
**IMPACT OF COLLABORATIVE LEARNING STRATEGY ON
INTEREST OF SENIOR SECONDARY SCHOOL STUDENTS IN
BIOLOGY IN GUMA LOCAL GOVERNMENT AREA, BENUE STATE,
NIGERIA**

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ABSTRACT

The study aimed to investigate the impact of collaborative learning strategy on interest of senior secondary school students in biology in Guma local government area, Benue state, Nigeria. Two objectives, and two research questions were set and two hypotheses. The study adopted Quasi-experimental design of non-equivalent group. The study area was Guma Local Government Area of Benue State. The population of the study was 1142 Senior Secondary School (SS1) Biology students in Guma Local Government Area of Benue State. The sample for this study was 225 students. The instrument for data collection was Biology Achievement Test (BAT). Three experts validated the instrument. The reliability coefficient of 0.85 was obtained. The research questions were answered using mean and standard deviation while the hypotheses formulated were tested using Analysis of Covariance (ANCOVA) at 0.05 level of significance. The study found that the collaborative instructional strategy promotes higher interest of secondary school students in Biology as compared to the conventional teaching strategy. While using this strategy, there were no significant differences in the interest in Biology due to the gender of secondary school students and therefore the strategy is deemed effective, efficient, and appropriate for both male and female students. Therefore, recommended that Biology teachers should be encouraged to use collaborative instructional strategy in presenting some Biology concepts to students in order to enhance their interest

and academic achievement in Biology and other science-related subjects.

KEYWORDS: Collaborative learning strategy, interest, Gender and conventional teaching methods.

INTRODUCTION

Science and technology education are the bedrock of human civilization and development. Many of the developed nations were able to achieve their status of development through the knowledge of science and technology. Science is a systematic enterprise that builds and organizes knowledge in form of explanation and predictions about the universe. Science education has been widely conceptualized. Igwe (2017) define science as a systematic process of obtaining knowledge and behaviour of the physical diverge through observation, experimentation, measurement and recording of information.

Science Education is the field of study that exposes learners to contents as well as a methodology (processes) of acquiring scientific knowledge for practical application. Science learning is associated with laboratory activities. Science contributes enormously in solving societal problems like quality of life in many areas such as health, nutrition, agriculture, transportation, information and communication (Akpa, 2008). Hence, nations all over the world, Nigeria inclusive are striving to develop technologically and scientifically (Adejoh, Amali & Omega, 2013).

In view of the importance of science to the nation, science education curriculum has been developed at various levels of education in Nigeria. The e-Curriculum of the National Educational Research and Development Council (NERDC) (2024) stated that Science Education curricula at the Basic Education Level include Basic Science and Technology at lower and Middle Basic Education levels (primaries 1-6) and Basic Science at Upper Basic Education level (Junior Secondary School, JSS 1-3). At the Senior Secondary School Level, Science Education includes; Biology, Chemistry and physics while at the tertiary Education level, the contents of curricula of Science Education include Chemistry Education, Integrated Science Education, Physics Education, Biology Education, among others.

Biology as one of the science subjects taught in Nigerian secondary schools plays an important role in transforming the environment and improving the general quality of life. Nwuba, Egwu and Osuafor (2022) stressed that the importance of Biology cannot be overemphasized as it provides the knowledge applied in every sphere of life today ranging from food production, environmental protection, conservation of resources, bioengineering,

and agriculture. Biology as a Science subject plays an important role in transforming the environment and improving the general quality of life. Onu, Anyaegbumam and Uzoigwe (2020) define Biology as a natural science which studies the existence (evolution, morphology and physiology) of living things, as well as their interactions with non-living components of the earth. Hence, it is that branch of science that studies living things and their interactions with their natural environment.

The field of Biology holds a paramount place in the modern world. With the sound knowledge of Biology in secondary schools, students will find it easier to study professional courses like Nursing, Pharmacy, Medicine, Dietary, Geology, among others in higher institutions of learning. Hence, there is a need for effective and efficient learning and teaching of Biology in our Nigerian Secondary Schools (Orisa, 2011).

