



Demonstration and Discussion Methods of Teaching in the Enhancement of Learning Attitude of Students by Gender in Senior School Biology in Yenagoa and Ogbia Local Government Areas of Bayelsa State

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Abstract: *This study, effects of demonstration and discussion teaching methods on learning attitude of public and private students in senior school biology in Yenagoa and Ogbia Local Government Areas, Bayelsa State was a quasi-experimental research design. The population of the study was 6,988 Senior School Two Biology students in Bayelsa State. The sample consists of 323 Senior School Two students from 23 Senior Secondary Schools in the above Local Government Areas of Bayelsa State. One research question and one hypothesis guided the study. Three validated and reliable instructional guides namely Instructional Guide on Demonstration Teaching Method (IGDTM), Discussion Teaching Method Guide (DTMG) and Guide on Lecture Teaching Method (GLTM) were used in training teachers to use the methods of teaching. Standardized Biology Achievement Test (SBAT) was used as a reliable instrument for data collection. Data were analyzed using percentage, mean, standard deviation and z-test statistics. The findings of the study were that there is no significant difference in the mean scores of SS2 students in public and private schools in learning attitude enhancement taught with demonstration and discussion methods in Biology. Also, there was slight increase in learning attitude enhancement from pretest to posttest in all the groups but when subjected to z-test analysis, it showed statistically not significant in all the groups. Recommendation made was that teachers should give adequate consideration to teaching methods in biology to enhance attitude of students during lessons as school type does not affect students' attitude nor improve academic achievement.*

Keywords: *Demonstration, Discussion, Biology, Method, Attitude*

Introduction

For some decades now, rate at which knowledge is moving is challenging to nations especially developing nations especially African Nations and Nigeria in particular and capacity to move with its speed is vague and unattainable. The speed at which knowledge is increasing due to scientific and technological breakthrough is not synonymous to increase in positive attitude to science. This has become a concern that calls for attention in education. Attitude is our feeling, conduct or predisposition to changes in the environment. Attitude can be referred to as a combination of thoughts, sensation, reaction, manner, disposition, opinion, and conduct, ideologies that reflect the state of the mind as a result of observation, experience and background. It could be positive or negative based on the state of the mind of the person influenced by observation, background and experience. All learners have existing knowledge and experiences based on background and their environment (McLeod, 2019). These standing knowledge could be exploited positively or negatively in teaching and learning. Ahmad and Asghar (2011) defined attitude as feelings in response to ideas, views, people, place and happenings. They added that the concept of attitude has many definitions based on people's views. Ogunleye and Fasakin (2011) are of the opinion that attitude is a major factor in choosing a subject. George (as cited in Ahmad & Asghar, 2011) opined that students' manner is a major factor in education and development of positive science attitude that enhances interest in science courses. Attitude is feeling, actions, manner, opinion, orientation or predisposition to changes in the environment based on the state of the mind.

Based on academic achievement of students, positive attitude toward science, scientists and learning science in science education have been an issue that calls for attention (Ogunleye & Fasakin, 2011). Studies have shown that students have a role to play in improving academic achievement in biology (Gbore & Daramola, 2013; Nichols & Sutton, 2006; Ali, Toriman & Gasim, 2014; Samikwo, 2013). Fareo (2019) stated that confidence level, satisfaction about a grade, boldness in tackling challenging difficult tasks, speed and accuracy in getting work done and pursuit of biology related courses are dependent on a positive learners' attitude. In addition, appropriate teaching methods that best explain the topic and arouse students interest, in order, to influence his/her attitude, positively, should be used. Attitude determines altitude goes a saying. Wrong attitude of students could make students absent themselves from classes, indifferent about the lesson because students dislike the teacher and these will result to poor academic achievement. Some of the factors that make impact on attitude of learners include students' factor, teacher factor, parents' factor, school factor, government factor, among others. Ahmad and Asghar (2011) reported that studies have a wide range of components for measuring students' attitude to science which include fear of science, view of science teacher, value of science, fun of science, motivation to science, nature of environment to do science, peer group attitude to science, self-concept at science, parents' attitude towards science, fear of failure of science and academic achievement in science. Studies (Wirth & Perkins, 2013; Adu & Olatundun, 2007; Adesoji & Olatundun, 2008; Arokoyu & Chukwu, 2017) revealed that attitude of teachers affect students' attention in class, interest and academic achievement in science in senior schools. Hence, teachers and learners should develop positive science attitude towards education of science to enhance academic achievement in biology (Gbore & Daramola, 2013).

