

## MATHEMATICS READING IN IMPROVING MATHEMATICS LEARNING AND ACHIEVEMENT

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### ABSTRACT

Evidence (Omo-Ojugo, 1987), has indicated that teachers rarely teach reading in their content areas, especially in Mathematics. One of the reasons for teachers' inability to teach mathematics reading in our mathematics classrooms could be as a result of their inadequate knowledge of reading comprehension skills in mathematics.

This paper, therefore, highlights some of the reading comprehension skills in mathematics and also suggests possible ways of teaching such skills. It is hoped that the submissions presented here would sensitize our mathematics teachers, to the need for the teaching of mathematics reading comprehension skills in mathematics classrooms.

### Introduction

The poor achievement of pupils in mathematics at various levels of education has been variously expressed. Efforts at improving the level of achievement in this subject are therefore continuously being made, and areas that need improvement are also being identified constantly.

In recent attempts to provide solution to this poor achievement in the subject, authorities, for instance, Ale, (1989); Aina (1986); Olorundare, (1989) identified an area which is lacking in our mathematics classrooms. This area is the teaching and learning of problem-solving skills. These authorities contend that problem-solving skills can and should be taught in our mathematics classrooms.

Several skills in problem-solving have been identified and one of the basic skills in this area is reading (Moulton, 1946; McKillip, Cooney, Davis and Wilson, 1978; Moses, 1982). It is believed that for a pupil to be able to solve a problem effectively, especially in Algebra and Geometry word problems, he/she must first comprehend the problem situation. Hence the student must be taught the basic processes of mathematical problem-solving which involve mathematical reading comprehension.

Although students study reading comprehension in language art, the mathematical context may be quite different from some other contexts. Thus proficiency in English reading may not correlate with proficiency in mathematics reading. This is because mathematics has a language of its own which is internationally acknowledged, as reported by Seidel (1955); Eshun (1976). Hence, the necessity for the mathematics student to be taught mathematics reading comprehension skills.

Reports and evidence (McKillip et al, 1978; Omo-Ojugo, 1987) have indicated that whereas reading is taught in the language arts, it is not taught in other content areas. For instance, Omo-Ojugo (1987:33), highlights that:

Content teachers hardly see themselves having anything to do with the teaching of reading. The inability of pupils to read well is often blamed on the language teacher, who is seen, to have left undone those things which he ought to have done!. This instance, however, is far from the ideal situation for every content area has its own vocabulary, register and lexical jargons which help to convey the main concepts of the area. This implies content and therefore help pupils learn how to read adequately.

This statement conveys the message that subject specialist teachers have not been teaching reading for comprehension in their content areas, despite the fact that it is a crucial thing to do in every subject area. It is even more important in such a highly technical subject like mathematics, especially in word problems.

### **Reading Comprehension Skills in Mathematics**

Authorities in language arts have identified their reading skills and reading comprehension skills. According to Doehring and Aulls (1979), the skills involved in reading acquisition include: visual skills which help in the extraction of letter features, the left-right scanning of letter sequence, and the segmentation of text into words, phrases, clauses, sentences; Grammatical skills which are needed for the recognition of words classes and word inflections, for detection of the syntactic structure of phrases, clauses, sentences, paragraphs and for the extraction of letter sequence patterns; and semantic skills which are used to extract the meaning of words and phrases, the prepositions in clauses and sentences, and the network of propositions implicit in paragraphs. However, DeBOER and Dallmann (1960), provide a more comprehensive list of these reading skills. These include: developing habit of word recognition; comprehension of sentences and longer units; recognition of letters and phonic elements; discovering familiar words; using context clues; noting details; finding the main idea of a longer passage, comparing, evaluating, and visualizing the author's meaning; locating and utilizing needed information; following printed directions; and adapting approach and speed of reading both to the nature of the material read and to their purpose. From the above reading skills, they present the following as reading comprehension skills; reading to find the main idea, to select significant details, to find answers to questions, to summarize and organize to arrive at generalizations, to follow directions to predict outcomes and to evaluate critically. Considering the above, the following reading comprehension skills could be applied in the mathematics context, especially in the teaching of Algebra word problems: getting meaning from the context; knowing meaning of mathematical terms, words and phrases; recognizing meaning of mathematical symbols and abbreviations; seeking for implied relationship between the parts and the whole; identifying mathematical signs for the relationship; identifying required operation(s); identifying relevant and irrelevant data, reorganizing ideas presented in a material, translating verbal symbols into mathematical symbols and formulas; analysing carefully all

mathematical symbols and formulas; translating verbal relationships into mathematical statements or equations, and reading graphs, tables, charts and maps.

