



Effect of Teacher Made Teaching Aids on the Teaching and Learning of Basic Science in junior secondary schools in Ogba/Egbema/Ndoni Local Government Area of Rivers State

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Abstract

This study investigated the effect of teacher made teaching aids on the teaching and learning of Basic Science in junior secondary schools in Ogba/Egbema/Ndoni Local Government Area of Rivers State. Two research questions and two hypotheses which were tested at .05 level of significance guided the study. The population for the study consisted Junior Secondary School (JSS) 3 students of four selected schools in Ogba/Egbema/Ndoni Local Government Area of Rivers State. Instrument used for data collection was Basic Science Achievement Test (BSAT). The instrument was subjected to face and content validation by 3 experts in Federal College of Education (Technical), Omoku. It was further pilot tested on 30 Basic Science students of Idu Comprehensive High School in order to test for reliability. The reliability co-efficient of BSAT was determined using Pearson Product Moment Correlation (PPMC) with the aid of (SPSS) software package and it yielded a reliability index of 0.71. Data collected were analyzed using mean gain. Findings revealed that teacher made models and charts had positive effect on the teaching and learning of Basic Science. Based on the findings, recommendations were made.

Keywords: Teaching, Learning, Teaching Aids, Basic Science.

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INTRODUCTION

Science has been regarded as the bedrock on which modern day technological breakthrough is built. 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 scientific and all proper functioning of lives depend greatly on science. To Ogunleye (2002), Science is a dynamic human activity concerned with understanding the workings of our world. This understanding helps man to know more about the universe. Without the applications of science, it would have been difficult for man to explore other planets of the universe. It is generally agreed by both teachers and school administrator that apart from the chalkboard and textbooks which are often available for the teacher to use, there are other materials that aid or are capable of complementing the teacher's effort in teaching/learning Basic Science. Those materials are commonly called "instructional materials".

One of the reasons why students in our secondary schools find it difficult to comprehend immediately what is being taught by the teacher is the non availability of instructional materials that can easily convey the message of the lesson to the learners. Akinleye (2021) emphasized that effective teaching and learning requires a teacher to teach the students with instructional materials and use practical activities to make learning more vivid, logical, realistic and pragmatic. Abdullahhi (2010) added that instructional materials are tools locally made or imported that help to facilitate the teaching and learning process. Some of the teaching aids include; charts, maps, models, video cassette disc, digital video disc, amongst others. Instructional materials play a very important role in the teaching and learning process. They enhance the memory level of the students. At this time that education has spread wide and entirely, oral teaching cannot be the key to successful pedagogy; therefore, the teacher has to use instructional materials to make teaching and learning process interesting.

The use of teaching aids or instructional materials can enhance the learning achievement. Use of instructional materials can appeal to the individual attention by creating interest goal that will help the learner achieve direct effort. Teacher's problem of motivation is essentially one of arranging situation with instructional materials in which the learner will see goals he wants to attain.

Brown et al. (2005) summarized the role of teaching aids to include:

- Promotion of meaningful communication and effective learning,
- They ensure better retention, thus making learning more permanent,
- They provide a common experience upon which late learning can be developed, and
- They stimulate and motivate students to learn, amongst others.

The nature of the learning and the wide range of student's abilities in the average science classroom necessitate a high degree of teachers' experience in the method of presenting the subject matter. This has been truncated with the unavailability of instructional materials or teaching aids in schools. However, a common goal a teacher carries wherever he/she is, is to make lesson presentation vitally fresh, stimulating and testing for students. This will help the teacher to individualize the learning method as well as the content and also working according to the student's need. This goal can be reached most effectively through the use of instructional materials.