Demonstration Method is referred to as the display, exhibition and dramatization of lessons (activities) by the teacher to the students in the laboratory for teaching and learning purposes. Nwachukwu and Nwosu as cited in Ugwuadu, (2011) defined demonstration method as a teaching technique in the laboratory that involves experimentation/investigation, while Ngada (as cited in Ugwuadu, 2011) saw demonstration method as vital in highlighting significant points in a lesson.

Discussion Method is referred to as an interactive session between the teacher and the learners and among the learners. It is a method that encourages exchange of ideas based on the topic under study. The teacher is not a custodian of knowledge. He/she only acts as a facilitator. Albert, Osman and Yungungu (2014) are of the opinion that teachers should utilize methods that will encourage positive attitude towards biology through the use of discussion groups, excursion and hands on activities.

Statement of the Problem

No doubt, science is one of the pre-requisite for evaluating progress and achievement of any nation in terms of economy, health, agriculture, security, medicine, education, among others. Nations across the globe are making tremendous movement in getting science education to a higher standard in order to achieve more to better the welfare of their citizens. However, many factors influence students' attitude towards teaching and learning of science. These factors include parental, environmental, peer group, government, teachers, teaching methods and learners' attitude among others. Students' attitude is a fundamental factor to learning science. Also, another major factor that lead to poor retention level in students is students' attitude to science education, biology in particular (Esiobu, 2005). Despite the results obtained from researchers (Ali et al, 2014; Awodun, Adekunle & Femi-Adeoye, 2016), it is yet a concern to stakeholders in education that learners' attitude contributes to poor academic achievement, low enrolment into science-oriented courses and science education in particular. Also, studies in Ahmad and Asghar (2011) and Awodun *et al* (2016) reveal that there is substantial connection in attitude and academic achievement of students in Biology. It is a on this note that the researcher investigate effects of demonstration and discussion teaching methods on attitude of students in senior school biology in Yenagoa and Ogbia Local Government Areas of Bayelsa State

Purpose of the Study

The main purpose of the study is to ascertain the effects of demonstration and discussion teaching methods on attitude of students in senior school biology in Yenagoa and Ogbia Local Government Areas in Bayelsa State.

Research Question

What difference exist between the mean attitude scores of SS2 students in public and private schools taught Biology using demonstration and discussion methods?

Hypothesis

There is no significant difference between the mean attitude scores of SS2 students in public and private schools, taught Biology using demonstration and discussion methods.

Method

The pretest-posttest control group quasi-experimental research design was adopted for the study. The population was 6,988, Senior school Two students offering biology as a subject in the senior secondary school from purposive selection of 23 schools (14 public and 9 private) in two Local Government Areas, and random assignment to treatment and control group was done. Purposive sampling technique was used to obtain a sample size of 323 biology students. One research question and one hypothesis were used. Three validated and reliable instructional guides namely instructional guide on demonstration teaching method (IGDTM), Discussion Teaching Method Guide (DTMG) and Guide on Lecture Teaching Method (GLTM) were used in training teachers to use the teaching methods. One validated and reliable instrument namely Standardized Biology Achievement Test (SBAT) was used for data collection. Standardized Biology Test has been processed for validity and reliability by WAEC. Students taught with demonstration and discussion teaching methods serve as experimental groups while students taught with lecture teaching method serve as the control group. The instrument was administered with the help of research assistants. The data was analyzed using percentage, mean, standard deviation and z-test statistics.

