Network for Research and Development in Africa
International Journal of Pure and Applied Science Research
ISSN: 2384-5918. Volume 12, Number 6
Pages 33-43 (April, 2023)
DOI: 67321673211265
https://arcnjournals.org

Relationship between Availability of Resources and Academic Performance of Senior Secondary School Students in Chemistry in Sokoto State, Nigeria

KABIRU Faruk
Department of Mathematics Shehu Shagari University of Education Sokoto | kabirufarukut@gmail.com | 08063575517
UMAR, Adama Usman
Department of Science and Vocational Education Faculty of Education and Extension Service, Usmanu Danfodiyo University, Sokoto | 08036464864
UMAR, Yahaya Moriki
Science and technical teachers board Gusau, Zamfara State | Yahayamoriki22@gmail.com |08060209544

Abstract: *This study investigated the relationship between availability of resources and academic performance of senior secondary school Chemistry students in Sokoto state, Nigeria. The study used correlational research design. The sample of this study was (169) senior secondary school SSII students, derived from the population of (31,020) using Research Advisor, (2006). This study used Chemistry observation checklist as the instruments which contained list of apparatus and chemical reagents found in a chemistry laboratory and also Senior Secondary School Chemistry performance test (SSSCPT) which contained 30 multiple questions drawn from SSII syllabus, the instruments were validated and with a reliability coefficient of 0.75. The data collected was analysed using descriptive statistics, while Pearson Product Moment Correlation Coefficient (PPMCC) and T-test statistics were used to test null hypotheses at 0.05 level of significance. The findings showed that there was significant relationship between availability of resources for teaching chemistry in senior Secondary Schools in Sokoto State, whereas, there was significant difference between the academic performance of public and private senior secondary school students taught chemistry using available resources in Sokoto State and It is recommended that Chemistry teachers should always use available resources when teaching Chemistry.*

Keywords*: Geometry, Performance Test.*

Introduction

Science education is an indispensable tool for national development because of the important position it occupies in the development and growth of all nation. Odunisi (2001) observed that the economic and political strength of a nation is always assessed in terms of her achievement in

science and technology. This may be the reason why emphasis is placed on the provision of science education at all level of education in Nigeria. The emphasis placed on science and technology along side with the important role it plays towards national development makes it pertinent and practically necessary for science to be taught in an organised and well-structured pattern, involving activities for both teachers and students. This will undoubtedly make learning more interesting and meaningful. In contrary, before the mid 1950s science teaching was geared towards memorization and regurgitation of scientific knowledge. Akinmade (1996) observed that most elementary science teachers spend most of their time in the class teaching for memory and comprehension as opposed to teaching for the development of productive thinking skills. This attitude of teacher centered teaching method continued until when the then Soviet Union launched its first satellite (the sputnik) into space in 1957. This event necessitates a call for a reform in both the curriculum content and method of teaching across the globe.

In Nigeria, the National Policy on Education (FGN, 2013) clearly spells out the objectives of science teaching from pre-primary to the tertiary level. Specifically, at the secondary level it entails equipping students to live effectively in the modern age of science and technology. The global change in science curriculum arising from knowledge explosion and new wave in science and technological development demands for qualitative science teaching, Chemistry in particular. Science deals with an attempt to understand the happenings around us. It could be described as a discipline and a way of life. Science is a tool for achieving technological ends, solving human problems through tentative hypotheses. Science is research; it is an active pursuit of empirical knowledge based on scientific method. It is also an interconnected series of concepts and conceptual schemes that have developed and is developing as a result of experimentation and observations and are fruitful for further experimentation and observation (Conant, 1951 and Urevbu 1990). The National Policy on Education (FME, 2004), stated that, Science Education shall emphasize the teaching and learning of process and principles of science through the following goals:

i. cultivate inquiring, knowing and rational mind for the conduct of good life and democracy;
ii. produce scientists for national development;
iii. service studies in technology and the cause of technological development; and
iv. Provide knowledge and understanding of the complexity of the physical world, the forms and the conduct of life.

Stanley (2007) observed that the purpose of science teaching is to make pupils learn or understand what they are taught. In this direction, Nwoji (2007), pointed out that for the Nigerian child to understand science concepts, the science curriculum must be part of the culture of the child. Therefore, the knowledge a child acquires in the process of “doing” is a product of the “activities” ”context” and culture in which it is developed and used.

Nwoji (2007) further stated that science is acknowledged as an important part of every child’s education, yet in many countries, including Nigeria, there is much evidence to suggest that science education is still in a parlous state, due to the way it is being taught.

