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Assessment of Research Skills Among Undergraduates in the University of Calabar, Nigeria

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Abstract

The study assessed the research skills of undergraduates in the University of Calabar, Nigeria. The Ex-post Facor research design was adopted in this study which population consists of all the final year undergraduates of the 2016/2017 academic session. There were a total of 11,193 students as recorded by Academic planning unit of the university, 2017. The sampling techniques adopted for this study were the stratified, proportionate, accidental and simple random sampling techniques. The stratified sampling technique was used to stratify the University into stratum: Faculty of Education, Medical College, Faculty of Management, Faculty of Science and Faculty of Arts. The proportionate sampling technique was used to select 20% of the final year students from each Faculty while the accidental sampling technique was use to get at the respondents. A sample size of six hundred and ninety (690) undergraduates was used. The instrument used for data collection was an adapted University of Calabar assessment scale. The data collected was analyzed using population t-test. The study found that the research skills of undergraduates in the University of Calabar were significantly high. It was recommended in the study that every undergraduate should have a mentor, someone who is more knowledgeable and can guide them, not just in the area of academic success, but to also excel in the area of research.

Keywords: Assessment; Research; Skills; Undergraduates; University.

1. Introduction

Research is a process of investigation intended to solve a real or perceived problem. It is a systematic process that requires acquisition of basic skills on the part of the researcher in order to be successful in any research project embarked upon. This explains why research is taught to undergraduates in Nigeria Universities to prepare them for efficiency and competence in the conduct of research. The ability to conduct empirical research is a mark of scholarship and a step towards problem solving. Research is the key to the solution of all human problems and challenges. It simply requires identification of the problem or challenge. If a problem is well articulated and the logistics needed are provided, a researcher with the prerequisite skills in the conduct of research can proffer solution to the problem under consideration.

Undergraduates in Nigeria universities are made to experiment their knowledge and skills in the conduct of research by submitting a research project at the completion of their studies. The project is written under the guidance of supervisor whose duties is simply to guide the student by ensuring that the right methodology is followed and the project is presented in line with the specifications stipulated. A look at a completed student project, from the background to the study, through the review of literature, the methodology, the analysis of data, presentation of results, up to the references, will obviously reveals the student's ability and competences in terms of research skills acquisition. The undergraduates are expected to demonstrate good research skills in the conduct and writing of such project. Therefore, the basic research skills expected of undergraduates includes: skills in problem articulation, review of literature, hypotheses formulation, statistical analysis and skills in documentation. These were the skills evaluated in this study.

Problem articulation is the beginning of the research process. If the problem of a study is well articulated and presented, the researcher can confidently proceed with the investigation. Articulation of the research problem is the basis on which all the other items in the whole research procedures and conclusion are to be made. All the other research skills would be moving towards providing a solution to the problem identified. A strong conceptual knowledge is required in order to be able to define the problem and forecast its consequences. This could be done based on personal experience, preliminary observation or through literature search.

Another relevant research skill expected of undergraduates is the skills in formulation and testing of hypothesis. A hypothesis is developed as a preliminary or tentative statement giving answer to the question under consideration. The outcome of the research could be in agreement with hypothesis formulated or at variance with it. An important aspect of any scientific discipline is the search for answers to properly formulated questions and hypothesis. When the result is presented, students should have the skills, knowledge and competence to know when the result is significant and when it is not significant. With this knowledge, they should know when a null hypothesis should be accepted and when it should be rejected. Students with good research skills should be able to formulate testable hypothesis that will guide the research study and draw conclusions at the end of the study that answers the research question posed.

Review of literature is an exercise in which a researcher carefully searches, examines, and analyses available sources as they relate to the problem under investigation. According to Isangedighi *et al.* (2004), literature review is an activity which involves identifying, locating, reading and assessment of existing literature in relate to the problem under investigation, with a view to sharpening and clearly defining the problem in specific term. Such knowledge to be sought for in literature review includes conceptual frameworks, empirical evidence, theories, hypothesis and conclusions of other scientific works related to the question under investigation. The review of literature puts the researcher in a vantage position to ascertain whether the given problem has received partial or elaborate attention, whether there is need for fresh research or further research or no need for further investigation on the problem under consideration.

