

Effect Of Demonstration And Lecture Methods On Academic Performance Of Senior Secondary School Students' In Biology, Maiduguri Metropolis, Borno State, Nigeria

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Abstract

The study examined effect of demonstration and lecture methods on academic performance of senior secondary school students' in Biology in Maiduguri Metropolis. Two (2) objectives and two (2) null hypotheses were drawn in the study. The objectives of this study determined effect of demonstration method of teaching on academic performance of senior secondary school students' in Biology in Maiduguri Metropolis and effect of lecture method of teaching on academic performance of senior secondary school students' in Biology in Maiduguri Metropolis. Quasi-experimental research design was adopted in the study. The population of the study was 7687 senior secondary school students in Maiduguri Metropolis. Stratified random sampling was used in drawing the sample of 367. A researcher made test was used for data collection. The data was analysed using means and t-test to test the two (2) hypotheses at 0.05 level of significance. Instrument used for data collection in this study was researcher made performance test in Biology which consists of 25 items of multiple choice types the items were drawn carefully within the scope of Biology syllabus. The performance test in Biology was used to measure the performance of students in both pre-test and post-test. While split half method was used to determine the reliability of the instrument. Two (2) types of performance test i.e. performance test, and aptitude test were used by the researcher. Method used in analyzing data in this study was t-test and mean. T-test was used to test the hypothesis, while mean was used to find the differences. The findings of this study revealed that demonstration method was more effective in teaching Biology in senior secondary schools in Maiduguri Metropolis, Borno State, Nigeria. It also revealed that lecture method was effective in teaching Biology in Maiduguri Metropolis, Borno State, Nigeria; it finally revealed that there was significant difference between the performance of students taught using demonstration and lecture methods in favour of demonstration method in Maiduguri metropolis, Borno State, Nigeria. Based on the findings of this study it was recommended that Borno State government should employ quality teachers who will use appropriate teaching methods while teaching Biology or other subjects. Biology teachers should increase the use of demonstration method when teaching subject like Biology.

Keyword: Demonstration Method, Lecture Method, Students, Academic Performance

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I. Introduction

The level of education has increased overtime with improved method of teaching in most institutions today in Nigeria. Over the years, there have been an increased rate of poor performance among adult learners due to inexperienced instructors and the unavailability of instructional materials to demonstrate before the learners while teaching subject like Biology. This effect is mostly noticed in most of secondary schools; maybe due to lack of infrastructural development and finances to run the activities of the institutions (Hejazi, 2006).

Methodology is very vital in any teaching-learning situation. The method adopted by an instructor may promote or hinder learning. It may sharpen mental abilities which are bases of social power or may discourage initiatives and curiosity thus making self-reliance and survival difficult. There are different types of methods for efficient and effective teaching. These methods include: lecture, demonstration, laboratory, field-trip, peer-teaching method, etc.

Ugboaja (2008) asserted that instructional methods involve the instructors' skills and manipulations on the subject's matter and the learning situations in other to secure positive and desired response for the learners. He also stated that they are sequence of steps by which means of information is consistently presented to the learners in line with a given instructional approach. Akinfe, Fashiku, Olufiniyi (2012) asserted that most untrained instructors are accusing learners when they are unable to carry out the expected behaviour at the end

of the lesson or examination rather than on themselves in failing to utilize appropriate and effective instructional method.

Researchers have revealed that a number of studies have been carried out to identify and analyze the numerous factors that affect learners' academic performance in various Centre's of learning, their findings identify learners' effort, previous schooling, self-motivation, age of learner, learning preferences class attendance and entry qualification as factors that have significant effect on the learners' academic performance in various settings Milambo, (2011). At all levels of our educational system, problems such as inadequate infrastructure, brain drain, population explosions lack of infrastructural aids, lack of recreational facilities, high learner/instructor ratio, inadequate training and development for staff and dearth of data and statistic exist. All these have serious implication on instructor's delivery system in the classroom and certainly have undesirable effects on learners' academic performance. It has been observed that successful learning depends on various factors that are not all instructors related but the method that the instructor uses continue to play an important role in learners learning and in their academic performance. Teaching method is non-one-size fit-fits all proposition. Flexibility is crucial in adapting teaching method in the class. Since all instructors are different, the strategies they use and the way they use them will depend on the context and situation of their class. What an instructor does in the classroom depend on the context and situation of their class or degree upon which his approach to learning situation, Fahintola (2014).