Teaching methods are being categorized into two approaches; namely: teachers-centered approaches and students-centered approach. Teachers-centered approaches include lecture, expository, demonstration, discussion, among others. These teacher-centered approaches see the teacher as the only possessor of knowledge and they are grounded in Behaviorism. Students centered approaches on the other hand are grounded in constructivism and students are always active when such methods are used these instructional methods (Students-Centered) underscores teachers as decision makers and problem solvers but rather as a guide in the learning process. Examples of student-centered learning approaches include inquiry-based learning, Discovery method, laboratory method, among others.

The traditional method of learning called teacher-centered method is gradually becoming irrelevant and does not seem to satisfy or meet the current need of the society. This approach of teaching only provides theoretical knowledge which is irrelevant for students and society in which they live. There are new strategies or trends of learning that make efforts to introduce new methods or evolve new techniques of instructions suitable for positive learning outcomes in education. To understand this study, we have to shift our traditional teacher-centered learning approach to modern classroom techniques-based approach of learning by adopting new trends and techniques of teaching so that we can produce more intellectual researchers and scientists that would contribute to the process of resolving environmental issues and help to save our earth and society.

The focus of this study is to find out the impact of collaborative instructional strategy on interest and academic achievement of senior secondary school students in biology in Guma Local Government Area of Benue State as one of the new trends in teaching of science without making it difficult for learners to understand concepts. It is not sufficient for students

to remember information in the same way in which it is presented in the classroom, rather they need to be able to use what they have learnt in class, to answer new questions, solve new problems, relate to everyday life and facilitate learning of new subject matters to accomplish meaningful learning. Therefore, in the teaching and learning of science, several methods, techniques and strategies that are student-centered have been adopted to facilitate the teaching and learning of science.

Okoro (2011) states that, one of the strongest factors affecting students' interest and academic achievement in sciences and Biology in particular is the method of instruction adopted by the teacher which highly correlated with their perception of the relevance of the subject to their future career. Lioted, Neilson, King and Dyball (2012) found that students' negative perception about science results from inappropriate teaching method adopted by science teachers.

Teaching methods are ways through which the teachers organize and presents contents and learning. However, despite the importance of science to the society, it is quite disheartening to note that, there is a strong evidence of student's low interest and poor academic achievement in Biology and other science subjects in Nigeria (Adeniran, 2013; Omenka & Eriba, 2013). In Nigeria for instance, quite a number of students on getting to senior secondary school drop out of science class. The trend has been described with such terms as a swing away from science "and" unimpressive enrolment in science (Eriba, 2013). There has been persistent poor performance among Biology students and Science in general leading to low interest and poor academic achievement in Sciences and Biology particularly. West African Examination Council (WAEC) and National Examination Council (NECO) results of 2017-2021 have shown the poor achievement of Senior Secondary Schools Students in Sciences and Biology in particular.

The low interest and poor academic achievement in science, and Biology particularly during the corona virus pandemic era stemmed from inappropriate and uninspiring traditional teaching approaches adopted by science teachers (Eriba & Samuel, 2013). It was stated that, teachers shy away from activity-oriented teaching approaches that are known to be effective and they rely mostly on teaching approaches that are easy but most at times inadequate and inappropriate and that leads to low interest and poor academic achievement in Biology in our Senior Secondary Schools in Nigeria. Many studies have shown that, large or overcrowded classrooms, lack of adequate textbook, (indigenous textbooks), insufficient funds to purchase equipment, lack of motivation among teachers, lack of proper monitoring and feedback mechanism have also contributed greatly to the low interest and poor academic achievement

among senior Secondary Schools Biology students in Nigeria and Benue state in particular (Adejoh, Amali, Omega & Adeniran, 2013).

Several research reports indicate that students (both Male and Female) achieve very low in Senior Secondary Schools science subjects especially Biology (Nwagbo, 2017; Azubuike, 2015). Educators today are required to be highly knowledgeable to improve the interest and perhaps, achievement among students in our Secondary Schools. Teachers have the responsibility of imparting knowledge and training the current generation with the needed knowledge and skills in science, particularly Biology-fit in order to tackle the current challenges such as prevalence diseases. That can only be achieved if improved teaching methods such as collaborative instructional strategies are adopted.