Bassey (2002) opined that Science is resource intensive, and in a period of economic recession, it may be very difficult to find some of the electronic gadgets and Teaching Aids for the adequate teaching of Basic Science in schools. A situation that is further compounded by the

galloping inflation in the country and many at times, some of the imported sophisticated materials and Teaching Aids are found expensive and irrelevant; hence the need to produce materials locally. Researchers such as Obioha (2006) and Ogunleye (2002) reported that there were inadequate resources for teaching Science subjects in secondary schools in Nigeria. They further stated that the available ones are not usually in good conditions. There is the need therefore, for improvisation. Daramola (2008) however noted that improvisation demands adventure, creativity, curiosity and perseverance on the part of the teacher, such skills are only realizable through well-planned training programmes on improvisation.

The need to emphasize on the use and importance of instructional materials in any learning and teaching environment cannot be underestimated. For any learning to take place, the teacher has to make use of these materials that would enable him or her to teach effectively. Equipment and other instructional materials to some extent determine the method the teacher uses in the teaching of Basic Science. Since teaching aids are not readily available in the public secondary schools in Ogba/Egbema/Ndoni Local Government Area, Abdu-Raheem (2014) then encouraged teachers to improvise teaching aids because they are in great measure to enhance learners' full participation in the lesson, give room for inquiry, problem-solving, discussion and clarification of issues and ideas among students and the teacher. It is the impact of these teacher made teaching aids on the academic achievement of Basic Science students in Ogba/Egbema/Ndoni Local Government Area of Rivers State that this study is set out to investigate.

Statement of the Problem

It is the goal of every vocational subject in junior secondary schools to enable the individual acquire appropriate skills, abilities and competence as equipment for him to live in and contribute to the development of his society. One of such vocational subjects in junior secondary schools is Basic Science. A broad aim of secondary education amongst others is "to equip the students to live effectively in our modern age of science and technology (FRN, 2004). It is however observed that Basic Science students in Ogba/Egbema/Ndoni Local Government Area of Rivers State perform poorly in examinations as a result of under-implementation of the curriculum. The latter being attributed to lack of teaching aids.

Odu (2013) observed that a recurring problem besieging Basic Science since its inception has been the absence of adequate facilities to foster effective teaching and learning. In the absence of such facilities, improvisation becomes necessary, which according to Hornby (2010) means to make or do something by using what is available, usually because you do not have what you really need. It is based on this that this research has set out to investigate the effect of teacher-made (improvised) teaching aids on the teaching and learning of Basic Science in junior secondary schools in Ogba/Egbema/Ndoni Local Government Area of Rivers State.

Research Questions

The following questions were raised:

- What is the effect of teacher made models on the teaching and learning of Basic Science in junior secondary schools in Ogba/Egbema/Ndoni LGA, Rivers State?
- What is the effect of teacher made charts on the teaching and learning of Basic Science in junior secondary schools in Ogba/Egbema/Ndoni LGA, Rivers State?

Hypotheses

- There is no significant difference between the mean score of students taught Basic Science using teacher made models and those taught with conventional text books in junior secondary schools in Ogba/Egbema/Ndoni LGA, Rivers State.
- There is no significant difference between the mean score of students taught Basic Science using teacher made charts and those taught with conventional text books in junior secondary schools in Ogba/Egbema/Ndoni LGA, Rivers State.

METHODS

The design of this study is a quasi-experimental pre-test, post-test design with experimental and control groups. A quasi-experimental research design involves exposure of experimental group to treatment but lacks the randomization of the research subjects into groups. Quasi-experimental research design is used where absolute control of all the variables involved cannot be achieved. This design allows maximum control of extraneous variables (Nworgu, 2006). Hence, it is suitable for this work. The population for the study involved all JSS 3 students of four selected junior secondary schools in Ogba/Egbema/Ndoni Local Government Area namely: Community Secondary School (CSS), Omoku; Egbema Grammar School, Okwuzi; Community Secondary School, Ebogoro; and Community Secondary School, Obrikom. Simple random sampling technique was used to select 25 JSS 3 students from each of the schools to give a sample size of 100 students. This sample was further split into two and designated as experimental and control groups. Students of CSS Omoku and CSS Obrikom were used as experimental group, while students of Egbema Grammar School and CSS Ebogoro served as control group.