Demonstration method refers to the type of teaching method in which the instructor is the principal actor while the learners watch with the intention to act later. Here the instructor does whatever the learners are expected to do at the end of the lesson by showing them how to do it and explaining the step-by-step process to them (Ameh, Daniel and Akus, 2007). Mundi (2006) described it as a display or exhibitions usually done by the instructor while the learners' watch with keen interest. He further added that, it involves showing how something works or the steps involved in the process. Some of the advantages of this method as outlined include: - It saves time and facilitate material economy; the method is an attention inducer and a powerful motivator in lesson delivery; learners receive feedback immediately through their own products; it gives a real-life situation of course of study as learners acquire skills in real-life situations using tools and materials; it help to motivate learner's when carried out by skilled instructor and it is good in showing the appropriate ways of doing things.

Demonstration method is one of the methods which are capable of improving learning through its diversity effect activity. It has the prerequisite characteristics for individualized instruction and therefore has high potential for making teaching-learning process challenging and rewarding. There is a radical departure from the direct teaching model in which the instructor engages learner to learn. Learners are encouraged to ask questions. In short, the learner is viewed as an inquirer, a seeker of information and a problem-solver. These attributes are crucial to problem-solving and are at the heart of demonstration model of teaching. Consequently, there is now a growing concern for the use of demonstration method in the teaching of Integrated Science in Nigerian Schools.

The use of demonstration by instructors has been shown to have positive results on learners, academic performance. Ameh & Dantani, (2012) noted that the demonstration method has the advantage of being a good way of motivating learners to learn and also believed to save time and materials as well as shows how to avoid breakages and accident. They also reported that providing learners with combination of behavioural objectives on topics using demonstration methods will help in enhancement of the topic and hence for better performance than other teaching methods in Integrated science. The act of demonstration with instructional materials during integrated science class is very important to enhance the learners' achievement in learning, since images stick more than words in the mind of learners. It is a subject that has to do with different aspects of science such as colours and textures; take for instance a chemical like copper which is bluish in colour can stick properly in the mind of learners when the learners see the chemical. An integrated science instructor can tell the learners the colour of a chemical, at the end of the day most learners tends to forget most of this colours. Statistics shows that most institution that adopt the method of teaching and demonstration tend to produce better learners than those institution that teach learners without instructional materials.

Lecture Method is a series of actions or activities planned by the instructor and systematically provided to the learner to enable him receive and process the information; retain and recall it in order to be able to use it to tackle emerging life tasks and problems. The lecture method was one of the most effective and efficient ways to disseminate information and has often been used, because many instructors are poor lectures and learners poor participants in the traditional setting. This type of instruction has allowed learners to be passive in the classroom, learners not knowing how to be active participants in lecture, have relied on transcription, copying direct from the textbooks or chalkboard, memorization and repetition for learning. Researchers like (Wanjohi 2016 and Tao 2001) supported the use of lecture method but emphasized that the problem arise from the way lectures are used, not from their inherent inability to promote significant learning. In practice, most lectures do not engage learners or motivate them to take responsibility for what and how they learn (Andala and Ng'umbi

2016). Tao (2001) affirmed that when learners that have learned using lecture are tested in class, they tend to be proficient in using the knowledge in immediate problem solving activities. He based this observation on lack of conceptual understanding of the concepts and referred to the practice as 'rote' learning which may produce the correct answer without the ability to reason as to why a particular concept has been used.

