EFFECTS OF DEMONSTRATION AND DISCUSSION TEACHING METHODS ON ACADEMIC PERFORMANCE OF SENIOR SECONDARY STUDENTS IN BIOLOGY IN LERE EDUCATION ZONE, KADUNA, NIGERIA

Danjuma Sunday  
Department of Science Education,  
Ahmadu Bello University Zaria, Nigeria  
sdkurama@gmail.com

And

Ya’u Ahmad  
Department of Science Laboratory Technology,  
Nuhu Bamalli Polytechnic Zaria, Nigeria  
yauahmadkauru@gmail.com

ABSTRACT

The aim of the study was to determine the Effects of Demonstration and Discussion Teaching Methods on Academic Performance of Senior Secondary Students in Biology in Lere Education Zone Kaduna, Nigeria. Quasi-experimental design was used to achieve this by adopting pre-test and post-test. A population of 1,602 senior secondary II students were used while a sample of 87 students were randomly selected from two secondary schools and shared into two groups. Three specific objectives and three null hypotheses each were formulated to guide the study. The instrument used to collect data for the study was a 25-item Biology Performance Test (BPT). The mean scores and standard deviations obtained from the results of pre-test and post-tests as well as t-test statistic (p<0.05) were used to test the three null hypotheses. The study revealed the superiority of demonstration teaching method over the discussion teaching method in terms of skills acquisition and academic performance among students. As such, teachers are encouraged to use demonstration teaching method regularly so as to enhance rapid development in education and economic recovery. Since global economy has moved from resource-based to knowledge-based, demonstration method could therefore be a paradigm shift for economic recovery in Africa.

KEYWORDS: Demonstration and discussion teaching methods, Students’ academic performance, Biology

INTRODUCTION

Biology is one of the core subjects taught in senior secondary schools in Nigeria. This is because of the promising role it plays in promoting self-reliance through provision of employment opportunities and production of stable food for the populace, hence, economic recovery in Africa. Olumese (2000) said that functional and sustainable Biology Education is a foundation for a viable and solid economic prosperity of any country. That was why the Federal Ministry of Education (FME, 2013) stressed the goals and objectives of Biology
Education as being to stimulate and sustain students’ interest in Biology, inculcate in students basic science skills, enable students acquire basic knowledge and practical skills in Biology for a sustainable economy, and create employment opportunities to provide stable food for the populace.

The instructional teaching method adopted by the teacher determines to a great extent the realization of the laudable goals and objectives of education. Any country that wants to use education as a paradigm shift for rapid economic recovery should ensure that teachers are up to date in some contemporary teaching methods (Amess, 2009). This will equip the citizens with basic skills in Biology for sustainable and stable economy. Demonstration teaching method is a practical session which makes the students and teachers to participate actively in the course of lesson presentation, hence, improves the ability of the students to acquire basic knowledge and skill required in that vocation. Demonstration teaching method is a carefully prepared presentation showing how to perform an action used in procedures which is accompanied by oral and visual explanations, illustrations and questions (Paul, 2000). On the other hand, Aremu (2002) opined that discussion teaching method is a strategy employed by teachers where the students are grouped and appointed leaders, and then each group given a topic to be discussed as the teacher goes around to supervise and correct errors. Students’ academic performance is a situation in which students obtain certain marks whether low, average or high in an examination depending on the student’s Intelligent Quotient (IQ) (Paul, 2000). Simply, put the use of education as a paradigm for a rapid economy recovery necessitates building a solid and formidable teacher education.

The theoretical framework on which this study was built upon is theory of learning by Doing or Experiential learning postulated by Dewey (2009). He viewed learning by doing to be a practical or demonstrative type of learning process because it gives the students the opportunity to participate in the teaching-learning process which can give the students experiences and improves his/her academic performance. Students should be given something to do, not something to learn as doing is of such a nature as to demand thinking which should include games, play and constructive occupation because the students would be more engaged in what they are doing.

Piaget (2004) in his contribution to the theory of learning by Doing or Experiential learning suggested that curriculum should be based on students’ interest and should involve them in active experience. Also, students should be actively involved in real-life tasks and challenges because it is relieved that knowledge emerges only in a situation which learning have to draw them out of meaningful experiences.
STATEMENT OF THE PROBLEM

The persistent poor performance among Biology students in Kaduna State motivated the researchers to embark on the research. Biology teachers in Kaduna State are continuously adopting the conventional teaching method which usually does not enhance high academic performance. The main reason given by these Biology teachers is that, the Biology curriculum is bulky, as such, students need to be rushed so as to cover the syllabus before the commencement of West African Senior Secondary School Certificate Examination and National Examination Council. This usually gives room to poor understanding of the subject, hence, poor academic performance of the students during examination since the teachers were rushing the students. The poor mastery of the subject matter by some Biology teachers in Kaduna State also hinders the adoption of some contemporary teaching methods that can improve students’ academic performance. This was because according to Danjuma (2017) few Biology teachers in the study area have not acquired first Degree that can expose them to more practical skills to enable them adopt demonstration teaching method. In view of the problem stated, the study critically examined the acquisition of science skills/knowledge and academic performance of students using two teaching methods: demonstration and discussion and then advanced some suggestions for improvement.

