

**EFFECTS OF DEMONSTRATION STRATEGY ON SENIOR SECONDARY SCHOOL STUDENTS' RETENTION AND ACHIEVEMENT IN CHEMISTRY IN TARABA STATE, NIGERIA**

<sup>1</sup>Jerusha Philip Danjuma and <sup>2</sup>Mangut Mankilik  
Department of Integrated Science, School of Sciences, College of Education, Zing, Taraba State, Nigeria, <sup>2</sup>Department of Science and Technology Education, Faculty of Education, University of Jos, Jos. Plateau State, Nigeria

E-mail: [jpdanjuma@gmail.com](mailto:jpdanjuma@gmail.com)

**ABSTRACT**

*The study investigated Effects of Demonstration Strategy on Senior Secondary School Students' Retention and Achievement in Chemistry in Taraba State, Nigeria. This study was necessitated by students' achievement in secondary schools in Chemistry examinations in Nigeria and in Jalingo Education Zone in particular over the years in which there have been fluctuating low results. These fluctuating low results are due to teachers' use of inappropriate teaching strategies in most secondary schools that do not encourage active learning by students through participation. This study adopted the quasi-experimental pretest-posttest non-equivalent control group research design. The population comprised 1,500 senior secondary two (SSII) students in 32 co-educational secondary schools. The sample consisted of 95 SSII Chemistry students for both the experimental and control groups. A 50 multiple-choice Periodic Table Achievement Test (PTAT) was used to collect data and had reliability coefficient of 0.91 obtained by the use of Kuder-Richardson formula 20. Two research questions guided the study while two null hypotheses were tested at 0.05 levels of significance. The research questions were answered descriptively by using mean and standard deviation while the hypotheses were tested using Analysis of Covariance (ANCOVA). Findings from the study revealed amongst others, that Demonstration Teaching Strategy was more effective in improving students' achievement and as well as enhancing students' retention in Chemistry than the Lecture Teaching Strategy. Furthermore, the result revealed a significant difference of using Demonstration Teaching Strategy and Lecture Teaching Strategy on SS II students' retention and achievement mean scores in chemistry. Based on the findings, it was recommended among others, that Chemistry teachers should adopt Demonstration Teaching Strategy in teaching Chemistry in senior secondary schools. Stakeholders should organize workshops, conferences and seminars for in-service and pre-service Chemistry teachers on the use of Demonstration Teaching Strategy in teaching Chemistry.*

**Key Words: Chemistry, Demonstration Teaching Strategy, Achievement, Retention, Periodic Table**

**Background to the Study**

Chemistry is the science that systematically studies compositions, structure, properties, interactions, transformations of organic and inorganic substances and various elementary forms of matter (Anaso, 2010). Nnaka (2006) opined that Chemistry deals with nonliving matters. Ugwu (2014) reported that Chemistry has helped in the development of modern technology through the application of its principles in inventions. It is also a necessary prerequisite and integral part of such professions as Medicine, Pharmacy, Dentistry, Agriculture, Home Economics, Food Science, Engineering and Science-related professions. With effective chemical education, the natural resources which abound in Nigeria are harnessed, processed and converted to needed products for use by the society. Solid minerals such as coal, columbite, tin, iron ore, kaolin, limestone, gold, uranium, among others, and agricultural produce like hides and skins, rubber, palm produce, groundnut, cassava, among others would have been under-utilized without

Chemistry (Eze & Egbo, 2010). Therefore, Chemistry education is one of the major bedrocks for the transformation of national economy and hence must be given adequate attention due to the gains of its learning and advancement in standard of living. Despite the importance of Chemistry to the society, low achievement of students in Chemistry have been reported over the years in both internal and external examinations (WAEC, 2014, 2015, 2016, 2017, 2018) which indicated poor quality of Chemistry education at senior secondary school level in Nigeria and especially Taraba State (Anaso, 2010; Otor & Achor, 2015; Ajayi, Achor & Agogo, 2017). It is then a matter of necessity to think about what can be done to improve the situation as the fluctuating low achievement of students in the subject is a major concern of stakeholders in many developing country (Otor & Achor, 2015; Khan, Hussain, Ali, Majoka & Ramzan, 2011).