Nowadays, countries all over the world, especially the developing ones like Nigeria, are striving hard to develop technologically and scientifically, since the world is turning scientifically and all proper functioning of lives depend greatly on science. Science is a dynamic human activity concerned with understanding the workings of our world. Science education is very important to the development of any nation (Omosewo, 2013) that is why every nation must take it very serious in all institutions of learning. Many of the developed countries were able to achieve so much in science and technology because of science education.

Several branches of science have been identified such as Mathematics, Biology, Physics and Chemistry, Chemistry is one of the fundamental ingredients of technology. It is a branch of science that deals with the practical and experimental understanding of natural phenomena. The study of Chemistry flows from simple to a complex. . Science Teachers Association of Nigeria (STAN, 2016) broaden the definition of Chemistry as a branch of science that studies the properties of matter in terms of compositions, structures, transformations, interactions and energy implications of chemical changes. Chemistry is the central in the drive of global economic development. Chemistry is a branch of science that deals with nature of matter and its transformation (Bugaje, 2010). It plays the major roles in production of food (fertilizers and insecticides), clothing (textile fibers), housing (cement, concrete, steel, bricks), Medicine (drugs), Transportation (fuel, alloy materials). Presently, man is experiencing an era in scientific and technological development that affects his life in one way or the other. Virtually everything we use daily involves science.

Chemistry is a popular subject among senior secondary school students in Nigeria due to its nature. It addresses the needs of majority through its relevance and functionality in content, practice and application. What many nations like Nigeria need now is a functional chemistry education that will assist in national development. Chemistry education has been identified to be one of the major bedrocks for the transformation of our national economy.

Secondary schools not only occupy a strategic place in the educational system in Nigeria, it is also the link between the primary and the tertiary levels of education. According to Asikhai (2010), education at secondary school level is supposed to be the bedrock and the foundation towards higher knowledge in tertiary institutions. It is an investment as well as an instrument that can be used to achieve a more rapid economic, social, political, technological, scientific and cultural development in a country. It is rather unfortunate that the secondary schools today are not measuring up to standard expected of them. There have been public outcries over the persistently poor performance of secondary school students in public examinations (Asikhai, 2010). According to Nwokocha&Amadike (2005), academic performance of students is the yardstick for testing educational quality of a nation. Hence, it is expedient to maintain a high performance in internal and mostly external examinations.

The availability and utilization of educational resources is very important because of its role in the attainment of educational objectives. Resources are unique educational input necessary for the overall development of skill acquisition and literacy of the students. Resources are divided into two, Human and material. Human resources within the educational system can be classified into teaching and non-teaching staff. While the material resources are the laboratories, chemicals, equipment's. Availability of these classes of resources are needed to achieve excellence in the system. Studies on the relationship between availability of human and material resources and academic performance have shown that human resources enhance academic performance of students.

The performance of students in Chemistry in Sokoto State is fluctuating which leads to discouragement of students to participate in the field of science. Poor administration in most secondary schools leads to bad maintenance of resources in schools. There are varieties of resources which the science teacher can use to enrich learning. Chemistry teachers are scanty and even if found they may not be professionally and academically qualified to promote chemistry learning in schools. Some schools are lacking some of the instructional resources, laboratories, ICT centers, chemical equipment's/facilities. It is anticipated that availability of these resources have a strong link with student's academic success (Okafor, 2006). On the basis of this anticipation, the study therefore seeks to investigate the relationship between the availability of resources in teaching chemistry and student's academic performance in Senior Secondary Schools in Sokoto State, Nigeria.

Objectives of the Study

The main purpose of this study was to investigate the Resources Availability and Relationship with Academic Performance of Senior Secondary School Students in Sokoto State, Nigeria. In specific terms, the study was to: -

1. Find out the level of availability of resources for teaching chemistry in Senior Secondary Schools in Sokoto state.
2. Compare the performance of Ssenior secondary school student's Taught chemistry using Available Resources and those Taught without Available Resources in Sokoto State.
3. Compare the Performance of Public and Private Senior Secondary Schools Students Taught Chemistry using Available Resources in Sokoto state.

Research Questions

The research questions for the study are:

1. What is the level of Availability of Resources for Teaching Chemistry in Senior Secondary Schools in Sokoto state?
2. What is the Relationship between the Performance of Senior Secondary Schools Students Taught Chemistry using Available Resources and those Taught without Available Resources in Sokoto State?

3. What is the Relationship between the Performance of public and private Secondary Schools Students Taught Chemistry using Available Resources in Sokoto State?