The instrument used for data collection was Basic Science Achievement Test (BSAT). It was subjected to face and content validation by 3 experts from Federal College of Education (Technical), Omoku. The instrument was pilot tested on 30 Basic Science students of Idu Comprehensive High School. These subjects were not part of the main study but were selected as an equivalent sample of the group for which the test was developed, that is, they are in the same class (JSS 3). The reliability co-efficient of BSAT was determined using Pearson Product Moment Correlation (PPMC) with the aid of (SPSS) software package. PPMC was used because the BSAT is a multiple-choice question test. This helped to establish the internal consistency of the items. The students' scores were computed and yielded a reliability index of 0.71. BSAT had two sections, A and B. section A elicited personal information from the students and section B carried 10 objective questions from the topic taught. Each question in BSAT had four options A-D. The students were required to underline the correct answer. Every correct answer from the four options of each question scored one (1) point while an incorrect answer scored zero (0) point.

The data for the two research questions of this study were analyzed using mean gain. Hypotheses were tested at 0.05 level of significance using analysis of covariance (ANCOVA). The pre-test was used to control the initial differences, across the groups as well as increase the precision due to the extraneous variables reducing error variance. The statistical package for social sciences (SPSS) was used for all data analysis in this study. The value of f-ratio at 0.05 level of significance and above resulted in the rejection of the null hypotheses, while the value of f-ratio less than 0.05 level of significance resulted in the acceptance/upholding of the null hypotheses.

RESULTS

Research Question One: What is the effect of teacher made models on the teaching and learning of Basic Science in junior secondary schools in Ogba/Egbema/Ndoni LGA, Rivers State?

Table 1: Descriptive statistics showing Mean and Standard Deviation of Academic Achievement of Experimental and Control Groups in Basic Science Achievement Test

Method	N	Pretest		Posttest		Mean Difference	Mean Gain
		Mean	SD	Mean	SD		
Experimental Group	50	7.78	2.15	19.75	2.43	11.97	4.86
Control Group	50	6.14	2.05	13.25	2.55	7.11	

Result from table 1 shows that the difference in the mean scores of experimental group students (11.97) was greater than that of control group students (7.11). The mean gain of 4.86 shows that the use of teacher made models was more effective than the conventional use of only textbooks in teaching Basic Science.

Research Question Two: What is the effect of teacher made charts on the teaching and learning of Basic Science in junior secondary schools in Ogba/Egbema/Ndoni LGA, Rivers State?

Table 2: Descriptive statistics showing Mean and Standard Deviation of Academic Achievement of Experimental and Control Group in Basic Science Achievement Test

Method	N	Pretest		Posttest		Mean Difference	Mean Gain
		Mean	SD	Mean	SD		
Experimental Group	50	6.55	2.18	19.50	2.55	12.95	7.59
Control Group	50	6.87	2.74	12.23	3.69	5.36	

Result from table 2 shows that the difference in the mean scores of experimental group students (12.95) was greater than that of control group students (5.36). The mean gain of 7.59 shows that the use of teacher made charts was more effective than the conventional use of only textbooks in teaching Basic Science.

Test of Hypotheses

H_{01} : There is no significant difference between the mean score of students taught Basic Science using teacher made models and those taught with conventional text books in junior secondary schools in Ogba/Egbema/Ndoni LGA, Rivers State.

Table 3: ANCOVA result of academic achievement scores of experimental and control groups with the use of teacher-made models

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Corrected Model	51692.595	2	25846.297	673.717	.000
Intercept	15242.180	1	15242.180	397.307	.000
Pretest	5319.586	1	5319.586	138.662	.000
Groups (Treatment)	41844.822	1	41844.822	1.091*	.000
Error	4450.195	46	38.364		
Total	498332.000	460			
Corrected Total	56142.790	459			

Significant at $p < 0.05$.

