EFFECT OF ACTIVE REVIEW STRATEGY ON STUDENT'S ATTITUDE TO BASIC SCIENCE IN OYO STATE

Oluyemi Akinleye OGUNDIWIN, Ph.D
Department of Science Education,
Faculty of Education
National Open University of Nigeria, Abuja Nigeria.
oogundiwin@noun.edu.ng;

Adewumi, Gabriel SEGUN Ph.D
Department of Science Education, Faculty of Education,
Prince Abubakar Audu University, Anyigba, Kogi State, Nigeria.
 adewumigabriel60@gmail.com;

Asaaju, Olayemi ADEROKUN Ph.D
Department of Curriculum and Instruction,
Adeyemi Federal University of Education, Ondo, Nigeria.
oasaaju@gmail.com

Abstract: *This study determined the effects of active review strategy on students' attitude to basic science. The study adopted the pretest-posttest control group, quasi-experimental design. 262 JSS II students from four co-educational schools in two Local Government Areas (LGAs) of Oyo state were randomly assigned to treatment and control groups. The instruments used were: Students Basic Science Attitude Scale (r=0.86) and Teachers Instructional guides. Three questions and three hypotheses were formulated and tested at 0.05 level of significance. The data collected were analysis using descriptive statistic and analysis of covariance ,the treatment had significant main effect on students' attitude to basic science(F(1, 254)=13.294;p<0.05, partial η2=0.067). Mean while there was no significant effect of gender and parental educational background on students' attitude to basic science. Based on the finding of this study, active review strategy is recommended to be adopted for the improvement of students' attitude to basic science among others.*

Keywords: *Active review strategy; attitude to basic science; gender and parental educational background.*

Introduction
The relevance of basic science to technological development in Nigeria cannot be underestimate for the knowledge of the concepts in the subject

is a rudimentary pivotal to the scientific academic careers of students in the field of sciences in higher institutions. The role of science in this modern era of technology is wide and profound. In line with this reasoning, Oredein and Awodun (2013) emphasized the importance of scientific knowledge in boosting national prestige, military might, national income and international rating of the country. According to them, science gives birth to the production of micro-computers and their innovative applications which earned the developed countries such as the United States of America and Japan unparalleled national wealth, military potential and enviable national prestige.

The specific objectives to be achieved by basic science curriculum include the following among others: to enable the learners,

- Develop interest in science and technology;
- Acquire basic knowledge and skills in science and technology
- Apply scientific and technological knowledge and skills to meet contemporary societal needs;
- Take advantage of the numerous career opportunities provided by science and technology;
- Become prepared for further studies in science and technology. Revised, (2012)

In spite of the enormous role that basic science plays in national development and the efforts of government and other stakeholders in improving science education, science have not been encouraging. Many factors have been attributed to this ugly and unwholesome situation. This factors, include; students' negative attitude towards to science subjects, student' lack of interest in science subject, gender inequality and student study habits according to (Akanbi, 2014; Asikhia 2010; Macmillian, 2012). Ige and Arowolo (2011) asserted that only negligible sample of students made it to offer science courses at senior secondary schools and higher levels due to their recurrent mass failure in the junior secondary School Certificate Examination (JSSCE).

Consequently, students' poor performance has revealed by chief examiner reports might be because students develop negative attitude towards the science subject Adewumi & Ogundiwin (2021). Attitude is an emotional state of individual towards an object or situation. Oliver and Simpson (2008) stated that attitude is the extent (degree) at which learners'likes' science. Also, attitude is an inclination to reason, sense, and perform decidedly or contrarily in the direction of objects in our present environment.

