THE EFFECT OF INTEGRATION OF ASSESSMENT OF PRACTICAL ASPECT OF SCIENCE ON PUPILS' INTEREST IN BASIC SCIENCE IN ODEDA LOCAL GOVERNMENT OF OGUN STATE, NIGERIA

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Abstract:

There are various approaches to science teaching at the primary school level. Common to these approaches is assessment of pupils only in the theoretical aspect of science. This study determined the effect of an approach that inculcates the assessment of the practical aspect of science into the teaching and learning process on pupils' achievement in basic science and technology. In this approach, pupils in primary schools were engaged in science activities which were in line with the content of science as reflected in the basic science, basic technology and information and communication technology themes of the basic science and technology curriculum. This study adopted a pretest-posttest control group quasi experimental research design. The population of the study was all the basic four pupils (primary 4) in Odeda local government area of Ogun state. Three hundred and three (303) basic four pupils selected from four public primary schools formed the sample of the study; the instruments for data collection were: basic science and technology interest questionnaire. Participants' practical activities were assessed. The data collected were analysed using the analysis of covariance and estimated marginal means. The result of the study indicates that the pupils who were taught science with the approach which makes the assessment of practical an integral aspect of teaching and learning process had an insignificant posttest interest mean gain in two themes of basic science and technology. Since the education enterprise focuses on learners' progress no matter how insignificant; it was

recommended that pupils should not only be engaged in hands on activities but their performance in hands on activities must be assessed.

Keywords: integration, assessment, practical aspect of science, pupils' interest in basic science

1. Introduction

Basic Science and technology is a broad field subject in Nigeria basic education curriculum. It is an integration of four major science subjects which the curriculum refers to as themes: basic science, basic technology, information and communication technology, and physical and health education. The major focus of science education at the basic level is to prepare all students for a life in which they will need to be scientifically literate so as to deal with the many issues that science raise (Royal society, 2008). At the same time, science education at the basic level lays foundation for a higher level and prepare future scientist. But to achieve this pupils' interest is important and needs to be explored.

There have been concerns by various scholars on the state of the interest of pupils' at the primary school level in science (Royal society of Science, Mathematics Education, 2008; Jarvis and Pell, 2002). In Nigeria, there are concerns over the declining interest in science most especially in basic science and technology (Sambo, Kukwi, Mahmuda & Eggari, 2014). Low enrolment in science at the senior secondary school has been often associated with lack of interest in science at the basic level (Osborne, Simon & Collin 2003; Kola & Akanbi, 2013). In the order of importance, interest is ranked second to intelligence among factors that contribute to academic success (Fisher & Evans, 2000). Interest is the gate way to more personal motivation (Kalle & Jari, 2015).

Osborne, Simon & Collin (2003) offered a review of major literature about interest in science and its implication for two decades and several factors which affect pupils' interest in science at the basic level. These include gender, environmental factor (structural variables), classroom/teacher factor, and enhanced subject choice, curriculum variables, perceived difficult and enhanced subject choice. Classroom/teacher factor and curriculum factors were found to have the strongest impact on interest (Osborne & Collin, 2003).

It could be inferred that the approach of teaching science has a lot to do with the interest of students and their attitude. The approach of teaching science at the primary school has been labeled often as content laden which denies the learners maximum benefits of what was learnt in terms conceptual and procedural understanding; and Nigeria is not an exemption (Duggan & Got, 1995). Towards the development of pupils' interest in science, teachers need to have techniques and ways of exciting the kids in science. In Nigeria, pupils at the primary school level are exposed to activities during science teaching, but assessment of learning outcomes does not cover the activities being carried out. It therefore means that only the theoretical aspect is being evaluated. This practice is more profound at the basic level of education, most especially in basic

science, basic technology and information and communication technology themes. The physical and health education theme already has some measure of activities which are always assessed; hence, it was excluded in this study. This neglect of practical during assessment of science lesson often makes pupils to be unexcited about science and thus the improvement of pupils' procedural knowledge is very difficult.

