

EFFECTS OF METACOGNITIVE STRATEGIES ON SENIOR SECONDARY STUDENTS' READING COMPREHENSION ACHIEVEMENT IN JOS SOUTH LOCAL GOVERNMENT AREA, PLATEAU STATE, NIGERIA

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ABSTRACT

Investigation has shown that secondary school students achieve poorly in reading. Against this backdrop, this study examined the effects of metacognitive strategies on senior secondary students' reading comprehension achievement in Jos South Local Government Area, Plateau State, Nigeria. Non-randomized pre-test, post-test quasi-experimental control group research design was adopted in the study. Using simple random sampling technique, a sample of 100 SS 2 students in intact classes was selected from the population of 1,823 SS2 students in 20 public senior secondary schools and assigned to the experimental (metacognition) and control (conventional) groups. Two research questions and two corresponding null hypotheses guided the study. Data were collected using a test tagged Reading Comprehension Achievement Test (RCAT). Data collected were analysed using mean and standard deviation to answer the research questions and ANCOVA to test both null hypotheses at 0.05 level of significance. The findings revealed that students exposed to reading comprehension using metacognitive strategies achieved significantly higher mean scores in literal and inferential comprehension levels than their counterparts who were not. It was, therefore, recommended among other things that teachers of English as a Second Language should guide students to employ metacognitive strategies during the reading process for maximum comprehension.

Keywords: *metacognitive strategies, planning, self-monitoring, reading comprehension, literal comprehension, inferential comprehension.*

INTRODUCTION

Reading is one of the most important skills that second language learners of English need to acquire. This is because it facilitates independent learning and success in academic work and their future careers. Reading comprehension is the act of making inferences from written texts based on the complex processes of the various sources of information related to each other. It is the process of constructing meaning as a result of blending content and message of the text with the readers' existing knowledge and skills during reader text interaction (Grabe & Stoller, 2019). This meaning construction is described as students reading the text, selecting some information from the text in the light of preliminary information, reinterpreting and re-configuring them in his mind by combining them with the preliminary information.

The importance of reading to students and the society cannot be overestimated. According to Rintaningrum (2019), it is the foundation of learning across disciplinary subjects. The ability to read is very important for carrying out academic tasks in the tertiary institution and for finding a job. Effective reading enhances students' performance and an individual's astuteness and competence in discharging professional and leadership duties. In addition, reading enhances the vocabularies of the reader, broaden his knowledge and world view. Hence, strategic reading results in improved students' performance not only in English language but also in other areas of life.

Furthermore, students and indeed any literate person who intends to make any meaningful progress in life need to be proficient in reading. The ability to read is a crucial skill for information retrieval thus it must be accorded a priority in formal education system because of its role in learning and understanding all school subjects (Oyetunde (2015)). However, effective reading comprehension does not just occur as students have to deliberately acquire the knowledge of

metacognitive strategies and how to apply them to ensure effective comprehension. Metacognition means the thinking about one's knowledge (Oyinloye, 2023).

In spite of the indispensable roles of reading in the academic and other spheres of human endeavours, students fail to comprehend what they read. This failure manifests in the incessant decline in students' achievement in internal and external examinations in recent times. For instance, the West African Examinations Council's (WAEC) Chief Examiner's reports of 2016 - 2022 paint a gloomy and dismal picture of students' poor achievement in the West African Senior School Certificate Examinations (WASSCE) English language paper, specifically, the reading comprehension segment.

According to educationists, one of the reasons for this failure is the poor method of teaching employed by teachers as well as the fact that reading is not recognized as a separate school subject thus teachers are not adequately trained to teach it. Most teachers use traditional methods to teach English and by extension reading; the weaknesses of these methods directly impede students' comprehension the consequence of which is the mass failure in both internal and external examinations. This is evident in a baseline reading comprehension test carried out by the researchers in some secondary schools in which the results showed that students are either not aware of metacognitive strategies or the teachers do not instruct students to use these strategies in their reading comprehension.

Metacognition means the thinking about one's knowledge (Oyinloye, 2023). This implies the knowledge and control that students have over their cognitive processes or one's awareness of comprehension processes. It is knowledge involving cognitive processes for careful monitoring and regulating cognitive strategies of students with set goals. Metacognitive reading, therefore, refers to an individual's mental process and the behaviors that control the reader's efforts of deriving the meaning and understanding of the context.

Furthermore, metacognition is crucial in reading comprehension because the knowledge of metacognitive strategies enable students sustain comprehension, and apply the appropriate strategy when there is comprehension break down. Metacognition thus helps students to be aware of what they have read and to identify situations in which it could be applied to monitor their reading. The present study is limited to only the following metacognitive strategies of prediction, questioning, inferencing, monitoring, synthesizing and reflection.