Literature has also indicated that teachers attitude have exerted some influence on the academic achievement of students. For instance, Yara (2009) reported that teacher's attitude towards science has strong relationship with students science achievement as well as the students' attitude towards science while Amjad and Mohammed (2012) asserted

that one of the important factors in science teaching is the attitude which determines behavior while Olatoye and Aderogba (2012) was of the opinion that a person with good scientific attitude is free from superstition, unverified assumptions and many times from popular opinion that has no empirical basis and this in collaboration with Olasehinde and Olatoye (2014) that a person with scientific attitude is not necessarily a scientist but he or she consciously or unconsciously thinks, acts and demonstrates traits that are common to scientist. Instead of experiencing good outcomes in Basic Science through attitude, the result from different scientific researches on science has not been encouraging. The poor performance of students in basic science was not only attributed to attitude but also inappropriate methods of teaching mainly used by basic science teachers to teach the subject. Among the strategies that have been explored in previous researches are; Experiential strategy by Awolere (2015), Critical exploration strategy by Oloyede (2014), Puzzled Based Critical Thinking g Motivation Strategies by Ogundiwin (2013). In spite of all these strategies, students still experienced high rate of poor performance in the basic science especially, in the public examination such as junior secondary school certificate examinations conducted by state examination body and National Examination Council (NECO).

One of the active instructional strategies that had caught the attention of researchers is the Active Review Strategy. Active review strategy is a well-designed review strategy that help students organized the materials to be studied. Studies show, that, perhaps emphasis should be on total study time but not on the way students study (Gurung 2005). One way to reach more students in a review strategy would be to present the material in a different form than it was presented in class. If Power Point was the main form of presentation for example, then you should distribute or use overhead transparencies or handout or other graphic representation. Students could be encouraged to create their own concepts maps, or outlines that, will group and organize the materials in their minds cooperatively and showing active learning. One group was provided with basic questions and answers, on review strategy, the other in addition to time allotted for questions reviewed exam content in an outlined form. All the major concepts were discussed, and then time was allowed for questions; results showed that, the students who attended the second type of review strategy out performed those in the former. Jenson and Moore (2009) noted that, students who attended one or more review classes earned higher grades than those that did not.

In the course of focusing on the students' attitude, parental educational background and gender were factor in. Parent Educational background is also a factor affecting the learning outcomes of students in Basic Science. Studies carried out by Mok and Flynn (2008) showed that,

parents' level of education made a significant contribution to the achievement of the students. This is corroborated by Adodo (2007) that, showed, Parental Educational background affects learner's learning outcomes positively in terms of achievement in Basic Sciences while Yaya (2010) reported that children from broken homes and unstable marriage relations perform poorly in school. Steve, Guiseppe and Jim(2008) reported that, learners with high Parental Educational background status exhibit higher levels of achievement than those with low Parental Educational background and Gale, (2013) reveal that students whose parents have higher levels of education may have an enhanced regard for learning, more positive ability beliefs, a stronger work orientation and they may use more effective learning strategies than children of parents with lower levels of education while Chen (2009) concludes that, Parental Education is found as a key determinant to student's achievement.

Gender has also remained an important issue which is relevant to the field of education because it has been linked with students' success. Gender refers to the classification of human being on the basis of sex due to the roles they perform. Most studies show that on the average girls do better in school than boys (Adewumi, 2014). The study of Yuniskurin, Noviyanti, Mukti, Mahana, and Zubidah (2019) also show that female isbetter at spelling and perform better on tests of literacy, writing and general knowledge in education. In contrast, Okafor (2021) and Ekon and Eni (2015) showed that women were not only under-represented but their levels of achievement in the fields of sciences and technology where low compared to the males.

Many studies have explored different instructional strategies for the teaching and learning of basic science. For instance, mind mapping and concept mapping methods was researched by   Adodo, (2013), inquiry method was investigated by Abd-Hamid, Campebell, Der, Packenham, & Wolf (2012). However, not much has been done using active review strategy for teaching basic science concepts in junior secondary school. It is this gap that this research work stands to fill. This research work seeks to find out the effect of active review strategy on student attitude to basic science. The study further determined the moderating effects of Parental educational background and gender.

Statement of the problem
Basic Science is a compulsory subject offered at Junior Secondary Schools. In spite of the importance of the subject to the students, results from public examination bodies reveal that students' performance in the subject is not encouraging. Besides, the teaching and learning of Basic Science has not achieved the much desired goal among the educators. The poor performance has been traced to students' poor attitude to the

subject and inaprioprate teaching strategies employed by the teacher does not encourage self-construction of knowledge and self-assessment among learners. Efforts to address these problems have led researchers to experiment with various instructional strategies. As a way out, scholars have suggested a shift in focus from teacher-centered teaching strategies to learner-centre such as active review strategy.

