisions using the resources that are available to them. In essence, the Big6 process can help students master the Common Core standards, because the process gives students a way to actually do each specified portion of the standards.

The Common Core Standards present a challenge for schools and educators to integrate the standards into existing curriculum and into classroom instruction to meet specific standards through information and technology literacy programs, and to raise the status and awareness of the information and technology literacy program. Big6 Process can also be attributed to Literary theory," sometimes designated "critical theory," or "theory," and now undergoing a transformation into "cultural theory" within the discipline of literary studies. Literary theory refers to any principles derived from internal analysis of literary texts or from knowledge external to the text that can be applied in multiple interpretive situations. All critical practice regarding literature depends on an underlying structure of ideas in at least two ways: theory provides a rationale for what constitutes the subject matter of criticism "the literary" and the specific aims of critical practice the act of interpretation itself. The first step in the information problem-solving of the Big6 is task definition where students classify the information needed such as e-conferencing, email, computer, brainstorming, and other online communication methods.

The first process which is task definition would be a motivating task to eager learners. Hence, students will classify the content objectives to be engaged by the students. For teachers to guide

their students using the Big6 Approach, the first task should be in accordance to the curriculum standards and should be cognitively appropriate in such that the questions must be in higher-order-thinking, then in small groups students discuss the nature of the specific task. Learning how to ask good question can help advance students' comprehension of the subject matter by means of focusing on the main ideas and making connections through asking questions. Asking good questions increases students' comprehension of the subject matter. Eisenberg described that information seeking strategies is a mind-expanding stage. This is the stage 2 in Big6 Approach. It motivates the students to think creatively and innovatively where students can do so much of brainstorming about all possible sources that may include generating all potential information sources, prints, electronic and human sources, technology sources such as database, news, and internet. Information seeking can be an internet search utilizing various search engine or mechanisms and determine which one is best. Stage 3 is location and access is about getting the needed sources in one's hand like getting sources from stacks of books, online databases, on the web or books, online databases, or from experts. What is important is knowing where to look and how to find the needed source using indexes, card catalogs, or checking out print sources in the library media center or digital sources. Location and access leads students go through the process needed to complete an assignment or task. A major shift in information problem solving process is the use of information. This is the 4th stage and heart of the process where critical thinking and extracting which, in an efficient way through some form of note taking, is undertaken. This is all about literacy. It talks about learning or utilizing skimming and scanning technique to help students gather effectively relevant information. Stage 5 or synthesis is the end result, the outcome, or the conclusion. However, this approach does not always involve a report, paper, or project. Synthesis varies depending on the original tasks in which the focus is to make choices or

decisions that make a difference. The product of the synthesis merely depends on the information problem solving situations like writing an essay, creating a poster, writing research paper or report, making a decision, communicating in person, telephone conversation, email, chat or video conferencing. Synthesis is certainly a big part of the society when people speak about information explosion. Evaluation is the final stage or the culmination of the Big6 information problem-solving process. Yet, this is not a linear, lockstep process. In this stage, deciding help is needed to organize and present the output. It's helpful for the students to know where they are in the process, how well they are doing, and what help they need in life. This self-awareness and understanding is all part of the evaluation stage.

When students engage in evaluation during their information problem-solving process, it's called formative evaluation and the end of an output, also called summative evaluation which is a type that is crucial to long-term student success. Moving on, there are four types of questions which can aid in increasing students' comprehension. The first is memory level question where answers are found in books, web sites, and other reference materials. This question provides background for the subject. The next level is convergent thinking question that are representing the analysis and integration of given or remembered information. These are answerable by explaining, stating relationship, and comparing and contrasting. 3rd level is divergent thinking questions that are representing intellectual operation to generate independently over ideas, or take new direction or perspective on a given topic as predicting, hypothesizing, inferring, or reconstructing. The last one is evaluative thinking questions which deal with matters of judgment, value and choice which are characterized by students' judgmental quality like valuing, defending, or justifying choices. One of the most useful things a student can learn in Big6 is the Information Seeking Strategies where brain storming is considered the most interesting part.

Cluster diagram is utilized also along with graphics organizer which is flexible and appealing to both visual and textual learners. In information seeking strategies, searching for information can be an involved process, with multiple searchers using multiple keywords, synonyms, and related words; hence students begin to understand that a subject specific encyclopedia can assist them to narrow a topic, identify important names, dates, keywords, or subjects, and then proceed to help with the entire research process. In the process, students can learn become more aware of resources for information, including the services where Big6 is a tool for development. Location and access is the most widely used approach to information problem-solving in the world²¹¹. This approach allows students go through the Big6 stages conscientiously or not when they seek or apply information to solve a problem or make a decision. Thus, Big6 can be viewed as a set of essential skills that can be applied across situations school, personal, and work settings. This is getting the needed source that involves online databases, on the web or from experts. In this stage students find sources they need, use indexes, table of contents, and locate and check needed print sources among others. This leads students through the process required to get the desired source needed to complete an assignment. In an effort to better understand the research process or the information problem-solving process, the thoughts, feelings, and actions associated with various activities within the process was examined. The search process details the changes that occur for searchers while progressing from seeking relevant to pertinent information. This shift describes feelings that ebb and flow between more negative emotions such as uncertainty, confusion, frustration, and doubt, to more positive emotions such as optimism, clarity, confidence and relief. Searchers was examined as information is sought in a variety of situations, other authors focused on research paper writing in order to better understand the information search process. For example, the model was described as a thinking frame for research. This ten-

step process emphasizes a thinking framework that can be adapted for any age level and any curricular subject. The authors maintain that, most students do not automatically think about research in an explicit manner.

Therefore, by prescribing the method in which to write research papers, the authors hope to improve student thought about the research process. The ten steps of the search process model are organized around the major activities performed in writing a coherent research paper: topic selection, planning the information search, locating and accessing materials, and creating a final product. Throughout the model, students have several reflection points that allow them to make judgments about their progress. Similarly, this study applied Big6 in searching information to come up with good quality essays with science themes. Two groups were formed, the controlled and the experimental group and yielded a significant result. Researchers examined the search process from the point of view of the searchers. By formulating a model that can be used by students to guide their thinking and research activities and by teachers to guide their planning and implementation of classroom instructional activities, a scholar provided school library media specialists, students, and classroom teachers with a model that could be used in a variety of settings for a variety of activities. Big6 provides support in the activities required to solve information-based problems: task definition, information seeking strategies, location and access, use of information, synthesis, and evaluation.

A researcher conducted a research to determine how information synthesis skills can be taught effectively, and to discover how the level of synthesis in student writing can be effectively measured. The intervention utilized was an information synthesis lesson that broke down the synthesis process into sequenced tasks. A rubric was created and used to assess students' levels of information synthesis demonstrated in their final research essays. A form of counting analysis

was also created to see if other methods could help in measuring synthesis. Findings from the rubric analysis revealed that students appear to benefit from the synthesis lesson. The level of synthesis, however, remains low overall. In addition, the study showed that the different measures of synthesis established were able to identify different levels of information integration. Discovering effective ways to measure and teach synthesis continues to be essential in helping students become information literate. Several researchers have examined behaviors & skills associated with information use. From the rich and empirical and rational empirical body of knowledge, three prominent models of the research process have been developed such as process model, the research process model.

A case study conducted on the Big Six Information Skills as a Metacognitive Scaffold examined the effect of Big6 on grade 8 students who were asked to write about the events surrounding the African American Civil Right Movement. Results showed that Big6 act as a metacognitive scaffold during the problem-solving process. Likewise, it was found out that Big6 may provide an overarching process that students can employ in a variety of learning situations. On another study conducted, it was noted that one of the essential skills that students must possess to become successful in problem based learning activities is metacognition.

2.2.3 Theoretical Framework on Information Literacy

Several frameworks and models have since been developed on information literacy in different countries. Some of them are: the Standing Conference of National and University Libraries (SCONUL) (1999) in the UK, the Association of College and Research Libraries in the USA, the Council of Australian University Librarians (CAUL) (2001), the Library and Information Association of New Zealand Aotearoa (LIANZA), and the National Institute of Library and Information Science (NILIS) in Sri Lanka²¹². This study focuses on the five information literacy

standards reviewed by the Association of College and Research Libraries (ACRL) and approved by the Board of Directors of the ACRL. They are: Standard One: The information literate student determines the nature and extent of the information needed. Standard Two: The information literate student accesses needed information effectively and efficiently. Standard Three: The information literate student accesses needed information and its sources critically and incorporates selected information into his or her knowledge base and value system. Standard Four: The information literate student, individually or as a member of a group, uses information effectively to accomplish a specific purpose. Standard Five: The information literate student understands many of the economic, legal, and social issues surrounding the use of information and uses information ethically and legally.

2.3 Review of Empirical Studies

2.3.1 Information Literacy Skills and Research Competency

A recent study found out that 96% of the respondents agreed that user education class helped them to increase their searching skills while 100% of the respondents agreed that user education program helped them to better use the Library Online Public Access Catalog (OPAC)²¹³. The study further reveal that 55% of the respondents agreed that to obtain strong skills libraries should provide many classes of user education. A research on the role of academic libraries in the enhancement of information literacy: a study of Fort Hare Library found out that majority of the respondents (53%) has not attended library orientation, which was compulsory²¹⁴. However, a study shows that most of the respondents (53.3%) indicated that they learnt about electronic resources through workshops and seminars²¹⁵. Another research indicates that all the respondents were involved in the training programme on information literacy²¹⁶. The result also shows that 52% of the respondents suggested that the campus library should provide practical training on

searches in the library, while 20% indicated that the library should develop an information literacy program in the University. It can be deduced here that information literacy skill training in all library across the world is at different stage. While some libraries have made significant effort, others are tackling issues of users' ability to identify, access, retrieve information and to use ICT tools in the library. Again, a process that may be effective in one library may be difficult to apply in another. This kind of situation may hamper desired objectives. In such complex situation, survey could be carried out to identify the best suitable method in order to ensure successful literacy skill.

A comparatively larger number of studies conducted self-perception-based surveys of students. A scholar used a 10-item self-perception information competency scale (based on the ACRL standards) at a large public university in the southwestern United States²¹⁷. Another researcher used an online questionnaire through Survey Monkey to assess perceived confidence in online searching of graduate students of at the University of Florida²¹⁸. Several used a self-assessing questionnaire to find out information literacy skills (mapped to the ALA standards) of undergraduate students of a college of agriculture in India²¹⁹. Although the surveys of perceptions have been most popular many authors have mentioned limitations of this assessment technique. The researchers, who used other techniques in addition to perception surveys to the same groups of students, claimed that students had over-estimated their self-assessed information abilities than their actual level of skills. Only a few studies proved a significant correlation between students' perceived information literacy skills and their actual score on an achievement test. Many authors have explored the relationship between information literacy skills and various personal and academic variables of students. In a study at Kuwait University, a scholar compared library skills with students' age, gender, type of high school the students had attended, class level,

student GPA, and level of English proficiency²²⁰. Several researchers found differences in information literacy skills based on students' gender.

A scholar explored relationship of the internet facility at home with the students' information literacy skills²²¹. Pakistani literature of the LIS field failed to report any diagnostic surveys to determine information literacy skills of students. In a survey of the university libraries in a scholar found that most of them offered ill-planned and informal user education programs without a survey of user needs²²². Based on some studies conducted at the University of the Punjab on the use of online databases and digital libraries a scholar inferred that the use of these resources was low for a variety of reasons. They claimed that the community was "unable to use and/or unaware of the databases and digital services available through the HEC, and this state of information and digital illiteracy (IDI) is responsible for a significant loss of resources"²²³. Inadequate assessment of library users' needs and information seeking behaviour was among the inhibiting factors for successful implementation of information literacy instruction programs in Pakistani universities²²⁴.