It is equally necessary for undergraduates to be conversant with data analysis techniques. It requires the ability to apply appropriate methods to interpret data. Data analysis skill in research is the ability of the researcher to apply an appropriate method for interpreting and manipulating data. Slammart (2005) noted that, most undergraduate students in the Universities lack adequate awareness in applying techniques of statistical analysis, including the use of appropriate statistical tools in research. Available literature (Okebukola, 2002), showed that many undergraduates in Nigeria lack the basic skills to conduct research. There is therefore the serious challenge among scholars concerning the quality of project prepared by graduates in Universities in Nigeria.

2. Statement of the Problem

Undergraduates are expected, as part of the requirement for conferment of Bachelor Degree, to undertake a research project by articulating a problem that can be investigated, formulate testable hypotheses, review related literature, collect and analyze data using appropriate statistical tools, interpret the result, draw conclusion and make recommendations based on the findings and objectives of the study. Students were exposed to adequate training in Research Methodology and Educational Statistics. These are two different courses undergraduates in the university undertake as part of their preparation for independent research work. However, preliminary observations of undergraduate research Projects and their approach towards writing the project reveals that undergraduates finds it difficult in completing their projects in record time. The projects submitted shows discrepancies in organization, poor presentation and substandard projects. It invariably means that undergraduates in the University of Calabar appear to have challenges in writing their research projects.

From the above observations, the question that arises is, to what extent do undergraduate students in the University of Calabar applied appropriate research skills in terms of problem articulation, formulating testable hypotheses, organization of literature review, and choice of suitable statistical data analysis in their research? This constituted the problem this study sought to find solution to.

3. Objective of the Study

The objective of the study were to make an assessment of research skills acquisition among undergraduates in the University of Calabar. Specifically the study sought to:

1. Assess the research skills of undergraduates in the University of Calabar, in terms of problem articulation in research.
2. Assess the research skills of undergraduates in the University of Calabar in terms of formulating and testing of hypotheses in research.
3. Assess the research skills of undergraduates in the University of Calabar in terms of organization of literature review in research.
4. Assess the research skills of undergraduates in the University of Calabar in terms of statistical analysis in research.

4. Statement of Hypotheses

The following hypotheses were formulated to guide the study:

1. The research skill of problem articulation among undergraduate students in University of Calabar was not significantly high.
2. The research skill of formulation of testable hypotheses among undergraduates in the University of Calabar was not significantly high.
3. The research skill of organization of literature review among undergraduates in University of Calabar was not significantly high.
4. The research skill of statistical analysis among undergraduates in the University of Calabar was not significantly high.

5. Review of Related Literature

Writing a research project requires basic knowledge of specific research skills; skills that often require explicit instruction and time to hone (Hedengren, 2004; White, 2007). Some of these skills include being able to locate sources, evaluate and question sources, and make use of the available resources (DuBravac, 2013; Johns, 2011; Purdue University, 2013). Lyons *et al.* (2005) found that students reported improvement in their research skills as a result of participation in their teaching fellowship programs. According to Steigelmeyer and Feldon (2009) inquiry based teaching methods and research share cognitive processes that supports the acquisition of research skills. Other

studies that emphasize the acquisition of Research skills include: (Deen and Lucas, 2006; Maher *et al.*, 2009; Robertson and Blackler, 2006; Steigelmeyer and Feldon, 2009).

Okafor (2011) define research as human activity based on intellectual application in the investigation of matter, the aim of which is the discovery and development of methods and systems for the advancement of human knowledge. According to Webb *et al.* (2011), Research material could come from scholarly journals, conference papers and other sources, research should have the skills to search and review existing sources as panacea to understanding the problem under investigation. Lambert and Yanamandram (2004) reported that students spend more time doing research on the Web, which means spending less time or no time at all in a library. Consequently, they rarely worked with journals and were unable to differentiate between journal articles and those published on the Web. Isangedighi *et al.* (2004) argued that, problems that agitate the mind and urge for solution arises from the contact between the mind and the world of nature outside the person. Articulation or identification of problems for research abound everywhere but seen only by inquiring and curious minds.

Data analysis is the modern scientific method of research, which is empirical in nature. Most undergraduate students in the University of Calabar experience some difficulty in this aspect of the research process. Data analysis skills entails accuracy in interpretation of research data and the ability to utilize the right statistical technique that is fitted for the hypothesis since wrong statistical analytical tool gives wrong interpretation and wrong findings. Lubben and Sanchra (2005) conducted a research on skills in mathematics, science and technology. The data suggested that outcomes in terms of an increase in research capacity are limited by poor contexts, where potential novice researchers give priority to income generating professional activities. The poor context of research capacity has some significant influence on school science curriculum which is dangerous for a progressive technical and scientific research. Talafhah (2012) opined that although students have been trained to do research, their research confidence and self-efficacy are major components that will determine whether their research will be a success or a failure. To improve the understanding of researchers' psychological and mental characteristics, self-efficacy is an important additional dimension for this reason (Mohamed and Nordin, 2012).