Interest of students in Biology in Senior Secondary Schools in Nigeria are poor and this has been a persistent problem for many years and this could be attributed to use of conventional teaching methods where the teacher employs the “chalk and task” approach, without significant participation of students, making rote learning the order of the day (Ojekwe & Ogunleye, 2020) and (Ogbomanu & Akporekwe, 2018). However, there have been gradual paradigm shift towards the adoption of innovative teaching and learning strategy where the students (both Male and Female) are expected to be active participants in the teaching-learning process (Ogunleye, 2021).

Gender, as a concept, has captured the interest of science educators in Nigeria, especially now that gender equity is being emphasized in many quotas. According to Filgona & Sababa (2017), gender is defined as a range of physical, biological, mental and behavioural characteristics pertaining to and differentiating between the feminine and masculine (female and male) population. Hence, gender in the context of this study may simply be defined as an attribute ascribed to male and female students based on biological features. The study anchor on two theories reviewed; Vygotsky's socio-cultural theory and Jerome Saymon Bruner's psychological/cognitive constructivism theory. In recent times, gender related issues in science education have generated serious concerns for science educators judging by the number of studies done to that effect. Still, there is no consensus as to whether it affects students' interest in science or not. Hence, this study also intends to examine gender differences in interest among secondary school students' taught Biology using collaborative instructional strategies.

Statement of the problem

Biology as a science subject deals basically with man's interactions with his immediate and

natural environment and it is important for students to work together through collaboration to help them understand the various entry level brought into the classroom by others to foster creative ideas, critical thinking and problem-solving skills which will lead to specialization in the various aspects of Biology that will make the learners useful to their society and the world at large.

Several feedbacks given by the WAEC chief Examiners between 2021 to 2023 on academic achievement level among Senior Secondary School students in sciences particularly Biology clearly shows that, there is relatively steady decline in students' overall interest in Biology. This low interest may be as a result of teachers' inability to use or adopt innovative teaching strategies to teach Biology, lack of funds to purchase textbook among others.

This low interest and poor academic achievement in Biology imply that, only few candidates will apply to study Biology and Biological related courses in the tertiary institution. This study therefore seeks to find out the impact of collaborative learning strategy on interest of Senior Secondary School Students in Biology in Guma local government area, Benue state, Nigeria.

Purpose of the Study

The objective of this study was to determine the impact of collaborative instructional strategy on interest and achievement of senior Secondary school students in Biology in Guma Local Government Area of Benue State. Specifically, the study seeks to;

- i. ascertain the mean interest ratings of students taught Biology using collaborative learning strategy and those taught using conventional teaching strategy.
- ii. ascertain the difference in mean interest ratings of male and female students taught Biology using collaborative instructional strategy.

Research Questions

The following questions will be raised to guide this study.

- i. What are the mean interest ratings of students taught Biology using collaborative learning strategy and those taught using conventional teaching strategy?
- ii. What is the difference in the mean interest ratings of male and female students taught Biology using collaborative instructional strategy?

Hypotheses

- i. There is no significant difference in the mean interest ratings of students taught Biology using collaborative learning strategy and those taught using conventional teaching strategy.

- ii. There is no significant difference in the mean interest ratings of male and female students taught Biology using collaborative learning strategy.

METHODOLOGY

The study adopted Quasi-experimental design of non-equivalent group. The study area was Guma Local Government Area of Benue State. The population of the study was 1142 Senior Secondary School (SS1) Biology students in Guma Local Government Area of Benue State. The sample for this study was 225 students. The instrument for data collection was Biology Achievement Test (BAT). Three experts validated the instrument. The reliability coefficient of 0.85 was obtained. The research questions were answered using mean and standard deviation while the hypotheses formulated were tested using Analysis of Covariance (ANCOVA) at 0.05 level of significance.

RESULTS

Research question one

Table 1: Mean and Standard Deviation of the Mean Interest Rating of Students in Experimental and Control Groups.

Groups			N	Pre-interest	Post-interest	Mean Gain	
			Mean		SD	Mean	SD
Experimental	212	1.65		0.63	3.61	0.49	1.96
Control	213	1.52		0.58	1.92	0.57	0.40
Mean Difference		0.13			1.69		1.56
Total	425						

Table 1 shows that in the interest rating of students before treatment, the experimental group had a mean interest rating of 1.65 with a standard deviation of 0.63, while the control group had a mean interest rating of standard deviation of 0.58.