In a study conducted by the Educause Center for Analysis and Research (ECAR), 80.7% of students rated themselves as expert or very skilled in searching the internet effectively and efficiently, although students rated themselves slightly lower in their ability to evaluate the credibility of online information and their understanding of related ethical and legal issues²²⁵. A 2011 ECAR study found that while 88% of students use their institution's library website, only 27% do not believe their skills meet their needs for searching the library site effectively. A Credo Student survey also revealed that 'students feel reasonably capable of doing the research necessary for assignments'²²⁶. These studies indicate that students seem confident in their research skills, but does faculty concur with students' assessment of their skills? Are students

developing information literacy skills that enable them to complete research assignments effectively and efficiently? The majority of the library literature assessing college students' information literacy skills is on pre- and/or postlibrary instructional session assessment. But assessment of instruction does not typically measure competency levels of all five Association of College and Research Libraries (ACRL) information literacy skills²²⁷. As the evaluators of student research assignments, faculty should have a more comprehensive picture of information literacy skills, as compared to instructional session assessment.

However, fewer studies have been conducted on faculty assessments of students' IL competencies. A review of the literature on faculty views of information literacy reveals inconsistencies among faculty regarding how and by whom information literacy should be addressed, but also shows that academic faculty overwhelmingly believe that IL is important for their students²²⁸. 'It appears that the goals of the IL professional and the subject faculty member are at least somewhat in sync' regarding the need to improve students' skills²²⁹. However, the focus of faculty is primarily on the subject matter, while librarians' expertise lies in the process of conducting research²³⁰. A scholar suggests that faculty culture places more of an emphasis on research and content and less on teaching and process, which can hinder collaboration with librarians regarding information literacy education²³¹. Several scholars found that science and engineering faculty 'perceive that more self-directed learning is useful, for both themselves and their students, suggesting that more how-to guides, electronic help screens for various resources, and print and online pathfinders are desirable'²³². In her study of sociology and civil engineering faculty, a scholar exposed faculty members' belief that information literacy is dependent on personal interest and individual motivation, and improves according to the 'law of exposure' as students repeatedly encounter situations requiring their information literacy skills²³³.

A scholar suggests that there can be an ad-hoc approach to information literacy by faculty, depending on whether a course requires a research paper. Although faculty believe that IL skills are very important, many do not utilise library instruction sessions to improve those skills²³⁴. A researcher found that journalism and mass communication faculty require students to conduct research for their courses, are aware that their students are not as information literate as they could be and understand that library instruction improves research skills, and yet faculty do not consistently integrate instruction into their courses²³⁶. Research conducted in the UK revealed that there was a high level of enthusiasm amongst faculty for IL, but that few academic staff teach or assess information skills or even develop them through student-centered learning. In a subsequent study she confirmed these findings with supportive data from United States (US) faculty that ‘there is an apparent gap between the IL skills that faculty want their students to have and those that they actively support and develop’²³⁷. A scholar found ‘that the large majority of faculty believes that information literacy education should be undertaken collaboratively by faculty and librarians’²³⁸.

While information literacy skills were considered important, a scholar discovered that ‘there was not a lot of agreement on the academic level at which information literacy outcomes are expected by faculty’²³⁹. In order to remedy these inconsistencies in delivering information literacy instruction to students, librarians need to take a proactive approach in meeting with faculty and managers to determine collectively how to successfully infuse information literacy into the curriculum. All US two-year and four-year institutions of higher education undergo a process of accreditation using a set of standards developed by peers to assure and improve the quality of education. Reviews of regional accreditation standards and programmatic accreditation processes suggest that alignment of information literacy instruction programmes to student learning

outcomes required by accreditation organisations can be drivers for institutional focus on information literacy. The primary goal is for librarians to work in concert with faculty in order to graduate information literate students who can effectively utilise information literacy skills in the workplace, as well as to make informed decisions in their personal lives.

Osmosis does not work for the development of information literacy, but neither does it work for effective collaboration between librarians and faculty²⁴⁰. The ERIAL (Ethnographic Research in Illinois Academic Libraries) Project offers unique perspectives from faculty interviewed during the two-year study of the student research process, on how research skills can be taught and supported by librarians. The interviews revealed that some faculty view teaching as within their domain and seek assistance from librarians to augment their own research instruction, others schedule one-shot instructional sessions and still another segment embed librarians into their courses with multiple visits to the class to establish a better rapport²⁴¹. A number of learning theories have been utilised by librarians delivering information literacy instruction, including: behaviourism, cognitivism and constructivism. In a behavioural approach, instruction is teachercentered information is presented by the instructor and students acquire skills through drills and practice and then demonstrate their understanding of the material through assessment²⁴².

By comparison, cognitive learning is a process of relating new information to previous knowledge the individual has collected. A scholar builds on this theory by advancing social constructivism, a student-centered approach where environment comes into play and individuals learn not only from their own experiences, but also learn from the experiences of others. Technology has also had a significant impact on information literacy education, with Web 2.0 tools (e.g. wikis, blogs, podcasts, RSS, Twitter, Facebook, YouTube, Flickr and social

bookmarking) being used to retrieve and produce information. ‘Given that Web 2.0 tools support the constructivist ideas upon which the ACRL standards are at least partially based, it should be possible to find ways that the tools can be used to promote the various outcomes’²⁴³. Several scholars discuss new applications of technology that can help students navigate the ever-changing information environment²⁴⁴. However, some caution needs to be taken when introducing Web 2.0 tools since not all students possess the necessary skills to use them. In addition, a recent ECAR study found that although students agree that technology can help them achieve academic outcomes, they are sensitive to the boundaries that technology plays in their personal and academic lives²⁴⁵.

2.4 Conceptual Framework

Independent Variable

Dependent Variable

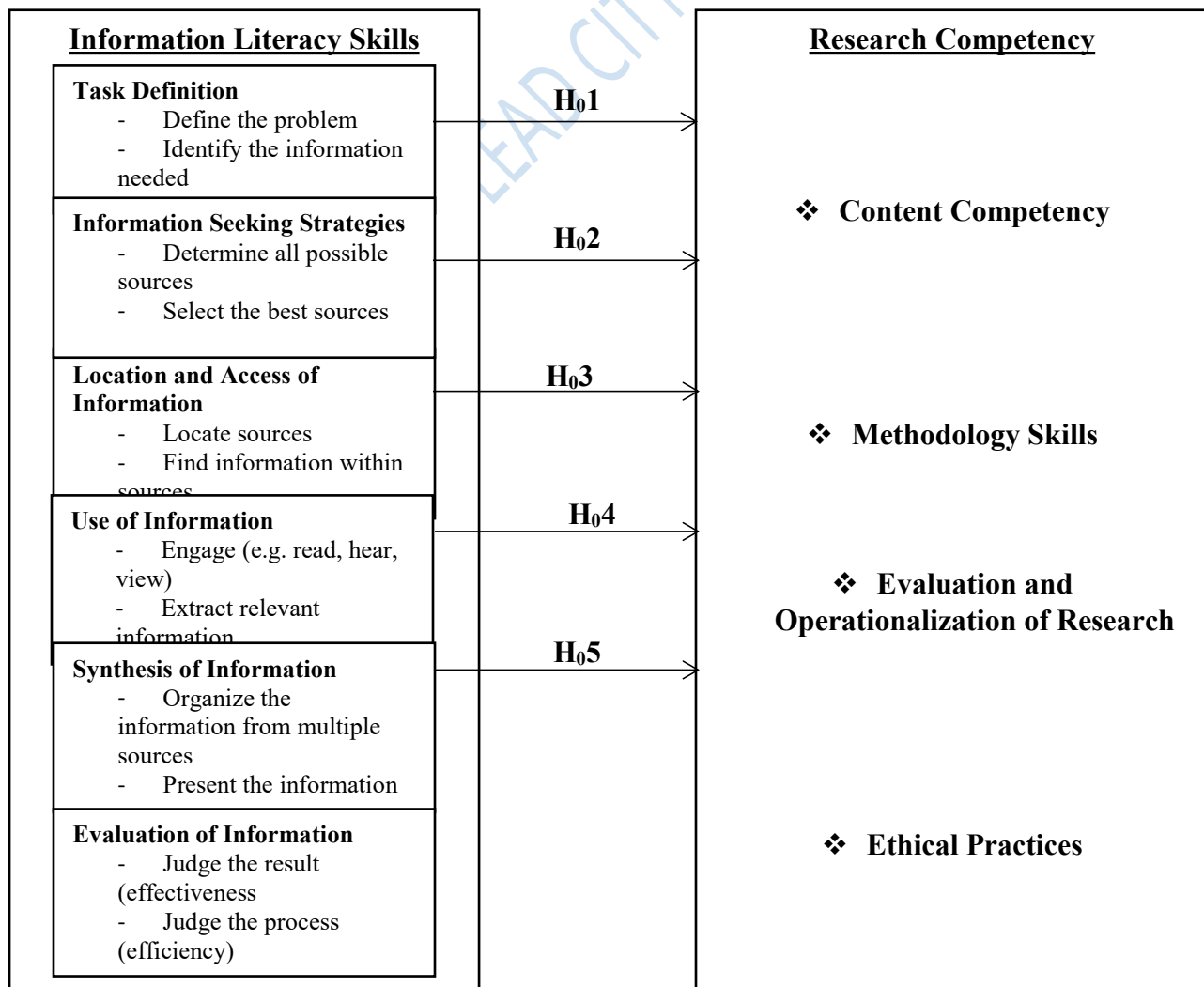


Figure 2.1: Conceptual Framework Showing Information Literacy Skills and Research Competence

Source: Researcher's Conceptual Framework, (2022)

The dependent variable is research competency, as depicted in the diagram above, and four measures were used to assess it: content competency, methodology skills, evaluation and operationalization of research and ethical practices as adapted from literature²⁰⁸. Information Literacy Skills is the independent variable. Task definition, information seeking strategies, location and access to information, use of information, synthesis of information and evaluation of information were used to measure information literacy skills as adopted from literature²⁰⁹. As shown in the diagram above, each of the measures of information literacy skills will be used to test research competency of postgraduate students of universities in Lagos State.

2.5 Summary of Literature Reviewed

The impact of information literacy skills on research competency of postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria is the subject of this chapter, which presents scholars' perspectives on the topic of this research. The study demonstrates the value of information literacy skills on research competency, particularly among doctoral and masters students. The concepts have been clarified due to the assessment of the conceptual framework (information literacy skills on research competency). It depicts the link between the independent variable and dependent variable.

This section highlight the gaps found in the literature reviewed in their 2017 study on research competency of students, Moltick J. and Hauser F. elucidated certain determinant they modified

in the course of their study which included content competency, methodology skills, evaluation and operationalization of research and ethical research, among others whereas the finding of the study reinforces the basic component of research competency and gave an understanding of the reasons for going through information literacy. The research was unable to indicate the essence of information literacy in research writing and evaluation.

Pete J. O. Conner, Andrew Hill, Mana Kaya, and Bret Martin, in 2019, wrote on “The measurement of Information Literacy: A Critical Review of the Literature and Recommendation for Researchers and Practitioners. The authors distilled the six widely used measures of information literacy and clarified the importance of information literacy programmes.

Apparently, the authors only reviewed available ‘Literature but were unable to give an in-depth understanding of the key studies underlying the various measures they presented.

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Chapter Three

Methodology

The method employed in this investigation is presented in this chapter. It covers the research design, population, sample and sampling technique, research instrument, validity, reliability and method of data collection.

3.1 Research Design

This study used descriptive and cross-sectional survey research to examine a subset of the population at a specific point in time and analyze the influence of information literacy skills on the research competency of postgraduate students in selected tertiary institution in Lagos State.

The design's benefit:

- i) Its resilience in terms of data distribution.
- ii) Simple to compute the detailed information gathered from the test;
- iii) Utilized in studies where parametric assumptions can't be met,
- iv) Flexibility in the data processing.

