

## **EFFECTS OF PROBLEM SOLVING STRATEGY ON ACADEMIC ACHIEVEMENT IN READING COMPREHENSION**

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### **Abstract**

*The study investigated the effects of use of Problem solving strategy on academic Achievement in reading comprehension when compared to a control group taught with read re-read approach. The design of the study was a quasi-randomised, pretest-posttest control group design. The population of the study was 6001 SS1 students while the sample were 179 students from two co-educational secondary schools purposively selected for the study. There were 83 students in experimental group. The control group had 96 students. The instrument for data collection was a reading comprehension Achievement Test which was duly validated by experts. The reliability index of the instrument was established using Kuder Richardson formula 20 and it was 0.81. one research question and one null hypothesis guided the study. Mean and standard deviation were used to answer the research question while ANCOVA was used to test the hypothesis at 0.05, level of significance. The study revealed among others that there was a significant difference in the achievement of students taught reading comprehension with problem solving strategy and that of those taught same contents with the conventional read and reread. It was recommended that: Teacher preparation Institutions/ Departments in Universities should use strategies that would help students learn materials presented to them meaningfully through giving them good opportunities to practice active collaborative thinking and engagement with study materials.*

### **Introduction**

English Language is a core subject in secondary school curriculum and the language of instruction and Lingua Franca in Nigeria. English Language functions as a vehicle of interaction and instrument of communication, an official irresistible Language as far as development is concerned because for any nation particularly in the 3<sup>rd</sup> world to be relevant and derive the maximum benefit from the opportunities that abound in the environmental areas of

human needs, for personal advancement and national development, English language is a *sine qua non*. The knowledge of the contents of schools' subjects is acquired by the students at all levels of education via English language medium.

English language is an essential pre-requisite for propelling educational wheel of Nigeria. Joseph and Joshua (2010) added that the government having recognized the importance of English language for enhancing educational attainment as well as for improving communicative competence and ability of citizens, has made it a core and compulsory subject for all in Nigerian schools. The English language continues to be a medium of instruction for all subjects from primary level to tertiary level in very many countries including Nigeria.

Academic achievement is the outcome of education and the extent to which students, teachers or institutions have achieved their educational goals. It is commonly measured by examination or continuous assessment but there is no general agreement on how it is best tested or which aspects are more important, either procedural knowledge such as skills or declarative knowledge such as facts.

For authentic learning to take place, innovative and constructive teaching methods and strategies are required in order to motivate learners and sustain their interests throughout the lesson. On the other hand, students are to be made to take some responsibilities of their learning and be able to develop analytical and deductive thinking skills that could help them retain learned materials. The need to explore various instructional strategies, techniques and methods in teaching, therefore, becomes imperative if not mandatory. Onwuka (2010) averred that the strategy adopted by a teacher may promote mental or cognitive learning, sharpens mental activities which are the bases of intellectual attainment; or it may discourage initiative and curiosity, thus making attainment of academic success difficult.

The inability of most students in secondary schools in Nigeria to understand or comprehend the content and apply English Language in contexts has led to the noticeable poor achievement of students in English language at public examinations. For example, the performance of Nigerian secondary students in Senior Secondary School Certificate Examination organised by West African Examination Council (WAEC) have always shown consistent decline in performance year in year out. Academic achievement of adolescents in Nigeria has been a source of worry and concern vis-à-vis the future of education in Nigeria. The WAEC chief examiner (2015) reported that over 60% of the candidates failed, which according to the report, means that they did not make five credits including English language. Out of the candidates

that sat for the examination, only 616,370 scored five credits which is a pass rate of 38.68%. West African Examination Council (WAEC) released the result of the May/June 2014 Senior Secondary School Certificate Examination. Announcing the result, Mr. Charles Eguridu, Head of WAEC National Office in Lagos said there was marginal decline in performance of the candidates, especially when compared with that of 2012 and 2013. The results as announced by WAEC show that there was massive failure of candidates in English Language. Out of the 1,692,435 candidates that sat for the examination, only 727,000 candidates representing 46.75% obtained 6 credits and above. A total of 529,427 candidates representing 31.28% obtained five credits and above in English Language. In 2012, 38.8% of the candidates obtained five credits in English Language and in 2013, it was 36.57%. In 2014 and 2015 it was 38.68% 1,471,151 who sat language and mathematics.