Researchers had shown that Parental Income affects learner's learning outcomes in terms of achievement in and attitude to Basic Sciences. Therefore, this study determines effects of Active Review strategy on students' attitude to Basic Science. The moderating effects of Parent Educational Background and Gender of students were also examined.

Purpose of the Study

The purpose of this study was to investigate the effect active review strategy on students' attitude in basic science in Oyo State. Specifically, the study sought to;

1. Determine the difference between the attitude mean score of the students exposed to active review strategy in basic science and compare with their counterpart taught using conventional strategy.

2. Find out the effect of treatment and gender on students' attitude in basic science.

3. Find out the effect of treatment and parental educational background on students' attitude in basic science.

Research Question

Three research questions were formulated to guide the study:

1. What is the difference between the attitudes mean score of the students exposed to active review strategy in basic science and compare with their counterpart taught using conventional strategy?

2. Is there any significant main effect of Gender on Students' Attitude to Basic Science?

 3. Is there any significant main effect of Parental Educational Background on Students' Attitude to Basic Science?

Research Hypotheses

To guide the study three null hypotheses were formulated and were tested at 0.05 level of significance:

H_{01}: There is no significant difference in the attitudes mean score of the students exposed to active review strategy in basic science and compare with their counterpart taught using conventional strategy

H_{02}: There is no significant main effect of Gender on Students' Attitude to Basic Science

H_{03}: There is no significant main effect of Parental Educational Background on Students' Attitude to Basic Science

Methodology

This study adopted the pretest-posttest control group quasi-experimental research design. The population consisted of all junior school students in kajola Local Government Areas of Oyo – State while the target population comprised all junior school students in JSS II. The choice of JSS II Basic science students was made because they have been exposed to introductory aspects of living and non-living things, chemicals, work, and power and types of energy in (JSS I) Basic science subject and JSS 1 Basic science which act as pre-requisites for the study of the chosen concepts. The students were likely to be more receptive to the teaching strategy as they were not under the pressure of preparing for external examination. The teaching of the concepts was appropriate to the scheme of work at this stage of their spiral curriculum.

 Samples of 262 (126 male and 136 female) students were involved in the research study. Six instruments were used for data collections which are Students Basic Science Attitude Scale (SBSAS), the attitudinal scale consists of two sections, A and B. Section A seeks personal information on the students such as name of the school, class of student, sex, Parent Educational Background, and time allowed for the attitudinal scale while the section B consists of the attitudinal scale made up of 20 items It comprises of 20 items on a 4-point liker type scale ranging from: Strongly agree (4marks) Agree (3 marks) Strongly disagree (2 marks) Disagree(1 mark). Kr 20 was used in analyzing the data and of 0.86 was obtained as reliability coefficient. Teachers Instructional guides on Active Review Strategy and Conventional strategy, and Evaluation Sheet for Assessing Teachers Performance during Training. The draft of the Teacher's Guide on (Active Review Strategy and conventional Strategy) and evaluation sheet were given to five experienced Biology tutors in selected secondary schools. This was done in order to ensure the face, content and construct validity of the guide. These teachers are seasoned WAEC, NECO and NABTEB examiners, and based on their comment and suggestion necessary amendments were made. The researchers administered the instruments as pre-test and the student's scores were recorded. Thereafter, the researchers taught the experimental group and control group was taught with conventional strategy. The treatment lasted for eight weeks. The data collected were analyzed using descriptive statistics, Analysis of Covariance and Scheffe Posthoc test at 0.05 level of significance.

Results

Research Question 1: What is the difference between the attitudes mean score of the students exposed to active review strategy in basic science and compare with their counterpart taught using conventional strategy?

