

EFFECTS OF TWO STUDY STRATEGIES ON SECONDARY SCHOOL STUDENTS, ACHIEVEMENT IN BIOLOGY

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Abstract

The study was informed by the need to evolve ways to improve students' performance in science. The study examines the effect of study strategy on academic achievement of senior secondary school students in some selected secondary school in Minna, Niger state. A pre-test, post test experimental and control group design was adopted for the study. Three secondary schools were purposively selected; the sample size was 86 which was drawn using random sampling technique. The study was guided by two research questions and two research hypotheses. The instrument used was biology achievement test (BAT) made up of 20 multiple choice objective questions which was duly validated by experts. The data collected were analyzed using one way ANOVA and t-test at 0.05 significant levels. Results from the data analysis indicated a significant difference in the mean achievement score between the experimental groups and control group in favour of the experimental groups. On the other hand, there was no significant difference between the mean achievement score of male and female students exposed to Survey, Question, Read, Recite and Review (SQ3R) and Rereading study strategy. From the finding, it was concluded that SQ3R and Rereading study strategy enhances student's academic performance, it was also concluded that SQ3R and Rereading study strategy enhances students achievement in science and is gender friendly. From the findings, it was recommended among others that seminars, conferences and counseling be organized for teachers and students on the benefit of SQ3R and Rereading study strategy

Keywords: SQ3R, Rereading study strategy and Performance

Introduction

Study strategy is one of the most important processes in life. It is the way a student plans his private readings, after classroom learning so as to master what he/she is taught in a subject. Study strategies are learning tendencies that enable students to work privately (Omotere, 2011). Good study habits assist students to acquire adequate skills and competences in a subject or area of specialization as well as enhance academic performance in that subject area.

Science teaching and learning in Nigeria have suffered a lot of set backs. This can be seen in the continuous poor performance of secondary school students in WAEC and NECO as documented by Ezenwa (2005) and Gambari (2010). The main causes of poor performance can be attributed to a lot of factors chiefly among them is poor study habits and ineffective learning style (Wenyi, 2002). In view of this Omotere (2011) posits that most secondary school students have poor study habit which might lead to poor academic performance.

Bakare (1997) in Emmanuel (2003) opined that study habits should be logical, dynamic, functional and relevant to the personal characteristic of the individual learner. The West Africa Examination Council (WAEC) Annual Report (2001-2006) attributed students' poor performance to poor teaching and weak preparation of candidates for examination and recommended teaching and good preparation of candidate as the only remedy to student's poor performance in both junior and senior secondary certificate examinations. Umoranyanyi (1999) observed that study habit is a good predictor of learning outcome in school to support this Omotere (2011)

posits that most secondary school students have poor study strategy which might lead to poor academic performance hence the drive for this study.

The SQ3R is an acronym that stands for S=survey, Q=question, R= Read, R= Recite, and R= Review (SQ3R) study skill is an approach that is learner centered. It helps in the development of learning skill and strategies as well as recognizes each individual's ability to study at his own pace. This will enable individual learners to develop their learning potentials and encourage learners to choose both the way and direction for their own learning.

Yahaya (2004) found that SQ3R study skill improve students study habit and thereby improve their performance. Issa (2008) in mathematics, found that students who employ SQ3R study strategy perform better than those who study via the conventional method. Lusford (1993) in Issa (2008) found that research on learning strategy identified SQ3R study strategy to be appropriate for all learners.

The rereading strategy is a strategy in which a learner reads a text more than once i.e. reading and rereading it severally. Faust & Glenzer (2000) observed that rereading strategy is a useful pedagogical tool and has potential benefit for enhancing readers' comprehension as well as enjoyment of literature. They concluded that the rereading strategy helps students obtain meaning of their favorite reading sections and makes meaning with texts. On the contrary, Short, Kane, and Peeling (2000) found that rereading a longer text may be time consuming. Empirical finding from Hsieh & Dwyer (2009) shows that rereading strategy enhances students' performance than those who study via the conventional method. Brown (2002) also found that female Japanese college students' reading comprehension improved through the use of rereading strategies. However Josemon (2006) revealed that in order to maximize students' academic achievement, approaches to study and study strategy of the students are as important as classroom environment and that inability of a school system to develop useful study habits in its learners leads to wastage and stagnation. This study attempt to find out the extent, to which training in study or study habit behaviour could solve the achievement problem in science, biology inclusive. Gender issues have been linked with performance of students in academic tasks in several studies but without any definite conclusion. The findings of Umar (2011) and Yaki (2011) revealed that there is no significant gender difference in the performance of students in science concepts. Contrary to this Chinweze (2007), found that male students perform better than female students in science and technology concepts.

Statement of the problem

Fibersima (2001) identified poor study habit as one of the major causes of student's poor performance in examination. The desire to pass by all means syndrome without studying effectively usually leads students into examination malpractice or failure. Anameze (1999) and Ewemyi (2002) found in their studies that many Nigerian students have defective study habits. They noted that poor study habits could result in little or no learning. Jackson (1971) in Yahaya (2003) observed that there was positive correlation between students study strategy and their academic performance. Ajayi, Opadare & Anwola (1997) reported a study involving 450 students from ten secondary schools Ibadan municipality. They discovered that candidates got involved in exam malpractice due to laziness, poor teaching and study strategy among others.