AIM AND OBJECTIVES OF THE STUDY

The aim of the study is to investigate the Effects of Demonstration and Discussion Teaching Methods on Academic Performance of Senior Secordary School Students in Biology in Lere Education Zone, Kaduna, Nigeria. Three specific objectives were formulated. These are to:

1. find out whether there is difference in academic performance among students by gender when they are taught with demonstration and discussion teaching methods.
2. identify whether there is difference in academic performance of students when they are taught with demonstration and discussion teaching methods.
3. find out whether there is a difference in academic performance of students based on the teaching methods adopted by Biology teachers.

RESEARCH HYPOTHESES

The following null hypotheses were formulated and tested at $P \leq 0.05$ level of significance.

1. There is no significant difference in academic performance of Biology students by gender when they are taught with demonstration and discussion teaching methods.
2. There is no significant difference in academic performance of Biology students when they are taught with demonstration and discussion teaching methods
3. There is no significant difference in academic performance of students based on the teaching methods adopted by Biology teachers.

**SIGNIFICANCE OF THE STUDY**

The findings of the study will help the Biology teachers to choose suitable instructional techniques or methods in teaching and learning of Biology. This is because most teachers in the study area use the conventional teaching method which does not allow students’ active participation in Biology lessons Danjuma (2017). This conventional teaching method involve talk and chalk or reading from the textbooks makes students to memorize and regurgitate facts and concepts exactly the way they were outlined by the teacher. The research findings will also prove that instructional techniques or methods adopted by teachers are a determinant of students’ academic performance which will serve as a guide for teachers to adopt integrated methods during lesson presentation.

The findings will be of significance to the Ministry of Education in particular and the government of Kaduna State in general because they will come to know about their responsibilities of providing fund for the establishment of school gardens and Biology laboratories in schools where they are not found so as to make teaching materials available in schools for teacher to use. The Biology teachers can use the study as a reference point in search of different instructional techniques during lesson presentation.

**METHODOLOGY**

The research design used for this study was quasi-experimental design in which pre-test and post-test were adopted. The design made it easy for the researcher to select the respondents into two groups who were taught with demonstration and discussion teaching methods after the pre-test was conducted. This was in line with what Olayiwola (2007) stated that experimental design gives the researcher the opportunity to randomly select the sample respondents into groups and administer pre-test and then give treatment followed by post-test after which the results are compared and interpreted.

The population for the study was 1,602 students in SS2 who were offering Biology in Lere Education Zone in Kaduna State. The secondary schools that were used for the population of the study were G.S.S Kono with 123 students, G.S.S Ramin Kura with 186 students.

Eighty-seven (87) students were used as the sample for the study. This sample was obtained from two senior secondary schools which were randomly selected by balloting from the nine senior secondary schools that made up the population of the study in Lere Education Zone in Kaduna State. In each of the two secondary schools selected for the study, one class was selected for demonstration and discussion methods respectively.
The study used a 25-item Biology Performance Test (BPT) as the instrument to conduct the pre-test and post-test for the two groups in rural and urban areas. The instrument (BPT) was made up of multiple choice questions which consisted of four options lettered A-D. The questions were to measure the students, academic performance in Biology. The instrument was validated, pilot tested and the reliability was found to be 0.77 and was also found to be good for the main study. Group A was taught using demonstration method while group B was taught using discussion teaching method.

The mean scores and standard deviation obtained from the scores of pre-test and post-test as well as t-test statistic (P<0.05) were used to test the three null hypotheses. The null hypotheses were rejected when the t-calculated values were greater than the t-critical values, while the null hypotheses were accepted when t-calculated values were equal to or less than the t-critical values.

RESULTS AND DISCUSSION

Three null hypotheses were tested using t-test as the statistical tool at 0.05 level of significant as follows:

**Null Hypothesis One:** There is no significant difference in gender academic performance of Biology students when taught with demonstration teaching method and those taught with discussion teaching method.