Null Hypotheses

From the research questions, the following null hypotheses were formulated.

H_{01}. There is no significant Relationship between the Performance of Senior Secondary School Students Taught Chemistry using Available Resources and those Taught without Available Resources.

H_{02}. There is no significance Relationship between the Academic Performance of public and private Senior Secondary Schools Students Taught Chemistry using Available Resources.

Methodology

A correlational research design was considered to be appropriate research design for this study, in which performance of (SSII) Senior Secondary School chemistry students were assessed using already available student result and observation check list for the data collection. Correlational research was suitable for the study because it deals with relationship between the variables. The population of the study comprises of all Senior Secondary Schools (SSII) Chemistry Students in Sokoto State. Three senior secondary schools in Sokoto metropolis was purposively selected to participate the study. A sample of one hundred and sixty nine (169) students was selected as a sample from Research Advisor, (2006).

Instrumentation

Observation Checklist and Already Available Students result were used as instruments. The Observation Checklist contains a comprehensive list of all apparatus, equipment's, chemicals reagents to be found in a school laboratory necessary for chemistry teaching. Senior Secondary School Student's Chemistry Performance termly test was used as instrument, first term test result was used for the 2020/2021 session. (See Appendix E).

Administration of Instrument

The instrument was administered to the selected sampled schools by the researcher to the subject teacher within the sampled schools for easy distribution and retrieval of instrument. Permission to carry out the research was secured from Ministry of Education Sokoto state as well as letter of introduction of the researcher for the principals of the sampled schools. And performance test of students in each of the selected schools were collected.

Research Question 1: What is the level of availability of resources for teaching chemistry in senior secondary schools in Sokoto State?

Table 1.0 Level of Availability of Chemistry Resources in Sampled Schools in Sokoto State

S/N	Schools	Availability over 65	Percentage
1	G T C R/Sambo	45	31.69%
2	G G C Sokoto	54	38.02%
3	S S C O E Staff School	43	30.06%

The availability of resources for teaching chemistry in senior secondary schools in Sokoto metropolis in the sampled schools indicated that, the first school (G T C R/Sambo) had 31.69% out of 65 available chemistry resources. The second school (G G C Sokoto) had 38.02 out of 65, and the third School (S S C O E Staff School) 30.06 out of 65 respectively. This also indicated that, there are in adequate facilities for teaching chemistry in senior secondary schools in Sokoto state.

Research Question 2 Is there any relationship in the performance of senior secondary schools students taught chemistry using available resources and those taught without available resources in Sokoto state?

Table 1.1: Descriptive Statistics on the Academic Performance of Chemistry Students Taught with Available and without Available Resources in Sokoto State

Group	N	Mean	Standard Deviation	M.D
With Availability	80	25.73	7.64	
				-3.93
Without Availability	62	21.80	6.26	

Source: Fieldwork (2021)

Table4.4 showed the performance of students taught chemistry using available resources and those taught without available resources. The result revealed that, the mean performance of students with available resources 25.73 was greater than the mean performance of students without available resources 21.80. Therefore, there is relationship between the academic performances of students taught with available and those taught without available resources in Sokoto State with -3.93 mean difference.

Research Question 3 What is the Relationship between the Performance of public and private Secondary Schools Students Taught Chemistry using Available Resources in Sokoto State?

Table 1.2: Descriptive Statistics on the Academic Performance of Public and Private Students Taught with Available Resources in Sokoto State

Group	N	Mean	Standard Deviation	M.D
Public	323	32.00	7.40	
				14.57
Private	58	17.48	7.48	

Source: Field work (2021)

Table 4.6 Present summaries of the descriptive statistics of mean and standard deviation conducted to compare the performance of public and private students taught chemistry using available resources. The table revealed a mean of 32.00 for the public while private students have a mean of 17.43 and a difference of 14.57 which was significance difference. This result showed that there was difference in the academic performance of public and private students taught chemistry using availability of resources

Hypotheses one

There is no significant Relationship between the Performance of Senior Secondary School Students Taught Chemistry using Available Resources and those Taught without Available Resources.

Summary Analysis between the performance of Senior Secondary Schools Students Taught Chemistry Using Available Resources and Those Taught without Available Resources.

Group	N	Mean	SD	df	r	P-value	Decision
With Available	333	21.80	7.64	68	-0.108	0.050	Rejected
Without Available	48	25.73	6.26				

Source: field work (2021) **α- value= 0.05**

Table 4.8, was a summary of Pearson Moment Correlation Coefficient (r) conducted to compare the academic performance of chemistry students taught with available and those taught without available resources. The results showed that, *p*-value of 0.050 is equal to the α-value of 0.05 at 0.05 level of significance, hence the null hypothesis which says (there is no significant relationship between the academic performance of students taught chemistry with available resources and those taught without available resources is here by rejected which also show that there is weak negative relationship at r of -0.108.