Table 1: Descriptive Statistics of Attitude Associates with Treatment

| Parameter | Attitudes Scores | |
	Active Review Strategy	Conventional Strategy
No of cases	126	136
Pre-test mean	44.04	41.29
Pre-test SD	1.85	2.12
Post-test mean	51.11	25.28
Post-test SD	1.81	2.17
Mean Gain	7.07	3.99

Table 1 shows the descriptive statistics of the students' attitude scores. The mean gain score for active review strategy was 7.07 while that of conventional strategy was 3.99. The highest mean gain contribution was obtained by students exposed to active review strategy and the least was from student taught with conventional strategy.   Thus, active review strategy had higher mean gain than conventional strategy.

Research Question 2: Is there any significant main effect of Gender on Students' Attitude towards Basic Science?

Table 2: Descriptive Statistics of Attitude Associates with Gender

| Parameter | Attitudes Scores | |
	Male	Female
No of cases	120	142
Pre-test mean	43.19	44.58
Pre-test SD	21.06	17.15
Post-test mean	49.37	50.60
Post-test SD	2.11	1.95
Mean Gain	6.18	6.02

The descriptive statistics of the students' attitude scores with gender in Table 2 indicate improvements for male   students (6.18) over the female students (6.02).

Research Question 3: Is there any significant main effect of Parental Educational Background on Students' Attitude towards Basic Science?
Table 3: Descriptive Statistics of Attitude Associates with Parental Educational Background

| Parameter | Attitude Scores | | |
	Low	Medium	High
No of cases	90	45	25

Pre-test mean	43.35	43.77	44.59
Pre-test SD	1.59	1.29	3.07
Post-test mean	49.78	5o.66	49.51
Post-test SD	1.63	1.33	3.15
Mean Gain	6.43	6.94	4.92

Table 3 displays the Descriptive Statistics of the Students' Attitude scores associate with Parent Education Background of the students. The mean gain scores is as follow; medium parent educational qualification had higher mean gain (6.94) than the high parent educational background (6.92), while high parent educational background had higher mean gain than low parent educational background (6.43).

H_{01}: There is no significant difference in the attitudes mean score of the students exposed to active review strategy in basic science and compare with their counterpart taught using conventional strategy.

Table 4: 3x3x2 ANCOVA of Post-test Attitude scores of students by treatment, Parent Educational Background and Gender.

Source	Sum of Squares	DF	Mean Square	F	Sig.	Eta Square
Main Effect:	9164.051	16	572.75	10.539	.000	.339
Pretest	3746.660	1	3746.660	77.561	.000	.1
Attitude to	1284.342	1	1284.342	13.294	.000*	.067
Basic	88.909	2	44.454	.920	.399	.005
Science	21.901	1	21.901	.453	.501	.001
Treatment						
groups	230.636	2	115.318	1.194	.313	.013
Parent	55.935	1	55.935	.579	.561	.003
Educational	141.910	2	70.955	1.469	.232	.008
Background						
Gender	82.360	4	20.592	.426	.790	.005
2-way	9164.051	256	35.797			
Interactions:	17873.204	254	70.366			
Treatment	27037.254	262				
group x PEB						
Treatment						
group x						
Gender						
PEB x						
Gender						
3-way						
Interaction:						
Treatment x						

PEB	x		
Gender			
Explained			
Residual			
Total			

*Significant at P<0.05

Table 4 Revealed that there was significant effect of treatment on student's attitude towards Basic Science (F (1,254) = 13.294; P<.05; η^2 = 0.067). The effect size of 6.7% was fair. On this basis, hypothesis 1 was rejected. This means that the difference between the attitudes score of students exposed to treatment group was significant. To find out the magnitude of mean scores of the group performance, the Table 5 is presented as follows;

Table 5: Estimated Marginal Means of Attitude score of students According to treatment group.

	Mean	Std. Error	Upper Bound	Lower Bound
Active Reviews group	51.11	1.89	52.13	50.09
Conventional group	45.28	2.17	46.52	44.04

Table 5 Revealed that students in the active review strategy group had the highest adjusted posttest mean Attitude scores ($\bar{x}$=51.11) while students in the Conventional Strategy group had the least adjusted mean Attitude scores ($\bar{X}$=45.28). Further, the source of the significant difference obtained was also traced using Scheffe Post hoc test in table 6

Table 6: Scheffe Post-Hoc of Attitude score of students According to treatment group.

