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**EFFECTS OF INTEGRATING INSTRUCTIONAL MODELS WITH LECTURE METHOD ON ACADEMIC PERFORMANCE AND RETENTION OF STUDENTS OF SMALL CLASS-SIZE IN ZARIA EDUCATIONAL ZONE KADUNA STATE.**

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**Abstract**

*This study investigated the effects of integrating instructional models with lecture method on academic performance and retention of students of small class-size in some Biology concepts among Senior Secondary School Students in Zaria Education Zone. The study adopted a pretest, posttest, post-posted quasi experimental and control group design. Fifty students were randomly selected from two Senior Secondary Schools that constituted the sample for the study. The schools were grouped into two, one as experimental with 25 students and the other as control with 25 students from the total population of 4,450, S.S.S 3 students in the zone. The subjects in the experimental groups were taught by Integrating Instructional Models with Lecture while the control groups were exposed to lecture method. A Biology Achievement Test (BAT) with Reliability Coefficient  $r_f = 0.75$  was used to measure the students' achievement and retention after the treatment. The data collected were analysed using mean, standard deviation and t-test. Results indicated that there is significant difference in the means academic performance and retention of students taught Biology concepts using Integrating Instructional models with lecture method compared to those taught using lecture method of instruction in small class size. Based on the findings it was recommended that Integrating Instructional models with lecture method should be used by Biology teachers in Senior Secondary Schools. Biology teachers should be trained on effective use of instructional models in Senior Secondary Schools.*

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**Introduction**

Science is defined by different people from different perspectives. Science as an intellectual activity carried out by humans designed to discover information about the natural world in which we live and to discover the ways in which this information can be organized to benefit human race (Nwagbo 2005). Science is also seen as a complex human activity that leads to the production of a body of universal statements, called laws, theories or hypotheses which serve to explain the observable behaviour of the universe or part of it and which in themselves have predictive characteristics (Shaibu 2008).

The above definitions show that science is an organized body of knowledge and a way of thinking in order to understand and explain natural phenomena. Science is one of the major tools for nation building, because the economic emancipation, national development and the survival of any nation, Nigeria in particular, is dependent upon a sound scientific and technological base. Therefore science and technology are the potent instruments for

preparing the young generations into the society (Shaibu, 2008).

The National Policy on Education (FGN, 2004) stated that the aim of education is to inculcate in the child, the spirit of inquiry and creativity through the exploration of nature. Secondly, education should equip students to live effectively in our modern age of science and technology.

The Nigerian educational system is confronted with many issues. Adedura and Tayo (2007) observed that the most identified one is the academic performance in science among students in certificate examinations. Academic performance is the display of knowledge attained or skills developed in school subjects designed by test and examination scored or marks assigned by the subject teachers. The poor Academic performance in Biology has been the major concern of parents, teachers and the general public. Studies have shown that students perform poorly in Biology. Gilbert (1998) observed that Biology students encountered difficulties due to their inability to make reasonable connection between concept areas and their application in solving problems in

Biology. The West African Examination Council (WAEC) (2010) reported unqualified and incompetents science teachers, the use of inappropriate method of instruction, inability to use and improvise instructional materials (models) among others are the causes of declining rate of the academic performance of Senior Secondary School Students in Biology. In related studies, Yilwa, (1999), Jibrin and Nuru, (2007), independently identified poor methods of teaching and improper use of instructional materials like models as some of the deficiencies of Biology Teachers. Similarly, Duniyileme (1998), Mahboob (1999), and Bassey (2002) have attributed the poor performance of students in Biology in Senior Secondary Schools to large class-size. In this study, the effect of Integrating Instructional models with lecture method on academic performance of students of small class-size in some Biology concepts was investigated.

### Statement of the problem

The declining rate of the performance of Senior Secondary School Students in Biology in Nigeria is a problem of serious concern among science educators, and examination bodies such as West African Examination Council (WAEC) and National Examination Council (NECO) (Gyusa, 2009). As the enrollment of Biology students increases over the years the level of passes is not encouraging. This consistent poor performance of students in S.S.C.E. Biology also indicated that many students can not gain admission into Biology related courses in higher institutions.

