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The Effect of Active Review Strategy on Student's Attitude to Basic Science in Oyo State

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Abstrak

Peran ilmu pengetahuan di era teknologi modern ini sangatlah luas dan mendalam. Buruknya prestasi siswa pada mata pelajaran IPA dasar bukan hanya disebabkan oleh sikap tetapi juga metode pengajaran yang tidak tepat yang terutama digunakan oleh guru IPA dasar dalam mengajar mata pelajaran tersebut. Penelitian ini menganalisis pengaruh strategi review aktif terhadap sikap siswa terhadap IPA dasar. Penelitian ini mengadopsi kelompok kontrol pretest-posttest, desain quasi-eksperimental. 262 siswa SMP II dari empat sekolah co-edukasi di dua Wilayah Pemerintah Daerah (LGA) secara acak ditugaskan ke kelompok perlakuan dan kontrol. Instrumen yang digunakan adalah: Skala Sikap Dasar Sains Siswa (r=0,86) dan Panduan Pembelajaran Guru. Tiga pertanyaan dan tiga hipotesis dirumuskan dan diuji pada tingkat signifikansi 0,05. Data yang terkumpul dianalisis menggunakan statistik deskriptif dan analisis kovarians, perlakuan mempunyai pengaruh utama yang signifikan terhadap sikap siswa terhadap IPA dasar (F (1, 254) =13,294; p<0,05, parsial η2=0,067). Sementara itu tidak terdapat pengaruh yang signifikan antara jenis kelamin dan latar belakang pendidikan orang tua terhadap sikap siswa terhadap IPA dasar. Berdasarkan temuan penelitian ini, strategi tinjauan aktif direkomendasikan untuk diterapkan antara lain untuk meningkatkan sikap siswa terhadap sains dasar.

Kata Kunci: *Strategi Tinjauan Aktif, Sikap, Gender dan Latar Belakang Pendidikan Orang Tua*

Abstract

Students' oral language skills are very important in the digital era, and technology and communication have developed rapidly by presenting spoken language content that is popular with students. Multiliteracy learning refers to the multicontext aspect, which means learning uses various contexts or broad topics. In the multimedia aspect, multiliteracy learning uses various media. This research uses a case study design with the aim of exploring the oral language skills of elementary school students in the digital era to support multiliteracy learning. The data in the research was collected through several collection techniques in the form of questionnaires, observations and interviews. The data of this study were analysed using a qualitative approach with thematic analysis techniques. The research results show that students' oral language skills in this digital era are still limited to non-formal speaking skills. Talking content comes from shows that are watched, namely short dramas, advice, food review videos, other entertainment content. The type of text used in oral language learning is only printed text, which in their daily lives students often watch content on social media such as WhatsApp, Tiktok, snackvideo and YouTube. Students prefer short, interesting videos, with a few activities that involve thinking skills. Listening and speaking activities through these sources can be included in learning according to a multiliteracy context so that it is more meaningful for students.

Keywords: Active Review Strategy, Attitude, Gender and Parental Educational Background

1. 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, previous studies emphasized the importance of scientific knowledge in boosting national prestige, military might, national income and international rating of the country (Fırat & Laramee, 2018; Ibrahem & Alamro, 2020). According to them, science gives birth to the

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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.

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 (Alawamleh et al., 2022; Lübke et al., 2019; Oh et al., 2019). Previous study 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) (Awopeju & Afolabi, 2016). Consequently, students' poor performance has revealed by chief examiner reports might be because students develop negative attitude towards the science subject. Attitude is an emotional state of individual towards an object or situation. Previous study stated that attitude is the extent (degree) at which learners' likes' science (Bai et al., 2022). 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, previous study reported that teacher's attitude towards science has strong relationship with students science achievement as well as the students' attitude towards science (Hobbs et al., 2013), while other study asserted that one of the important factors in science teaching is the attitude which determines behavior (Baker et al., 2020), while it was of the opinion that a person with good scientific attitude is free from superstition (Chang & Tsai, 2022), unverified assumptions and many times from popular opinion that has no empirical basis and this in collaboration with study state 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 (Kibirige & Teffo, 2014).

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 (Aboobaker & K.A, 2020; Syahrial et al., 2019). Among the strategies that have been explored in previous researches are; Experiential strategy (Young & Lee Warren, 2011), Critical exploration strategy (Al Mamun et al., 2022), Puzzled Based Critical Thinking g Motivation Strategies (Agarwal et al., 2020). 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 (Ade-Ojo et al., 2022; Rahimi & Yadollahi, 2017). 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 PowerPoint 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. Previous study noted that, students who attended one or more review classes earned higher grades than those that did not (Piotrowska et al., 2022).