Result

Research Question 1: What difference exist between the mean attitude scores of SS2 students in public and private schools taught Biology using demonstration and discussion methods?

Table 1: Summary of Mean Attitude Scores of Pretest and Posttest of SS2 students in Public and Private Schools taught Biology using Demonstration, Discussion and Lecture Methods

Teaching Method	School Type	N	Pretest Attitude \bar{x}	Posttest Attitude \bar{x}
Demonstration	Public	96	2.94	3.01
	Private	25	2.98	3.06
Difference			0.04	0.05
Discussion	Public	51	2.95	3.10
	Private	64	2.85	2.95
Difference			0.10	0.15
Demonstration	Public	96	2.94	3.01
	Private	48	3.10	3.11
Difference			0.16	0.1
Demonstration	Public	25	2.98	3.06
	Private	39	2.83	2.83
Difference			0.15	0.23
Discussion	Public	51	2.95	3.10
	Private	48	3.10	3.11
Difference			0.15	0.01
Discussion	Public	64	2.85	2.95
	Private	39	2.83	2.83
Difference			0.02	0.12

Answer to research question one, Table 1 shows that at pretest, students in the public schools had a mean of 2.94 and private school students had a mean of 2.98 when taught with demonstration method. At posttest, when taught with demonstration method, students in the public schools had a mean of 3.01 and private school students had a mean of 3.06 with a difference of 0.5 in favour of private school students. In discussion method group, at pretest, students in the public schools had a mean of 2.95 and students in the private schools had a mean of 2.85. At posttest, when taught with discussion method, students in the public schools had a mean of 3.10 and private school students had a mean of 2.95 with a difference of 0.15 in favour of students in the public schools. In the control group, at pretest, students in the public schools had a mean of 3.10 and private school students had a mean of 2.83. At posttest, when taught with lecture method, students in the public schools had a mean of 3.11 and students in the private schools had a mean of 2.83 with a difference of 0.28 in favour of public school students. This shows that private school students have a slight higher mean than public school students when taught with demonstration method while public school students had higher mean than students in the private schools when taught with discussion and lecture methods. It also shows that there is an increase in learning attitude in both public and private school students at posttest. The Table also shows that, at pretest, public school students taught with lecture teaching method had better learning attitude with a difference of 0.16 mean than public school students taught with demonstration teaching method. Also, private school students taught with demonstration teaching method had better learning attitude with a difference of 0.15 mean than private school students taught with lecture teaching method. At posttest, public school students taught with lecture teaching method had better learning attitude with a difference of 0.10 mean than public school students taught with demonstration teaching method and private school students taught with demonstration teaching method had better learning attitude with a difference of 0.23 mean than private school students taught with lecture teaching method. Also, at pretest, public school students taught with lecture teaching method had better learning attitude with a difference of 0.15 mean than public school students taught with discussion teaching method. Private school students taught with discussion teaching method had better learning attitude with a difference of 0.02 mean than private school students taught with lecture teaching method. At posttest, public school students taught with lecture teaching method had better learning attitude with a difference of 0.01 mean than public school students taught with discussion teaching method. Also, private school students had better learning attitude with a difference of 0.12 mean than private school students taught with lecture teaching method.

Hypothesis 1: There is no significant difference between the mean attitude scores of SS2 students in public and private schools, taught Biology using demonstration and discussion methods.

Table 2: Summary of z- test Analysis of Public and Private SS2 Students Attitude taught using Demonstration, Discussion and Lecture Methods

Teaching Method	Sch Type	N	Post Attitude \bar{x}	SD	df	Z _{cal}	Z _{crit}	Type of test
Demonstration <0.05	Public	96	3.01	0.7	119	0.2	1.96	2-tailed
	Private	25	3.06	1.3				
Discussion <0.05	Public	51	3.10	0.9	113	0.9	1.96	2-tailed
	Private	64	2.95	0.8				
Demonstration <0.05	Public	96	3.01	0.7	142	0.66	1.96	2-tailed
	Private	48	3.11	0.96				
Lecture Demonstration <0.05	Public	25	3.06	1.3	62	0.82	1.98	2-tailed
	Private	39	2.83	1.0				
Lecture Discussion <0.05	Public	51	3.10	0.9	97	0.07	1.98	2-tailed
	Private	48	3.11	0.9				
Lecture Discussion <0.05	Public	64	2.95	0.8	101	0.07	1.96	2-tailed
	Private	39	2.83	1.0				