One of the factors said to be responsible for the fluctuating low achievement is the use of inappropriate instructional strategy (Achor & Ukwuru, 2013; Adejo & Adikwu, 2015). They maintained that teaching strategy is a variable that can be manipulated by teachers to increase student's retention and achievement rate. A situation where teachers use the expository strategies (lecture, discussion and demonstration) that are basically teacher-centred does not enhance effective learning of Chemistry. Fatokun, Egya and Uzoechi (2016) reported that 60 % of Nigeria secondary school Chemistry teachers use the conventional teaching strategy with teacher dominated experiments which make students passive learners. Inappropriate instructional strategy is therefore recognized as a major contributor to low achievement in Chemistry. This is the reason Nzewi (2010) suggested a shift from the lecture strategy in teaching science, technology and mathematics (STM) and adopt innovative strategies for better retention and achievement in secondary schools. These researchers feel that the use of Demonstration Teaching Strategy (DTS) would be a good innovation in teaching Chemistry in senior secondary schools.

Demonstration strategy is performed with the simplest equipment that ensures the same effect and it is vital that the science behind them is well understood at the secondary school level (Maizuwo, 2011). There are two types of demonstration namely, teacher-demonstration and student-demonstration. Teacher-demonstration strategy therefore, is one whereby the teacher illustrates a procedure to be followed and thereafter students follow those procedures to solve the given problems. The students then learn by imitating the teacher. According to Aliyu (2008), in teacher demonstration strategy a new subject matter is presented and explained by the teacher before it is imitated by students in the class. Demonstration is usually accompanied by a thorough explanation, which is essentially a lecture. As an activity based teaching strategy, it is expected to provide opportunity for measuring learning through experience, direct observation and participation of learners. In the student-demonstration strategy, students are grouped in fives or whatever number dependent on the number of students in the class and number of apparatus and chemicals available for use during the demonstration. The demonstration strategy provides opportunity for learners to work in a cooperative manner; helps to develop original ideas making learning process an entertaining one.

Retention is the term used to indicate and demonstrate that learning has taken place and maintained over time. It may be displayed through recognition or recall. Meaningful learning is explained in terms of retention. Ngwoke (2010) identified poor teaching method as one of the reasons for students' forgetfulness in learning process; those teaching strategies that alienate the learners from active participation in the learning process are responsible for forgetfulness. Retention which is the preservation of memory traces of learned experiences can affect the achievement of students in a given subject. Retention could also mean the storage of information over some period of time called retrieval interval and if the information cannot be produced at the end of that time, then forgetting has occurred.

What a learner retains after instruction is a function of the degree of involvement in the learning process (Muhammad, 2010). This implies that any teaching strategy that is student-centred is capable of enhancing students' retention. The ability to recall or repeat experience

from memory traces or otherwise defines the remembering ability (retention) and forgetfulness of individual students respectively. In essence, meaningful learning is deemed to have taken place if after a passage of time, the chemistry students can recall and apply information in the area of Periodic Table which they had been taught. According to Achor, Imoko and Uloko (2009), retention is the ability to keep knowledge of learnt materials after particular instructional strategies have been applied and to be able to recall it when required. It further goes to imply that any pedagogical strategy adopted to improve students' achievement may also improve their retentive ability in the subject since retention in chemistry is not acquired by mere rote-memorization but through appropriate teaching strategies. This study therefore shall seek to find out to what extent Demonstration Teaching Strategy can enhance students' retention and achievement in chemistry.

