

# **Reforming Basic Science Teaching and Learning In Primary Schools Through Mutual Team Teaching: A Study of Oyo East Local Government Area of Oyo State**

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## **Abstract**

This paper discusses an innovative programme of team-teaching in primary schools of Oyo East Local Government Area of Oyo State; Nigeria. First it analyses the way in which the scheme has evolved from previous experiences. Then, sampled 240 primary five pupils of forty (40) pupils in six intact classes, the classes were randomly allotted to the treatment (Team-teaching) and control (Conventional method) using pre-test-post-test control group, quasi experimental design. A 40 items Basic Science Achievement Test (BSAT) validated and having reliability value of 0.72 was administered to the six classes before and after the treatment and the scores obtained were analysed using Analysis of Covariance (ANCOVA). The findings revealed that pupils taught with team teaching performed significantly better than those on conventional method in Basic Science ( $F\text{-Ratio} = 437.47$ ,  $F\text{-Critical} (0.05) = 4.00$ ,  $df = 1,235$ ). It was therefore recommended among others that Basic Science Teachers in primary schools should engage pupils with mutual team-teaching strategy.

**Keywords:** Basic Science, Teaching, Learning, Mutual Team-Teaching

## Introduction

Learning is a function of teaching. It involves the acquisition of manipulative skills, intellectual as well as social competencies and habits. There are different categories of learning ranging from very simple (conditioning) to the complex learning by man (insightful learning, observational learning). Generally, learning involves a relatively permanent changes in behavioural patterns, even though the processes which bring about the changes are profoundly different.

Hammed (2009) defined learning as the process by which activity originates or is changed through reaching to an encountered situation provided that the characteristics of the change in activity cannot be explained on the basis of negative response tendencies, maturation, or temporary state of the organism. Also, quoting Okoye (1981) learning is succinctly put as a process which involves the learning and what he sets to learn.

From all indications, learning can be said to take place when the existing repertory of responses has to be modified in order that a successful adaptation is made in a new situation. Such modification of an individual takes place when individuals are exposed to set of experiences in a process termed teaching.

According to Oluokun (2009) teaching has two aspects; planning for teaching (pre-active teaching) and managing the teaching-learning process in the classroom (interactive teaching). The pre-active teaching involves selecting the appropriate content to teach, selecting the appropriate methods(s), selecting the appropriate instructional materials and organizing the content, materials and procedures for teaching while the interactive teaching involves the teacher in organizing pupils for learning, interacting with the pupils, using methods to reinforce, illustrate and consolidate pupils learning, evaluating pupils and evaluating the teaching-learning process.

Adewuyi, Abodunrin & Ogunwuyi (2004) perceived teaching as a process by which one person helps others to achieve knowledge, skills and attitude. It entails the passing on ideas, knowledge, attitude, beliefs and feelings to someone with particular changes in that person's behaviour. The effectiveness of any teaching is based on change in learner's behaviour, any teaching that does not bring about learning or changed in learner is considered ineffective (Obanya, 2010).

Babarinde (2009) presented a graphical representation of teaching when he argues that teaching occurs whenever:

X is fostering or trying to foster in  
Y some disposition D by method m

Where;

X = those doing the teaching;  
Y = those being taught;  
D = Dispositions that are desirable for Y to acquire;  
M = methods that are satisfactory.

It is noted that whenever sound and effective teaching takes place, learning must succintly follows it. For both teaching and learning to occur, according to Adewuyi (2009) a prolific and effective teacher should be:

- (i) attentive, discerning and comprehending his/her pupils;
- (ii) always and ready to learn;
- (iii) patient and conscientious;
- (iv) kind and understanding;
- (v) well versed in the subject matter;

- (vi) active, neat and demonstrate good characters and
- (vii) innovative in teaching methods and strategies selection.

Teaching and Learning Basic Science in primary schools becomes more expedient today as the country intends to actualize her vision 20:2020. Also, the lingering low performance of Junior and Senior Secondary Schools Students in Basic Science and Sciences is of major concern to educational state holders in the country.