Therefore, this study provides an approach to science teaching which offers pupils engagement in practical and equally assesses their learning outcomes in both the theoretical and practical aspects of the three themes of basic science and technology. Research indicates that if you do a bad job teaching kids science and mathematics in primary school it is extraordinarily hard to get them back on track, no matter what is done at the secondary school stage, and ultimately at the higher education level (Dawson & Schmidth, 2012). This is therefore a worrisome situation.

2. Research Questions

1. What is the pupils' interest score before and after treatment in
   a) Basic science;
   b) Basic technology;
   c) Information and communication technology?
2. Does the treatment have a significant effect on pupils' score in
   a) Basic science;
   b) Basic technology;
   c) Information and communication technology?

3. Methodology

This study adopted the pretest-posttest quasi experimental research design.

3.1 Subjects and setting
The population for this study was all the primary four pupils in all the public primary schools in Odeda local government area of Ogun state. The three hundred and three 303 participants for the study were selected through the stratified random sampling technique. The primary schools in Odeda local government were stratified into rural and urban areas respectively. Two public schools in each of the rural and urban areas were randomly selected and the selected schools were randomly assigned to treatment and control groups respectively. The participants were made up of primary four pupils.

3.2 Instrument
3.2.1 Pupils' Interest in Basic Science and Technology Questionnaire (PIBSTQ)
This instrument was designed by the researchers to assess the pupils' interest in basic science and technology. The instrument has two sections as follows: Section A consisted on the respondent demographic details which includes; name, school, gender, and age. Section B contains three other subsections as follows: Pupils' Interest in Basic Science

Questionnaire (ten items), Pupils' Interest in Basic Technology Questionnaire (ten Items) and Pupils' Interest in Information and Communication Technology Questionnaire (ten items). The pupils were expected to respond by ticking yes or no. During the posttest an alternative form of the items were administered as follows: the second section was redesigned to have two sections. The first section consisted in five items each in basic science, basic technology and information and communication technology and the students are to respond by ticking yes or no. The second section contains 7 items in which students are to do ranking.

The reliability of the instrument was determined by administering the instrument to twenty primary four pupils who were not part of the population of the study and the reliability value of 0.8 was obtained using Cronbach alpha.

3.3 Treatment

A week was used for the administration of the Basic Science and Technology Interest Questionnaire this was followed by the treatment which lasted for four weeks. Since the schools in Ogun state operate the same curriculum, the pupils were exposed to the same topics. The treatment groups were taught by research assistants. After the treatment, the post-test was administered and this lasted for a week. The pupils were engaged in practical in each of the themes separately. The nature of the activities in basic science and basic technology were such that pupils interacted directly with materials while in information and communication technology the activities were indirect form (alternative to practical). The assessment of the activities was based on the form of activities the students were exposed to. For example in basic science and basic technology, there is direct assessment.

4. Result

4.1 What is the interest of pupils in basic science and technology before and after treatment?
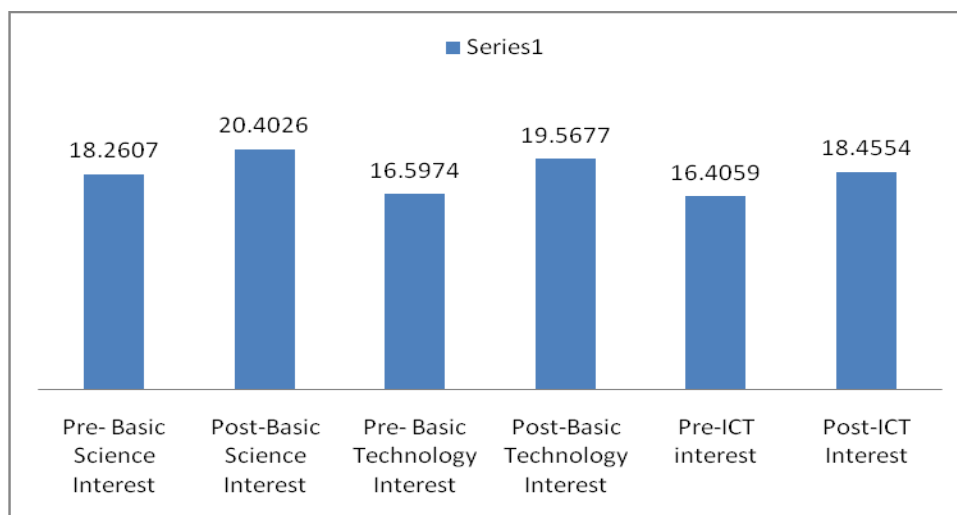