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 previous study showed that, parents' level of education made a significant contribution to the achievement of the students (Chen et al., 2018). This is corroborated showed, parental educational background affects learner's learning outcomes positively in terms of achievement in basic sciences (Assari, 2019), while other study reported that children from broken homes and unstable marriage relations perform poorly in school (Goodall, 2018). Learners with high parental educational background status exhibit higher levels of achievement than those with low parental educational background (Lau et al., 2011; Muraina et al., 2012). 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 (Angrist et al., 2020). Parental education is found as a key determinant to student's achievement.

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 (Elvira & Fitriza, 2023; Juhji & Nuangchalerm, 2020). 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 inappropriate teaching strategies employed by the teacher do not encourage self-construction of knowledge and self-assessment among learners (Borz et al., 2021; Godfrey & Mtebe, 2018). 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 has a novelty in determine 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. The purpose of this study was to analyze the effect active review strategy on students' attitude in basic science in Oyo State.

2. METHODS

This study adopted the pretest-posttest control group quasi-experimental research design (Madadizadeh, 2022). 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.

3. RESULTS AND DISCUSSION

Results

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. Descriptive statistics of attitude associates with treatment is show in Table 1.

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. The significant main effect of Gender on Students' Attitude towards Basic Science is show in Table 2.

Base on Table 2, 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). The significant main effect of Parental Educational Background on Students' Attitude towards Basic Science is show in Table 3.

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

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	50.66	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). The 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 is show in Table 4.

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	0.000	0.339
Pretest Attitude to Basic Science	3746.660	1	3746.660	77.561	0.000	0.1
Treatment groups	1284.342	1	1284.342	13.294	0.000*	0.067
Parent Educational Background	88.909	2	44.454	0.920	0.399	0.005
Gender	21.901	1	21.901	0.453	0.501	0.001
2-way Interactions:						
Treatment group x PEB	230.636	2	115.318	1.194	0.313	0.013
Treatment group x Gender	55.935	1	55.935	0.579	0.561	0.003
PEB x Gender	141.910	2	70.955	1.469	0.232	0.008
3-way Interaction:						
Treatment x PEB x Gender	82.360	4	20.592	0.426	0.790	0.005
Explained	9164.051	256	35.797			
Residual	17873.204	254	70.366			
Total	27037.254	262				

*Significant at P<0.05

Table 4 Revealed that there was significant effect of treatment on student's science (F (1.254) = 13.294; P<.05; = 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 is show in Table 5.

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	*	

Note: *significant

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. The result of significant main effect of Gender on Students' Attitude towards Basic Science is show in Table 7.

Table 7. Estimated Marginal Means of Post Test Attitude Score by Gender

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

Table 7 revealed that there was no significant main effect of gender on the attitude of the students towards basic science. (F (1.254) =0.453; P > 0.05 =0.001). Hence hypothesis 2 was rejected. Female students had higher mean $\bar{x}$= 14.48 while the male students had a lower mean of $\bar{x}$= 13.75, but the differences in there means was not significant. The significant main effect of Parental Educational Background on Students' Attitude towards Basic Science is show in Table 8.

Table 8. Estimated Marginal Means of Post Test Attitude Score by Parent Educational Qualification Group

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 reveal that there was no significant main effect of Parent Educational on students Attitude towards Basic Science (F (2.254) =0.920 > 0.05, = 0.005) the effect size of 0.5 was negligible hence hypothesis 2 was not rejected. Students with the Medium Education Background has the highest mean $\bar{x}$= 50.66 followed by low parent educational background $\bar{x}$= 49.78 while the least was from High Parent Educational Background ($\bar{x}$) = 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 studies (Kibirige & Teffo, 2014; Wu & Chen, 2020). However, this finding is opposed to study who argued that the conventional lecture method could not be totally ignored (Fadlilah et al., 2020). The result support the work of who's found that attitudes tended to vary significantly in relation to research strategy used (Ivanović et al., 2013; Rugaiyah, 2022). 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 (Anggraini et al., 2020; Niraula, 2021).

This shows that sex may not be a determinant factor in the method of teaching. This is supported by the finding state that no significant interaction effect on students' gender as far as academic performance is concerned (Luo et al., 2021). Previous study corroborates this outcome that both sexes when equal encouragement to use their intellectual gifts fully, that both sexes are not differ in their studies (Van Geel, 2016). He said further that gender does not affect students' learning of basic science and their performance.

The implication of this research shows that active review strategies can significantly improve students' attitudes towards Basic Science subjects. This suggests that teachers in Oyo State and other regions may need to adopt more interactive and participatory teaching methods to increase students' interest and engagement in science. The results of this research can be a basis for educational policy makers to recommend or even integrate active review strategies into primary and secondary school curricula. This can help in improving the overall quality of science education. This study was conducted in Oyo State, so the results may not be completely generalizable to other regions with different social, economic and cultural conditions. Further research is needed in various locations to confirm these findings.

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, and Japan.

4. 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 effect 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.

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