### **Statement of the Problem**

Fluctuating results by students in several achievement tests, both teacher - made and national examinations are common. This is caused by the use of inappropriate strategies in teaching by Chemistry teachers. This situation is worrisome and creates serious problems to students aspiring for different career options such as medical doctors, pharmacists, biochemists, chemical engineers and other Chemistry based professions. Therefore, this trend needs to be checked. The situation requires the implementation of appropriate teaching strategies that will be both valid and reliable in promoting students' achievement and enhancing retention in chemistry. Literature is replete with evidences of the use of lecture teaching strategy to deliver expected knowledge which implies that this situation would remain as long as students' centred teaching strategies are not found and used.

The need to stem the tide of fluctuating low achievement and increased low retention in Chemistry among senior secondary school students has necessitated the exploration of the innovative Demonstration Teaching Strategy (DTS). The problem of the study is: what are the effects of DTS on senior secondary school students' retention and achievement in chemistry in Taraba State, Nigeria?

### **Aim and Objectives of the Study**

Specifically, the objectives of the study were to:

1. determine pre-test and post-test achievement mean scores of SS II students taught chemistry using DTS and those taught with LTS.
2. establish the retention mean scores of SS II students taught chemistry using DTS and those taught with LTS.

### **Research Questions**

The following research questions guided the study:

1. What is the difference in the pre-test and post-test achievement mean scores of senior secondary two (SS II) students taught chemistry using DTS and those taught using LTS?
2. What is the difference in the retention mean scores of SS II students taught chemistry using DTS and those taught using LTS?

### **Hypotheses**

The following null hypotheses were tested at 0.05 level of significance.

1. There is no significant difference in the pre-test and post-test achievement mean scores of senior secondary two (SS II) students taught chemistry using DTS and those taught using LTS.
2. There is no significant difference in the pre-test and post-test retention mean scores of SS II students taught chemistry using DTS and those taught using LTS.

## METHODOLOGY

This study employed the quasi-experimental non-equivalent pretest-posttest non randomized control group design. The design allows the use intact classes. One SS II class in each of the two schools selected was used for the study. From the two schools, one was used as control group and the other was used as experimental group. The design is represented symbolically as shown below:

$$\begin{array}{l} \text{EG} \rightarrow O_1 \rightarrow (\text{AC}) \rightarrow X_1 O_2 \rightarrow (\text{AC RT}_1) \\ \text{CG} \rightarrow O_3 \rightarrow (\text{AC}) \rightarrow X_0 O_4 \rightarrow (\text{ACRT}_2) \end{array}$$

Source: Nworgu (2015)

Where:

EG = Experimental group; CG = Control group;  $X_1$  = Experimental treatment (DTS);  $X_0$  = Control (LTS);  $O_1$ , &  $O_3$  = Pretest for the EG and CG;  $O_2$ , &  $O_4$  = Posttest for the EG, and CG;  $RT_1$  = Retention Test for EG;  $RT_2$  = Retention Test for CG; AC = Achievement

## Population of the Study

The population of the study was 1,500 senior secondary two (SSII) students that were currently offering Chemistry as a school subject. This comprised 1,200 male and 300 female Chemistry students spread in 32 co-educational public senior secondary schools in Jalingo Education Zone of Taraba State for the 2019/2020 academic session (Education Resource Center, 2019).

## Sample and Sampling Techniques

Ninety five (95) SS II Chemistry students (65 males and 30 females) from two sampled co-educational secondary schools were used as sample for the study. Out of this, the experimental group had 30 males and 15 females while the control group had 35 males and 15 females. The sample distribution of the students is as shown in Table 1.

**Table 1: Summary of Sampled Schools and Number of SSII Students by Gender**

| S/N | School | Group | Gender |        | Total |
|-----|--------|-------|--------|--------|-------|
|     |        |       | Male   | Female |       |
| 1.  | B      | EG    | 30     | 15     | 45    |
| 2.  | C      | CG    | 35     | 15     | 50    |
|     | Total  |       | 65     | 30     | 95    |

The multi-stage sampling technique was used. First, simple random sampling procedure was used to obtain the zone used for the study. Purposive sampling procedure was used to obtain two secondary schools with comparable characteristics as: school type (public schools); school composition (co-educational schools in order to remove sex bias); the school had an SS II population of not less than 30 Chemistry students per class since intact classes would be used; having qualified and experienced Chemistry teachers (teachers with at least B.Sc.Ed or B.Sc/PGDE and M.Ed in Chemistry) and the teachers had at least three years of teaching experience; the secondary schools must have been presenting candidates for WAEC and NECO for a minimum of five years; availability of functional Chemistry laboratories; the willingness of the school administrators and staff to participate in the study, and the distance between the schools would not be too close in order to prevent interactions between the schools.