Figure 1: Pre-Post Pupils' Mean Score Interest in Basic Science and Technology

The figure 1 shows that pre–interest mean score of pupils in basic science is (18.2607) and the post-interest mean score of pupils in basic science (20.4026). This means that the pupils gained about (2.1419) interest unit score as a result of the treatment in basic science. The figure 1 showed that pupils had a pre-test interest mean score of (16.5974) and after the treatment, the post interest mean score of (19.5677). This means that the pupils gained about (2.9703) mean score interest in basic technology.

The figure above also show that pre–interest mean score of pupils in information and communication technology is (16.4059) and the post-interest mean score of pupils in information and communication technology (18.4554). This means that the pupils gained about (2.0495) mean score interest in information and communication technology.

4.2 Does the treatment have a significant effect on pupils' interest in basic science?

Table 1: Effect of Treatment on pupils' Interest in Basic Science and Technology

	Treatment	N	Pre-test mean	Posttest interest score mean	Mean gain	F-test result $F_{(1,302)}$;p-value
Pre-basic science interest	Control	162	17.8148	20.1790	2.3642	1.282;0.258
	Treatment	141	18.7730	20.6596	1.8866	
Pre-basic technology interest	Control	162	18.3642	19.6296	1.2654	0.933;0.336
	Treatment	141	14.5674	19.4965	4.9291	
Pre-information communication interest	Control	162	18.3333	18.3704	.0371	0.012;0.912
	Treatment	141	14.1915	18.5532	4.3617	

Table 1 reveals that there is no significant main effect of treatment on pupils' post interest in all the three themes (basic science $F_{(1,302)}$=1.282;p>0.05, basic technology $F_{(1,302)}$=0.933;p>0.05 and information and communication technology $F_{(1,302)}$=0.012;p<0.05).

Even though there is no significant effect of treatment on the post interest of pupils in all the three themes of basic science and technology, the table shows that pupils' exposed to treatment gained more in their interest in basic technology and information and communication technology themes of basic science and technology. The table above reveals that pupils exposed to practical and the assessment of practical gained less interest (1.8866) in the basic science than those in the control (2.3642). On the other hand, basic technology result pupils in treatment group (4.9292) had a higher gain interest in basic technology themes in basic science and technology than those in the control groups (1.2654). Also, the pupils in treatment group (4.3617) had a higher mean gain in interest in information and technology theme in basic science and technology.

The implication of this is that pupils who were in the treatment group were able to developed more interest in the basic science and information and communication technology themes of basic science and technology. The pupils in the control group had a slightly higher mean gain than their counterparts in the treatment group in basic science theme. This implies that when pupils are engaged in hands on activities and these activities are equally assessed, they gain more interest in science at the primary school level no matter how insignificant it is.

5. Recommendation

Based on the findings of this study the following recommendations were made:
- There is a need to train in-service and pre-service science teachers on the skills required to integrate assessment of the activities of pupils' at the primary school level science education.
- There is also a need to inculcate assessment of interest in science education at the primary school.

Acknowledgment

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