The issue is of concern in science education, hence the need to find ways to reverse the trend of poor performance of students in science Biology inclusive especially at the secondary level. Considering the teacher to student ratio especially in public school which is 80-120 per class to a teacher. The focus is on the study skill of individual learner. A learner needs to identify that he needs to improve his strategies in reading. Such as underlining, high lightening or writing notes in his book etc. One of the methods that could be employed to improve study habits and

performance in science is the provision of appropriate information on relevant study skills, this form a major basis for this study. Research on gender in science has been inconclusive, hence gender is considered as a moderating variable in this study.

Research questions

To guide the study, the following questions are raised:

- (i) Is there any difference in the performance of student who employed SQ3R, rereading study strategy and those who did not use it?
- (ii) Is there any gender difference in the performance of students who employed SQ3R and rereading study strategies?

Research Hypotheses

- (i) There is no significant difference in the performance of student who employed SQ3R, rereading study strategies and those who did not use it
- (ii) There is no significant gender difference in the performance of student who employed SQ3R study strategies
- (iii) There is no significant gender difference in the performance of student who employed rereading study strategies

Methodology

The research design is a pretest posttest experimental and control group design. The population was all Biology students in Minna metropolis. The sample for this study was randomly drawn from three comparable co-educational secondary schools Minna metropolis. Preliminary investigation showed that the schools were comparable in terms of academic standard, method of student's admission, recruitment of teachers, physical facilities and science materials. The sample of this study are 84 senior secondary school students who are systematically drawn and assigned into experimental group 1, (n=28). Subjects in this group will be instructed on how to study ecology using SQ3R: Survey: this means to get the best overall picture of what one is going to study before the proper study in detail. Scanning for general ideal; the title, headings, subheadings, Captions under picture, charts, graphs or maps, Review questions or teacher-made study guides, Introductory and concluding paragraphs. This should be done in few minutes and by so doing one can make some prediction before the reading.

Question: ask your self questions or the concept you are studying as you read or study on. Turn each heading and subheading into a question or question asked by the author especially while practicing this technique, write this question down. These questions give one the direction, focus and goal to satisfy rather than simply looking at words.

Read: Reading is the translation of symbols, or letters into words and sentence that have meaning for individual looking at them. The reader must follow a sequence of symbols arranged in a particular way –in English from left to right, in Hebrew from right to left, and in Chinese from top to bottom.

Read with attention and carefully looking for the answer to your question i.e. read to answer the question you have asked yourself or the author has asked i.e. answering your proposed question looking for main ideas, highlighting and labeling text. Sort out ideas and evaluate them. If the contents does not relate to the question, give it only a glance, read selectively. The best way to improve your reading speed is simply to practise under time conditions.

Recite: One should stop reading periodically and recall the important ideas, concept in the material you have read to fix them in your memory. The good things to recite are answers to your proposed questions. Recite is to say to yourself allow or write down a key phrase that sums

up the major points and answers the question. It is important to use your own words, not just copy a phrase from the book.

Review: Recall mentally, recite orally the highlight of what you have read. Ask yourself question (may be the same ones you use before you read the section) and answer them in your own words. Underline and make original note of the key words or phrases in the section. Underline after you read is the best way to decide the most important information to remember. Make separate note or outlines of what you have read. This technique often works for more technical materials which you need to put into your own words. Recall with/ to a friend and what you don't recall, he/ she might. The review part is usually meant to be ongoing process, review for minutes every day for several days.

Experimental group 11, (n=28). Subjects in this group will be instructed on how to study ecology using rereading strategy: the rereading strategy is a strategy in which a learner reads a text more than once i.e. reading and rereading it severally While the control group (n=28) will study using the conventional study strategy.

The instrument for this study is Biology Achievement Test (BAT). The BAT was composed of 25 item multiple choice questions. The Biology Achievement Test objective questions were validated by two science lecturers and one Basic science teacher in secondary school. The reliability of the instrument was found to be 0.78 using test retest method and KR21.

The study lasted for eight weeks, the experimental group 1, experimental group 11 and control groups were given BAT as pretest at the beginning of the study thereafter both groups received treatment. At the end of the treatment, both groups were administered BAT as post-test. The method of data analysis was t-test and ANOVA.

Presentation of Results

The results of the analysis of data for this study are presented below. The analysis and result is done according to the research hypotheses.

Hypothesis one (H_{01}) There is no significant difference in the performance of student who employ SQ3R, rereading study strategies and those who did not use it.