## Instrument for Data Collection

Periodic Table Achievement Test (PTAT) was developed by the researchers and used to collect data for the study. PTAT comprised of two sections: A and B. Section A consisted of demographic data which elicited information on respondent's name of school, time allowed, date

and gender. Section B consisted of 50-item multiple-choice questions on students' achievement and retention in secondary school Chemistry concepts of Periodic-Table. Each item had four options labeled A-D. Periodic-Table Achievement Test (PTAT) was developed using table of specification based on SSCE syllabus and scheme of work on the concept of Periodic Table; and in conjunction with the behavioural objectives of the lesson plans for both experimental and control groups. The model answers for PTAT were provided.

### **Validation of the Instrument**

Face and content validity of Periodic Table Achievement Test (PTAT) were carried out by three experts, one from Science and Technology Education Unit, the second from Test and Measurement Unit both of Faculty of Education, University of Jos and the third (a seasoned Chemistry teacher) from a secondary school in Jalingo Education Zone of Taraba State, Nigeria.

### **Reliability of the Instrument**

To ascertain the reliability of PTAT, a pilot study was carried out in two public senior secondary schools in Takum Education Zone, Taraba State, Nigeria. The choice of these schools was because they were not part of the main study. Moreover, the schools have the same characteristics in terms of learning and quality of Chemistry teachers as the schools for the main study. The reliability coefficient of PTAT was computed as 0.91 using Kuder-Richardson formula 20 (KR-20).

### **Procedures for Data Collection**

The researchers employed the services of two research assistants comprising one qualified Chemistry teacher from each of the two sampled schools to be used. The Chemistry teacher for the experimental group was trained for five days by the researcher using a training guide before the commencement of the treatment. The research assistant for the control group was also exposed to the details on the training schedule on how to use the lesson plans provided to him by the researcher on Lecture Teaching Strategy.

Prior to the treatment on the experimental groups, the Periodic-Table Achievement Test (PTAT) was administered as pre-tests to all the students in the two groups. Treatment was provided to the experimental groups for a period of four weeks while the control group was also engaged during the same period of weeks. The experimental group was taught the concept of Periodic Table using DTS while students in the control group were taught the same concept of Periodic Table using LTS in the same period. The researcher monitored the research assistants at the different locations since the periods for the Chemistry lessons differed in the sampled schools. After the treatment period of four weeks, the posttests were administered to the students in the fifth week to both the experimental and control groups using PTAT. The retention test was administered to the experimental and control groups after an interval of two weeks from the post-test administration.

### **Method of Data Analysis**

Mean and standard deviation were used to answer the two research questions while the two hypotheses were tested using Analysis of Covariance (ANCOVA) at 0.05 level of significance. ANCOVA was considered appropriate because the test was for analyzing differences between variables in the experimental and control groups using pre-test scores as covariates.

## **Data Presentation, Analysis and Result**

### **Research Question One**

What is the difference in the pre-test and post-test achievement mean scores of SS II students taught chemistry using DTS and those taught using LTS?