6. Methodology

This study was conducted in the University of calabar, Nigeria. The Ex-post Facor research design was adopted in this study. The population of this study consists of all the final year undergraduate in the University of Calabar of 2016/2017 academic session. There were a total of 11,193 final year undergraduates spread across ten Faculties, as recorded by Academic Planning Unit of the University, 2017. The sampling techniques adopted were; the stratified, proportionate, accidental and simple random sampling techniques. The stratified sampling technique was used to stratify the University into stratum (Faculties), from which Faculty of Education, Medical College, Faculty of Management, Faculty of Science and Faculty of Arts were selected for the study. The proportionate sampling technique was used to select 20% of the final year students from each Faculty. The accidental sampling technique was used for selecting the respondents from each Faculty. Finally, the purposive sampling technique was employed to use only the final year students involved in research (writing of project). A sample size of six hundred and ninety (690) undergraduates was used. The instrument used for data collection was an adapted University of Calabar assessment scale. The questionnaire is titled "University of Calabar Assessment Rating Scale For Students Research Skills (UCARSSRS). The data collected was analyzed using population t-test.

7. Presentation of Data and Discussion of Finding

Hypothesis One:

The research skill of problem articulation among undergraduate students in University of Calabar is not significantly high.

Table-1. Population t-test analysis of whether assessment of students' research skills in terms of problem articulation is significantly high

Students' research skills	N	Sample Mean	Sample SD	Reference Mean	t-value	Sig level
Problem articulation	690	16.19	1.21	15.00	29.75*	.000

* p< .05; critical t = 1.96; df = 689

The results of analysis presented in Table 1 shows the mean and standard deviation of the sample of skill of problem articulation, which is the research skill in focus in this hypothesis. The comparison of these sample Means with the reference Mean score of 15.00 yielded t-values of 29.75. The calculated absolute t-value is higher than the critical t-value of 1.96 at .05 level of significant with 689 degrees of freedom. With this result, the null hypothesis was rejected. This implies that Assessment of students' research skills in terms of problem articulation was significantly high. The result of the first hypothesis indicated that assessment of students' research skills in terms of problem articulation was significantly high. This finding agree with Hoffman *et al.* (2008) who revealed that on the overall, 72% of respondents had been taught how to search online article data base at some point in their academic career, but this percentage decreased for most other skills, (such as data analysis and validation skills).

Hypothesis Two:

The research skill of organization of literature review among undergraduates in University of Calabar is not significantly high.

There is only one variable in this hypothesis, which is Assessment of students' research skills in terms of organization of literature review.

Test statistics: t-test of one sample Mean (also known as population t-test) was employed to test this hypothesis. This reference Mean score was obtained by multiplying the average of the scores assigned to the six response categories for each of the items on the questionnaire by the number of items used to measure organization of literature review (which were 4).

Thus, the Reference mean score = (5+4+3+2+1) X 4

5 =15.00

Testing hypothesis 2 involved comparing the sample Mean of organization of literature review skills with the reference mean score of 15.00. The statistical technique deploy to do this comparison was the t-test of one sample Mean (also known as population t-test). The results of the analyses are presented in Table 2.

Table-2. Population t-test analysis of whether assessment of students' research skills in terms of literature review was significantly high

Students' research skills	N	Sample Mean	Sample SD	Reference Mean	t-value	Sig level
Literature review	690	15.41	1.85	15.00	5.86*	000

* p< .05; critical t = 1.96; df = 689

The results of analysis presented in Table 2 shows the Mean and Standard Deviation of the sample on the organization of literature review skill in focus in this hypothesis. The comparison of the sample Means with the reference mean score of 15.00 yielded t-value of 5.86. The calculated absolute t-value is higher than the critical t-value of 1.96 at .05 level of significant with 689 degrees of freedom. With these results, the null hypothesis was rejected. This implied that assessment of students' research skills in terms of literature review was significantly high. The result of the second hypothesis revealed that students' skill of organization of literature review in their research is significantly high. This finding is at variance with Hart (2008) whose study indicated that students in Higher Institution do not have a good understanding of the critical research skills or possible ways of structuring a literature review. Hoffman *et al.* (2008) also found that various institutions seemed to feel most strongly that their students should develop a repertoire of strategies for searching the literature while students' perspectives were that, institutions place importance on knowledge copyright, intellectual property than guiding them on other research skills.

