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Effect of Target Task Instructional Strategy on Secondary School Students' Interest in Biology

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Abstract---This study was carried out to investigate the effect of Target Task Instructional Strategy on Secondary School Students' Interest in Biology. Two research questions and two null hypotheses were formulated to guide the study. After a review of related literature, Quasi-experimental design was adopted for the study. A sample of 411 students out of 4817 SS 2 students from four (4) intact senior secondary class two (SSII) in Awka and Aguata education zones of the Anambra State were used for the study. Biology Interest Scale (BIS) was used for data collection. Cronbach Alpha was used to determine internal consistency of the instrument (BIS) and the reliability coefficient of 0.812. The Mean and standard deviation were used to answer the research questions while Analysis of Covariance (ANCOVA) was used to test the hypotheses at .05 level of significance. The major findings of the study showed that students exposed to Target-Task Instructional Strategy had higher interest in Biology than those taught with lecture method. Further findings also revealed that the male students are significantly more interested in Biology than the female students. It was recommended among others that teachers should adopt target-task teaching strategy as a teaching method for teaching their students, since it is suitable for promoting enhanced level of student' interest and also increase their interest in studying biology in higher institution of learning.

Key Words---Target Task Instructional Strategy, Interest, Biology

Introduction

Science is the bedrock on which modern day technological breakthrough is hinged. Science is a systematic study of the universe and environment through observation and experimentation leading to production of an organised body of knowledge (Njoku, 2013). It embraces every attempt of humans to explore, interpret and manage the natural world (Garuba, Agweda & Abumere, 2012). Science comprises basic disciplines such as Physics, Chemistry, Mathematics and Biology.

Biology is the study of life. It deals with the study of living organisms, their vital processes and the way they interact with each other in an environment. Biology is one of the science subjects offered by majority of students at secondary school level of Nigerian education system. However, the issue remains that in most secondary schools in Nigeria, there is high rate of failure in the subject. Studies have revealed that the achievement of Nigerian students in Ordinary Level Biology was generally and consistently poor over the years (Nwagbo, 2010). Various researchers observed that the poor achievement in biology was traced to poor usage of instructional strategies and the use of lecture method for teaching Biology (Ibitoye & Fape, 2007; Igboanugo, 2013; Nnorom, 2016 & Igbokwe, 2007). This method makes students to be passive listeners in the classroom learning. In lecture method, lessons are delivered to students from notes or textbooks, with little discussion. Thus no serious effort is made to engage the bored minds of the students; this usually leads to a situation whereby students complete their courses or study without knowing how to carryout simple experiments in biology. The Biology curriculum is planned to enable the teacher use child-centered approach like target task instructional strategy to teach (Nzewi & Nwosu, 2010). In view of the relevance of student-centered approach to teaching and learning of Biology, many researchers in science education: (Opara, 2011 & Nnorom, 2016) recommend for a shift from the use of lecture teaching methods (teacher-centered approach) of teaching biology to a modern/innovative teaching methods (student-centered approach) such as Target task instructional strategy.

Target task instructional strategy is an adaptation of the guided discovery method for teaching science (Harbour-Peter, 2002). Joe Exline in Educational Broadcasting Services (2004) during a workshop quoted an old adage which states: "Tell me and I forget, show me and I remember, involve me and I understand." The last part of this statement is the essence of target task instructional strategy. Isola (2010) referred to Target task instructional strategy as a device which helps the teacher to make a lesson much clearer to the learner. It involves presentation of a major problem, the solution of which requires the application of rules and principles, with which the students may not be familiar with. It is expected that the teacher presents some solutions by providing some hints or clues similar to the target task and guides the students to solve the problem (Olaniya & Omosewo, 2015). The knowledge and experience gained from the solution of the graded questions transfer positively to the target task. Eventually, the students are able to solve the target task. According to Olaniya & Omosewo, (2015) the target-task strategy involves six stages:

1. **Pre-task:** the teacher introduces the topic, explains the topic in detail and ensures the students understand what they are to do at the task stage.
2. **Task:** The students complete the task in pairs or groups, while the teacher monitors and offers encouragement.
3. **Planning**: Students prepare a written report on what they went through during the task in their group.
4. **Report:** The students make their reports available to the teacher for assessment. After correction, the teacher presents the report back to the students.