Several studies related to this study have proven the effectiveness of metacognition. In a study by Albazi and Shukri (2016) on the use of metacognitive strategies to enhance reading skills among high school students, the findings of the treatment showed development of regulatory skills among high school students which in turn helped them to acquire reading comprehension. In the same vein, Babashamsi, Noordin and Kotamjani (2022) investigated the effect of metacognitive strategies on the critical thinking skills of undergraduate students in Putra University, Malaysia; and the results revealed the mean score of students in the metacognitive group was significantly higher than that of the students in the conventional group.

RESEARCH QUESTIONS

The following research questions guided the study:

1. What are the pre-test and post-test achievement scores of the experimental and control groups in answering literal questions?
2. What are the pre-test and post-test achievement scores of the experimental and control groups in answering inferential questions?

HYPOTHESES

The following null hypotheses were tested at 0.05 level of significance in this study:

1. There is no significant difference between the post-test achievement mean scores of students exposed to metacognitive strategies in their ability to answer literal questions and those who are not.

2. There is no significant difference between the post-test achievement mean scores of students exposed to metacognitive strategies in their ability to answer inferential questions and those who are not.

METHODOLOGY

The population of this study was made up of 1,823 SS2 students in 20 public senior secondary schools in Jos South Local Government Area, Plateau State, Nigeria. This comprised of 1,078 males, and 745 females. The sample for the study comprised 100 students selected from two public senior secondary schools. The choice of SS2 students was because they are not in examination class like SS3 students who are already preparing for their West African School Certificate Examinations (WASCE).

The study adopted the non-randomized pre-test, post-test quasi-experimental control group research design. Quasi-experimental design was adopted because it was not possible for the researchers to randomly assign subjects to groups without disrupting the classroom structure of the schools involved in the study. Four intact classes were used, two for the experimental group and two for the control group.

The instrument for data collection in this study was tagged Reading Comprehension Achievement Test (RCAT). This was used to measure the different skills identified in the study, which are literal comprehension and inferential comprehension. The instrument consisted two sections namely: sections A and B. Section A was solicited personal information of the students such as age, gender, name of school and school code. Section B was made up of an expository passage, and questions were asked on the literal and inferential comprehension skills. The instrument was adapted from the SS2 English text book. The items selected were essay type and tested the students' understanding of the passage at the literal and inferential levels

A table of specifications was generated to cover the areas, objectives and skills taught in the course of the study, as well as research questions and hypotheses. In choosing the passage, considerations were given to the familiarity of the concepts and ideas covered in the passage as well as students' background experience, the objectives and the skills the study intended to develop in the students. The readability level of the passage was also considered to ensure the passage was not at frustration level for the students.

Based on the table of specifications, a marking scheme was prepared by the researchers for the scoring of items of the instrument. The instrument was made up of five literal and five inferential comprehension questions, making the total of ten questions. Each of the ten questions was allotted 10 marks (that is, 50 marks for literal questions and 50 marks for inferential questions), making the total of 100 marks.

In order to determine the content validity of the RCAT, the instrument was validated by two experts in English Education unit, and an expert from Research, Measurement and Evaluation Unit, Department of Educational Foundations, University of Jos. The experts scrutinized the contents of the instrument to establish the accuracy and appropriateness of expressions in line with the research questions, hypotheses and the table of specifications. Their comments and suggestions were considered in preparing the final version of the instrument. And to ensure accuracy, the test-retest method was used to establish the reliability of the instrument.

Two research assistants from each of the sampled schools were trained in one of the schools that was used. The research assistants were made up of teachers of English who were B. A (Ed) holders. The research assistants were trained for two hours every day for three days before the exercise. The researchers gave them training on the use of metacognitive strategies to enhance students' achievement in reading comprehension based on the lesson plans prepared by the researchers. After the training of the research assistants, the researchers engaged them in micro teaching to assess them and ensured that they had understood the use of metacognitive strategies before teaching the students in the classroom.

In the first week of the study, the pre-test was administered to the students by the research assistants, and lasted for 1hour 20minutes. The questions were based on literal and inferential comprehension. The researchers gave full explanation to the students on the importance of the research and what they stood to benefit as a result of the study. However, the control group were not given any explanation. The test was administered during school hours in one of the reading comprehension lesson. After the test, the scripts were collected and the marking was done with the help of the research assistants.

The provision of treatment for the experimental group started in the second week of the study. The students in the experimental group in schools A and B were taught how to use metacognitive strategies in reading comprehension, while those in the control group in schools A and B were taught pronunciation of consonant sounds within the treatment period. The research assistants used the lesson plans prepared by the researchers and adhered strictly to the method stated in the lesson plans. The treatment was based on the application of metacognitive strategies of prediction, questioning, inferencing, monitoring, synthesizing and reflection in their reading comprehension. Participants in the experimental group were taught twice in a week for six weeks. This provided a total of 24 lessons. The duration for each lesson was 1hour, 20 minutes of double lesson periods. Thereafter, the treatment was given which lasted for six weeks before administering the post-test in the last week, which was the eighth week of the study.