**Table 1:** Basic Science Results 2005 – 2009, Oyo State

Years	Total Students	No with A & B	% with A & C
2005	89,826	45,138	50.25%
2006	112,182	56,316	50.20%
2007	123,894	62,172	50.18%
2008	132,560	61,505	40.40%
2009	96,050	48,250	50.23%
Total	554,512	273,381	49.30%

**Source:** Oyo State Ministry of Education (2010)

Table 1 shows that students performance in Basic Science in Junior Secondary Examination in Oyo State is below average. Can better Basic Science teaching and learning at the primary level of education improve performance of the students in sciences when in junior or senior secondary school classes?

Really, a solid foundational teaching and learning at the primary level of education is a bedrock upon which strong future academic performance in secondary and tertiary education are laid (Quadri, 2001; NPE, 2004; Jaiyeoba, 2007; Obanya, 2010).

Alao (2010) writing on towards effective teaching and learning of integrated science at Junior Secondary School level stated that science teachers should be aware of certain rules which facilitates the selection of approaches of imparting knowledge to pupils. Thus, observed that in selecting the methodology for a science lesson the science teachers should consider among other things innovative teaching strategies to enhance pupils academic performance in the subject.

Researches in the constructive teaching strategies identified improved learners performance when innovative strategies was adopted (Okebukola, 2007). The psychological theories of Piaget (1953), Ausubel (1963), Gagne (1970) all stressed the individual students being assisted to construct personal knowledge through active engagement in learning. Empirically, when innovative teaching strategies are used, there is significant improvement in the learners performance in science. Babatunde (2008) focused a study on the effects of Team Assisted Instructional Strategy on Students' Learning outcomes in Chemistry, using pretest, post test, control group, quasi-experimental design on total of 200 SS 1 students, the results showed that the experimental group performed significantly better than the control group in Chemistry achievement, attitude and retention of Chemistry knowledge.

Ogunseemi & Boris (2009), Uhumuavbi & Eromosele (2009); Abdulhamid (2010); Ogbenevwe (2010) and others reported significant learners performance with innovative teaching strategies.

## **Concept of Team Teaching**

Team teaching involves a group of instructors working purposefully, regularly and cooperatively to help a group of learners of any age learn. Teachers together set goals for a course, design a syllabus, prepare individual lesson plans, teacher learns and evaluate the result. They shared insights, argue with one another and perhaps even challenge pupils to decide which approach is better.

Teams can be single-discipline, inter-disciplinary, or school-within-a-school teams that meet with a common set of student over an extended period of time. New teachers may be paired with veteran teachers. Innovations are encouraged and modifications in class size, location and time are permitted. Different personalities, voices, values and approaches spark interest, keep attention and prevent boredom.

The team-teaching approach allows for more interaction between teachers and pupils, school evaluate pupils on their achievement of the learning goals; students or pupils evaluate schools on their teaching proficiency. Emphasize pupils and school growth, balancing initiative and shared responsibility, specialization and broadening horizons, the clear and interesting presentation of content and pupils development, democratic participation and common expectation and cognitive, affective and behavioural outcomes. This combination of analysis, synthesis critical thinking and practical applications can be done on all levels of education, from kindergarten through graduate school. Team-teaching afford opportunities to address different study skills and learning techniques. It can also offset the danger of imposing ideas, values and mindsets on minorities or less powerful ethnic groups.

Although, team-teaching makes more demands on teachers time and energy in terms of mutual arrangement and preparation. Its merits like encouraging the lateral transmission to every sentient members of learning society, ideas, discoveries, products, process etc; improving teaching and learning quality as various experts approach the same topic from different angles: theory and practice, past and present, different genders or ethnic backgrounds, spreading responsibility, encourages creativity, deepens friendships and builds community among the teachers and pupils. All things being equal, team-teaching enhances quality of teaching and learning making it plausible to improve pupils outcomes in Basic Science in primary schools.

According to the pioneer of team-teaching concept, William M. Alexander (1963) in Creative Pro Education (2011), Team-teaching has varieties of techniques, Viz:

- (i) Conventional team teaching;
- (ii) Mutual team teaching;
- (iii) Supportive team teaching;
- (iv) Analogous team teaching;
- (v) Split team teaching; and
- (vi) Monitoring team teaching;

Among the above, mutual team teaching techniques was employed for the study. The mutual team-teaching as the name suggest is processed with mutual consent of the teachers. The teachers deign the concept together and exchange their ideas in front of the pupils, through this process pupils feel them as integral part of the teaching and learning process.