**Table 2: Means and Standard Deviations of Pre-test and Post-test Achievement Scores of SS II Student Taught Chemistry Using DTS and those Taught Using LTS**

| Group | Pre-test |       |      | Post-test |       | X diff. |
|-------|----------|-------|------|-----------|-------|---------|
|       | N        | Mean  | SD   | Mean      | SD    |         |
| DTS   | 55       | 20.47 | 7.67 | 57.38     | 13.49 | 10.10   |
| LTS   | 50       | 23.72 | 7.98 | 47.28     | 9.09  |         |

From the result in Table 2, students taught using DTS (experimental group) had a pretest mean score of 20.47 with a standard deviation of 7.67 while their counterparts taught using LTS had a pretest achievement mean score of 23.72 with a standard deviation of 7.98. However, the posttest achievement mean score of students in the experimental group was 57.38 with a standard deviation of 13.49 while that of their counterparts in the control group was 47.28 with a standard deviation of 9.09 respectively. The findings showed that students in the experimental group who were taught using DTS had a higher achievement mean score in Chemistry than their counterparts in the control group who were taught chemistry using the LTS.

### Hypothesis One

There is no significant difference in the pre-test and post-test achievement mean scores of SS II students taught chemistry using DTS and those taught using LTS.

**Table 3: ANCOVA Results of Pre-test and Post-test Achievement Mean Scores of SS II Students Taught Chemistry Using DTS and Those Taught Using LTS**

| Source          | Sum of Squares        | Df  | Mean Square | F       | Sig. | Partial Eta Squared |
|-----------------|-----------------------|-----|-------------|---------|------|---------------------|
| Corrected Model | 2701.478 <sup>a</sup> | 2   | 1350.739    | 9.949   | .000 | .163                |
| Intercept       | 33264.519             | 1   | 33264.519   | 245.012 | .000 | .706                |
| PRETEST         | 28.826                | 1   | 28.826      | .212    | .646 | .002                |
| Group           | 2450.170              | 1   | 2450.170    | 18.047  | .000 | .150                |
| Error           | 13848.236             | 102 | 135.767     |         |      |                     |
| Total           | 306744.000            | 105 |             |         |      |                     |
| Corrected Total | 16549.714             | 104 |             |         |      |                     |

Result in Table 3 shows that  $F(1,102) = 18.05$ ,  $p < 0.05$ , and since the p-value of 0.000 is less than 0.05 level of significance, the null hypothesis is rejected, indicating that there is a significant difference of DTS on students' achievement in chemistry. Hence, DTS does increase students' achievement scores in Chemistry compared to LTS.

### Research Question Two

What is the difference in the retention mean scores of SS II students taught chemistry using DTS and those taught using LTS?

**Table 4: Means and Standard Deviations of Retention Scores of SS II Students Taught Chemistry Using DTS and Those Taught Using LTS**

| Group | N  | Mean  | SD    | X-diff. |
|-------|----|-------|-------|---------|
| DTS   | 55 | 58.80 | 13.33 | 12.48   |
| LTS   | 50 | 46.32 | 20.47 |         |

From the result in Table 4, students taught using DTS had a retention mean score of 58.80 with a standard deviation of 13.33 while their counterparts in the control group taught using LTS had a retention mean score of 46.32 with a standard deviation of 20.47 after exposure to treatment. The findings showed that students in the experimental group had a higher retention mean score in chemistry than their counterparts in the control group.

### Hypothesis Two

There is no significant difference in the retention mean scores of SS II students taught chemistry using DTS and those taught using LTS.

**Table 5: ANCOVA Results of Retention Mean Scores of SS II Students Taught Chemistry Using DTS and Those Taught Using LTS**

| Source          | Sum of Squares        | Df  | Mean Square | F       | Sig. | Partial Eta Squared |
|-----------------|-----------------------|-----|-------------|---------|------|---------------------|
| Corrected Model | 4088.658 <sup>a</sup> | 2   | 2044.329    | 14.053  | .000 | .216                |
| Intercept       | 32761.434             | 1   | 32761.434   | 225.207 | .000 | .688                |
| PRETEST2        | 9.481                 | 1   | 9.481       | .065    | .799 | .001                |
| GroupH2         | 3829.240              | 1   | 3829.240    | 26.323  | .000 | .205                |
| Error           | 14838.199             | 102 | 145.473     |         |      |                     |
| Total           | 312284.000            | 105 |             |         |      |                     |
| Corrected Total | 18926.857             | 104 |             |         |      |                     |

a. R Squared = .216 (Adjusted R Squared = .201)

The result in Table 5 shows that  $F(1,102) = 26.32$ ,  $p < 0.05$ , and since the  $p$  value of 0.000 is less than 0.05 level of significance, the null hypothesis is rejected, indicating that there is a significant difference on students' retention mean score in chemistry when taught with DTS and LTS. Hence, DTS does increase students' retention scores in Chemistry compared to LTS.