3.2 Population of the Study

The population of this study is made up of 10,000 postgraduate students of Universities in Government-Owned Universities in Lagos State, Nigeria, which are Lagos State University and University of Lagos.

Table 3.1 Population of Postgraduates Students in the Two Universities

S/N	Name of Institution	Number in each Institution
1.	Lagos State University	5000
2.	University of Lagos	5000
Total		10,000

3.3 Sample and Sampling Technique

The sample size for this study comprise three hundred and seventy (370) students, all of whom are postgraduate students of the two public universities Lagos State. Krejcie and Morgan provided the used to arrive at the sample size (1970)¹ table of sample sizes (as indicated below);

Table 3.2: Table for determining sample size of a known population

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	346
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	354
35	32	150	108	360	186	1100	285	5000	357

40	36	160	113	380	191	1200	291	6000	302
45	40	170	118	400	196	1300	297	7000	364
50	44	180	123	420	201	1400	302	8000	367
55	48	190	127	440	205	1500	306	9000	368
60	52	200	132	460	210	1600	310	10000	370
65	56	210	136	480	214	1700	313	15000	375
70	59	220	140	500	217	1800	317	20000	377
75	63	230	144	550	226	1900	320	30000	379
80	66	240	148	600	234	2000	322	40000	380
85	70	250	152	650	242	2200	327	50000	381
90	73	260	155	700	248	2400	331	75000	382
95	76	270	159	750	254	2600	335	100000	384

Source: Krejcie and Morgan (1970) Sample Size Determinant

From the above table, the researcher collected demographic information from the respondents and it contain the population of study.

Table 3.3 Stratified Sampling Calculation for the study³

S/N	Name of Ministry	% of total population	Calculated no for each sample
2.	Lagos State University	$\frac{305}{737} \times 100 = 41\%$	$\frac{41 \times 254}{100} = 185$
2.	University of Lagos	$\frac{432}{737} \times 100 = 59\%$	$\frac{59 \times 254}{100} = 185$

3.6 Description of Research Instrument (s)

The instrument used is a structured questionnaire, which makes collected data easier from respondents because it allowed researcher to assess the structured questions to meet the required goal. The Likert Type scale design was used in this study, which allowed the researcher to give options for respondents to choose from. This study's instrument is divided into four sections.

Section A: The researcher created this section to collect demographic information from respondents, and it contains biographical information about them based on five factors: gender, age, educational qualifications, and year of experience.

Section B: Research Competency scale (of four points) that indicates the level of research competency: Very high = 4, High = 3, Low = 2, Very low = 1 with 20 items. The study instrument will be broken into several components, each of which will be designed to elicit responses on the subject at hand, example of question is: Ability to formulate and justify morally acceptable solutions².

Section C: Information Literacy Skills scale showed how efficient and effective the students are in information evaluation and operationalization with 16 items. The scale consists of the followings: Strongly Agree = 4, Agree = 3, Disagree = 2, and Strongly Disagree = 1 are the four points on the scale.

3.7 Validity of Research Instrument

The instrument's items were acquired through a survey of related literature and adaptations of questionnaires used by other researchers. The supervisor and other specialists in information management provided input on both the face and content product validity. Corrections were integrated into the final questionnaire, which was distributed to the study participants.

3.6 Reliability of the Instrument

The researcher samples the questionnaire through a reliability test to ensure that all items assessing each variable in the study are consistent. The instrument's reliability was tested in a

pilot study with roughly 30 copies of the questionnaire given to postgraduate students of Augustine University, which is not part of the study.

3.7 Distribution of Research Instrument

Primary data were collected through a structured questionnaire following existing research to address the study's objectives. This instrument works well with descriptive survey research because it allows for collecting data on respondents' opinions and perceptions on current events at a specific point in time. The Department of Information Administration, Lead City University, provided a letter of introduction and a project attestation form, which were utilized to get authorization to survey the postgraduate students of the two public universities in Lagos State. A two-day training session were held for five (5) research assistants to help with questionnaire administration, retrieval, and initial sorting. The researcher and research assistants worked with management help to ensure the anonymity of their responses while also advising them on the importance of adequate responses and the benefits embedded in the study's findings. The surveys were distributed to postgraduate students in total.

3.8 Methods of Data Analysis

The data will be analyzed using descriptive and inferential statistics by the researcher. For study questions, one through three, descriptive statistics (mean, frequency distribution, standard deviation, and percentage) was used. The first two null hypotheses were investigated using inferential analysis, while the third was analyzed using multiple regression analysis. All hypotheses in the study were assessed at a significance level of 0.05. Statistical Product and Service Solution (SPSS) Version 24 were used to analyze the data collected for the project.

3.8 Ethical Consideration

Ethical considerations were taken into account to ensure that the study was conducted in proper way. To comply with ethical considerations in conducting research all respondents provided with questionnaire to participate in the research. The respondents willingly participated in the study after they were approached and the research purpose and process were explained to them. The respondents were later assured that the information provided would remain confidential.

Endnotes

1. R.V. Krejcie. University of Minnesota, Duluth. Daryle W. Morgan, Texas A and M. University, 1970
2. F., Hauser, R., Reuter & J., Moltick. *Modification of a Questionnaire to Measure Research Competence at Universities of Applied Sciences*, 2018.
3. J., Creswell. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, Sage, London, 2009.
5. M. B. Eisenberg, & R. E. Berkowitz. *Information Problem-Solving: The Big Six Skills Approach to Library & Information Skills Instruction*, Norwood NJ: Ablex Publishing, 1990.

Chapter Four

Results and Discussion of Findings

This chapter presents the results of the analysis of data collected from the respondents in the study area and discussions of findings arising from the study. The chapter consists of data presentation, analysis of research questions, test of hypotheses, and discussion of findings. Table 4.1 shows the response rate of the study.

Table 4.1: Response Rate

Response	Frequency	Percent
Returned and used	347	93.8
Not returned	15	4.1
Returned but not used	8	2.2
Distributed Questionnaires	370	100.0

Source: Field Survey, 2022

4.1 Demographic Data of Respondents

This section presents the results of demographic characteristics of respondents using frequency distribution tables. For gender profile, Table 4.2 shows that there are 199 males who accounted for 60% of the respondents and 144 females who accounted for 40% of the respondents. The table also shows 4 respondents (1.2%) who did not disclose their gender. The result shows that more males participated in this study.

Also, for age profile, Table 4.2 shows that there are 43 respondents between the age of 20 and 25, which accounted for 12.4%; 102 respondents between the age of 26 and 30, which accounted for 29.4%; 133 respondents between the age of 31 and 35, which accounted for 38.3%; 61 respondents between the age of 36 and 40, which accounted for 17.6%; 4 respondents between the age of 41 and 45, which accounted for 1.2%; and 2 respondents who were 46 and above years

old, which accounted for 0.6%. The table also shows 2 respondents (0.6%) who did not disclose their age. The result shows that majority of the respondents are between the age of 26 and 35 years.

Table 4.2 Demographic Characteristics of Respondents

Variables	Category	Frequency	Percent
Gender	No response	4	1.2
	Male	199	57.3
	Female	144	41.5
	Total	347	100.0
Age	No response	2	0.6
	20 – 25	43	12.4
	26 – 30	102	29.4
	31 – 35	133	38.3
	36 – 40	61	17.6
	41 – 45	4	1.2
	46 and above	2	0.6
	Total	347	100.0
Educational level	No response	5	1.4
	PGD degree	163	47.0
	Master's degree	123	35.4
	PhD	56	16.1
	Total	347	100.0
Years of experience	No response	5	1.4
	5 – 10	109	31.4
	11- 15	212	61.1
	16 – 20	10	2.9
	21 – 25	10	2.9
	26 – 30	1	0.3
	Total	347	100.0

Source: Field Survey, 2022

According to Table 4.2, for educational level, there are 163 respondents who had PGD degree, which accounted for 47.0%; 123 respondents who had Master's degree, which accounted for 35.4%; and 56 respondents who had PhD degree, which accounted for 16.1%. There were also 5

respondents (1.4%) who did not disclose their educational level. This result suggests that most of the participants of this study held PGD and Master's degree.

For years of experience, Table 4.2 shows that there are 109 respondents who had between 5 and 10 years of experience, which accounted for 31.4%; 212 respondents who had between 11 and 15 years of experience, which accounted for 61.1%; 10 respondents who had between 16 and 20 years of experience, which accounted for 2.9%; another 10 respondents who had between 21 and 25 years of experience, which accounted for 2.9%; and a respondent who had between 26 and 30 years of experience, which accounted for 0.3%. Also, there were 5 respondents (1.4%) who did not disclose their years of experience. This result shows that majority of the participants of this study have had between 5 and 15 years of work experience. This also implies that very few of the respondents had between 16 and 30 years of experience.

4.2 Analysis of Research Questions

Research Question One: What is the level of research competency among postgraduate students of universities in Lagos State, Nigeria?

Table 4.3: Responses on Level of Research Competency among Postgraduate Students of Universities in selected tertiary institutions in Lagos State, Nigeria

Content Competency	VH	H	L	VL	Mean
Ability to use open digital scientific and educational systems to search and store information	31 (8.9%)	264 (76.1%)	49 (14.1%)	3 (0.9%)	2.93
Ability to select optimal digital technologies at each stage of scientific research	169 (48.7%)	125 (36.0%)	50 (14.4%)	3 (0.9%)	3.33
Ability to search for like-minded people on scientific ideas	203 (58.5%)	104 (30.0%)	40 (11.5%)	0 (0.0%)	3.47
Skills to carry out scientific communication with the use of digital technologies	136 (39.2%)	163 (47.0%)	48 (13.8%)	0 (0.0%)	3.25
Ability to understand how to add to a scholarly or professional conversation through research and writing	134 (38.6%)	164 (47.3%)	48 (13.8%)	1 (0.3%)	3.24
Weighted Mean					3.24

Methodology Skills	VH	H	L	VL	Mean
Self-assessment of own research activity and received scientific results	165 (47.6%)	125 (36.0%)	56 (16.1%)	1 (0.3%)	3.31
Ability to match a scholarly question to the appropriate theories and methods	157 (45.2%)	133 (38.3%)	56 (16.1%)	1 (0.3%)	3.29
Ability to analyze data or information relevant to the project	218 (62.8%)	117 (33.7%)	10 (2.9%)	2 (0.6%)	3.59
Ability to organize and synthesis information in the required format from multiple sources	105 (30.3%)	188 (54.2%)	52 (15.0%)	2 (0.6%)	3.14
Ability to develop cognitive and creative abilities of the individual	152 (43.8%)	140 (40.3%)	54 (15.6%)	1 (0.3%)	3.28
Weighted Mean					3.32
Evaluation and Operationalization of Research	VH	H	L	VL	Mean
Ability to analyse current research	217 (62.5%)	70 (20.2%)	11 (3.2%)	49 (14.1%)	3.31
Ability to use digital technologies for research planning	218 (62.8%)	71 (20.5%)	53 (15.3%)	5 (1.4%)	3.45
Skills mastery in working with scientific literature and ability to compile bibliographic lists	171 (49.3%)	119 (34.3%)	57 (16.4%)	0 (0.0%)	3.33
Skills to apply digital technologies to solve a specific research problem	219 (63.1%)	69 (19.9%)	10 (2.9%)	49 (14.1%)	3.32
Choice of actual directions of further scientific researches	22 (6.3%)	311 (89.6%)	10 (2.9%)	4 (1.2%)	3.01
Weighted Mean					3.28
Ethical Practices	VH	H	L	VL	Mean
Knowledge of ethical use of information	221 (63.7%)	71 (20.5%)	55 (15.9%)	0 (0.0%)	3.48
Knowledge about plagiarism	41 (11.8%)	245 (70.6%)	56 (16.1%)	5 (1.4%)	2.93
Ability to apply information ethics by citing sources appropriately and observing copyright	168 (48.4%)	168 (48.4%)	8 (2.3%)	3 (0.9%)	3.44
Ability to explain the ethical dimension of a case to those involved and to others	268 (77.2%)	67 (19.3%)	12 (3.5%)	0 (0.0%)	3.74
Ability to formulate and justify morally acceptable solutions	244 (70.3%)	95 (27.4%)	6 (1.7%)	2 (0.6%)	3.67
Weighted Mean					3.45
Grand Mean					3.32

Decision rule: 1.00 – 1.49= very low, 1.50 – 2.49= low, 2.50 – 3.49 = high, 3.50-4.00= very high

Note: VH - Very High (4), H - High (3), L - Low (2), VL – Very Low (1)

Source: Field Survey Results, 2022

According to the result on content competency in Table 4.3, 31 respondents (8.9%) had ability to use open digital scientific and educational systems to search and store information to a very high extent; 264 respondents (76.1%) to a high extent; 49 respondents (14.1%) to a low extent; and 3 respondents (0.9%) to a very low extent. On average, the respondents reported ability to use open digital scientific and educational systems to search and store information with a mean of 2.93. Also, 169 respondents (48.7%) had ability to select optimal digital technologies at each stage of scientific research to a very high extent; 125 respondents (36.0%) to a high extent; 50 respondents (14.4%) to a low extent; and 3 respondents (0.9%) to very low extent. On average, the respondents reported ability to select optimal digital technologies at each stage of scientific research with a mean of 3.33.