The continuous failure rate among senior secondary school students in their certificate examination is worrisome, considering that these are the future of the homes and the nation. If their foundation in terms of knowledge is weak, it therefore means that the society will be at the receiving end, and the nations quest for economic, political, scientific and technological growth and development would be bleak due to poor quality graduates from institutions of learning. Ohia and Ochuba (2015) found that the prominent factor in the trend of students' poor performance in English language is their inability to read let alone comprehend and simple English passages. They affirmed that comprehension of learnt materials is one of the most fundamental objectives of the school system. Students must read and comprehend information for effective utilisation. It is not enough only to learn to pass examinations, but to use the knowledge and the skills acquired from school to solve ones problem within and out of school. It therefore becomes imperative, that strategies that will help the learners develop critical thinking skills of deep processing of information should be used in teaching reading comprehension to students. One of the outcomes of education is to raise life-long learners, individuals who would use the skills acquired while in school to solve their personal problems and problems of others, even when they are out of school (Ahangar, 2010). This can only be achieved effectively through use of pedagogical teaching strategies such as problem solving strategy, which helps learners to take personal actions to solve their learning problems, focus on thinking as vital elements and use real life experiences to acquire knowledge in meaningful real life activities, thus working at higher level of thinking.

Reading comprehension is an intentional, active and interactive process that occurs before, during and after a person reads a particular piece of

writing. It involves reading, understanding deeply, and being able to recall learned materials when needed. Reading a text without understanding means mere tracking the symbols on the pages without getting meaning out of wasted venture. It is therefore important to use a strategy that would help the learners critically process and understand texts read. Harvertape (2010) stated that in adopting the problem solving strategy, an individual would have to identify the problem, define the problem, and devise a plan to fix the problem in so doing; the individual becomes an active learner. Kapa (2001) averred that problem solving strategy helps the problem solver to organize the knowledge of the problem cycle, figure out the resources at the user's disposal, monitor one's progress, and evaluates the solution for accuracy. In other words problem solving strategy helps an individual to be metacognitively active and self-regulated.

According to Bakracevic and Licardo (2010), most students are not exposed to overt, coherent, and systematic programmes that require learners to be active participants in teaching and learning processes, in order to solve challenging tasks and in problem situations. Learners must of necessity perform cognitive activities; such as activating existing knowledge structures or organising new information which is made possible through critical thinking and self-regulation.

Students become self-regulated as they actively participate in the teaching and learning situations, solving challenging tasks implicated in problem situation.

Blanchard-fields (2007) identified techniques that could be used in problem solving strategy to include; self-regulation, critical thinking, brain storming and analysis. Problem solving strategy as a type of collaboration learning allows students of different learning ability to work together to achieve their desired goal. This helps to place the learners at the centre of the learning wheel, as there is mixed abilities whereby the learners are made to take full charge of their learning experiences, initiate, participate and personally and collaboratively direct efforts to acquire knowledge rather than relying solely on teachers to learn. Teaching/learning strategies such as problem solving strategy has been shown in literature to promote independent and group learning, increases and strengthen repertoire of thinking process among students. Through these skills, students become more resilient, forge ahead even when they meet with challenging situations in the course of learning. A problem solver is tough, dogged in face of difficulties (Fahim & Pezeshki 2012). When students learn to be metacognitively active processors of knowledge, when they think critically to improve understanding and are emotionally positioned to be in charge of the process of their learning, the

better they would be able to apply knowledge for personal and societal benefits.

In the context of this work therefore, problem solving strategy is a teaching and learning strategy whereby students work together in small groups (team) to seek solution to their reading comprehension problem. Polya's four steps in removing obstacles in reading comprehension in which students acquire knowledge and skills that help them move from level of not knowing how to solve reading comprehension problem to knowing how to solve it is used and the steps are: (1) Identification/understanding the problem through asking self-regulated questions ('wh'-questions) which would help them to understand what to do with given comprehension passages. This helps them to have deeper understanding of the problems in the reading task. The second step is to devise a plan in form of scheming out critical thinking skills to use in solving the identified problems. The third step is carrying out the plan. This is the implementation stage, whereby the students use the comprehension skills to read the passages in order to remove the identified obstacles. The fourth step which is the last stage is the look back step, whereby the problem solver does personal assessment to ascertain whether the problem so identified has been solved. The easiest way to ensure this is by drawing a sketch of mental representation of the passage read using mind map. It is based on this that the Study sought the effects of Problem solving strategy on Students academic achievements in reading comprehension.

The following research question and hypothesis guided the study:

- What are the pretest and posttest mean achievement scores of students taught reading comprehension with problem-solving strategy and that of those taught with conventional (read , re-read) method?
- There is no significant difference in the pre-test and post-test mean achievement scores of students taught reading comprehension with problem solving strategy and those taught same contents with conventional (read, re-read) method.

## **Method**

The Study adopted a quasi experimental that adopted a non-randomized pretest post-test control group design. The Study was conducted using Orlu education Zone 1 of Imo State. The population was made up of 6001students both males and females. The sample size was 179 students in the intact classes. 83 in experimental class, 95 students in control group. Purposive sampling technique was used to select two co- educational schools in the area. An instrument (RCAT) was used to collect the data for the study.

The instrument was validated and tested for reliability using Kuder Richardson (KR 20) formula which gave 0.81. Mean and standard deviation were used to answer the research question while the hypothesis was tested using Analysis of Covariance (ANCOVA) at 0.05 level of significance.