**Table 1: Significant Difference in Gender Academic Performance among Students when they were taught with Demonstration and Discussion Teaching Methods**

<table>
<thead>
<tr>
<th>Teaching Method</th>
<th>N</th>
<th>X</th>
<th>SD</th>
<th>DF</th>
<th>t-calc</th>
<th>t-crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstration Method (Female Students)</td>
<td>43</td>
<td>50.28</td>
<td>6.48</td>
<td>85</td>
<td>1.960</td>
<td>5.682</td>
</tr>
<tr>
<td>Discussion Method (Male Students)</td>
<td>44</td>
<td>32.47</td>
<td>3.25</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Table 1 results indicates that the mean score and standard deviation of female Biology students taught with demonstration teaching method were 50.28 and 6.48 respectively, while the mean and standard deviation of the male students taught with discussion teaching method were 32.47 and 3.25. This means that the mean score and standard deviation of the female students were higher than the male students. The t-calculated (1.960) was greater than the t-critical (5.682) at 0.05 level of significant. Therefore, null hypothesis one was rejected. It was then confirmed that there was a significant difference in gender academic performance when students were taught with demonstration and discussion teaching methods. This means that when female students were taught with demonstration teaching method, they performed
academically better than their male counterparts who were taught with discussion teaching method.

**Null Hypothesis Two:** There is no significant difference in academic performance of Biology students when taught with demonstration and discussion teaching methods.

**Table 2: Significant Differences in Academic Performance of Biology Students Taught with Demonstration and Discussion Teaching Methods**

<table>
<thead>
<tr>
<th>Teaching Method</th>
<th>N</th>
<th>X</th>
<th>SD</th>
<th>DF</th>
<th>t-calc</th>
<th>t-crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstration Method</td>
<td>43</td>
<td>84.24</td>
<td>14.22</td>
<td>85</td>
<td>5.816</td>
<td>1.960</td>
</tr>
<tr>
<td>(Rural Students)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discussion Method</td>
<td>44</td>
<td>34.12</td>
<td>8.28</td>
<td>85</td>
<td>6.101</td>
<td>1.960</td>
</tr>
<tr>
<td>(Urban Students)</td>
<td></td>
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</tbody>
</table>

Table 2 result shows that the mean and standard deviation of the Biology students taught with demonstration teaching method were 84.24 and 14.22 respectively, while the mean and standard deviation of the urban Biology students taught with discussion teaching method were 34.12 and 8.28 respectively. The t-calculated value (5.816) was greater than the t-critical value (1.960) at 0.05 level of significance. Therefore, null hypothesis two was rejected. This means that when Biology students were taught with demonstration teaching method, they performed academically better than the Biology students taught with discussion teaching method.

**Null Hypothesis Three:** There is no significant difference in academic performance of students based on the teaching methods adopted by the Biology teachers.

**Table 3: Significant Differences in Academic Performance of Biology Students based on the Teaching Method Adopted by the Teachers**

<table>
<thead>
<tr>
<th>Teaching Method</th>
<th>N</th>
<th>X</th>
<th>SD</th>
<th>DF</th>
<th>t-calc</th>
<th>t-crit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demonstration Method</td>
<td>43</td>
<td>60.24</td>
<td>6.41</td>
<td>85</td>
<td>6.101</td>
<td>1.960</td>
</tr>
<tr>
<td>Discussion Method</td>
<td>44</td>
<td>21.33</td>
<td>3.11</td>
<td>85</td>
<td>6.101</td>
<td>1.960</td>
</tr>
</tbody>
</table>

Table 3 results show that when demonstration teaching method was administered on the students, the mean score and standard deviation were 60.24 and 6.41 respectively, but when the discussion teaching method was adopted by the Biology teachers, the mean score and standard deviation obtained were 21.33 and 3.11 respectively. This indicated that the mean score and standard deviation of demonstration teaching method were higher than the discussion teaching method. The t-calculated value (6.101) was greater than the t-critical value (1.960). Therefore, null hypothesis three was rejected. This means that the instructional teaching method adopted by the Biology teachers is a determinant of students, academic performance in Biology students.
MAJOR FINDINGS

Three major research findings were revealed from the study as follows:

1. Female Biology students taught with demonstration teaching method performed academically better than their male counterparts taught with discussion teaching method.
2. Biology students taught with demonstration teaching method performed academically better than their counterparts taught with discussion teaching method.
3. The instructional teaching method adopted by the teacher determines the academic performance of Biology students.

RECOMMENDATION

On the basis of the findings emanating from this study, it was recommended that the use of demonstration teaching method should be encouraged among teachers of Biology to improve students’ academic performance.

REFERENCES