### Discussion of Results

The discussion of the findings of the study is as follows:

Difference in Achievement Mean Scores of Senior Secondary Two (SS II) Students in Chemistry using Demonstration and Lecture Teaching Strategies

Based on the summary of results as indicated in Table 2, students in the Demonstration Teaching Strategy (DTS) group (Experimental group) had a higher achievement mean score in chemistry than the students in the Lecture Teaching Strategy (LTS) (Control group) group. This means that students in the DTS performed better than the students in the LTS group. Hence, the DTS is more facilitating than the LTS in teaching the Periodic Table aspect of Chemistry.

The result as obtained for using the DTS was facilitated by the classroom learning situation in which the students did not only observe the details of the activities as demonstrated by the teacher and followed suit, but practically took part in carrying out the activities themselves. This process highly aided students' perception of the concepts being taught and enhanced their

achievement. It is very possible that the students followed due processes of demonstration strategy in carrying out their activities such as: planning all the activities relating to demonstration in great detail, ensuring that all the illustrations and relevant materials are available in time before the demonstration started, broke down the demonstration into suitable steps so that it can be easily understood by them, proceeded with the demonstration slowly so that all the students may grasp the details, ascertained after every step whether they had grasped the meaning, contents and explanation of the topic, explained suitable verbal explanations to heighten their interest, gave confidence to themselves, turned to their textbooks to create a feeling of assurance and be powerfully motivated by their achievement at work.

The above result situation through DTS is in line with the statement of Ibrahim (2015), which states that demonstration is helpful in introducing a topic for study with vivid illustration for quick grasping of facts. The result agrees with Daluba (2015) who conducted a research on the effect of Demonstration Method of Teaching Agricultural Science in secondary schools in Kogi East Education Zone of Kogi State and found a significant effect. This result also agrees with Efe and Khalil (2016) who investigated the effect of teachers' demonstration and lecture instructional methods on students learning outcomes in selected senior secondary schools in Kaduna, Nigeria and found that the Demonstration Teaching Method was more facilitating.

The result of the test of significance as shown in Table 4 reveals that the p-value of 0.000 is less than 0.05 level of significance, therefore, the null hypothesis 1 is rejected, showing a significant effect (difference) of DTS on students' achievement in Periodic Table. The significance of the result is in line with the works of Daluba (2015) that revealed that Demonstration Method had significant effect on students' achievement with those taught with the Conventional Lecture Method. Similarly, Efe and Khalil (2016) investigated the effect of teachers' Demonstration and Lecture Instructional methods on students learning outcomes in Chemistry in selected senior secondary school in Kaduna, Nigeria and the found that there was a significant difference in learning outcome on students exposed to Demonstration and Lecture Strategies used to teach chemistry. The result of the hypothesis 1 means that the two groups of students cannot be taught with the two methods in the same class. They have to be separated for effective outcome to be achieved.

Difference in Retention Mean Scores of Senior Secondary Two (SS II) Students in Chemistry using Demonstration and Lecture Teaching Strategies

Following the summary of results as indicated in Table 3, students in the DTS group had a had a higher retention mean score in chemistry than the students in the LTS (Control group) group. This means that the DTS is more facilitating in bringing about retention of knowledge of Periodic table in the students than the LTS.