### **Statement of the problem**

Primary education is the foundation of educational structure and the key, therefore to the success or failure of the whole education system. The National Policy on Education

(2004) recognizing this factor incorporated innovative teaching strategies at this level of education, thereby giving the education system a solid and dependable foundation. The question is, will Team Teaching Instructional Strategy enhance pupils performance in Basic Science?

Despite the efforts of the stakeholders in improving pupils performance in schools, it was identified that their performance was still deplorably low. Can the pupils performance in primary schools especially in science be improved with innovative teaching strategies like Team Teaching? This paper investigated this.

### **Purpose of Study**

The purposes of this study are as follow:

- (i) To compare the relative effectiveness of the Team Teaching and Conventional Instructional Strategies on primary school pupils academic achievement in Basic Science;
- (ii) To recommend to teachers in primary schools of the need to adopt Team Teaching Instructional Strategy of teaching Basic Science.

### **Hypotheses**

**H<sub>01</sub>:** There is no significant impact of Team Teaching on pupils academic achievement in Basic Science;

**H<sub>02</sub>:** There is no significant interaction impact of instructional strategy and pupil sex on their academic achievement in Basic Science.

### **Methodology**

#### **Research Design**

This study investigated the impact of mutual team-teaching strategy on pupils academic outcomes in Basic Science at primary school level. The research design adopted for this study was the quasi-experimental method. This design was fitting for it allows approximate conditions of the true experiment in the setting which all control or manipulation of relevant variable is unattainable (Akinsola & Ogunleye, 2004).

#### **Population & Sample**

The target population of this study consisted of all primary five pupils in Oyo East Local Government Area of Oyo State, Nigeria. The sample comprises of two hundred and forty (240) primary five pupils from six intact classes (40 in each class) which were purposely selected from six schools in the Local Government Area of the State. Each treatment was replicated trice.

#### **Instrument**

The instrument used for this study was the "Basic Science Achievement Test" (BSAT). The Instrument was a forty (40) items achievement test developed by the researcher with table of specification on non-living components of the environment, Air, Electricity, Heat

Energy and Temperature. The BSAT have five options, one key and four distracters. The items in the instrument have difficulty index of 35 to 55 percent (0.35 to 0.55).

**Validity of the Instrument**

The BSAT was validated by a panel of qualified experts in science education, test and measurement and Basic Science teachers in primary schools for proper scrutiny. Their suggestions were thus incorporated into the final draft of the instrument to ensure its face and content validity.

**Reliability of the Instrument**

The Basic Science Achievement Test (BSAT) was pilot-tested at Afijio Local Government Area of Oyo State to establish its reliability using Kuder-Richardson 21 (K-R 21) method. A reliability index of 0.72 was gotten.

**Treatment and Procedure for Data Collection**

The treatments comprises the two instructional strategies (Team teaching and conventional (expository methods) Nine Basic Science Graduate teachers of over five years of teaching experience were used in the teaching (treatment) process which lasted for eight weeks. Each school and teacher were randomly selected for each teaching method (Team teaching or conventional strategy).

The nine Basic Science teachers were well trained on how to administer the instructional strategies and were given a copy of validated lesson plan and pre-activity questions as pre-test. Two teachers for each team-teaching treatment and one teacher for the conventional method. Each treatment was replicated trice for consistency.

The test instruments were administered as a pre-test before the treatment commenced and immediately after the treatment, the test instrument (BSAT) was administered again to the students as post-test.

**Method of Data Analysis**

The data collected were analysed using Analysis of Covariance (ANCOVA) at significant level of 0.05.