Hypothesis Three:

The research skill of formulation of testable hypotheses among undergraduates in the University of Calabar is not significantly high. There is only one variable in this hypothesis, which is assessment of students' research skills in terms of formulation of hypotheses.

Test statistics: t-test of one sample Mean (also known as population t-test) was employed to test this hypothesis. This reference mean score was obtained by multiplying the average of the scores assigned to the six response categories for each of the items on the questionnaire by the number of items used to measure formulation of hypotheses (which were 4).

Thus, the Reference mean score = (5+4+3+2+1) X 4

5 =15.00

Testing hypothesis 3 involved comparing the sample Mean on formulation of hypothesis skills with the reference mean score of 15.00. The statistical technique deploy to do this comparison was the t-test of one sample mean (also known as population t-test). The result of the analysis is presented in Table 3.

Table-3. Population t-test analysis of whether students' research skills in terms of formulation of hypotheses was significantly high

Students' research skills	N	Sample Mean	Sample SD	Reference Mean	t-value	Sig. level
Formulation of hypothesis	690	15.62	1.89	15.00	8.86*	000

* p< .05; critical t = 1.96; df = 689

The results of analysis presented in Table 3 have shown the Mean and Standard Deviancy of the sample on formulation of hypotheses in focus in this study. The comparison of the sample Means with the reference Mean score of 15.00 yielded t-values of 8.86. The calculated absolute t-value is each higher than the critical t-value of 1.96 at .05 level of significant with 689 degrees of freedom. With these results, the null hypothesis is rejected. This implies that Assessment of students' research skills in terms of formulation of hypotheses is significantly high. The result of the third hypothesis revealed that undergraduates' skill of formulating hypothesis is significantly high. This result is not unconnected with the training undergraduates training in research methodology and statistics.

Hypothesis Four:

The research skill of statistical analysis among undergraduate students in University of Calabar is not significantly high. There is only one variable in this hypothesis, which is assessment of students' research skills in terms of statistical analysis.

Test statistics: t-test of one sample Mean (also known as population t-test) was employed to test this hypothesis. This reference Mean score was obtained by multiplying the average of the scores assigned to the six response categories for each of the items on the questionnaire by the number of items used to measure statistical analysis (which were 4).

Thus, the Reference Mean score = $\frac{(5+4+3+2+1) \times 4}{5} = 15.00$

Testing hypothesis 4 involved comparing the sample Mean on statistical analysis skills with the reference Mean score of 15.00. The statistical technique deploy to do this comparison was the t-test of one sample mean (also known as population t-test). The result of the analysis is presented in Table 4.

Table-4. Population t-test analysis of whether students' research skills in terms of statistical analysis is significantly high

Students' research skills	N	Sample Mean	Sample SD	Reference Mean	t-value	Sig level
Data analysis	690	14.56	2.63	15.00	-4.89*	000

* p< .05; critical t = 1.96; df = 689

The results of analysis presented in Table 4 shows the Mean and Standard Deviancy of the sample on statistical analysis skills in focus in this hypothesis. The comparison of the sample Means with the reference Mean score of 15.00 yielded t-value of 4.89. The calculated absolute t-value is higher than the critical t-value of 1.96 at .05 level of significant with 689 degrees of freedom. With these results, the null hypothesis is rejected. This implies that Assessment of students' research skills in terms of statistical analysis is significantly high. The result of the forth hypothesis revealed that undergraduates research skills in terms of statistical analysis was significantly high.

8. Conclusion and Recommendations

Universities and other tertiary institutions across the world are recognized as citadels of learning and centres of research. Research occupies the centre stage in all the activities of universities. This is to guarantee continuity and advancement of the society at large through research development. Research skills are taught to undergraduates to keep hopes alive and retain the tradition of using research as the search light to the unknown. Research skills then become the source of energy that keeps the search light on. If you consider the place of research in the overall development of the society, you will be properly positioned to appreciate the need to build, develop and sustain research skills on the future generation of any nation.

It is important to emphasize mentoring in the university system. Every undergraduate should have a mentor, someone who is more knowledgeable and can guide them not just in the area of academic success but to also excel in the area of research. This is necessary to guarantee sustainability of the significant research skills already acquired.

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