Like their counterparts in the experimental group, participants in the control group were taught twice a week in schools A and B for six weeks providing a total of 24 lessons lasting for 1hour, 20 minutes of double lesson period. Unlike the experimental group, the control group were not exposed to the treatment (that is, training in metacognitive strategies). However, the teacher used placebo method in teaching them pronunciation of consonant sounds. This was to keep the control group busy and engaged, as well as distract them from the treatment package for the experimental group.

At the end of the six-week treatment, the post-test was administered to both groups with the help of the research assistants. The post-test, like the pre-test, was the administration of the Reading Comprehension Achievement Test (RCAT). The same questions used for the pre-test were reshuffled and used for the post-test before administration to avoid prediction of the questions by the respondents. The test was allotted 1hour 20minutes and it was made up of questions on literal and inferential comprehension.

Data collected from the study were analyzed using Statistical Package for Social Sciences version 27.0. The research questions raised for the study were answered using mean and standard deviation, while all the hypotheses were tested at 0.05 level of significance using Analysis of Covariance (ANCOVA). The choice of ANCOVA was to enable the researchers take care of the initial differences in the experimental and control groups.

RESULTS

The data collected were analysed and interpreted based on the two research questions and the two corresponding null hypotheses formulated.

Research Question One

What are the pre-test and post-test achievement scores of the experimental and control groups in answering literal questions?

Table 1: Pre-test and post-test Achievement Scores of Students in Answering Literal Questions in the Experimental and Control Groups

Group	Pre-test		Post-test		Mean Gain	$\bar{x}$ - difference
	N	Mean	SD	Mean	SD	
Experimental	33	39.73	13.26	63.27	16.89	23.54
Control	21	24.52	10.95	35.05	14.35	10.53

Table 1 reveals the pre-test and post-test achievement mean score of students in the experimental and control groups in answering literal questions. In the experimental group the post-test achievement mean score was 63.27 and standard deviation of 16.89, higher than the pre-test mean score of 39.73 and standard deviation of 13.26 with a mean gain of 23.54, indicating that there was improvement in the achievement of students after treatment. Also, for the control group the mean score was 24.52 and a standard deviation of 10.95 in the pretest. The post-test mean score of students rouse to 35.05 and a standard deviation of 14.35. The findings show that students in the experimental group had a higher achievement mean score (63.27) after treatment using metacognitive strategies than those in the control group (35.05) who were not given treatment with a mean difference of 13.01. This means that at the pre-test the students in both groups had a poor achievement, but after the intervention the experimental group performed better than the control group. It can be deduced that metacognitive strategies do improve students' achievement in answering literal questions.

Research Question Two

What are the pre-test and post-test achievement scores of the experimental and control groups in answering inferential questions?

Table 2: Pre-test and Post-test Achievement Scores of Students in Answering Inferential Questions in the Experimental and Control Groups

Group	N	Pre-test		Post-test		Mean Gain	$\bar{x}$ - difference
		Mean	SD	Mean	SD		
Experimental	33	39.42	9.71	69.85	11.92	30.43	22.38
Control	21	36.14	14.54	44.19	5.64	8.05	

Table 2 reveals the pre-test and post-test achievement score of students in the experimental and control groups in answering inferential questions. In the experimental group the post-test achievement mean score was 69.85 and standard deviation of 11.92, higher than the pre-test mean score of 39.42 and standard deviation of 9.71 with a mean gain of 30.43, indicating that there was improvement in the achievement of students in answering inferential questions after treatment. Also, for the control group the mean score was 36.14 and a standard deviation of 14.54 in the pretest. The post-test mean score of students rouse to 44.19 and a standard deviation of 5.64. The findings show that students in the experimental group had a higher achievement mean score in answering inferential questions (69.85) after treatment using metacognitive strategies than those in the control group (44.19) that were not given treatment with a mean difference of 22.38. This means that at the pre-test the students in both groups had a poor achievement, but after the intervention the experimental group performed better than the control group. It can be deduced that metacognitive strategies do improve students' achievement in answering inferential questions.

Hypothesis One

There is no significant difference between the post-test achievement mean scores of students who are exposed to metacognitive strategies in their ability to answer literal questions and those who are not.