Null Hypothesis 2

There is no significantt relationship between the academic performance of public and private senior secondary schools students taught chemistry using available resources in Sokoto state.

Table 4.10: Summary Analysis between the Aacademic Performance of Public aand Private Senior Secondary Schools Students Taught Chemistry Using Available Resources in Sokoto State

Group	N	Mean	SD	Df	R	P- value	Decision
Public	323	32.00	7.40	643	0.040	0.478	Retained
Private	58	17.48	7.40				

Source: field work (2021) **α- value= 0.05**

Table 4.9, shows a summary of Pearson Moment Correlation Coefficient (r) conducted to compare the academic performance of public and private students taught chemistry with

available resources in Sokoto State. The results showed the *p*-value of 0.478 is greater than the α-value of 0.05 at 0.05 level of significance hence the null hypothesis which says (there is no significant relationship between the academic performance of public and private school students taught chemistry using available resources in Sokoto State) is here by retained. And also there is weak relationship at r of 0.040.

Discussion of Findings

The discussion of the major findings was done based on the outcome of the research questions and hypotheses tested;

Research question one that stated that what is the level of availability of resources for teaching chemistry in senior secondary schools in Sokoto State was answered based on the percentage scores obtained from the data collected. Out of the three schools sampled, it shows that there is inadequate resources in teaching chemistry in the schools. This agrees with Audu and Oghogho (2007) and Oboh (2008) that most striking problems of Science Education is that of inadequate problems of science teaching materials and in most cases unavailability of materials and equipment. This study is also in line with the findings of Omiko (2016) who conducted a research on investigating the availability and the extent of use of instructional materials by secondary school teachers in Nigeria. The study focused on level of utilization of available instructional materials, teacher made instructional materials and the obstacles faced by the chemistry teachers during improvisation of the teacher made instructional materials in Ebonyi State secondary schools.397 chemistry teachers from the 212 government owned secondary schools in Ebonyi State formed the population. Questionnaire was the instrument used for data collection. The reliability of the instrument was determined to be 0.81. Descriptive survey research design was adopted for the study. 3 research questions and one hypothesis guided the study. The 3 research questions were answered using mean statistics while the hypothesis was tested at 0.05 level of significance using the z-test statistics. The findings revealed that teachers are not utilizing effectively the available instructional materials in their teaching, the chemistry teachers are not making enough efforts in improvisation of those instructional materials that are not available and that the teachers faced obstacles such as lack of fund and skill for the improvisation of instructional materials.

The findings of this study also reveals that, there was significant relationship between the performance of senior secondary schools students taught chemistry using available resources and those taught without available resources. This study agreed with the findings of Agboghale and Adavbiele (2018) who conducted a research on relationship between resources availability and students' academic performance in wood work in technical colleges in Delta State, Nigeria. The researcher employed correlational survey research design. Three research questions were raised for the study. Checklist was adopted from National Board for Technical Education (NBTE) (2008) approved lists of equipment/tools in technical colleges and administered to the respondents. Achievement Test on Wood work was also administered to a sample of 20 students in technical colleges at two different occasions with an interval of two weeks. The scores received

from the test were subjected to person's product movement correlation coefficient. A reliability coefficient of 0.75 was obtained. The results of the study showed that there were inadequate qualified teachers in various technical colleges, the workshop assistant staffs were inadequate and the equipment/tools in workshops were grossly inadequate in technical colleges in Delta State, Nigeria and also, there was significant relationship between resource availability and students' academic performance in wood work in technical colleges.

From the findings of this study it was discovered that, there was no significance relationship between the academic performance of public and private senior secondary schools students taught chemistry using available resources in Sokoto state. It's in agreement with the findings of Ekundayo and Alonge (2012) in their research, examined relationship between human and material resource availability and students' academic performance in public and private secondary schools in Ondo State. An inventory format was designed and used to collect data from a sample of 65 public and 49 private secondary schools selected through a stratified random sampling. Five hypotheses were generated and tested at 0.05 level of significance. Pearson product moment correlation and t-test statistic were used to test the hypotheses. The study showed that human and material resources were not significantly related to students' academic performance in both public and private schools. The study also revealed that there was no significant relationship in human resources availability in the two schools. It was also revealed in this study that private schools were better equipped in terms of material resources than the public schools and those private schools had better academic performance than the public schools in public examinations.