The Table also shows that after treatment, the experimental group had a mean interest rating of 3.61 with a standard deviation of 0.49, while the control group had a mean interest rating of 1.92 with a standard deviation of 0.59. from the pre-interest and post-interest ratings, the mean gain for the experimental group was found to be 1.96 while the mean gain for the control group was 0.40. The mean difference between the mean interest gain ratings of the experimental and control group was 1.56. This shows that the experimental group gained more interest compared with the control group.

Research hypothesis one

Table 2: Summary of Analysis of Covariance (ANCOVA) of Experimental and Control Groups' Interest Ratings in Biology.

Source of Variance	Sum of squares	df	Mean square	F	Sig
Corrected Model	301.492 ^a	2	150.746	534.672	.000
Intercept	437.466	1		437.566	1551.980
Post-test	324	1		324	1.149
Group	299.842	1		299.842	1063.492
Error	118.979	422		.282	
Total	3669.000	425			
Corrected Total	420.471	424			

Table 2 shows the ANCOVA analysis of the interest ratings of students taught Biology using collaborative instructional strategy and those taught using conventional teaching strategies. From the analysis, $F(1,422)=1063.49$, $p<0.05$. Hence, the null hypothesis was rejected. This means that there is a statistically significant difference in mean interest ratings between students taught Biology using collaborative instructional strategy and those taught using conventional teaching strategies. 4.1 was a higher improvement in the mean interest ratings of students in the experimental group than students in the control group.

Research Question Two

Table 3: Mean Interest Ratings and Standard Deviation of Male and Female Students in Experimental Groups.

Groups			N	Pre-interest		Post-interest	Mean Gain	
				Mean		SD	Mean	SD
Male	103			1.62		0.64	3.64	0.50
Female	109			1.67		0.62	3.73	0.44
Mean Difference				-0.05			0.25	
Total	212							-0.20

Table 3 shows that before the treatment was carried out, the males had mean interest ratings of 1.62 with a standard deviation of 0.64, while the females had a Mean interest rating of 1.67 with a standard deviation of 0.62. The Table also shows that after the treatment was administered, the males had a mean interest rating of 3.48 with a standard deviation of 0.50, while the females had a mean interest rating of 3.73 with a standard deviation of 0.44. From the pre-interest and post- interest ratings, the mean interest gain for the males was found to be 1.86 while the mean interest gain for the females was 2.06, The mean difference between the interest gain ratings of males and females was -1.20. This shows that the females gained slightly higher in interest ratings compared with the males.

Hypothesis Two

Table 4: Summary of Analysis of Covariance (ANCOVA) of the Interest Ratings of Male and Female Students in the Experimental Group in Biology.

Source of Variance	Sum of squares	df	Mean square	F Sig	
Corrected Model	3.639 ^a	2	1.820	8.115	.000
Intercept	437.466	1	437.566	1625.630	.000
Post-test	.108	1	.108	.484	.488
Group	3.573	1	3.573	15.936	.000
Error	46.865	209	.224		
Total	2811.000	212			
Corrected Total	50.505	211			

Table 4 shows the ANCOVA analysis of the interest ratings of male and female students taught Biology using collaborative instructional strategy. From the analysis, $F(1,209)=15.94$, $p<0.05$. Hence, the null hypothesis was rejected. This indicates that there is a statistically significant difference in mean interest ratings of male and female students taught Biology using collaborative learning strategy.

CONCLUSION

Conclusively, this study found that the collaborative instructional strategy promotes higher interest of secondary school students in Biology as compared to the conventional teaching strategy. While using this strategy, there were no significant differences in the interest in Biology due to the gender of secondary school students and therefore the strategy is deemed effective, efficient, and appropriate for both male and female students.

Recommendation

- i. Biology teachers should be encouraged to use collaborative instructional strategy in presenting some Biology concepts to students in order to enhance their interest and academic achievement in Biology and other science-related subjects.
- ii. Collaborative instructional strategy should be adopted as a learning strategy for Biology in secondary schools in order to improve and sustain students' interest in the subject which consequently leads to improvement in their achievement in the subject and other areas of science.

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