**Results and Discussion**

**H0<sub>1</sub>:** “There is no significant impact of Team Teaching on pupils academic achievement in Basic Science”

**Table 2:** Analysis of Covariance (ANCOVA) of the post-test scores as treatment groups using pre-test scores as covariate

Sources of Variation	Sum of Square	D.F	Mean	F-Ratio	F-Critical
Pre-test (Covariate)	293.08	1	293.08	20.82	3.84
Main Effects	6159.64	1	6159.64	437.47	3.84

Explained	6475.68	4	1618.92	114.98	2.37
Residual	3308.21	235	14.08		
Total	10783.89	239	45.12		

**Source:** *Pre-test, Post-test Pupils Data (2011), Significant at  $p < 0.05$*

From table 2, the main effects of the treatment (Team teaching) is found to be significant on pupils academic outcome with calculated value of 437.47 which was greater than the critical value of 4.00 at 0.05 level of significance. Therefore, the null hypothesis that says that there is no significant impact of Team teaching on pupils academic outcome in Basic Science is not held

**Table 3:** Pupils Score's in Basic Science Achievement Test (BSAT)

Groups	Frequency	Mean (X)	SD
Team Teaching	120	32.86	3.37
Conventional	120	17.59	5.31

**Source:** *BSAT Pupils Data (2011)*

Table 3 showed that the pupils taught with Team teaching strategy performed significantly better than those in conventional method.

**H0<sub>2</sub>:** "There is no significant interaction impact of instructional strategy and pupil sex on their academic achievement in Basic Science?"

**Table 4:** Analysis of Covariance (ANCOVA) of Interaction Effect of Instructional Strategy and Pupils Sex on their Academic Achievement in Basic Science.

Sources of Variation	Sum of Square	D.F	Mean Square	F-Ratio	F-Critical (0.05)
Pre-test (covariate)	314.62	1	314.62	16.92	3.84
Main Effects	89.47	3	29.82	1.60	2.60
Explained	2745.35	8	343.17	18.45	1.94
Residual	4296.59	231	18.60		
Total	7041.94	239	29.46		

**Source:** *Pre-test, post test pupils data (2011), not significant at  $p < 0.05$*

From table 4, the main effects of the interaction of the instructional strategy and pupils sex on their academic achievement was found to be non-significant with F-Ratio of 1.60 which was lesser than the F-critical value of 2.60. Therefore the null hypothesis which says that there is no significant interaction impact of instructional strategy and pupils sex on their academic achievement in Basic Science is upheld.

## Discussion of Findings

The findings have revealed the latent efficiency of mutual team-teaching which is readily plausible in most primary schools of today. The pupils taught with mutual team-teaching strategy performed significantly better than those on the conventional method (F-Ratio = 437.47, F-critical = 3.84,  $df_{1, 235}$ ). This result finds support in the work of Babatunde (2008); Alao (2010); Abdulhamid (2010) and Ogbenevwe (2010) that students taught with innovative teaching strategies performed significantly better than those on conventional strategy.

The results of this study also revealed no sex influence on the academic outcome of the pupils exposed to the treatment (F-Ratio = 1.60, F-critical = 2.60,  $df_{3, 231}$ ). This implies that both sexes (male and female pupils) responded positively to the mutual team-teaching strategy. This findings corroborated by the results of Ogbenevwe (2010) & Abdulhamid (2010) which identified no significant effect of sex on the students academic performance in science when innovative teaching strategies were employed.

### **Conclusion**

In view of the findings of the investigation, the following conclusions were made:

- The experimental group (pupils taught with mutual-team teaching strategy) performed significantly better than those on traditional, conventional method in Basic Science;
- Gender difference had no significant impact on the pupils academic outcome when mutual team-teaching strategy was employed;
- Although there were observed limitations to the use of mutual team-teaching strategy in primary schools Basic Science due to time constraints in mutual agreement and preparation for lessons, the gains in pupils performance outweighed the constraints.
- The pupils in experimental group seemed to be more self-reliant, constructive and cooperative with teachers and fellow pupils than those on the control group.

### **Recommendations**

The researches, based on their findings have the following recommendations:

- (1) Basic Science teachers in primary schools should engage the pupils with mutual team-teaching strategy since they are usually in pair in the classroom;
- (2) Workshops, seminars, symposia and conferences should be made compulsory for primary school Basic Science teachers as in-service training to acquaint them with versatile teaching strategies and remove obsolescence from their practices;
- (3) Curriculum developers should incorporate mutual team-teaching strategy as among the innovatives to facilitate Basic Science teaching and learning in schools;
- (4) Government at local, state and national level should refurbish primary schools with adequate instructional materials to facilitate proper, solid and dependable foundation to Basic Science teaching and learning in schools.

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