In addition, 203 respondents (58.5%) had ability to search for like-minded people on scientific ideas to a very high extent; 104 respondents (30.0%) to a high extent; 40 respondents (11.5%) to a low extent; and none to very low extent. On average, the respondents reported ability to search for like-minded people on scientific ideas with a mean of 3.47. Also, 136 respondents (39.2%) had skills to carry out scientific communication with the use of digital technologies to a very high extent; 163 respondents (47.0%) to a high extent; 48 respondents (13.8%) to a low extent; and none to very low extent. On average, the respondents had skills to carry out scientific communication with the use of digital technologies with a mean of 3.25.

Table 4.3 also shows that 134 respondents (38.6%) had ability to understand how to add to a scholarly or professional conversation through research and writing to a very high extent; 164 respondents (47.3%) to a high extent; 48 respondents (13.8%) to a low extent; and a respondent (0.3%) had the ability to very low extent. On average, the respondents had ability to understand how to add to a scholarly or professional conversation through research and writing with a mean

of 3.24. The weighted mean for content competency is 3.24 which indicates that content competency among postgraduate students of universities in Lagos State is high.

For methodological skills, 165 respondents (47.6%) accepted self-assessment of own research activity and received scientific results to a very high extent; 125 respondents (36.0%) to a high extent; 56 respondents (16.1%) to a low extent; and a respondent (0.3%) very low extent. On average, the respondents accepted self-assessment of own research activity and received scientific results with a mean of 3.31. Also, 157 respondents (45.2%) accepted ability to match a scholarly question to the appropriate theories and methods to a very high extent; 133 respondents (38.3%) to a high extent; 56 respondents (16.1%) to a low extent; and a respondent (0.3%) very low extent. On average, the respondents accepted ability to match a scholarly question to the appropriate theories and methods with a mean of 3.29.

Table 4.3 also shows that 218 respondents (62.8%) accepted ability to analyze data or information relevant to the project to a very high extent; 117 respondents (33.7%) to a high extent; 10 respondents (2.9%) to a low extent; and 2 respondents (0.6%) very low extent. On average, the respondents accepted ability to analyze data or information relevant to the project with a mean of 3.59. In addition, 105 respondents (30.3%) accepted ability to organize and synthesis information in the required format from multiple sources to a very high extent; 188 respondents (54.2%) to a high extent; 52 respondents (15.0%) to a low extent; and 2 respondents (0.6%) very low extent. On average, the respondents accepted ability to organize and synthesis information in the required format from multiple sources with a mean of 3.14.

Also, 152 respondents (43.8%) accepted ability to develop cognitive and creative abilities of the individual to a very high extent; 140 respondents (40.3%) to a high extent; 54 respondents (15.6%) to a low extent; and a respondent (0.3%) very low extent. On average, the respondents

accepted ability to develop cognitive and creative abilities of the individual with a mean of 3.28. Likewise, the weighted mean for methodological skills is 3.32 which reveals that methodological skills among postgraduate students of universities in Lagos State is high.

For evaluation and operationalization of research, 217 respondents (62.5%) had ability to analyse current research to a very high extent; 70 respondents (20.2%) to a high extent; 11 respondents (3.2%) to a low extent; and 49 respondents (14.1%) to very low extent. On average, the respondents accepted ability to analyse current research with a mean of 3.31. Also, 218 respondents (62.8%) had ability to use digital technologies for research planning to a very high extent; 71 respondents (20.5%) to a high extent; 53 respondents (15.3%) to a low extent; and 5 respondents (1.4%) to a very low extent. On average, the respondents accepted ability to use digital technologies for research planning with a mean of 3.45.

In addition, 171 respondents (49.3%) accepted skills mastery in working with scientific literature and ability to compile bibliographic lists to a very high extent; 119 respondents (34.3%) to a high extent; 57 respondents (16.4%) to a low extent; and none to a very low extent. On average, the respondents accepted skills mastery in working with scientific literature and ability to compile bibliographic lists with a mean of 3.33. More so, 219 respondents (63.1%) accepted skills to apply digital technologies to solve a specific research problem to a very high extent; 69 respondents (19.9%) to a high extent; 10 respondents (2.9%) to a low extent; and 49 respondents (14.1%) to a very low extent. On average, the respondents accepted skills to apply digital technologies to solve a specific research problem with a mean of 3.32.

Also, 22 respondents (6.3%) accepted choice of actual directions of further scientific researches to a very high extent; 311 respondents (89.6%) to a high extent; 10 respondents (2.9%) to a low extent; and 4 respondents (1.2%) to a very low extent. On average, the respondents accepted

choice of actual directions of further scientific researches with a mean of 3.01. The weighted mean for evaluation and operationalization of research is 3.28 showing evaluation and operationalization of research among postgraduate students of universities in Lagos State as high. For ethical practices, 221 respondents (63.7%) accepted knowledge of ethical use of information to a very high extent; 71 respondents (20.5%) to a high extent; 55 respondents (15.9%) to a low extent; and none to very low extent. On average, the respondents accepted knowledge of ethical use of information with a mean of 3.48. Also, 41 respondents (11.8%) accepted knowledge about plagiarism to a very high extent; 245 respondents (70.6%) to a high extent; 56 respondents (16.1%) to a low extent; and 5 respondents (1.4%) to very low extent. On average, the respondents accepted knowledge about plagiarism with a mean of 2.93.

Table 4.3 also shows that 168 respondents (48.4%) accepted ability to apply information ethics by citing sources appropriately and observing copyright to a very high extent; another 168 respondents (48.4%) to a high extent; 8 respondents (2.3%) to a low extent; and 3 respondents (0.9%) to very low extent. On average, the respondents accepted ability to apply information ethics by citing sources appropriately and observing copyright with a mean of 3.44. In addition, 268 respondents (77.2%) accepted ability to explain the ethical dimension of a case to those involved and to others to a very high extent; 67 respondents (19.3%) to a high extent; 12 respondents (3.5%) to a low extent; and none to very low extent. On average, the respondents accepted ability to explain the ethical dimension of a case to those involved and to others with a mean of 3.74.

Also, 244 respondents (70.3%) accepted ability to formulate and justify morally acceptable solutions to a very high extent; 95 respondents (27.4%) to a high extent; 6 respondents (1.7%) to a low extent; and 2 respondents (0.6%) to very low extent. On average, the respondents accepted

ability to formulate and justify morally acceptable solutions with a mean of 3.67. The weighted mean is 3.45 showing ethical practices among postgraduate students of universities in Lagos State as high. The grand mean for research competency is 3.32 which indicates that the level of research competency among postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria is high.

Research Question Two: What are the different information literacy skills available for postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria?

Table 4.4: Responses on Different Information Literacy Skills Available for Postgraduate Students of Universities in Lagos State, Nigeria

Task Definition	SA	A	D	SD	Mean
I am able to determine the information search topic	230 (66.3%)	115 (33.1%)	2 (0.6%)	0 (0.0%)	3.66
I am able to determine the information related to leaving results	223 (64.3%)	116 (33.4%)	8 (2.3%)	0 (0.0%)	3.62
I am able to discuss with friends	282 (81.3%)	64 (18.4%)	1 (0.3%)	0 (0.0%)	3.81
I am able to discuss with the lecturer about learning resources information	269 (77.5%)	73 (21.0%)	5 (1.4%)	0 (0.0%)	3.76
Weighted Mean					3.71
Information Seeking Strategies	SA	A	D	SD	Mean
I can use keywords in finding information	199 (57.3%)	141 (40.6%)	6 (1.7%)	1 (0.3%)	3.55
I read books as learning resources	319 (91.9%)	24 (6.9%)	3 (0.9%)	1 (0.3%)	3.90
I read information over the internet	222 (64.0%)	121 (34.9%)	3 (0.9%)	1 (0.3%)	3.63
I take notes of the material provided	262 (75.5%)	81 (23.3%)	2 (0.6%)	2 (0.6%)	3.74
Weighted Mean					3.71
Location and Access	SA	A	D	SD	Mean
I can search for information in the library	212 (61.1%)	134 (38.6%)	1 (0.3%)	0 (0.0%)	3.61
I can search for information via the internet	210 (60.5%)	129 (37.2%)	8 (2.3%)	0 (0.0%)	3.58

I can search for information using other sources (newspaper, magazines etc.)	222 (64.0%)	124 (35.7%)	1 (0.3%)	0 (0.0%)	3.64
I can determine the information I am looking for	155 (44.7%)	184 (53.0%)	7 (2.0%)	1 (0.3%)	3.42
Weighted Mean					3.56
Use of Information	SA	A	D	SD	Mean
I read information in the form of charts, diagrams and article	60 (17.3%)	283 (81.6%)	3 (0.9%)	1 (0.3%)	3.16
I can compare information	221 (63.7%)	125 (36.0%)	1 (0.3%)	0 (0.0%)	3.63
I can keep information neatly	313 (90.2%)	28 (8.1%)	6 (1.7%)	0 (0.0%)	3.88
Weighted Mean					3.56
Information Synthesis	SA	A	D	SD	Mean
I can logically organize information	212 (61.1%)	126 (36.3%)	6 (1.7%)	3 (0.9%)	3.58
I can combine information	317 (91.4%)	20 (5.8%)	10 (2.9%)	0 (0.0%)	3.88
I can make conclusions in my own language	265 (76.4%)	71 (20.5%)	6 (1.7%)	5 (1.4%)	3.72
I can edit the information to be presented	233 (67.1%)	70 (20.2%)	44 (12.7%)	0 (0.0%)	3.54
Weighted Mean					3.68
Information Evaluation	SA	A	D	SD	Mean
I can complete assignments and exercises well	276 (79.5%)	67 (19.3%)	4 (1.2%)	0 (0.0%)	3.78
I can understand the information obtained	273 (78.7%)	74 (21.3%)	0 (0.0%)	0 (0.0%)	3.79
I actively search for information	320 (92.2%)	23 (6.6%)	4 (1.2%)	0 (0.0%)	3.91
Weighted Mean					3.83
Grand Mean					3.68

Decision rule: 1.00 – 1.49= very low, 1.50 – 2.49= low, 2.50 – 3.49 = high, 3.50-4.00= very high

Note: SA – Strongly Agree (4), A - Agree (3), D - Disagree (2), SD – Strongly Disagree (1)

Source: Field Survey Results, 2022

Table 4.4 reveals the responses on different information literacy skills available for postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria. For task definition, 230 respondents (66.3%) accepted they were able to determine the information search topic to a

very high extent; 115 respondents (33.1%) to a high extent; 2 respondents (0.6%) to a low extent; and none to very low extent. On average, the respondents accepted they were able to determine the information search topic with a mean of 3.66. Also, 223 respondents (64.3%) accepted they were able to determine the information related to leaving results to a very high extent; 116 respondents (33.4%) to a high extent; 8 respondents (2.3%) to a low extent; and none to very low extent. On average, the respondents accepted they were able to determine the information related to leaving results with a mean of 3.62.