Lecture methods can be more useful to promote learning fully if used interactively with other learning methods such as the use of power point the interactive approach by telling, showing, asking and providing learners with the opportunities to self-explore topics and lessons. The actual techniques to have been identified to work include: the use of flash cards, brain storming, think in pairs and sharing, demonstrations, cooperative learning and independent study among others Andala and Ng'umbi (2016). Learners may benefit from interactive teaching by learning to construct their own understanding and meaning while learning to reason, solve problem and think critically. Researchers such as Cortright et al (2005), Cahyadi (2004), and Falcona, Edet and Nkama (2001) reported increased conceptual understanding which leads to better qualitative problem solving and higher knowledge retention abilities when interactive lectures are used.

Despite these arrays of teaching methods being advocated in literatures there is no one universally accepted method. The question still remains which of these teaching methods contribute to failure or success of learners' performance especially in Borno State where the causes of poor performance in institution is not well understood.

The academic performance in secondary schools in the country has been of great concern to parents, scholars, educators' concerned individuals and the government at large. A number of seminars, conferences, symposia and workshop have been organized to look into the academic performance in sciences in schools as a takeoff into determining the relative academic performance of learners' in science subject. Some people are of the opinion that learners' performance in science subjects is on the decline. Conforming this view, Esezobar (1986) lamented, only few percent of Nigerian candidates who sat for Examination in the previous years passed science subjects with credits. The impression from the forgoing citation is that the percentage of failure in science subject is on the increase. The fact that the problems of education has reached on alarming stage should not be over emphasized. There is the belief that the standard of education has fallen. Akinpelu (2004) while working on the standard/quality in Nigeria education asserts that the standard of Nigerian education has fallen. In recent years, it is a conventional claim which nobody in the right mind dares dispute. In view of this, the researcher is motivated to investigate effects of demonstration and lecture methods on academic performance of senior secondary school students in Biology in Maiduguri Metropolis, Borno State, Nigeria.

Statement of the problem

Teaching and learning of Biology depends to a large extent on teacher's own knowledge of the content and ability to adequately deliver the instruction to the students. However a lot of factors or variables may inhibit or hinder effective dissemination of knowledge to the understanding of the content by the students, such variables may seem to be lack of teaching methods, qualified teachers, teachers' qualification, experience, inadequate use of instructional materials among others. The major problem confronting Biology in senior secondary schools in Maiduguri Metropolis seems to be the use of inappropriate method of teaching. It has been observed that students' performance in Biology in secondary schools has declined over the years. This could be attributed to the teachers' use of inappropriate instructional methods which hinders learners' comprehension of facts, concepts and details about Biology. Biology as a subject needs to be taught effectively where teachers use innovative instructional method that seems to center on the students to see if there will be improvement in their academic performance

It is generally believed that method is all important and subject matter teachers need to put in place for successful subject delivery in schools. Knowledge is not enough if one does not know how to pass it to learners. Similarly, training is not enough if one has no knowledge to pass on. Every teacher need sufficient subject matter and methods. It has also been noted that failure to apply suitable method by teachers seems to have a negative effect on the overall performance of students. In Nigeria, teaching and learning in schools has been observed to be dominated by lecture method. Apparently lecture method tends to emphasize teaching than learning, rote learning rather than understanding and facts dissemination rather than application, thereby seems to limiting students' academic performance. Since good teaching among other factors play significant role in enhancing students' performance, the study examined effect of demonstration and lecture methods on academic performance of secondary school students' in Maiduguri Metropolis, Borno State, Nigeria.

Objectives

The objectives of this study are to determine the:

- i. effect of demonstration method of teaching on academic performance of secondary school students' in Biology in Maiduguri Metropolis.

- ii. effect of lecture method of teaching on academic performance of secondary school students' in Biology in Maiduguri Metropolis.