5. **Analysis:** The teacher highlights relevant parts of the learning on the board.
6. **Practice**: The teacher selects areas of practice for the students.

The use of target task instructional strategy to learn biology will make the students work hard and think deeply to be self-independent in solving any problem in biology. In learning and and boost their interest in studying biology concepts.

Interest is an important variable in the learning of any subject because when one is interested in a particular subject, one becomes eager to learn it. Interest is a persisting inclination to be attentive and enjoy some activities in contents. According to Sholahuddin (2010) interest is the desire for something, the object of the soul in order to achieve something desired. Dewey much earlier in 1913 argued that if interest can be secured in a given set of facts or ideas, it will be perfectly sure that the pupils will direct their attention or energies towards mastering them. Dewey further claimed that a strong interest will sustain an individual's attention and lead to sustained effort in accomplishing an academic goal. According to Adeyemi and Adeyemi (2014) interest has to do with a learner's predisposition to react positively in certain ways towards certain aspects of the environment and is usually developed in relation to and remains allied to more basic motives. When students are allowed to pursue their own interests, they participate more, stay involved for longer periods, and exhibit creative practices in doing science. It is therefore important for teachers to be acquainted with adequate teaching methods or strategies and materials which will increase students' interest in biology.

Available evidence documented by Harbour-Peter (2002), Obiekwe (2008) and Okoro (2011) revealed that students' interest can be influenced by innovative teaching methods like target-task and tends to promote students' interest in biology. Yong (2009) and Nas and Asghar (2011) indicated that students' interest in Biology can also be influenced by gender.

The issue of gender is an important one in science education especially with increasing emphasis on ways of boosting manpower for technological development as well as increasing the population of females in science and technology fields (UNESCO, 2009). In Nigeria, and perhaps the whole of Africa, gender bias is still very prevalent (Nwosu, 2012). Gender issues, both on the part of the teachers and students have been documented to affect learning generally (Erinoso, 2005). However, researchers have also provided some insight on how gender actually affects students' interest in science, implying contradictory evidences on academic achievement of students due to gender. Consequently, this study seeks to investigate the effect of Target-Task Instructional Strategy on secondary school students' interest in biology.

Statement of Problem

Evidence abounds about students' interest in Biology which does not seem to be improving despite research efforts that sought ways of addressing the issue. Among the number of factors which have been posited as militating against enhancing students' interest in the subject, is teachers' persistent use of lecture method. The lack of active participation which lecture method promotes among learners does not give rise to positive learning outcomes especially in important biology topics such as excretory system and respiratory system.

Therefore, to foster the participation of all students irrespective of gender, it is expedient that everyone is actively engaged in the task. The target-task instructional strategy (TTIS) therefore engages students in specific tasks as in the case of specific topics selected for this study. Put in question form the statement of problem of this study is, "what is the effect of target-task instructional strategy on students' interest in selected biology topics?"

Purpose of the Study

1. Mean interest scores of students taught biology using target-task instructional strategy and those taught using lecture method.
2. Mean interest scores of male and female students taught biology using target task instructional strategy.

Research Questions

The following research questions guided this study:

1. What is the mean interest scores of students taught biology using target-task instructional strategy and that of those taught using the lecture method?
2. What is the mean interest scores of male and female students taught biology using target task instructional strategy?

Research Hypotheses

The following null Hypotheses guided this study and were tested at .05 level of significance.

H01: There is no significance difference between the mean interest scores of students taught biology using target-task learning strategy and those taught using the lecture method.

H02: There is no significant difference between the mean interest scores of male and female students taught biology using target task instructional strategy.