Researches have been carried out by Ndioho (2005) on the relative effectiveness of Constructivist-based Instructional model on Senior Secondary School Students' achievement in Biology in Obio/Akpor Local Government Area of River State. Anaso (2008) investigated the effects of class-size on the academic achievement of different ability groups among Chemistry students at the Senior Secondary School level in Zaria Education zone. While Ndirika (2009) study the effect of Teacher-student interaction on academic performance among Integrated science students of different classes and ability group in Giwa Education Zone. Therefore, it is based on this background that the researcher saw the need to investigate the effects of Integrating Instructional models with lecture method on academic performance and retention of students of small class-size in some Biology concepts.

This study is guided by the following Research questions and Null hypotheses.

### Research Question I

What is the Effects of Integrating Instructional Models with lecture method on academic performance of Senior Secondary School Students of small class-size in some Biology concepts.

### Research Question II

What is the Effects of Integrating Instructional Models with lecture method on retention ability of Biology Concepts among Senior Secondary Students in small class size.

### Null hypothesis I

HO<sub>1</sub> There is no significant difference in the means academic performance of students taught Biology concepts by Integrating Instructional Models with Lecture method and those exposed to lecture method only in small class-size.

### Null hypothesis II

HO<sub>1</sub> There is no significant difference in the means retention of learned concepts in Biology by Integrating Instructional Models with Lecture method and those exposed to lecture method only in small class-size.

### Research Design

The design for this study was pretest, posttest, post-posttest quasi experimental and control group design. Pretest was administered before treatment to determine the equivalence of the experimental and the control group ability level. The posttest to determined the effectiveness of the two methods of instruction involved in the study i.e. Integrating Instructional Models with lecture method for the experimental group taught Biology concepts (sense organs) by integrating instructional models with lecture method. The control group was also exposed to the same Biology concepts (sense organs) using traditional method of instruction. At the end of the treatment, the instrument was administered as posttest to the groups to determine the significance difference. The same instrument was also administered to the students two weeks later as post-posttest to determined the retention ability of the Biology Concepts learned by the students. The teaching of the groups was done by the researcher in order to establish the control of the result, so that the teacher factor and data manipulation will be minimized.

The population for the study consisted of all SS III students in public Senior Secondary

Schools under Zaria Zonal Inspectorate Division of Kaduna State Ministry of Education. Simple random sampling techniques was used to choose two schools out of the eighteen Senior Secondary Schools in the zone. The two schools were randomly assigned to Experimental group (25 students) and control group (25 students). Making up a total number of 50 subject sample from the total population of 4,450 S.S.S III students in the zone.

The instruments for data collection was a 30 objective questions adopted from West African Examination Council May/June 2005 – 2008 Biology paper I was used at pretest stage to determine the equality of the two groups ability level before administration of the treatment. While Biology Achievement Test (BAT) was used as posttest and post-posttest for the students

after the treatment is administered to the experimental and control groups. The Biology Achievement Test (BAT) was constructed by the researcher and validated by three PhD and Senior Lecturers in Science Education Department of Ahmadu Bello University Zaria and three Graduate Biology Teachers at the Senior Secondary Schools level. The BAT was pilot tested using another school that was not part of the study. Pearson Product-moment Correlation Co-efficient statistics was used to analyses the reliability of the instrument at  $P \leq 0.05$  and was found to be  $r = 0.74$ .

The Biology Achievement Test (BAT) was administered to the two groups after the treatment. The data collected was analysed using t-test statistics and the result is presented in Table I and II.

## Result

Table 1: Summary of t-test Comparison of Students Achievement of the Experimental and Control Groups.