Table 4.4 also shows that 282 respondents (81.3%) accepted they were able to discuss with friends to a very high extent; 64 respondents (18.4%) to a high extent; a respondent (0.3%) to a low extent; and none to very low extent. On average, the respondents accepted they were able to discuss with friends with a mean of 3.81. In addition, 269 respondents (77.5%) accepted they were able to discuss with the lecturer about learning resources information to a very high extent; 73 respondents (21.0%) to a high extent; 5 respondents (1.4%) to a low extent; and none to very low extent. On average, the respondents accepted they were able to discuss with the lecturer about learning resources information with a mean of 3.76. The weighted mean for task definition is 3.71 which indicates that task definition skills of postgraduate students of universities in Lagos State is very high.

For information seeking strategies, Table 4.4 shows that 199 respondents (57.3%) accepted they could use keywords in finding information to a very high extent; 141 respondents (40.6%) to a high extent; 6 respondents (1.7%) to a low extent; and a respondent (0.3%) to very low extent. On average, the respondents accepted they could use keywords in finding information with a mean of 3.55. Also, 319 respondents (91.9%) accepted they read books as learning resources to a very high extent; 24 respondents (6.9%) to a high extent; 3 respondents (0.9%) to a low extent;

and a respondent (0.3%) to very low extent. On average, the respondents accepted they read books as learning resources with a mean of 3.90.

In addition, 222 respondents (64.0%) accepted they read information over the internet to a very high extent; 121 respondents (34.9%) to a high extent; 3 respondents (0.9%) to a low extent; and a respondent (0.3%) to very low extent. On average, the respondents accepted they read information over the internet with a mean of 3.63. Also, 262 respondents (75.5%) accepted they took notes of the material provided to a very high extent; 81 respondents (23.3%) to a high extent; 2 respondents (0.6%) to a low extent; and another 2 respondents (0.6%) to very low extent. On average, the respondents accepted they took notes of the material provided with a mean of 3.74. The weighted mean for information seeking strategies is 3.71 which indicates that information seeking strategies skills of postgraduate students of universities in Lagos State is very high.

For location and access of information, Table 4.4 shows that 212 respondents (61.6%) accepted they could search for information in the library to a very high extent; 134 respondents (38.6%) to a high extent; a respondent (0.3%) to a low extent; and none to very low extent. On average, the respondents accepted they could search for information in the library with a mean of 3.61. Also, 210 respondents (60.5%) accepted they could search for information via the internet to a very high extent; 129 respondents (37.2%) to a high extent; 8 respondents (2.3%) to a low extent; and none to very low extent. On average, the respondents accepted they could search for information via the internet with a mean of 3.58.

In addition, 222 respondents (64.0%) accepted they could search for information using other sources (newspaper, magazines etc.) to a very high extent; 124 respondents (35.7%) to a high extent; a respondent (0.3%) to a low extent; and none to very low extent. On average, the respondents accepted they could search for information using other sources (newspaper,

magazines etc.) with a mean of 3.64. Also, 155 respondents (44.7%) accepted they could determine the information they were looking for to a very high extent; 184 respondents (53.0%) to a high extent; 7 respondents (2.0%) to a low extent; and a respondent (0.3%) to very low extent. On average, the respondents accepted they could determine the information they were looking for with a mean of 3.42. The weighted mean for location and access of information is 3.56 which indicates that locating and accessing information skills of postgraduate students of universities in Lagos State is very high.

According to Table 4.4, for use of information, 60 respondents (17.3%) accepted they read information in the form of charts, diagrams and article to a very high extent; 283 respondents (81.6%) to a high extent; 3 respondents (0.9%) to a low extent; and a respondent (0.3%) to very low extent. On average, the respondents accepted they read information in the form of charts, diagrams and article with a mean of 3.16. Also, 221 respondents (63.7%) accepted they could compare information to a very high extent; 125 respondents (36.0%) to a high extent; a respondent (0.3%) to a low extent; and none to very low extent. On average, the respondents accepted they could compare information with a mean of 3.63.

Table 4.4 also shows that 313 respondents (90.2%) accepted they keep information neatly to a very high extent; 28 respondents (8.1%) to a high extent; 6 respondents (1.7%) to a low extent; and none to very low extent. On average, the respondents accepted they could keep information neatly with a mean of 3.88. The weighted mean for use of information is 3.56 which reveals that use of information skills of postgraduate students of universities in Lagos State is very high.

For information synthesis, Table 4.4 shows that 212 respondents (61.1%) accepted that they could logically organize information to a very high extent; 126 respondents (36.3%) to a high extent; 6 respondents (1.7%) to a low extent; and 3 respondents (0.9%) to very low extent. On

average, the respondents accepted they could logically organize information with a mean of 3.58. Also, 317 respondents (91.4%) accepted that they could combine information to a very high extent; 20 respondents (5.8%) to a high extent; 10 respondents (2.9%) to a low extent; and none to very low extent. On average, the respondents accepted they could combine information with a mean of 3.88.

Table 4.4 also reveals that 265 respondents (76.4%) accepted that they could make conclusions in their own language to a very high extent; 71 respondents (20.5%) to a high extent; 6 respondents (1.7%) to a low extent; and 5 respondents (1.4%) to very low extent. On average, the respondents accepted they could make conclusions in their own language with a mean of 3.72. Also, 233 respondents (67.1%) accepted that they could edit the information to be presented to a very high extent; 70 respondents (20.2%) to a high extent; 44 respondents (12.7%) to a low extent; and none to very low extent. On average, the respondents accepted they could edit the information to be presented with a mean of 3.54. The weighted mean for information synthesis is 3.68 which reveals that the information synthesis skills of postgraduate students of universities in Lagos State is also very high.

For information evaluation, Table 4.4 shows that 276 respondents (79.5%) accepted that they could complete assignments and exercises well to a very high extent; 67 respondents (19.3%) to a high extent; 4 respondents (1.2%) to a low extent; and none to very low extent. On average, the respondents accepted they could complete assignments and exercises well with a mean of 3.78. Also, 273 respondents (78.7%) accepted that they could understand the information obtained to a very high extent; 74 respondents (21.3%) to a high extent; none to a low extent; and none to very low extent. On average, the respondents accepted they could understand the information obtained with a mean of 3.79.

Table 4.4 also indicates that 320 respondents (92.2%) accepted that they actively searched for information to a very high extent; 23 respondents (6.6%) to a high extent; 4 respondents (1.2%) to a low extent; and none to very low extent. On average, the respondents accepted they actively searched for information with a mean of 3.91. The weighted mean for information evaluation is 3.83 which reveals that information evaluation skills of postgraduate students of universities in Lagos State is very high. The grand mean for the different information literacy skills available is 3.68 which indicates that the different information literacy skills available for postgraduate students of universities in Lagos State, Nigeria is very high.

H₀₁: There will be no significant influence of task definition on research competency of postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria.

Table 4.5: Regression Analysis for Influence of Task Definition on Research Competency of Postgraduate Students of Universities in selected tertiary institutions in Lagos State, Nigeria.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.719 ^a	.517	.516	.34502

a. Predictors: (Constant), Task definition

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	43.988	1	43.988	369.527	.000 ^a
	Residual	41.069	345	.119		
	Total	85.057	346			

a. Predictors: (Constant), Task definition

b. Dependent Variable: Research competency

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.553	.203		-2.728	.007
	Task definition	1.045	.054	.719	19.223	.000

a. Dependent Variable: Research competency

Source: Field Survey, 2022

According to the results displayed on Table 4.5, task definition has a positive and high relationship with research competency ($R = 0.719$). The coefficient of determination (Adj. R^2) of 0.516 shows that task definition explained 51.6% of the variation in research competency of postgraduate students in universities in Lagos State under investigation. Therefore, the remaining 48.4% is explained by other exogenous variable different from task definition.

Also, Table 4.5 presents the results of the overall model significance of regression test (ANOVA) which revealed that task definition has a significant influence on research competency of postgraduate students in universities in Lagos State ($F(1, 345) = 369.527, p < 0.05$). Furthermore, the results of the regression coefficients revealed that at 95% confidence level, a unit change in task definition will lead to 1.045 increase in research competency of postgraduate students in universities in Lagos State ($B = 1.045, p < 0.05$). On the strength of the result of regression analysis in Table 4.5, this study rejects the null hypothesis one (H_01) which states that there will be no significant influence of task definition on research competency of postgraduate students in universities in Lagos State, Nigeria.

H₀₂: There will be no significant influence of information seeking strategies on research competency of postgraduate students of universities selected tertiary institutions in Lagos State, Nigeria.

Table 4.6: Regression Analysis for Influence of Information Seeking Strategies on Research Competency of Postgraduate Students of Universities in selected tertiary institutions in Lagos State, Nigeria.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.217 ^a	.047	.044	.48467

a. Predictors: (Constant), Information seeking strategies

ANOVA^b

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4.015	1	4.015	17.094	.000 ^a
	Residual	81.041	345	.235		
	Total	85.057	346			

a. Predictors: (Constant), Information seeking strategies

b. Dependent Variable: Research competency

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	1.952	.333		5.858	.000
	Information seeking strategies	.371	.090	.217	4.134	.000

a. Dependent Variable: Research competency

Source: Field Survey, 2022

From the results displayed on Table 4.6, information seeking strategies have a positive and low relationship with research competency ($R = 0.217$). The coefficient of determination (Adj. R^2) of 0.044 shows that information seeking strategies explained 4.4% of the variation in research competency of postgraduate students in universities in Lagos State under investigation. Hence, the remaining 95.6% is explained by other exogenous variable different from information seeking strategies.

Furthermore, Table 4.6 presents the results of the overall model significance of regression test (ANOVA) which revealed that information seeking strategies have a significant influence on research competency of postgraduate students in universities in Lagos State ($F(1, 345) = 17.094$, $p < 0.05$). Also, the results of the regression coefficients revealed that at 95% confidence level, a unit change in information seeking strategies will lead to 0.371 increase in research competency of postgraduate students in universities in Lagos State ($B = 0.371$, $p < 0.05$). On the strength of the result of regression analysis in Table 4.6, this study rejects the null hypothesis two (H_02) which states that there will be no significant influence of information seeking strategies on research competency of postgraduate students in universities in Lagos State, Nigeria.

H₀₃: There will be no significant influence of locating and accessing information on research competency of postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria.

Table 4.7: Regression Analysis for Influence of Locating and Accessing Information on Research Competency of Postgraduate Students on Universities in selected tertiary institutions in Lagos State, Nigeria.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.527 ^a	.277	.275	.42209

a. Predictors: (Constant), Location and access

ANOVA^b

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	23.590	1	23.590	132.409	.000 ^a
	Residual	61.466	345	.178		
	Total	85.057	346			

a. Predictors: (Constant), Location and access

b. Dependent Variable: Research competency

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients		Sig.
		B	Std. Error	Beta	t	
1	(Constant)	-.720	.352		-2.044	.042
	Location and access	1.136	.099	.527	11.507	.000

a. Dependent Variable: Research competency

Source: Field Survey, 2022

Based on the results displayed on Table 4.7, locating and accessing information has a positive and moderate relationship with research competency ($R = 0.527$). The coefficient of determination ($Adj. R^2$) of 0.275 shows that locating and accessing information explained 27.5%

of the variation in research competency of postgraduate students in universities in Lagos State under investigation. Therefore, the remaining 72.5% is explained by other exogenous variable apart from information location and access.