When hypothesis 1, H₀₁, was subjected to z-test examination, as shown in Table 2, it was discovered that the z- calculated value is 0.02, while the z-critical is 1.96 when taught with demonstration teaching method. The alternate hypothesis is rejected while the null hypothesis is accepted since the calculated value is smaller than the z-critical. This implies that there is no substantial variance in the mean scores of students in public and private schools in learning attitude enhancement when taught with demonstration teaching method in Biology. It was also discovered in Table 2 that the z-calculated value is 0.09, while the z-critical is 1.96 when taught with discussion teaching method. The alternate hypothesis is rejected while the null hypothesis is accepted since the z-calculated value is smaller than the z-critical. This implies that there is no substantial variance in the mean scores of students in public and private schools in learning attitude enhancement when taught with discussion teaching method in Biology.

It was also discovered in Table 2 that the z-calculated value is 0.66, while the z-critical is 1.96 when taught with demonstration and lecture teaching methods. The alternate hypothesis is rejected while the null hypothesis is accepted since the z-calculated value is smaller than the z-critical. This implies that there is no substantial variance in the mean

scores of students in public schools in learning attitude enhancement when taught with demonstration and lecture teaching methods in Biology. It was also discovered in Table 2 that the z-calculated value is 0.82, while the z-critical is 1.98 when taught with demonstration and lecture teaching methods. The alternate hypothesis is rejected while the null hypothesis is accepted since the z-calculated value is smaller than the z-critical. This implies that there is no substantial variance in the mean scores of students in private schools in learning attitude enhancement when taught with demonstration and lecture teaching methods in Biology.

It was also discovered in Table 2 that the z-calculated value is 0.07, while the z-critical is 1.98 when taught with discussion and lecture teaching methods. The alternate hypothesis is rejected while the null hypothesis is accepted since the z-calculated value is smaller than the z-critical. This implies that there is no substantial variance in the mean scores of students in public schools in learning attitude enhancement when taught with discussion and lecture teaching methods in Biology. It was also discovered in Table 2 that the z-calculated value is 0.70, while the z-critical is 1.96 when taught with discussion and lecture teaching methods. The alternate hypothesis is rejected while the null hypothesis is accepted since the z-calculated value is smaller than the z-critical. This implies that there is no substantial variance in the mean scores of students in private schools in learning attitude enhancement when taught with discussion and lecture teaching methods in Biology.

Discussion

From research question one, results showed that there was slight increase in learning attitude enhancement from pretest to posttest in all the groups but when subjected to z-test analysis, it showed statistically not significant in all the groups. This is probably because type of school does not determine attitude to science since teachers with equal educational standing taught them the same topic and content in biology. There is no significant difference in the mean scores of SS2 students in public and private schools in learning attitude enhancement taught with demonstration and discussion methods in Biology. This is in agreement with Fareo (2019), who opined that, attitude of senior school students influence study habits and academic achievement. Almasri *et al*, (2021) asserted that, factors that affect student's attitude in Biology include teaching method, poor self-concept, and self-determination, low motivation, lack of interest, fear and anxiety. Minimizing fear and anxiety of learning increases positive attitude in Biology. However, increased positive attitude will lead to better academic achievement.

Recommendations

Based on the findings of the study, the following recommendations were made.

- a) Teachers should give adequate consideration to teaching methods in biology to enhance attitude of students during lessons as school type does not affect students' attitude nor improve academic achievement.
- b) Demonstration method should be complimented with discussion method so as to enhance learning attitude of students, hence, improve academic achievement of students in senior school Biology.

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