Hypotheses

The following two hypotheses were formulated to guide the study:

H₀₁ There is no significant difference between pre-test and post-test performance of students taught using demonstration method in the post-test

H₀₂ There is no significant difference between pre-test and post-test the performance of students taught using lecture method in the post-test

II. Methodology

This study adopted quasi-experimental research design to determine effect of demonstration and lecture method on academic performance of students in Biology in Maiduguri Metropolis. Control group design, involving pre and post-test was used. Quasi-experimental design involves selecting groups, upon which a variable is tested, without any random pre-selection process (Abraham and MacDonald 2011). The study involved control and experimental groups consisting of both male and female students. The students were assigned to intact classes for the two experimental and control groups. A pre-test was administered to the groups, before the treatment, to determine the group comparability of experimental groups' ability level. Experimental group 1 (EG1) was taught on a topic (living and non-living things) in Biology using demonstration method while Experimental Group 2 (EG2) the same concept using lecture method. At the end of the treatment period, a post-test was administered to all the two (2) groups of students in order to determine the effectiveness of the treatment. The treatment is done within the period of five (5) weeks. The population of this study comprised of all the students of Biology in Maiduguri Metropolis (SS1) classes. The populations of the Biology students' were seven thousand eight hundred and sixty seven (7867) for the 2018/2019 academic session. Three hundred and sixty seven (367) Senior Secondary Schools students were randomly selected through stratified random sampling techniques across the Metropolis in Borno state.

Instrumentation

Instrument used for data collection in this study was researcher made performance test. In Biology which consist of 25 items of multiple choice type. The items were drawn carefully within the scope of Biology syllabus. Livings things and non-living things, characteristic of livings, classification of living things, difference between plant and animal, plant and animal cell. The students were required to select the correct answer from the four options lettered A – D. The performance test in Biology was used to measure the performance of students in both pre-test and post-test. According to Akuezulo (1993) performance test is an instrument used to measure student's abilities. Performance test are of two (2) types, and the two types were used by the researcher. These are:

- i. Performance test
- ii. Aptitude test

Akuezulo stated that “in collecting data about how much a student can learn in future or how much he can think, an aptitude test should be designed and conducted to him”. This is to say that aptitude test attempt to predict an individual or group capacity to acquire and improve performance with additional training.

The aptitude test in this study is pre-test that was designed and administered to both control and experimental groups to determine their level of understanding about Biology. On the other hand, achievement test is aimed at finding out how much a student has acquired or achieved after receiving a special treatment of training. This type of performance test is referred to as post-test. This test was designed to determine effect of demonstration and lecture method of teaching Biology on the experimental groups after being given special treatment. However, the test was administered to the two (2) groups. Split half method was used to determine the reliability of the instruments.

Table 3.1: Topic covered and contact lessons

Contact Session in a week	Topics	Duration	Experimental Group	Experimental Group	Control Group
Week 1	School visit/ Pre-test	2hrs	pre-test	pre-test	pre-test
Week 2					
Lesson 1	living/non-living things	2hrs	were taught using demonstration	were taught using Lecture	were taught using enquiry
Lesson 2	Matter		“ “	“ “	“ “
Week 3					
Lesson 1	characteristics of living things	2hrs	were taught using demonstration	were taught using lecture	were taught using enquiry

lesson 2	classification of living things		“	“	“	“	“	“
week 4								
lesson 1	d/f between plant and animal	2hrs	were taught using demonstration	were taught using lecture	were taught using enquiry			
Lesson 2	plant and animal cell		“	“	“	“	“	“
week 5	Administering Post-test	2hrs	Post-test	Post-test	Post-test			

III. Results And Discusion

H₀₁ there is no significant difference between pre and post-test performance of students taught using demonstration method.