Also, Table 4.7 presents the results of the overall model significance of regression test (ANOVA) which revealed that locating and accessing information has a significant influence on research competency of postgraduate students in universities in Lagos State ($F(1, 345) = 132.409, p < 0.05$). Furthermore, the results of the regression coefficients revealed that at 95% confidence level, a unit change in locating and accessing information will lead to 1.136 increase in research competency of postgraduate students in universities in Lagos State ($B = 1.136, p < 0.05$). On the strength of the result of regression analysis in Table 4.7, this study rejects the null hypothesis three (H_03) which states that there will be no significant influence of locating and accessing information on research competency of postgraduate students in universities in Lagos State, Nigeria.

H₀₄: There will be no significant influence of use of information on research competency of postgraduate students in universities in Lagos State, Nigeria.

Table 4.8: Regression Analysis for Influence of Use of Information on Research Competency of Postgraduate Students in Universities in Lagos State, Nigeria.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.679 ^a	.461	.459	.36459

a. Predictors: (Constant), Use of information

ANOVA ^b						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	39.198	1	39.198	294.886	.000 ^a
	Residual	45.859	345	.133		
	Total	85.057	346			

a. Predictors: (Constant), Use of information

b. Dependent Variable: Research competency

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-1.404	.276		-5.084	.000
	Use of information	1.329	.077	.679	17.172	.000

a. Dependent Variable: Research competency

Source: Field Survey, 2022

From the results displayed on Table 4.8, use of information has a positive and high relationship with research competency ($R = 0.679$). The coefficient of determination (Adj. R^2) of 0.459 shows that use of information explained 45.9% of the variation in research competency of postgraduate students in universities in Lagos State under investigation. Hence, the remaining 54.1% is explained by other exogenous variable different from use of information.

Furthermore, Table 4.8 presents the results of the overall model significance of regression test (ANOVA) which revealed that use of information has a significant influence on research competency of postgraduate students in universities in Lagos State ($F(1, 345) = 294.886, p < 0.05$). Also, the results of the regression coefficients revealed that at 95% confidence level, a unit change in use of information will lead to 1.329 increase in research competency of postgraduate students in universities in Lagos State ($B = 1.329, p < 0.05$). On the strength of the result of regression analysis in Table 4.8, this study rejects the null hypothesis four (H_04) which states that there will be no significant influence of use of information on research competency of postgraduate students in universities in Lagos State, Nigeria.

H₀₅: There will be no significant influence of synthesizing information on research competency of postgraduate students of universities in selected tertiary institutions in Lagos State, Nigeria.

Table 4.9: Regression Analysis for Influence of Synthesizing Information on Research Competency of Postgraduate Students of Universities in selected tertiary institutions in Lagos State, Nigeria.

Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.717 ^a	.514	.512	.34618		
a. Predictors: (Constant), Synthesis						
ANOVA^b						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	43.711	1	43.711	364.736	.000 ^a
	Residual	41.346	345	.120		
	Total	85.057	346			
a. Predictors: (Constant), Synthesis						
b. Dependent Variable: Research competency						
Coefficients^a						
Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Sig.
1	(Constant)	.346	.157		2.200	.028
	Synthesis	.809	.042	.717	19.098	.000

a. Dependent Variable: Research competency

Source: Field Survey, 2022

According to the results displayed on Table 4.9, synthesizing information has a positive and high relationship with research competency ($R = 0.717$). The coefficient of determination ($\text{Adj. } R^2$) of 0.512 shows that information synthesis explained 51.2% of the variation in research competency

of postgraduate students in universities in Lagos State under investigation. Therefore, the remaining 48.8% is explained by other exogenous variable apart from information synthesis.

Also, Table 4.9 presents the results of the overall model significance of regression test (ANOVA) which revealed that synthesizing information has a significant influence on research competency of postgraduate students in universities in Lagos State ($F(1, 345)=364.736, p < 0.05$). Furthermore, the results of the regression coefficients revealed that at 95% confidence level, a unit change in synthesizing information will lead to 0.809 increase in research competency of postgraduate students in universities in Lagos State ($B = 0.809, p < 0.05$). On the strength of the result of regression analysis in Table 4.9, this study rejects the null hypothesis five (H_{05}) which states that there will be no significant influence of synthesizing information on research competency of postgraduate students in universities in Lagos State, Nigeria.

H₀₆: There will be no significant influence of information evaluation on research competency of postgraduate students of universities in selected institutions in Lagos State, Nigeria.

Table 4.10: Regression Analysis for Influence of Information Evaluation on Research Competency of Postgraduate Students of in selected institutions Universities in Lagos State, Nigeria.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.285 ^a	.081	.078	.47598

a. Predictors: (Constant), Information evaluation

ANOVA^b						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	6.894	1	6.894	30.431	.000 ^a
	Residual	78.162	345	.227		
	Total	85.057	346			

a. Predictors: (Constant), Information evaluation

b. Dependent Variable: Research competency

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.738	.289		6.014	.000
	Information evaluation	.415	.075	.285	5.516	.000

a. Dependent Variable: Research competency
Source: Field Survey, 2022

From the results displayed on Table 4.10, information evaluation has a positive and low relationship with research competency ($R = 0.285$). The coefficient of determination (Adj. R^2) of 0.078 shows that information evaluation explained 7.8% of the variation in research competency of postgraduate students in universities in Lagos State under investigation. Hence, the remaining 92.2% is explained by other exogenous variable different from information evaluation.

Furthermore, Table 4.10 presents the results of the overall model significance of regression test (ANOVA) which revealed that information evaluation has a significant influence on research competency of postgraduate students in universities in Lagos State ($F(1, 345) = 30.431, p < 0.05$). Also, the results of the regression coefficients revealed that at 95% confidence level, a unit change in use of information will lead to 0.415 increase in research competency of postgraduate students in universities in Lagos State ($B = 0.415, p < 0.05$). On the strength of the result of regression analysis in Table 4.10, this study rejects the null hypothesis six (H_06) which states that there will be no significant influence of information evaluation on research competency of postgraduate students in universities in Lagos State, Nigeria.

4.3 Discussion of Findings

This section discusses the findings of this study in relation to past studies. Research findings are discussed and organized according to earlier stated hypothesis and in relation with past studies.

Hypothesis one results while examined the influence of task definition on research competency of postgraduate students in universities in Lagos State, Nigeria, revealed that task definition has a significant positive influence on research competency under investigation. The findings of this study have support in empirical literature. A recent study found out that 96% of the respondents agreed that user education class helped them to increase their searching skills while 100% of the respondents agreed that user education program helped them to better use the Library Online Public Access Catalog (OPAC)¹. The study further reveal that 55% of the respondents agreed that to obtain strong skills libraries should provide many classes of user education. A research on the role of academic libraries in the enhancement of information literacy: a study of Fort Hare Library found out that majority of the respondents (53%) has not attended library orientation, which was compulsory². However, a study shows that most of the respondents (53.3%) indicated that they learnt about electronic resources through workshops and seminars³. Another research indicates that all the respondents were involved in the training programme on information literacy⁴. The result also shows that 52% of the respondents suggested that the campus library should provide practical training on searches in the library, while 20% indicated that the library should develop an information literacy program in the University. It can be deduced here that information literacy skill training in all library across the world is at different stage. While some libraries have made significant effort, others are tackling issues of users' ability to identify, access, retrieve information and to use ICT tools in the library. Again, a process that may be effective in one library may be difficult to apply in another. This kind of situation may hamper

desired objectives. In such complex situation, survey could be carried out to identify the best suitable method in order to ensure successful literacy skill.

A comparatively larger number of studies conducted self-perception-based surveys of students. A scholar used a 10-item self-perception information competency scale (based on the ACRL standards) at a large public university in the southwestern United States⁵. Another researcher used an online questionnaire through Survey Monkey to assess perceived confidence in online searching of graduate students of at the University of Florida. Several used a self-assessing questionnaire to find out information literacy skills (mapped to the ALA standards) of undergraduate students of a college of agriculture in India⁷. Although the surveys of perceptions have been most popular many authors have mentioned limitations of this assessment technique. The researchers, who used other techniques in addition to perception surveys to the same groups of students, claimed that students had over-estimated their self-assessed information abilities than their actual level of skills. Only a few studies proved a significant correlation between students' perceived information literacy skills and their actual score on an achievement test. Many authors have explored the relationship between information literacy skills and various personal and academic variables of students. In a study at Kuwait University, a scholar compared library skills with students' age, gender, type of high school the students had attended, class level, student GPA, and level of English proficiency⁸. Several researchers found differences in information literacy skills based on students' gender.

A scholar explored the relationship of the internet facility at home with the students' information literacy skills⁹. Pakistani literature of the LIS field failed to report any diagnostic surveys to determine information literacy skills of students. In a survey of the universities offered ill-planned and informal user education programs without a survey of user needs¹⁰. Based on some

studies conducted at the University of the Punjab on the use of online databases and digital libraries, a scholar inferred that the use of these resources was low for a variety of reasons. They claimed that the community was “unable to use and/or unaware of the databases and digital services available through the HEC, and this state of information and digital illiteracy (IDI) is responsible for a significant loss of resources”¹¹. Inadequate assessment of library users’ needs and information seeking behaviour was among the inhibiting factors for successful implementation of information literacy instruction programs in Pakistani universities¹².

In a study conducted by the Educause Center for Analysis and Research (ECAR), 80.7% of students rated themselves as expert or very skilled in searching the internet effectively and efficiently, although students rated themselves slightly lower in their ability to evaluate the credibility of online information and their understanding of related ethical and legal issues¹³. A 2011 ECAR study found that while 88% of students use their institution’s library website, only 27% do not believe their skills meet their needs for searching the library site effectively. A Credo Student survey also revealed that ‘students feel reasonably capable of doing the research necessary for assignments’¹⁴. These studies indicate that students seem confident in their research skills, but does faculty concur with students’ assessment of their skills? Are students developing information literacy skills that enable them to complete research assignments effectively and efficiently? The majority of the library literature assessing college students’ information literacy skills is on pre- and/or post-library instructional session assessment. But assessment of instruction does not typically measure competency levels of all five Association of College and Research Libraries (ACRL) information literacy skills¹⁵. As the evaluators of student research assignments, faculty should have a more comprehensive picture of information literacy skills, as compared to instructional session assessment.

Hypothesis two results for the influence of information seeking strategies on research competency of postgraduate students in universities in Lagos State, Nigeria, revealed that information seeking strategies has a significant influence on research competency of postgraduate students in universities in Lagos State. A review of the literature on faculty views of information literacy reveals inconsistencies among faculty regarding how and by whom information literacy should be addressed, but also shows that academic faculty overwhelmingly believe that IL is important for their students¹⁶. 'It appears that the goals of the IL professional and the subject faculty member are at least somewhat in sync' regarding the need to improve students' skills¹⁷. However, the focus of faculty is primarily on the subject matter, while librarians' expertise lies in the process of conducting research¹⁸. A scholar suggests that faculty culture places more of an emphasis on research and content and less on teaching and process, which can hinder collaboration with librarians regarding information literacy education¹⁹. Several scholars found that science and engineering faculty 'perceive that more self-directed learning is useful, for both themselves and their students, suggesting that more how-to guides, electronic help screens for various resources, and print and online pathfinders are desirable'²⁰. In her study of sociology and civil engineering faculty, a scholar exposed faculty members' belief that information literacy is dependent on personal interest and individual motivation, and improves according to the 'law of exposure' as students repeatedly encounter situations requiring their information literacy skills²¹.