Research Method

The design for the study was Quasi-experimental design. Specifically the study applied pre-test and post-test control group design. This design was used because in quasi experimental, random assignment of subjects to experimental and control groups are not possible (Nworgu 2009). The study was carried out in Awka Education Zone and Aguata Education Zone of Anambra State. Population of the study comprised 4,817 SS2 biology students in the 86 Government owned co-educational secondary schools in both education zone (PPSSCA, 2019). Sample size comprised 411 students from four (4) intact classes in SS2 in Awka and Aguata education zones. Purposive sampling was used to select only double-stream co-education schools offering Biology. Simple random sampling was used to assign experimental and control groups. Biology Interest Scale (BIS) was used as instrument for data collection and consisted of 30 positive and negative items with structured response type based on the content that was taught in the lesson (Excretory system and Respiratory system). The instrument was measured on a four-point Likert type interest rating scale developed by the researcher. The four point Likert type rating scale that was used to enable students indicates their level of interest are: SA = Strongly Agreed (4), A = Agreed (3), D = Disagreed (2) and SD = strongly disagreed (1). The interest inventory scores were polychotomously and positively scored. The Biology Achievement Test was face validated by three experts in the Faculty of Education Chukwuemeka Odumegwu Ojukwu University Uli and Nnamdi Azikiwe University Awka. Scores of the Biology Interest Scale that were obtained from trial testing was used to calculate the reliability co-efficient of the instruments using Cronbach alpha formula and yielded a reliability index of 0.812.

Experimental Procedure

One week Training programme was organized for the biology teachers in the sampled schools to assist in the study. The biology teacher in the experiment group were trained on how to teach using target task instructional strategy while the biology teacher in the control group were notified on the general requirements of the research since they use lecture lesson plan to teach. The pre-treatment test was first administered to both the experimental and control groups, the

same week in each of the school that was used. The lesson note on target task instructional strategy was used by regular class room biology teacher in teaching experimental group and that of the lecture method was used by regular class room biology teacher in teaching the control group. In experimental group, regular biology classroom teacher served as facilitator and provide some hints or clues similar to the target task whereas the students solved the problem and get answers themselves. In control group, regular biology classroom teacher does the teaching using lecture method. The lesson plan for both experimental group and control group retained the same content based on excretory system and respiratory systems. These lesson plans highlighted the specific objectives to be achieved, the instructional materials, strategies, entry behaviour, the teachers' activities, learners' activities and the evaluation techniques. After the experimental teaching periods, the pre-test was rearranged, re-numbered, and administered to the student in each group on the same week as a post test at the end of 4 weeks. The Biology teacher in each school and the researcher administered and supervised the post test for proper monitoring and control. At the end of experimental session, scripts were collected and marked by the researcher based on the number of items given. Thereafter, the pre-test and post scores of the students were collected and used to test the research hypotheses and research questions.

The data collected from the pretest and post test of BAT were analysed using mean and standard deviation for answering the research questions and analysis of covariance (ANCOVA) was used for testing the hypotheses at .05 level of significance.

Results

Research Question One

What is the mean interest scores of students taught biology using target-task instructional strategy and that of those taught using the lecture method?

Table 1: Mean Interest Scores of Students Exposed to Target-Task Instructional Strategy and Lecture Teaching Strategy

Group	N	**Post Test Score (A)**		**Pre Test Score (B)**		Mean Difference Score (A – B)
		Mean	SD	Mean	SD	
Target-Tasking Instructional Strategy (Experimental group)	212	3.06	0.58	1.73	0.52	1.33
Lecture Teaching Strategy (Control Group)	199	2.25	0.76	1.58	0.51	0.67

Source: Author's computation

From the results presented on Table 1, it revealed that the mean interest scores of students taught biology using target-task instructional strategy is 1.33 and that of those taught using the lecture method is 0.67. This indicates that students exposed to target-task instructional strategy had more (0.66) interests in biology than those that were exposed to the lecture teaching Method.

Research Question Two

What is the mean interest scores of male and female students taught biology using target task instructional strategy?

Table 2: Mean Interest Scores of Male and Female Students Exposed to Target-Task Instructional Strategy

Gender	N	Post Test Score (A)		Pre Test Score (B)		Mean Difference Score (A – B)
		Mean	SD	Mean	SD	
Female		2.79	0.51	1.73	0.54	1.06
Male		3.26	0.54	1.73	0.50	1.53

Source: Author's computation

Results on Table 2 showed that the mean interest score differences for the male students (1.53) is higher than that of the female counterparts (1.06) exposed to Target-Task Instructional Strategy in Biology class. This indicates that male students have 0.47 scale more interest in Biology class when exposed to Target-Task Instructional Strategy.