### Teaching Mathematics Reading Comprehension Skills

In teaching mathematics reading, the teacher should first teach the student to change his reading habits. One of the main purpose of teaching reading in the language art is to increase the student's speed of reading. The reverse should be the case in mathematics. The student should be taught to read the mathematics problem slowly, to pause at commas or at the end of a single idea, to consider what he has read and decide what it means, and to go back and re-examine it as many times as necessary. Thus in reading mathematics, speed should be a minor concern. Comprehension of every detail, and getting meaning from the context, should be the concern of the problem-solver.

Secondly, the teacher should teach the meaning of mathematical words or of ordinary words used in a specialized sense, and meaning of mathematical symbols, as they occur in the mathematics context. For instance, the word 'rhombus' is a specialized mathematical term while the word 'square' has both an ordinary sense and a mathematical sense. Thus the teacher should call the students attention to every new mathematical term they meet, just as in the language arts where 'new words' in a comprehension paragraph, are taught. One way of teaching meaning of mathematical words and terms, could be by using 'root' words and prefixes. Root word and prefixes have been identified as being important clues to the meaning of words and to the development of vocabulary. For example, in helping students to solve the following problem; the sum of a number and twice the square of the number is 210. Find the number; the teacher should help students to understand the meaning of the words sum, twice, square and also the phrase 'twice the square of the number'. Students should be made aware of the fact that the word 'sum' serves as a root or stem for the terms sum, summation and summing.

Another way of introducing mathematical words, as they occur in context, is by considering word derivation. For instance, the meaning of words derived from Latin can be made clear by taking the word apart to show the root and/or the prefix. Example: consider the following problem: The sum of the squares of two consecutive integers is 113. Find the numbers. In this problem, the student needs to be taught the meaning of the term 'consecutive'. This can be done by considering the Latin derivation of the word, showing the root and the prefix. That is, the term consecutive comes from the Latin words sequi-meaning, 'follow', and con-meaning 'together'.

Thirdly, the teacher should teach the student mathematics reading by having the student solve a problem by restating the problem orally in his own words after he has read it. If he is able to state the problem in simple terms, he is well on his way to solving the problem. The ability to restate a problem in the student's own words, would enable him to identify what the problem asks for and also to identify relevant and irrelevant data in the problem.

Example: consider the following problem: 40 students were given the following problem to solve; twice a number subtracted from 3 times the square of the number leaves 133. Find the number solve problem. A student who can restate this problem in his own words would immediately find that the phrase '40 students' is not relevant to the solution of the problem. He can therefore restate the problem in the following simple way:

Find a number such that 3 times the square of the number, minus 2 times the number is equal to 133.

In teaching mathematics reading comprehension skills, especially as it relates to word problems, the teacher should therefore direct students to identifying from the given problems, answers to the following questions:

- What is given?
- What does the problem ask for?
- What information is relevant and what is not relevant?
- What condition(s) apply to the problem?
- What mathematical sign(s) is/are indicated by the given phrase in the problem?
- What quantities can be related?

### Conclusion

Evidence has shown that 'reading with comprehension' is a basic skill in problem-solving. Hence for effective teaching/learning of problem-solving in our mathematics classrooms, the students should be taught mathematics reading comprehension skills. These skills, as they relate to the mathematics context, have been identified and suggestions for teaching them in the mathematics classrooms, have also been given in this paper.

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### Introduction

Primary Education is seen by many a parent for all our social difficulties (Curtis, 1979). It helps to form a bridge between home environment and primary school environment (Chen, 1979). This bridge who have primary school experiences tends to socialize better in primary schools than those who do not have the experience. In addition evidence (Ayer et al. 1970; Agwagah, 1994), as shown that pupils who attend primary school perform better academically in mathematics both at the primary and secondary school levels. What wonder then, one wonders about the mathematics concepts that are mastered by the primary school pupils.

Whereas it is easy to identify the mathematics concepts that primary school pupils should master, it is not all easy to identify those that are to be mastered by primary school children, this is because formal mathematics teaching is clearly inappropriate at this level and so, "there is pervasive but unjustified pessimism about what mathematics young children can learn" (Bell, 1980:2). Also, there is no primary mathematics curriculum guide for primary schools which shows the scope and sequence of the years with a downward of progression. But it stands as well there is such a guide for middle schools. Based on this, it appears to be differing approaches to primary mathematics education here and there.

NR - ISSN 0001 - 3099



# abacus

THE JOURNAL OF THE MATHEMATICAL ASSOCIATION OF NIGERIA

VOLUME 24, NO. 1 1997  
MATHEMATICS EDUCATION SERIES  
SEPTEMBER 1997