A scholar suggests that there can be an ad-hoc approach to information literacy by faculty, depending on whether a course requires a research paper. Although faculty believe that IL skills are very important, many do not utilise library instruction sessions to improve those skills²². A researcher found that journalism and mass communication faculty require students to conduct

research for their courses, are aware that their students are not as information literate as they could be and understand that library instruction improves research skills, and yet faculty do not consistently integrate instruction into their courses²³. Research conducted in the UK revealed that there was a high level of enthusiasm amongst faculty for IL, but that few academic staff teach or assess information skills or even develop them through student-centered learning. In a subsequent study she confirmed these findings with supportive data from United States (US) faculty that 'there is an apparent gap between the IL skills that faculty want their students to have and those that they actively support and develop'²⁴. A scholar found 'that the large majority of faculty believes that information literacy education should be undertaken collaboratively by faculty and librarians'²⁵.

Hypothesis three results for the influence of locating and accessing information on research competency of postgraduate students in universities in Lagos State, Nigeria revealed that locating and accessing information has a significant influence on research competence under investigation. A study examined the influence of gender on cyberspace resources and services use and the expected competencies for research among postgraduates in federal universities in Southwest, Nigeria²⁶. This descriptive survey studied a purposive sample of 1008 postgraduates from five universities. For the analyses of data, the researchers used mean, standard deviation and t-test. The results indicate that postgraduate students pointed out the expected competencies that should be possessed for the effective utilization of cyberspace resources and services for research. The researchers note that there is a non-significant difference between male and female PG students' responses in view of accessing cyberspace resources and services for research. The researchers also found a non-significant gender influence on competencies expected of PG students for utilization of cyberspace resources and services for research.

Hypothesis four results for the influence of use of information on research competency of postgraduate students in universities in Lagos State, Nigeria, revealed that use of information has a positive significant influence on research competency of postgraduate students under investigation. While information literacy skills were considered important, a scholar discovered that ‘there was not a lot of agreement on the academic level at which information literacy outcomes are expected by faculty’²⁷. In order to remedy these inconsistencies in delivering information literacy instruction to students, librarians need to take a proactive approach in meeting with faculty and managers to determine collectively how to successfully infuse information literacy into the curriculum. All US two-year and four-year institutions of higher education undergo a process of accreditation using a set of standards developed by peers to assure and improve the quality of education. Reviews of regional accreditation standards and programmatic accreditation processes suggest that alignment of information literacy instruction programmes to student learning outcomes required by accreditation organisations can be drivers for institutional focus on information literacy. The primary goal is for librarians to work in concert with faculty in order to graduate information literate students who can effectively utilise information literacy skills in the workplace, as well as to make informed decisions in their personal lives.

Osmosis does not work for the development of information literacy, but neither does it work for effective collaboration between librarians and faculty²⁸. The ERIAL (Ethnographic Research in Illinois Academic Libraries) Project offers unique perspectives from faculty interviewed during the two-year study of the student research process, on how research skills can be taught and supported by librarians. The interviews revealed that some faculty view teaching as within their domain and seek assistance from librarians to augment their own research instruction, others

schedule one-shot instructional sessions and still another segment embed librarians into their courses with multiple visits to the class to establish a better rapport²⁹. A number of learning theories have been utilised by librarians delivering information literacy instruction, including: behaviourism, cognitivism and constructivism. In a behavioural approach, instruction is teacher-centered information is presented by the instructor and students acquire skills through drills and practice and then demonstrate their understanding of the material through assessment³⁰.

Hypothesis five results for the influence of synthesizing information on research competency of postgraduate students in universities in Lagos State, Nigeria revealed that synthesizing information has significant influence on research competency of postgraduate students under investigation. By comparison, cognitive learning is a process of relating new information to previous knowledge the individual has collected. A scholar builds on this theory by advancing social constructivism, a student-centered approach where environment comes into play and individuals learn not only from their own experiences, but also learn from the experiences of others. Technology has also had a significant impact on information literacy education, with Web 2.0 tools (e.g. wikis, blogs, podcasts, RSS, Twitter, Facebook, YouTube, Flickr and social bookmarking) being used to retrieve and produce information. 'Given that Web 2.0 tools support the constructivist ideas upon which the ACRL standards are at least partially based, it should be possible to find ways that the tools can be used to promote the various outcomes'³¹. Several scholars discuss new applications of technology that can help students navigate the ever-changing information environment³². However, some caution needs to be taken when introducing Web 2.0 tools since not all students possess the necessary skills to use them. In addition, a recent ECAR study found that although students agree that technology can help them achieve academic

outcomes, they are sensitive to the boundaries that technology plays in their personal and academic lives³³.

Hypothesis six results for the influence of information evaluation on research competency of postgraduate students in universities in Lagos State, Nigeria, revealed that information evaluation has significant influence on research competency of postgraduate students in universities under investigation. A study investigated the influence of information literacy skills on postgraduate students' use of electronic resources in private university libraries in Nigeria³⁴. The study adopted the survey research design. The study population comprised 2805 postgraduate students in five private universities offering postgraduate programmes in South-West, Nigeria. Multistage sampling technique was used in the selection process. A purposive selection of four faculties from each of the five universities was carried out. Proportionate sampling technique was used to select the sample size of 550 postgraduate students as the respondents for the study. Findings revealed that there was a significant positive correlation between information literacy skills and use of electronic resources ($r = 0.28, p < 0.05$). The study concluded that the utilization of electronic resources promoted access to current information among postgraduate students in the selected private universities in South-West, Nigeria.

Therefore, on the strength of the support found in prior conceptual, empirical and theoretical studies with this present study's result, the study posits that Information Literacy Skills has positive significant influence on Research Competency of Postgraduate Students in Lagos State, Nigeria.

Endnotes

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Chapter Five

Conclusion

This chapter presents and discusses the summary of findings, conclusions and provides useful recommendations, contributions to knowledge and suggestions for further studies.

5.1 Summary of Findings

The aim of this study is to examine the influence of Information Literacy Skills on Research Competency of Postgraduate Students in selected institutions in Lagos State, Nigeria. The study has five chapters so as to achieve its main objective. The chapter one presented the background to the study which established that the paradigm of the ultimate goal of education is changing: it is a competent professional and researcher with well-developed skills that make it possible to plan independent research activities. A great majority of students finish their education after undergraduate education or join in the business life or start graduate education to pursue . Literature review of existing relevant studies to the concept of Information Literacy Skills and Research Competency was done. Information Literacy Skills in this study included dimensions such as task definition, information seeking strategies, location and access to information, use of information, synthesis of information as well as evaluation of information which are used as measures of Information Literacy skills. Research Competency was measured with content competency, methodology skills, evaluation and operationalization of research and ethical practices. The empirical review was done to capture the interaction between Information Literacy skills and Research Competency.

The study reviewed three different theories which are of specific relevance to the study. These are; Big6 Model for Information Literacy and Research Competency Theory. This study is anchored on Big6 Model for Information Literacy. This theory serves as an effective tool for helping students learn the research process which allows researchers to effectively find, use,

apply, synthesize and evaluate information. It is an effective tool for helping students learn the research process as an inquiry process.

A cross sectional survey design was employed as it studied a subset of a population at a point in time and to investigate the influence of information literacy skills on research competency of postgraduate students of universities in Lagos State, Nigeria. The population of the study was ten thousand (10,000) postgraduate students of Universities in Government-Owned Universities in selected institutions in Lagos State, Nigeria, which are Lagos State University and University of Lagos.

Stratified random sampling was used for the study. Self-rated questionnaires were used to elicit response from 349 students of the sample Government-owned universities who returned the questionnaires. The study adopted descriptive and regression statistical analyses technique to explain the influence of Information Literacy skills on Research competency. Statistical Product and Service Solution (SPSS) Version 24 was used to test the hypotheses at 0.05 level of significance to determine the rejection or acceptance of the null hypotheses. The results were extensively discussed in the context of the current research as well as extant literature.

The findings of the study can be summarized as follows:

- ix. Research competency among postgraduate students of universities in Lagos State, Nigeria is high; however, content competency is low compared with other measures of research competency.
- x. Information literacy skills among post-graduate students are high, although location and access as well as use of information falls behind other measures of Information literacy skills investigated.

- xi. Task definition has a significant influence on research competency of postgraduate students in universities in Lagos State. This implies that ability to discuss with lecturers about learning resources information enhances postgraduate students' research competency.
- xii. There is significant positive influence of Information seeking strategies on research competency of postgraduate students in universities in Lagos State.
- xiii. Location and access to information has significant influence on research competency of postgraduate students in universities in Lagos State. This means been able to search for accurate information via the internet and other sources improves research competence of postgraduate students investigated.
- xiv. Use of information has significant positive influence on research competency of postgraduate students in universities in Lagos State.
- xv. There is significant positive influence of Information synthesis on research competency of postgraduate students in universities in Lagos State. This reveals that logical organization of information propels research competency of postgraduate students in universities in Lagos State.
- xvi. Information evaluation has significant influence on research competency of postgraduate students in universities in Lagos State. This implies that ability to understand the information obtained is very essential to research competency of postgraduate students in universities in Lagos State.

5.3 Conclusion

Emergence of knowledge based society with its challenges and demands has increased the urge for research in every sector of life endeavour. The main objective of the education system is to train competent and creative specialists that are able to plan their activities. Conventional skills are becoming less and less important, while non-standard and interdisciplinary skills are playing an increasingly important role. On the other hand, Information literacy is the ability to recognize when information is needed and to have the ability to locate, evaluate, and use effectively the needed information and “information literacy encompasses knowledge of one's information concerns and needs, and the ability to identify locate, evaluate, organize and effectively create, use and communicate information to address issues or problems on hand. Based on the empirical findings, this study concluded that there is statistically significant influence of Information literacy skills on research competency of postgraduate students in Government-owned universities in Lagos State, Nigeria.

5.3 Recommendations

The essence of any research activity is to advance the body of knowledge and boost overall development of the society by breeding new information that will either improve already existing status quo or create new ideas and methods of solving problems. In a bid to make such impact this study hereby recommends the following:

- vi. Postgraduate students in universities in Lagos State should broaden their knowledge in the use of open digital scientific and educational systems to search and store information.
- vii. The management of the selected Government-owned universities should ensure that strategies are put in place for worthwhile research learning process for their postgraduate students.

- viii. Postgraduate students should be given adequate opportunity to discuss with lecturers about learning resources information as this will go a long way in enhancing optimal research competence by the future researchers.
- ix. Postgraduate student should develop the ability to locate and access information via diverse channels i.e. online, monographs, etc.
- x. Logical organization of information is very essential as far as research competence is concerned, hence postgraduate students in universities in Lagos State should widen their horizon as regards synthesizing information.

5.5 Contribution to Knowledge

This study offers significant contribution to literature conceptually, theoretically, and empirically. Conceptually, the study focused on identifying gaps in literature pertaining the Information Literacy skills and Research competency. The conceptual framework of this study equally offers conceptual contribution as it was constructed by the researcher to analyze the gaps identified in literature. The model also can be adapted to suite future studies.

From the theoretical stand point the Big6 Model of Information literacy was strengthened. This model serves as an effective tool for helping students learn the research process which allows researchers to effectively find, use, apply, synthesize and evaluate information.

Empirically, the study is able to add to recent literature on the interaction among Information literacy skills and research competency. Though, studies on Information literacy skills and Research competency abound in developed economy context, however empirical study from developing countries like Nigeria seems to be few in this regard, most especially within the context of Government-owned universities in Lagos State, Nigeria. Hence by the findings of the

six null hypotheses examined, the study becomes a basis for reference for future study on Information literacy skills and Research competency. Moreover, the study provides findings which scholars can use to buttress the empirical submissions in their study.

Overall, these above-mentioned points lay emphasis on the fact that this study offers significant contribution to knowledge and has practical implication for the postgraduate students Government-owned in universities in Lagos State, Nigeria that were investigated.

5.5 Suggestion for Further Research

This study focused on the influence of Information Literacy skills and Research Competency of postgraduate students in universities in Lagos State, Nigeria. Nevertheless, to further broaden the frontiers of knowledge, the following areas of studies are suggested for further research.