The result as obtained above on the students' retention mean score for using the DTS is because the strategy provided classroom opportunity where students observe details of the activities as demonstrated by the teacher and practically carried out the same activities themselves. This process creates excitement in the students and they are motivated to learn better which enhances the retention of the learned facts. Sometimes, the students plan the activities relating to demonstration process by themselves such as ensuring that all the illustrations and relevant materials are available in time and eventually follow suitable steps so that it can be easily understood by them. The procedure provides full explanation of the topic. All these actions tend to heighten their interest and give confidence to them such that learned materials are easily understood making retention easier for remembrance.

The above result is in line with the statement of Ibrahim (2015) that demonstration strategy helps in presenting vivid illustration for quick grasping of facts, which is fosters retention of learned facts. The result agrees with Attah (2014) who using demonstration method and cooperative learning strategies found out that demonstration method brought about increased in retention than the cooperative learning strategy. This result also agrees with Efe and Khalil (2016) who investigated the effect of teachers' demonstration and lecture instructional methods on

students learning outcomes in selected senior secondary school in Kaduna, Nigeria and found out that the demonstration teaching method facilitated retention more in the learned facts than the Lecture Instructional method. The equally is supported by Muhammad, Bala and Ladu (2016), who conducted a study on the effectiveness of Demonstration and Lecture Methods in learning concepts in Economics among secondary school students in BornoState, Nigeria and found that Demonstration method was more effective than the Lecture method in learning concepts in economics among secondary school students in Borno State. The result is also in line with the work of Ajayi (2017) on the effect of hands-on activities (Demonstration) and Lecture Method on senior secondary chemistry students' on retention in Stoichiometry in Zone C of Benue State whose result showed that students taught Stoichiometry using hands-on activities had higher retention mean scores than those taught using the Lecture method. The result as obtained here is also in line with Fatokun, Egya and Uzoechi (2016) who investigated the effect of games teaching approach (experimental method) on chemistry students' achievement and retention in periodicity from public secondary schools in Keffi Local Government Area of Nassarawa State and found the students taught periodicity using game method retained better than those taught with conventional method (control method).

The result of the test of significance as shown in Table 6 reveals that the p-value of 0.000 is less than 0.05 level of significance. Therefore, the null hypothesis 2 is rejected, signifying that there is a significant difference of DTS on students' retention in Periodic Table. This confirmation proves that DTS had the capability to increase the retention scores of students in the study of Periodic table.

The significance of the result is not in line with the work of Attah (2014) who using Demonstration method and Cooperative learning found no significant difference in the retention mean scores of students taught balancing of chemical equation using demonstration method and those taught using cooperative learning. The work of Ajayi (2017) on the effect of hands-on activities (Demonstration) and Lecture Method on senior secondary chemistry students' on retention in Stoichiometry in Zone C of Benue State disagrees with the result as it showed no significant difference between the retention mean scores of hands-on activities (Demonstration) and Lecture Method on senior secondary chemistry students' on retention in Stoichiometry.

The result of the hypothesis 2 means that the two groups of students cannot be taught together with the two methods in the same class. They have to be separated for effective outcome to be realized in retention scores. The students must be separated and the more facilitating strategy for retention used in which case the DTS comes handy because the model is more effective than the LTS for enhancing retention in Chemistry at the senior secondary school level.

### **Summary of Result**

The major findings in this report are shown below:

1. Achievement mean score of students taught chemistry using DTS was significantly higher than those taught using LTS.
2. Retention mean score of students taught chemistry using DTS was higher than those taught using LTS.

### **CONCLUSION**

Findings showed that Demonstration Teaching Strategy improved students' retention and achievement more than the Lecture Teaching Strategy. This implies that when Chemistry teachers use Demonstration Teaching Strategy in teaching Chemistry contents, it will effectively improve students' retention and achievement considerably.

### **RECOMMENDATIONS**

Based on the results, the following recommendations are made:

1. Demonstration Teaching Strategy is hereby recommended for Chemistry teachers to incorporate into stipulated strategies for teaching Chemistry in the classroom because they improve students' performance in Chemistry.
2. Workshops and seminars should be organized for in-service teachers.
3. The teacher training institutions should include the use of DTS in their chemistry method course content to ensure the training of the pre-service chemistry teachers.

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