Table 4.1: t-test summary of pre and post-test performance of learners taught using demonstration method

Variables	Mean	N	Std. Dev	Std. Error	df	t-test	Prob	Decision
Pre demonstration method	11.8000	367	3.83964	.99139	14	16.713	0.0001	Rejected
Post demonstration method	19.9333	367	3.73146	.96346				

t-test_{cal}=16.713; **t-test_{tab}**=1.761; Prob<0.05

Table 4.1 above observed that there is significant difference between pre and post-test performance of students taught using demonstration method. Since the calculated t-test value is 16.713 greater than the table t-test value 1.761, the hypothesis stated that there is no significant difference between pre and post-test performance of students taught using demonstration method was rejected. Therefore, there is significant difference between pre and post-test performance of students taught using demonstration method.

H₀₂ there is no significant difference between pre and post-test performance of students taught using lecture method.

Summary of pre and post-test performance of learners taught using lecture method are presented on the table below

Table 4.2 t-test summary of pre and post-test performance of learners taught using lecture method

Variables	Mean	N	Std. Dev	Std. Error	df	t-test	Prob	Decision
Pre lecture method	11.6667	367	3.01583	.77868	14	10.469	0.0001	Rejected
Post lecture method	16.7333	367	2.91466	.75256				

t-test_{cal}=10.469; **t-test_{tab}**=1.761; Prob<0.05

Table 4.2 observed that there is significant difference between pre score of mean 11.6667 and SD 3.01583 and post score of mean 16.7333 and SD 2.91466 test performance of students taught using lecture method. Since the calculated t-test value is 10.469 greater than the table t-test value 1.761, the hypothesis stated that there is no significant difference between pre and post-test performance of students taught using lecture method was rejected. Therefore, there is significant difference between pre and post-test performance of students taught using lecture method.

IV. Discussion

The study determined effect of demonstration and lecture method of teaching on academic performance of secondary school students in Biology in Maiduguri Metropolis, Borno State, Nigeria. The first hypothesis stated and revealed that demonstration method was effective in teaching Biology on students in Maiduguri Metropolis, this study identified that the use of demonstration method of teaching enhance students' academic performance. This finding is in line with the findings of Ameh & Dantani, (2012) who stated that demonstration method is one of the methods which are capable of improving learning and performance through its diversity effect activity. It has the prerequisite characteristics for individualized instruction and therefore has high potential for making teaching-learning process challenging and rewarding. The finding also concurred with the findings of Adekoya & Otatoye, 2011 who stated that demonstration strategy has been shown to be effective with both large and small groups in terms of performance. The greater the degree of participation and sensory involvement by the students, the more effective learning will be and the better the performance of students. This implies that demonstration method is an effective method in improving the performance of students.

The second hypothesis of this study showed that lecture method was effective in teaching Biology in Maiduguri. The finding of this study is in contrast with Bok (2006) who stated that students' retention in lecture-based courses is weak. According to him, an average student only retains 42% of what he or she learned after the lecture and 20% one week later. This implies that lecture method does not help the students to acquire

sufficient functional understanding (Bernhard, 2007). It was supported by Clark (2014) who revealed that students taught in lecture based classes learn less than those taught with activity base reformed methods. He further stated that lecture method is frequently a one-way process unaccompanied by discussion, questioning or immediate practice that makes it a poor instructional method compared to other methods of teaching. Lecture method therefore, stands out as an effective method in teaching Biology.

V. Conclusion

The study has shown that students who were taught using demonstration method in the experimental group performed better than those taught using lecture method in the control group. In this study, students seem to get knowledge and understanding about the subject matter as revealed by their scores in the post-test. In contrast using the lecture method as the only means for instruction appeared to make most students bored very quickly, and thus loose enthusiasm and interest of what the instruction has to say. This affirmed Boja (2014) views who said lecture are not just boring they are ineffective. The study has also revealed increased in score in the post-test of students in both demonstration and lecture method. This means that both demonstration and lecture method were able to increase the students' knowledge on the topic.

VI. Recommendations

1. Borno State government should employ quality teachers who will use appropriate teaching methods while teaching Biology or other subjects.
2. Ministry of education should organize refresher training for teacher so that they can employ different strategies while teaching in the classroom in order to build students capacities.