## Results

**Table 1: The Pre-test and Posttest mean Achievement scores of Students taught Reading Comprehension with Problem-solving Strategy and that of those taught with Conventional Method.**

Source of Variation	N	Pretest X	SD	Posttest X	SD	Gained X	Rmk
Experimental Group	83	32.83	10.85	62.72	9.20	29.89	Effective
Control Group	96	39.65	6.27	44.20	6.57	4.55	

Table 1 shows that the experimental group that was taught with Problem Solving strategy(PSS) had a pretest mean achievement scores of 32.83 with standard deviation of 10.85 and a post test mean achievement score of 62.72 with standard deviation of 9.20. On the other hand, the pretest mean score of the control group taught with Read Re-read method (RRM) was 39.65 with standard deviation of 6.27, while the post test mean achievement was 44.20 with a standard deviation of 6.57.

The experimental group had a mean gain score of 29.89 as against the mean gain of 4.55 recorded by the control. The result revealed that students taught using Problem Solving strategy(PSS) achieved higher than students taught with Read Re-read method(RRM) in reading comprehension.

**Table 2: ANCOVA on pre-test and post-test mean achievement scores of students taught Reading Comprehension with Problem Solving Strategy and those taught with conventional method.**

Source of Variation	Sum of Square	df	Mean Square	Cal. F	P.value	Rmk
Corrected Model	17984.834	2	8992.417			
Intercept	13320.044	1	13320.044			
Pretest	2708.767	1	2708.767			
Methods	17974.304	1	17974.304	380.633	0.000	S
Error	8311.099	176	47.222			
Total	525087.000	179				
Corrected Total	26295.933	178				

The results from table 2, shows that the experimental group (PSS) has a significant effect on Students achievement in reading comprehension.. This

is attributed to the fact that the F-value of 380.63 in respect of treatment is shown to be significant at 0.00 level of significant. This indicates that at 0.05 level of significant, the F- value of 380.63 is significant. The result shows that the problem solving strategy method significantly improved students achievement in reading comprehension more than the Read Re-read method (RRM). Thus, the null hypothesis is rejected. The difference in the achievement between the treatment and control group is attributed to the method used.

### **Discussion**

The result from the Study showed that problem solving strategy method was superior to the Read Re-read Method (RRM) in enhancing students achievement in reading comprehension. The efficacy of the problem solving strategy over read re-read method is not surprising because it supports students active participation in the reading comprehension exercises, the students brainstorm, collaborate, analyze passages read and relate what they read with their real life experiences and also relate what they have watched on television and internet.

Problem solving strategy method encourages students active participation of all the students in discussing the topic on the passages read. The small group participations made their thinking open to one another as they learn in a play- way method. This method enables students to think in their own thinking which help them to be metacognitive learners.

On the other hand, the Read Re-read Method (RRM), students are not given opportunity to explore and to take full charge of their learning. The teacher directs, facilitate and controls the teaching and learning. The students sit and receive information without adding anything in the learning process. This makes it difficult for the students to develop useful skills needed to take full charge of their learning. what this experience leads to is poor academic achievements.

The studies conducted by Eziefula (2014), Okwara-kalu (2013), Odiba (2016), agree that training in Brainstorming collaborative Learning has positive effect on students' academic ability than lesson method. The studies by Bakracevic and Licardo (2010), Onyishi & Onuigbo (2016), Okigbo & Agu (2013), and Adekola & Adesoji (2014), posited that students identifying the problem in a given tasks, devising ways to solve the problem by raising questions, talk about the main ideas, make citation from given passages endear them to be more organized in their learning behaviour and are able to be in charge of their learning experiences and they are able to properly log in learned materials in long term memory. The result of this study also agrees

with social cognitive theory propounded by Albert Bandura (1977) which emphasises that learning occurs better and faster in social context and much of what a child learns is gained through observation and interactions with learning materials. Social cognitive theory agrees also with the Study because they believe that students learn better when they work in group and learn through experience of others and by involvement of more in learning makes learning natural and pragmatic, thereby giving room for meaningful learning to take place.

### **Conclusion**

The result of this study show that problem solving strategy method is superior to Read Re-read method in facilitating students achievement in reading comprehension. Students who were exposed to problem solving Strategy achieved better in their reading comprehension than those exposed to read and reread method.

### **Recommendations**

1. Teachers should be trained in the use of problem solving strategy so that they could help students develop robust learning skills.
2. To gain the best out of the study, the teachers should be given an opportunity to attend and participate in sensitization programs, seminar workshops and conferences organised by educational psychologists as to acquire more knowledge on problem solving strategy. The knowledge and skills so learned would help the teachers at various levels to make classroom learning situation an active metacognitive learning environment.
3. Teacher preparation Institutions/Departments in universities should use strategies that would help students learn meaningfully through giving them good opportunities to practice, collaborative thinking and engage actively with study materials.

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