- viii. The present study was carried out in Government-owned universities in Lagos State, further studies can be carried out in other tertiary institutions within the State so as to be able to extend the knowledge gained from this work to all tertiary institutions in the State.
- ix. This study investigated Information Literacy skills and Research competency of Postgraduate students in in selected institutions Lagos State, a comparative study with Private and Federal tertiary institutions in Nigeria may be considered in the nearest future.
- x. Information Literacy skills dimensions can be tested on each of the measures of Research Competency in further studies.
- xi. A cross-sectional survey design was used in the course of the study, and this means evidence of causality cannot be established hence, further study may consider longitudinal survey design to explain causality over a long period of time.

- xii. The present study was carried out using postgraduate students as respondents, future research work may examine the influence of information literacy skills on research competence of lecturers in tertiary institutions in Nigeria.
- xiii. Other factors like employee onboarding, employee commitment, and organization culture can equally influence institution performance and hence becoming an interesting area for future study.
- xiv. This study employed primary data for collection of information from the selected universities, same study may be carried out in the nearest future using the secondary data for collection of information.

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Lead City University

Faculty of Communication and Information Sciences (FCIS)

Department of Information Management

Dear Respondent,

I am a Master's student of the above named institution gathering data for the purpose of academic research on the topic "Influence of Information Literacy Skills on Research Competency of Postgraduate Students of Universities in Lagos State, Nigeria. To achieve this, your optimum cooperation is needed; there are no right or wrong answers. All your responses will be kept confidential and used for research purpose only.

Thank you.

Section A: Demographic Information

Gender: Male (), Female ()

Age: 20 – 25 (), 26 – 30 (), 31 – 35 (), 36 – 40 (), 41-45 (), 46 and above ()

Educational Level: Bachelor's degree () Master's degree () Ph. D ()

Years of experience: 5 – 10 (), 11 – 15 (), 16 – 20 (), 21 – 25 (), 26 - 30 ()

Section B: Level of Research Competency of Postgraduate Students of Universities in Lagos State, Nigeria.

The statement in this section concerns Research Competency as observed by the Postgraduate Students of Universities in Lagos State, Nigeria. Using the four-point Likert scale provided below. Please tick the appropriate choice that indicates your opinion on your level of research competency.

Very high = 4, High = 3, Low = 2, Very low = 1

S/N	In what way have you engaged in the following?	VH 4	H 3	L 2	VL 1
	Content Competency				
1	Ability to use open digital scientific and educational systems to search and store information.				
2	Ability to select optimal digital technologies at each stage of scientific research.				
3	Ability to search for like-minded people on scientific ideas.				
4	Skills to carry out scientific communication with the use of digital technologies.				
5	Ability to understand how to add to a scholarly or professional conversation through research and writing.				
	Methodology Skills				
6	Self-assessment of own research activity and received scientific results.				
7	Ability to match a scholarly question to the appropriate theories and methods.				
8	Ability to analyze data or information relevant to the project.				
9	Ability to organize and synthesis information in the required format from multiple sources.				
10	Ability to develops cognitive and creative abilities of the individual.				

Evaluation and Operationalization of Research					
11	Ability to analyze current research.				
12	Ability to use digital technologies for research planning.				
13	Skills mastery in working with scientific literature and ability to compile bibliographic lists.				
14	Skills to apply digital technologies to solve a specific research problem.				
15	Choice of actual directions of further scientific researches				
Ethical Practices					
16	Knowledge of ethical use of information				
17	Knowledge about plagiarism				
18	Ability to apply information ethics by citing sources appropriately and observing copyright.				
19	Ability to explain the ethical dimension of a case to those involved and to others.				
20	Ability to formulate and justify morally acceptable solutions				

Section C: Information Literacy Skills of Postgraduate Students of Universities in Lagos State, Nigeria.

The statement in this section concerns information literacy skills as observed in your institution. Using the four-point Likert Scale provided below. Please tick the appropriate choice that indicates your opinion.

S/N	Please indicate your level of agreement with the following	SA 4	A 3	D 2	SD 1
	Task definition				
1	The procedure for doing assigned tasks are good				
2	I feel comfortable with given priorities to do different tasks				
3	I experience personal growth such as updating skills and learning				

	different research skills				
	Information Seeking Strategies				
1	Using words with similar meaning to describe a concept				
2	Knowing when to refer to a journal				
3	Knowing the criteria of a scholarly journal				
4	Knowing when to use a database				
5	Knowing when to use a library catalogue				
	Synthesis of Information				
	Ability to define and articulate the need for information				
1	Ability to identify variety of types and formats of resources				
2	Working knowledge of literature				
3	Understanding of statement of problem				
	Locate and access information needs effectively and efficiently				
1	Understanding of the structure and content of the fields in a library catalogue/database in order to select the appropriate search index while executing the search.				
2	Ability to correspond to the words used to describe their own topic to those employed by the selected search tools such as identification of synonyms, related terms or descriptors used to represent a subject, etc.				
3	Understanding of controlled vocabulary				
4	Ability to develop relationship between the keywords by using Boolean logic/operators, etc.				
	Information Evaluation				
1	Ability to interpret a bibliographic reference				
2.	Ability to evaluate an internet site				
3.	Ability to evaluate library resources				
4.	Ability to interpret result				
	Use of information				

1	Ability to use of bibliometric analysis tools				
2	Ability to use freely available online research data, like open-access journals.				
3	Ability to use current awareness services like alerts, table of contents (TOCs), etc.				
4	Ability to use of blogs, really simple syndication feeds, social media				

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Bio-data

Names: Ayodele, Musbau Olajire

Designation: Librarian I

School Department/Unit: Lagos State University of Science and Technology,
Library Acquisition

Salary Grade Level: level 9/step 02

Name: Ayodele Musbau Olajire

Date of Birth: 20th June 1969

Place of Birth: Lagos Island

Nationality: Nigerian (By Birth)

State of Origin: Ogun State

Local Government Area: Odogbolu Local Government Area

Permanent Home Address: Flat. Zodiana Estate, 209 Bayeku Road Igbogbo

E-Mail Address: ayodeleolajire@gmail.com

Mobile Phone Number: 08035689635, 08058842843

Marital Status: Married with Children

(iii) Educational Institution (s) Attended with Dates

(f) Lead City University, Ibadan	2020 – 2022 (In view)
(g) Lagos State University, Ojo, Lasu	2010 – 2011
(h) University of Ibadan	1989 – 2001
(i) St. Andrews College of Education, Oyo (NCE)	1994-1996
(j) St. Timothy's College, Onike, Iwaya, Lagos	1987-1993

(iv) Academic and Professional Qualification Obtained with Dates

f. Master of Library and Information Science (MLIS)	2020-2022 (In View)
g. Master of Education in Sociology	2010-2011
h. Bachelor of Library and Information Studies (BLIS)	1989-2001
i. Accounting Education (NCE)	1994-1996
j. West African Secondary Certificate/GCE	1987-1993

Working Experience with Dates:

Lagos State University of Science and Technology (Formerly: Lagos State Polytechnic, Ikorodu, Lagos State	2017 – till date
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Academic Librarian 1

Lagos State Polytechnic, Ikorodu, Lagos: Part-Time Staff	2005-2017
Rio International Secondary School, School Librarian	2002-2004

Academic and Professional Qualification Obtained with Dates

6. Master of Library and Information Science (MLIS)	2020-2022 (In View)
7. Master of Education in Sociology	2010-2011
8. Bachelor of Library and Information Studies (BLIS)	1989-2001
9. Accounting Education (NCE)	1994-1996
10. West African Secondary Certificate/GCE	1987-1993

Details of Publication

D. Paper in Press

I, Oyebode, John Adeboye, Yusuf, Kuburat Folashade, Odeyemi, Taiwo Hope.
Talabi Adetutu Fatima. Makinde, Kehinde Joy. Salvador Yewande and Ayodele,
Musbau Olajire (2022). Effect of Library User Education and delinquent behaviours

of Polytechnic Students in Lagos State, Nigeria. A Chapter Contribution in contemporary issues in Honour of Professor David Folorunsho Elaturoti. CLN, FNLA. MNAE (Paper in Press)

E. Chapter Contribution in Books

- II. Azeez Adeoye and Musbau Olajire Ayodele (2022) Intellectual Property right and digital Library in Africa. Theory and Practice of Book Publishing in Nigeria: A Festschrift in Honour of Professor Oshote Andrew Okwilagwe.

F. Paper Published in Reputable Journals

- Salvador, M.Y., Ayodele M.O. Bamgbose : A.A. Ncha, J.O. (2017) Psychological Adjustment. Ethical issues in Information Management as a factor Affecting Work effectiveness of Library Personnel in Lagos State, Nigeria. Journal of Positive Psychology and Counselling 1 (2)./33.47
5. Adebawale Jeremy Adetayo Aishatu Ibrahim Sueliman, Musbau Olajire Ayodel (2022) Leveraging Digital Infor-preneurship for Financial Well – being of Academic Liberians. The Nigerian Perspective. University of Nebraska – Lincoln (e-journal) Library @ university of Nebraska – Lincoln
 6. Librarianship Themes in Library Users Education Questions and Answers. 2010.
 7. **Un-Published Work**
 6. **Musbau Olajire, Ayodele** (1996). The Administrative Management of Nigerian Bookstores and the problem facing them (A case study of Odusola Bookshop)
 7. **Musbau Olajire, Ayodele** (1991-1995). Petroleum Industries in Nigeria a Bibliography
 8. **Musbau Olajire, Ayodele** (2013). The Management of Nigeria Mobile Libraries and the problems facing them (A case study of Eti-Osa Local Government Mobile Library system Lagos State
 9. **Musbau Olajire, Ayodele** (2013). Impact of Media violence on student social interaction in School

10. **Musbau Olajire, Ayodele** (2021). Comparative analysis of information seeking behaviors among pupil in Public and Private Primary Schools in Lagos State a student of Holy Cross Catholic Primary School and Green Spring Primary School

Conference Attended

5. Nigeria Library Association: Information Technology Section, held at Ajayi Crowder University, Oyo - 4th – 8th October, 2021
6. Librarian's Registration Council of Nigeria (LRCN) – 27th November, 2018
7. Nigeria Library Association – 57th National Conference and AGM Libraries: Dialogue for Change. Held at Petroleum Training Institute (PTI) Effurun – Warri, Delta State 2nd August, 2019.
8. Marketing the west – African Library Association in the New Millennium, 11th – 13th October, 1999

Professional Body:

- Member: Librarian Registration Council of Nigeria (LRCN) 27th November, 2018
- Member: Lagos State Chapter, Nigeria Library Association (NLA)

Meritorious Service Awards

- Lagos State Polytechnic (Surulere Campus)
- Merit Awards 13th day of July 2012-2013
- National Association of Computer Science Students (NACOSS)

Award of Honour

Award of Appreciations for Meritorious and Recognition 2011 2010
(Accountancy) Abesan Annex
Lagos State Polytechnic (Agege Annex) National Association
of Polytechnic 2005-2006
Accountancy Students (NAPAS) Award of Excellence

Extra Curricular Activities

- **Reading**
- **Playing of Table Tennis**
- **Travelling**

Referees:

3. Mrs. Yusuf K. Folashade

Ag. University Librarian

Library Department, Lagos State University of Science and Technology

Formerly: Lagos State Polytechnic, Ikorodu

Tel: 0805610024, 08126817193

4. D.r. Adeyeye Vivian Sophia

Head of Department

Department of Information Management

Lead City University

Tel: 08061127708

Signature

Date

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University Compliance Certification

This is to certify that this Thesis written by **Musbau Olajire AYODELE** with Matriculation No. **LCU/PG/002052** in the department of Information Management of the Faculty of Communication and Information Sciences, Lead City University, Ibadan is in full compliance with the approved University format and style.

Signature

Date