Variables	N	Mean	Std	SE	df	t-Cal	P	Remarks
Experimental	25	21.08	3.89	0.77	48	27.07	0.001	S*
Control	25	14.20	4.91	0.98				

Significant at  $P \leq 0.05$

From Table I it is observed that the mean scores of students taught Biology concepts using Integrating Instructional models with lecture method (experimental group) was 21.08 while the mean score of lecture method (control group) was 14.20. Showing that mean score for

experimental group is higher than the control group. Meaning that there is significant difference in the mean academic performance of students taught Biology concept using Integrating Instructional Models with lecture method and those taught using Lecture method.

Table II: t-test Analysis of mean score of students Retention by Integrating Instructional Models with lecture method compared to Lecture method only in small class size

Variables	N	Mean	Std	SE	df	t-Cal	P	Remarks
Experimental	25	19.40	3.76	0.75	48	25.70	0.001	S*
Control	25	12.88	3.68	0.73				

Significant at  $P \leq 0.05$

From Table II it is observed that the means score of Students Retention of Biology Concepts using Integrating Instructional Models with Lecture Method (Experimental group) was 19.40 while the mean score of retention of lecture method (Control group) was 12.88. Showing that means score for experimental group is higher than the mean score for control group. Therefore, this indicated that there is significance difference in the retention of students taught Biology concept using Integrating Instructional Models with lecture method and those exposed to Lecture Method.

## Discussion

The result presented in Table 1 revealed that t-calculated is 27.07 and also P value observed is 0.001 and  $df = 48$ . since the P value of 0.001 is less than  $P \leq 0.05$  it means that there is significant difference in the mean academic performance of students taught Biology concepts using Integrating Instructional models with lecture method and those taught using lecture method. Therefore the null hypothesis which says, there is no significant difference in mean academic performance of students taught Biology concepts using Integrating Instructional models with lecture method in small class-size

was rejected. The significant difference was in favour of the experimental group as shown in the mean score recorded. The result confirms the earlier findings of Fagbemi and Ibidapo (2001), Njoku (2004) and Ndioho (2005) who reported that the application of instructional models improves students' academic performance in Biology.

The result presented in Table II shows that t-calculated is 25.70, P value observed is 0.001 and  $df = 48$ . Since the P value of 0.001 is less than  $P \leq 0.05$ , it means that there is significant difference in the retention of students taught using integrating instructional models with lecture method and those exposed to lecture method. Therefore the null hypothesis which says, there is no significant difference in retention of learned concepts in Biology by Integrating Instructional models with lecture method in small class-size is rejected. The significant difference was in favour of experimental group as show in the mean score recorded in Table II. The result also confirms the earlier findings of Fagbemi and Ibidapo (2001), Njoku (2004) and Ndioho (2005) who reported that the application of instructional models improved student's retention of Biology Concepts

#### Implications of the Findings

The implication of this finding is that using Integrating Instructional models with lecture method in teaching Biology concepts in small class improves students' academic performance and retention of Biology concepts at Senior Secondary Schools level. This might be due to change in mode of instruction that is from teacher-centered (i.e. lecture method) to Integrating of Instructional models in teaching the students in experimental group. This must have enabled the students to have concepts formation and better understanding of abstract concepts in Biology, as a result, the academic performance of the students is improve.

#### Conclusion

Based on the findings of this study it can be concluded that

- Integrating of Instructional models with lecture method improves students' academic performance in Biology.
- Integrating Instructional models with lecture method improve students retention.
- Integrating of Instructional models with lecture method also concretized and elucidate abstract concepts and this improve the academic performance and retention of students in Biology and as well enable more Senior Secondary School Student to gain admission and read Biology related courses in the higher institutions.

#### Recommendations

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

1. Teachers should be encouraged to use instructional models for teaching Biology in Senior Secondary Schools.
2. Teachers should be trained on effective use of Instructional models through seminars and workshops.
3. Government should provide adequate Instructional materials (models) for effective teaching and learning of Biology at Senior Secondary Schools.
4. Government should construct more classes to reduce over population of students in Senior Secondary Schools.
5. Curriculum planners of science education should adopt the Integrating of Instructional models with lecture method in restructuring Biology Curriculum in our Secondary Schools.
6. Teachers should improvise instructional materials for effective teaching and learning Biology in Senior Secondary Schools.

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