Treatment	N	Mean	Active review	Modified Conventional
Active Reviews	126	51.11		*
Conventional	136	45.28	*	

The result from post-hoc analysis in Table 6 revealed that attitude mean scores of students in Active review strategy (51.11) was significantly better than Conventional Strategy (45.28) in their mean attitude scores, these revealed that the direction of increasing effect of instructional strategy (treatment) on attitude was that Conventional Strategy did not perform better than Active Review Strategy.

H_{02}: There is no significant main effect of Gender on Students' Attitude towards Basic Science.

Table 4 revealed that there was no significant main effect of gender on

the attitude of the students towards basic science. (F (1,254) =.453; P > 0.05 η^2 =.001). Hence hypothesis 2 was rejected

Table 7 Estimated Marginal means of post test attitude score by Gender.

	Mean	Std. Error	Upper Bound	Lower Bound
Male	13.75	0.70	14.68	12.82
Female	14.48	0.64	15.36	13.60

From table 7, Female students had higher mean $\overline{X}$= 14.48 while the male students had a lower mean of $\overline{X}$= 13.75, but the differences in there means was not significant.

H₀₃: There is no significant main effect of Parental Educational Background on Students' Attitude towards Basic Science

Table 8 reveal that there was no significant main effect of Parent Educational Background on students Attitude towards Basic Science (F (2,254) =.920 > 0 .05, η^2 = .005) the effect size of 0.5 was negligible hence hypothesis 2 was not rejected

Table 8: Estimated Marginal means of post test Attitude score by Parent Educational Qualification Group.

	Mean	Std. Error	Upper Bound	Lower Bound
Low	49.78	1.63	50.78	48.78
Medium	50.66	1.33	53.64	47.68
High	49.51	3.15	50.87	48.15

From table 8 Students with the Medium Education Background has the highest mean $\overline{X}$= 50.66 followed by low parent educational background $\overline{X}$= 49.78 while the least was from High Parent Educational Background $\overline{X}$= 49.51.

Discussion
The result obtained in this study showed that, there was a significant main effect of treatment on student's attitude to Basic Science. Active review was more effective than the conventional strategy. The Active Review Strategy was found to be more effective than the conventional strategy, this may be as a result of the fact that the teacher monitor the students progress in active review, provides support, feedback and scores are awarded to each group which can serve as reinforcement to them thus change the attitude towards Basic Science. This is in line with the study of Duron, Limbach, and Waugh (2006), and Gurung (2005).

However, this finding is opposed to Brenda (2003) who argued that the conventional lecture method could not be totally ignored. The result support the work of Ogundiwin (2013) and Adewumi (2021) whose found that, attitudes tended to vary significantly in relation to research strategy used. Teachers that, are undertaking student centered strategy tended to be more positive about their student's attitude towards the subject (80.6% positive. Attitude towards science varied in relation to specific subjects taught. The result of the finding showed that gender does not have any significant effect on performance of students in basic science. This shows that sex may not be a determinant factor in the method of teaching. This is supported by the finding of Adewumi (2023) that no significant interaction effect on students' gender as far as academic performance is concerned. Adodo (2004) corroborates this outcome that both sexes when equal encouragement to use their intellectual gifts fully, that both sexes are not differ in their studies. He said further that gender does not affect students' learning of basic science and their performance.

 Conclusion

Base on the findings, it is concluded that with the use of Mind active review strategy students' performance can be improved upon in basic science in Junior secondary school. Also gender does not in any way affect on the student attitude to basic science. Active review strategy allows teachers to monitor student's attitude to basic science. The strategy enhances the development of creativity and problem solving ability in student. Hence, the teachers should adopt it as a strategy for teaching Basic Science in junior secondary schools.

Recommendations

From the results obtained and the discussion made, the following recommendations are therefore made:

1.   Active review strategy should be adopted as effective and viable strategies for teaching basic science concepts.

2.   Biology teachers should develop activities that will give room for learners to actively participate in the teaching and learning process.

3.   Students can therefore be encouraged to transfer the knowledge and the approach gained to study other subjects to balance up with the technological status of developed countries like China, Taiwan, Japan.

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