Hypotheses Testing

HO 1: There is no significance difference in the mean interest scores of students taught biology using target-task instructional strategy and those taught using the lecture method.

Table 3: ANCOVA on Difference between the Mean Interest Score of Students Taught Biology using Target-Task Instructional Strategy and Those Taught with Lecture Method

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Decision
Corrected Model	134.302[a]	4	33.576	114.522	.000	
Intercept	143.541	1	143.541	489.599	.000	
PreBIS score	14.512	1	14.512	49.497	.000	
Method	60.020	1	60.020	204.720	.000	S.
Error	119.031	406	.293			
Total	3176.000	411				
Corrected Total	253.333	410				

NB: NS = not significant at .05 level, S = significant at .05 level, df = degree of freedom

Data presented on Table 3 indicated that the calculated F-value of the test is 204.720 with a significant value of 0.000. Since the probability value is less .05 level of significance, the study rejected the null hypothesis that “there is no significant difference between the mean interest scores of students taught biology using the target-task instructional strategy and those taught using lecture method”. This shows that student exposed to target-task instructional strategy significantly exhibited higher interest in biology than those who were exposed to the lecture instructional method.

HO 2: There is no significant difference in the mean interest scores of male and female students taught biology using target task instructional strategy.

Table 4: ANCOVA for Testing Significance Difference in the Mean Interest Scores of Male and Female Students Taught Biology using Target-Task Instructional Strategy

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Decision
Corrected Model	134.302[a]	4	33.576	114.522	.000	
Intercept	143.541	1	143.541	489.599	.000	
PreBISscore	14.512	1	14.512	49.497	.000	
Method	60.020	1	60.020	204.720	.000	
Gender	45.125	1	45.125	153.914	.000	S
Method * Gender	3.929	1	3.929	13.402	.000	
Error	119.031	406	.293			
Total	3176.000	411				
Corrected Total	253.333	410				

NB: NS = not significant at .05 level, S = significant at .05 level, df = degree of freedom

Data on Table 4 showed that the calculated F-value of the test is 153.91 with is significant value of 0.000. Since the probability value is less than the .05 level of significance, the study rejected the null hypothesis that "there is no significant difference between the mean interest scores of male and female students in biology when taught using target-task instructional strategy". The result indicates that gender have a significant effect on students' interest in biology when exposed to target-task instructional strategy.

Discussion of findings

The results based on objective one revealed that students exposed to target-task instructional strategy are more interested in biology than those taught with lecture method and therefore supports the Piaget's theory of constructivism and Brunner's cognitive theory of learning. This also suffices the reforms that would change the learning process from the lecture instructional method to a more hands-on process like target-task thereby, enhancing learning outcome for students in Biology. The findings of this study supported the works of Nnorom (2019), and Nbina (2011) which posit that the use of target-task instructional strategy enables students to achieve higher learning outcomes than the conventional instructional methods.

Furthermore, the result showed that male students exposed to target-task instructional strategy are more interested in Biology than their female counterparts.

Conclusion

The study have shown that target-task instructional strategy is very effective as a teaching and learning technique for enhancing the students' interest in Biology among secondary school students in Nigeria. Further to enhancing students learning outcome, it closes the gap in the learning ability of male and female students.

Implication of the Findings to Education

The study revealed that target-task instructional strategy is suitable for promoting enhanced level of student's interest among senior secondary school students in Biology. Higher interest in Biology would encourage students to further their studies in science related courses at higher institutions. This implies to human capital in medical sciences such as radiography, surgery,

optician, anatomy and physiology among others. In a nutshell, a structure of Biology curriculum into target-task strategy would enable students to take advantage of numerous opportunities offered by science, acquired basic knowledge and skills to meet societal need among others.

Recommendations

The study makes the following recommendations:

1. Teachers should adopt target-task teaching strategy as a teaching method for teaching their students, since it increases students' interest and enhances learning.
2. Students should always be allowed to participate actively and interact freely with the teachers as this will improve their academic achievement gain in their subjects.
3. The education authorities should organise seminars and workshops for teachers to train them on the skills needed for the use of Target-Task Instructional Strategy in teaching and learning.
4. The policy makers and curriculum planners should not only spell-out those effective teaching methods or approaches to be used, but they should monitor their implementation as well.

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