Conclusion

i. Based on the findings of the study the following conclusion were reached: There was significant relationship between resources availability and utilization of resources for teaching chemistry in senior secondary schools in Sokoto state. The study revealed that there is availability of resources for teaching chemistry in senior secondary schools in Sokoto state.
ii. There was significant relationship between the performance of senior secondary schools students taught chemistry using available resources and those taught without available resources. Here the study showed that the students taught chemistry using available resources performed better in their performance than those taught chemistry without available resources.
iii. There was no significantt relationship between the academic performance of public and private senior secondary schools students taught chemistry using available resources in Sokoto state. Also the study showed that the private school students performed better then public schools students' taught chemistry in Sokoto State.

Recommendations

Based on the findings and conclusion from the study, the following recommendations were made;

1. Chemistry teachers should always use available resources when teaching chemistry.

2. The public schools authorities should allocate more time and tutorials to students and also provide all available resources necessary for teaching chemistry as to meet the gaps between the private schools.
3. The school authority should allocate more time and tutorial to students and also provide all materials necessary for laboratory practicals.

Reference

Agbonghale G. O. and Adavbiele J.A. (2018). Relationship between Resource Availability andAcademic Performance of Students in Wood Work in Technical Colleges in Delta State, Nigeria.

Asikhia, O.A (2010), Students and teachers perception of the causes of poor academic performance in Ogun state secondary schools: Implication for counseling for national development. *European Journal of Social Sciences*.

Ekundayo, H.T., and Alonge, H. O. (2012). Human and Material Resources as Correlates of Academic Performance of Private and Public Secondary School Students in Ondo State, Nigeria.

Nwachukwu, P. O. (2009). Understanding Teachers professional Competencies for Education Effectiveness. Owerri. Nigeria: Springfield Publishers Limited.

Nwagbo, C. & Obiekwe, C. (2010). Effects of constructivist instructional approach on students achievements in basic ecological concepts in biology. Journal of Science Teachers Association of Nigeria, 45 (1&2'), 26-36.

Omiko A. (2016). Investigating The Availability and the Extent of use of Instructional Materials by Secondary School Chemistry Teachers in Nigeria. *International Journal of Education, Learning and Development* Vol.4, No.3, pp.1-11, April 2016

Omiko A. (2016). Investigating the Availability and the Extent of use of Instructional Materials by Secondary School Chemistry Teachers in Nigeria. *International Journal of Education, Learning and Development* vol.4, No.3 pp.1-11

Omosewo, E.O. (2013) Views of physics teachers on the need to train and retrain physics teachers in Nigeria. *African Research Review,* 3{1}, 314-325.

schoolbiology in Bayelsa State of Nigeri. Information and Knowlegde Management, 1(2) 28- 35. Retrieved 20th December, 2018 from www.iiste.org.

Obanya, P.,Shabani, J. and Okebukola, P. (1996). "Guide to teaching and learning in higher education,"

Ogbebe J.A (2010) Using advance organized to improve the teaching and learning of Biology: A Case for Specific objectives. *Journal of Education Innovation*. 3 (2), 184-190

Ogunleye, B.O.(, 2002.), *Evaluating the environmental aspect of the senior secondary school chemistry curriculum in Ibadan*. Unpublished PhD Thesis, University of Ibadan, Ibadan

Ogunsagu, S. (2000). Human resources development and productivity Education and in Nigeria.InFagbamiye, E.O. &Durosaro, a publication of the Nigeria Association for Educational Administration and Planning, Unilorin.

Ogwa, A. (2002). Availability of Instructional Materials at the Basic Education Level in Enugu Educational Zone of Enugu State, Nigeria. *Journal of Education and Practice,* 7(12), 7-10

Okafor, A.I (2014) Investigating Relationships between availability of Laboratory Facilities and Academic Performance in Biology among Senior Secondary School Students in Zamfara State, Nigeria. An Unpublished (M.Ed) Dissertation Usmanu Danfodiyo University, Sokoto. Nigeria.

Okafor, C.F (1998) Nigeria Teacher Education: A Search for New Direction. Enugu: Fourth Dimension Publishers Co. Ltd.

Okafor, P. N (2006) The YES Programme as an intervention strategy in promoting the understating of primary science education. *Journal of School of Science*. Federal College of Education (Technical)Akoka. Unique Educational Publishers. Nigeria: 5.115-123.

Okandeji, C.O. (2007). Quality assurance in higher education, Ibadan, Nigeria.