References

- [1]. Abraham, T. and MacDonald, J. (2011). Experimental and Quasi-Experimental Design: Iowa State University
- [2]. Adekoya, P. and Otatoye, J. (2011). Approach to Learning Science Process Skills: Treatment Effect and Aptitude –Treatment Infection: Journal of Research in Science Teaching, 2(6), 237-250
- [3]. Ameh, B. and Dantani, G. (2012). Influence of Teachers' Participation in Decision Making on Job Productivity in Secondary Schools: Pedagogy-Job Education, Occupational Training, Further Education, 5-43
- [4]. Akinfe, E., O. Olafinniyi E. and Fashiku C. O. (2012). Teachers' Quality as Correlates of Students Academic Performance in Biology in Senior Secondary Schools of Ondo State, Nigeria: Online Journal of Education Research. 1(6), 108-114
- [5]. Akuezilo, M. C. (1993). Measure of Performance Test Instruments: Journal of Vocational and Technical Education. University of Nigeria, Nsukka
- [6]. Akinpelu, D. (2014). An Introduction to Philosophy of Education. Obafemi Awolowo University
- [7]. Ameh, P. O. and Dantani, B. (2012). Effect of Lecture and Demonstration Method on the Academic of Learners in Integrated Science, in Nasarawa Local Government, Kano State: International Journal of Modern science, 1(1)
- [8]. Andala, C. R. and Ngum'bi A. (2011). Lecture, Discussion and Independent Study Instructional Methods Revisited: The Journal of Experimental Education. 4(4), 24-28
- [9]. Benhard, M. Z. (2007). The Need for In-Service Training for Teachers and its Effectiveness in School: International Journal for Innovation Education and Research, 2(11)
- [10]. Bok, A. M. (2006). Factors Affecting the Teaching of Oral Communications in English Language in Secondary School in Kakamega and Vihiga Districts of Kenya: Oxford University Press
- [11]. Caryadi, F. (2004). Lecture Versus Discussion as Related to Students' Personality Factor. Improving College and University Teaching, 2(2), 112- 116
- [12]. Clarke, D (2014), Influence of Teaching Method on Employees Productivity in Public Institution Kilifi Sub-County Singorem Publishing, Kilifi, Kenya
- [13]. Esezobar B. (1986). Relative Academic Performance of Learners' in Computer Science and Integrated Science
- [14]. Fahintola J. O. (2014). Teachers Characteristics as Correlates of Learners Academic Performance in Schools. Saki West Local Government, Oyo State: Journal of Education and Social Research. MUSER Publishing
- [15]. Falcona, U. I., Edet, A. O., & Nkama, V. (2001). Staff Development Programme and Secondary School Teachers Job Performance in Uyo Metropolis, Nigeria: Journal of Education and Practice. 4(12)
- [16]. Hejazi, M. (2006). Relationship between Personal Traits and Learners' Academic Achievement: early Life and Education, 2(1), 34-41
- [17]. Milambo V. (2011). An Analysis of Some Factors Affecting Learners' Academic Performance: University of the West Indies. Caribbean Teaching Scholar
- [18]. Mundi, H. (2006). Comparing the Effect of Lecture and Work In Group on Integrated Science learners: Iranian J Medical Edu. (1) 79-84
- [19]. Tao, C. O. (2001). Students' and Teachers' Participation in Decision-Making and Impact on School Work and School Internal Discipline in Nigeria: An International Multi-Disciplinary Journal, Ethiopia, 5(2), 200-214
- [20]. Ugboaja, C. (2008). Teaching a Profession or Craft: An Art or Science: In Nworgu N .A (ed) Teacher and Teaching in Nigeria: Issues, Challenges and Prospect, (2-18). Benin City: NAE
- [21]. Wanjohi, T. S. (2016). Incentives, Selection and Teacher Performance: Evidence from IMPACT: Journal of Policy Analysis and Management, 34(2) 267-297

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