To test this hypothesis one way ANOVA was used and the result is presented in table 1

Tab 1: ANOVA Analysis of experimental group 1, experimental group 2 and control

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1451.786	2	725.893	20.846	.000
Within Groups	2820.536	81	34.821		
Total	4272.321	83			

Table 1. Shows the ANOVA results of the performance of student who employ SQ3R, rereading study strategies and conventional study strategy the results revealed that there is a significant difference in the performance of students in the two experimental group and the control ($F_{cal} = 20.846$, $df = 83$; $p < 0.05$). Hence, there was a significant difference in the performance of students who employ SQ3R, rereading study strategies and conventional study strategy.

Table 1b: Scheffes multiple comparison of experimental group1, experimental group 2 and control

(I) Grp	(J) Grp	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
1	2	5.357*	1.577	0.005	1.42	9.29
	3	4.179*	1.577	0.000	6.25	8.11
	1	-5.357*	1.577	0.005	-9.29	-1.42
	3	4.821*	1.577	0.012	.89	8.75
2	1	-4.179*	1.577	.000	-8.11	-6.25
	2	-4.821*	1.577	.012	-8.75	-.89

Scheffes analysis on table 1b indicated that the observed significant difference was between experimental group 1, experimental group 2 and control (i.e. 1&2, 1&3 and 2&3). However, the highest mean difference of 5.36 and highest upper boundary of 9.29 at 95% confidence level is found between experimental group 1 those who employed SQ3R and experimental 2: those who employed rereading strategy. Thus, hypothesis 1 is therefore not rejected.

Hypothesis two

There is no significant gender difference in the performance of students who employed SQ3R study strategies

To test this hypothesis, mean and standard deviation and t-test was used, the result are presented in table 2

Table 2: t-test comparison of the posttest mean score of male and female students of the experimental group 1

Variable	N	df	X	SD	t-value	P	Remarks
Male	14	13	63.21	7.75	0.52 ^{ns}	0.61	Not Significant
Female	14		62.5	5.1			

Ns = not significant

Table two indicates the posttest mean score of male and female students in the experiment group 1. The posttest means score is 63.21 for the male students and 62.50 for the female group. The male mean score did not differ significantly from the female scores when both employ SQ3R study strategy ($t = 0.52$; $df = 13$ $p > 0.05$). This shows that there is no significant difference between the posttest mean score of male and female students. Therefore, the null hypothesis two (H_{02}) is accepted.

Hypothesis three

There is no significant gender difference in the performance of student who employ rereading study strategies

To test this hypothesis, mean, standard deviation and t-test were used, the result are presented in table three.

Table 3: t-test comparison of the posttest mean score of male and female students of the experimental group 2

Variable	N	df	X	SD	t-value	P	Remarks
Male	14	13	63.2	7.8	0.52 ^{ns}	0.6	Not Significant
Female	14		62.5	5.1			

Ns = not significant

Table three indicates the posttest mean score of male and female students in the experiment group 2. From the table the posttest means score is 57.14 for the male students and 57.86 for the female group. The male score did not differ significantly from the female scores when both employ rereading strategy ($t = 0.56$; $df = 13$; $p > 0.05$). This shows that there is no significant difference between the posttest means score of male and female students. Therefore, the null hypothesis three (H_{03}) is accepted.

Discussion of Results

The result of data analyzed with regards to Hypotheses one reveals that there is a significance difference in the performance of experimental group1, experimental group 2 and control. The experimental groups performed better than the control. The results show that students with good study habit will performed better academically than those without good study habit.

This finding agrees with the results of Issa (2008) in mathematics who found that students who employed SQ3R study strategy performed better than those who study via the conventional method. Lusford (1993) in Issa (2008) found that research on learning strategy identified SQ3R study strategy to be appropriate for all learners.

Umoranyanyi (1999) also observed that study habit is a good predictor of learning outcomes in schools the finding of the study also agrees with Jackson (1971) in yahaya, (2003) who observed that there is passive correlation between students study strategy and their academic performance.

Hypotheses Two and Three showed the post test results of male and female students expose to SQ3R and Rereading strategy. The results of male and female students did not differ significantly. This agrees with the findings of Umar (2011) and Yaki (2011) that there is no significant gender difference in the performance of students in science concepts. This result also disagreed with the earlier finding of Chinweze (2007), who found that male students performed better than their female counterparts in science and technology concepts. Thus, SQ3R and rereading strategy is gender friendly.

Conclusion

The effective and efficient use of SQ3R and Rereading strategies enhanced students performance this can be seen in the results of the experimental groups. The use of SQ3R and Re-reading strategy is non sex discriminatory especially in terms of enhancing academic

performance among students therefore, they are gender friendly. Good study habit seems to enhance academic achievement consequently poor study habit leads to low academic achievement and that may lead to examination malpractice, withdrawal from school which may also lead to other social vices hence students should be encouraged to use SQ3R and Rereading study strategies.

Recommendations

From the findings of this study the following recommendations are made:

- (i) Seminars conferences and counseling be organized for teachers and student on the benefit of SQ3R and Rereading study strategy
- (ii) Teachers and parents should encourage their students to employ SQ3R and Rereading study strategy in their personal study because it is gender friendly.
- (iii) Students should employ healthy study strategy such as SQ3R and rereading strategies to enhance their academic achievement in science.

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