Table 3 shows the ANCOVA results of the achievement scores of groups taught Basic Science with the use of teacher made models and those taught with the conventional use of only textbooks in teaching Basic Science. From the table, the F-value = 1.091 and $p < 0.05$. This indicates that there was significant difference between the mean scores of the experimental group and the control group. Hence, hypotheses one is rejected. It therefore means that there was a significant difference between the mean score of students taught Basic Science using teacher made models and those taught with conventional text books in junior secondary schools in Ogba/Egbema/Ndoni LGA, Rivers State.

HO₂: There is no significant difference between the mean score of students taught Basic Science using teacher made charts and those taught with conventional text books in junior secondary schools in Ogba/Egbema/Ndoni LGA, Rivers State.

Table 4: ANCOVA result of academic achievement scores of experimental and control groups Clutch with the use of teacher-made charts

Source	Type III Sum of Squares	df	Mean Square	F-value	P-value
Corrected Model	3100.471	2	1550.236	154.177	.000
Intercept	170.170	1	170.170	16.924	.005
Posttest (Covariate)	3023.404	1	3023.404	300.690	.000
Groups (Treatment)	8.279	1	8.279	23.939*	.000
Error	573.129	41	10.055		
Total	399280.000	460			
Corrected Total	3673.600	459			

Significant at $p < 0.05$.

Table 3 shows the ANCOVA results of the achievement scores of groups taught Basic Science with the use of teacher made models and those taught with the conventional use of only textbooks in teaching Basic Science. From the table, the F-value = 23.939 and $p < 0.05$. This indicates that there was significant difference between the mean scores of the experimental group and the control group. Hence, hypotheses one is rejected. It therefore means that there was a significant difference between the mean score of students taught Basic Science using teacher made charts and those taught with conventional text books in junior secondary schools in Ogba/Egbema/Ndoni LGA, Rivers State.

DISCUSSION

Findings related to research question 1 revealed that the use of teacher made models is more effective in the teaching and learning of Basic Science in junior secondary schools in Ogba/Egbema/Ndoni Local Government Area of Rivers State. Findings related to research question 2 likewise revealed that the use of teacher made charts is more effective in the teaching and learning of Basic Science in junior secondary schools in Ogba/Egbema/Ndoni Local Government Area of Rivers State. This goes on to confirm the opinion of Brown et al (2005), who summarized the role of teaching aids to include promotion of meaningful communication and effective learning, better retention, making learning more permanent, amongst others. Furthermore, the tests for hypotheses 1 and 2 revealed that there is a significant difference between the mean score of students taught Basic Science using teacher made models and those taught with conventional text books in junior secondary schools in Ogba/Egbema/Ndoni LGA, Rivers State, and there is a significant difference between the mean score of students taught Basic Science using teacher made charts and those taught with conventional text books in junior secondary schools in Ogba/Egbema/Ndoni LGA, Rivers State, respectively.

CONCLUSION

This study investigated the effect of teacher made teaching aids on the teaching and learning of Basic Science in junior secondary schools in Ogba/Egbema/Ndoni Local Government Area of Rivers State. From the findings of the study, it is concluded that the use of teaching aids is essential for the achievement of the set objectives of Basic Science. The experiment revealed a significant difference in performance of students taught with and without the teacher made teaching aids such as models and charts, hence emphasizing the need to use such aids.

Recommendations

Based on the findings of this study, the following recommendations were made:

- The Universal Basic Education Board should ensure through regular supervisions that the use of teaching aids is not compromised as it has been shown to have a positive effect on the performance of students.
- The Rivers State Government through the education ministry should endeavor to provide as much teaching aids as possible to facilitate the teaching and learning of Basic Science.
- In the case of unavailability, teachers should be able and willing to improvise.

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