Table 3: ANCOVA Result on Posttest Achievement Mean Scores of Students in Answering Literal Questions

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	16100.385 ^a	2	8050.193	55.655	.000	.686
Intercept	3168.096	1	3168.096	21.903	.000	.300
Covariate	5876.624	1	5876.624	40.628	.000	.443
Group	2168.082	1	2168.082	14.989	.000	.227
Error	7376.874	51	144.645			
Total	171162.000	54				
Corrected Total	23477.259	53				

a. R Squared = .686 (Adjusted R Squared = .673)

Analysis of Covariance (ANCOVA) was conducted to determine if a significant difference exists in the posttest achievement mean score of students in answering literal questions when exposed to metacognitive strategies and those not exposed. Table 3 shows that $F(1,51) = 14.99$, $p < 0.05$, since the p-value of 0.000 is less than 0.05 level of significance, the null hypothesis was rejected, indicating that there was a significant effect of metacognitive strategies on achievement of students in answering literal questions. The result further reveals an adjusted R squared value of .673 which means that 67.3 percent of the variation in the dependent variable which is achievement in answering literal questions is explained by variation in the treatment of metacognitive strategies, while the remaining is due to other factors not included in this study. Hence, it can be stated that metacognitive strategies can help improve students' achievement in answering literal questions in a reading comprehension.

Hypothesis Two

There is no significant difference between the post-test achievement mean scores of students who are exposed to metacognitive strategies in their ability to answer inferential questions and those who are not.

Table 4: ANCOVA Result on Posttest Achievement Mean Scores of students in answering inferential questions

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	9079.477 ^a	2	4539.738	50.856	.000	.666
Intercept	9713.698	1	9713.698	108.816	.000	.681
Covariate	630.864	1	630.864	7.067	.010	.122
Group	7676.412	1	7676.412	85.994	.000	.628
Error	4552.616	51	89.267			
Total	207193.000	54				
Corrected Total	13632.093	53				

a. R Squared = .666 (Adjusted R Squared = .653)

Analysis of Covariance (ANCOVA) was conducted to determine if a significant difference exists in the posttest achievement mean score of students in answering inferential questions when exposed to metacognitive strategies and those not exposed. Table 4 shows that $F(1,51) = 85.99$, $p < 0.05$, since the p-value of 0.000 is less than 0.05 level of significance, the null hypothesis was

rejected, indicating that there was a significant effect of metacognitive strategies on achievement of students in answering inferential questions. The result further reveals an adjusted R squared value of .653 which means that 65.3 percent of the variation in the dependent variable which is achievement in answering inferential questions is explained by variation in the treatment of metacognitive strategies, while the remaining is due to other factors not included in this study. Hence, metacognitive strategies can help improve students' achievement in answering inferential questions in a reading comprehension.

DISCUSSION

The discussion of findings in this study is based on the analysis and interpretation of the research questions and hypotheses. Two research questions were raised and two corresponding null hypotheses were formulated.

The findings of the study indicated that students in the experimental group significantly achieved higher in literal comprehension after the treatment using metacognitive strategies than those in the control group who were not exposed to the treatment. This is because metacognition affords students the skill of thinking, flexible strategies, and periodic self-monitoring, with which to track implicit facts during the reading process. This finding aligns with the report of Albazi and Shukri (2016) that the use of metacognitive strategies helped students to acquire reading comprehension. This implies that metacognitive strategies improve students' literal comprehension ability.

Secondly, the findings revealed that students in the experimental group had a significantly higher achievement mean score in inferential comprehension after the treatment using metacognitive strategies than those in the control group that were not given the treatment. This is because metacognitive strategies enable the reader to use prior knowledge and textual information to draw conclusions. This finding is in agreement with Babashamsi, Noordin and Kotamjani (2022) whose results revealed that the mean score of students exposed to metacognition achieved significantly higher than those who were not. The implication of this finding is that metacognitive strategies are effective for developing students' ability to infer meaning from text.

CONCLUSION

Based on the findings of this study, it can be concluded that metacognitive strategies improve senior secondary students' ability to comprehend text at the literal and inferential levels. It can also be concluded that the strategies are effective for enhancing students' reading comprehension achievement in general.

RECOMMENDATIONS

Based on the findings of this study, the following recommendations are made:

1. Teachers of English as a Second Language should guide students to employ metacognitive strategies during the reading process for maximum comprehension.
2. Students should learn the metacognitive strategies for improved achievement in reading comprehension.
3. Government should organise seminars and workshops for the retraining of English Language teachers on the application of metacognitive strategies to develop students' reading comprehension ability.
4. Curriculum designers and English Language textbook writers should incorporate the metacognitive strategies into the secondary school students' reading comprehension programmes.
5. School administrators such as the principals should supervise the teachers of English for application of metacognitive strategies in their reading comprehension lesson.
6. Parents and guardians should patronise schools where metacognitive strategies are given priority for the improved achievement of their children and wards.

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