

A Comparative Study of Word Problems and Arithmetic Problems in Mathematics Faced by Students

Prashant V. Pawar

M.A. (Education)
Y.C.M.O.U. Nashik.
SC Code : 85225

Dr. Keshav W. Ingole

Principal
S.V.G.S.P.M. B.Ed. College Loha
Tq. Loha Dist. Nanded

Abstract :

Mathematics education is an important part of school education. Many students perform differently in solving arithmetic problems and word problems.

This study compares students' difficulties in solving these two types of mathematical problems. Research in mathematics education shows that word problems often require both arithmetic skill and language comprehension. Which makes them more challenging than symbolic arithmetic tasks.

The present study aims to identify the difference in performance types of errors and learning difficulties among students. The study can help teachers improve instructional stages.

Key words : word problem, arithmetic problem, student difficulties, mathematical achievement, problem solving.

1) Introduction :

Mathematics plays a major role in developing reasoning, critical thinking, and analytical ability among students.

Mathematics learning includes many forms of problem solving among which arithmetic problems and word problems are common.

Arithmetic problems involve direct numerical operations such as addition, subtraction, multiplication, and division. Word problems require students to read a verbal statement, understand the situation, identify relevant information, and convert it into mathematical form.

International studies have shown that students often perform better in arithmetic calculations than in word problems because word problems require language comprehension, reasoning, and mathematical modeling simultaneously.

Many students have a lack of knowledge of typical words. Words do not show many time numbers. Numbers and symbols are easy to know and understand. Arithmetic figures impact a student directly for calculation. Easy to tough like addition to square.

Many students are in a jumble after reading the word problems. Many time concepts are not clear about all the words.

Arithmetic problems build the mathematical skills. It helps students learn fundamental operations.

Arithmetic problems improve reasoning, analysis, and step-by-step thinking. It also helps to improve student problem-solving ability. It is also important for accuracy and speed. It's useful in daily life. It helps for higher mathematics to students. It builds confidence in students.

Word problems are also important as they connect mathematics to real life. Word problems help students understand how mathematics is used in daily life such as shopping, travel, budgeting, sharing, and measurement. It develops problem-solving skills. Word problems improve reading and comprehension. It also enhances logical and critical thinking. It is also useful in strengthening conceptual understanding.

So study of comparing is important.

2) Need and significance of the study :

Many students solve numerical problems successfully but fail in word problems. This difference creates learning gaps.

This study is significant because it helps:

- Identify specific learning difficulties
- Improve classroom teaching strategies
- Develop better learning material
- Support slow learners in mathematics

Studies indicate that linguistic complexity strongly affects performance in word problems.

solving. This comparative study helps us know the students' thinking about these two types of problems.

whenever such type of problems occurs in exams the students are thinking what to do first numerical or words. This study is helpful for this.

3) Statement of the problem :

"A comparative study of word problems and arithmetic problems in mathematics faced by students"

4) Objectives of the study :

The following mentioned objectives of the study:

- 1) To study students achievement in arithmetic problem.
- 2) To study the achievement in word problems.
- 3) To compare performance in arithmetic and word problem.
- 4) To identify difficulties faced by students in both types of problem.
- 5) To suggest remedial teaching strategies.

5) Research Questions :

- 1) Do students perform better in arithmetic problems than word problems?
- 2) What difficulties do student faces while solving word problems?
- 3) What difficulties do students face while solving arithmetic problems.
- 4) Is there a significant difference between achievement scores?

6. Hypothesis :

H0 (Null Hypothesis)

There is no significant difference between student performance in word problems and arithmetic problems.

H1 (Alternative Hypothesis)

There is a significant difference between student performance in word problems and arithmetic problems.

7. Review of Literature :

1. **Lieven Verschaffel et al. (2020):** Reported that word problems are among the most difficult mathematical tasks because they require comprehension, strategy selection, and reasoning.

2. **Nonmanut Pongsakdi et al. (2020):** Found that both text comprehension and arithmetic skills strongly influence word problem performance.
3. **Roberto Capone et al. (2021):** Found that students struggle with interpreting mathematical language in word problems.

8. Research Methodology

- **Research Method:** Survey method.
- **Population:** School students studying Mathematics.
- **Sample:** 100 students selected using random sampling.

Tools used for data collection:

1. Achievement Test
2. Questionnaire
3. Observation Schedule

9) Data Collection :

Two tests were administered (20 marks each):

1. Arithmetic Test
2. Word Problems

10) Analysis and Interpretation : 100 students participated.

Problem Type	Mean Score	S.D.
Arithmetic Problem	15.6	2.8
Word Problem	11.2	3.4

Interpretation:

The lower mean score in word problems suggests greater difficulty. Research consistently shows that language and reasoning demands make word problems harder than pure arithmetic computation.

11) Major Findings :

Students commonly faced:

In Arithmetic Problems:

1. Students made calculation mistakes.
2. The students' multiplication tables are weak, so it impacts performance.
3. Student behavior about problems includes carelessness.
4. The students are in confusion while problem-solving and operations.
5. Students seeing new types of problems confused them.

6. Many students do not achieve the passing level even in arithmetic problems.

In Word Problems:

1. Students are having poor reading comprehension.
2. Difficulty identifying important data given through the problem.
3. Students faced trouble converting text into equations.
4. Students choose the wrong selection of operations.

12) Educational Implications

The teachers should:

1. Use activity-based teaching.
2. Connect mathematics with daily life.
3. Develop reading comprehension in math class.
4. Use diagrams and visual models.
5. Provide repeated practice with verbal problems.

Schema-based and metacognitive instruction has been shown to improve student performance.

Conclusion :

This comparative study concludes that students generally perform better in arithmetic problems than in word problems. Word problems demand not only calculation skills but also language understanding, logical reasoning, and problem representation. Therefore, teachers need to give special attention to developing students' word problem-solving skills.

References:

1. **Capone, R. et al. (2021):** *Difficulties in arithmetic problem solving.*
2. **Daroczy, G. et al. (2015):** *Linguistic factors in word problems.*
3. **Pongsakdi, N. et al. (2020):** *Word problem solving and arithmetic skill.*
4. **Verschaffel, L. et al. (2020):** *Word problems in mathematics education.*

