

Name : Waseem Ahmed
Supervisor Name : Prof. Janaki Rajan

Title : A Study of the ways Children Solve Mathematical Problems

Department of Teacher Training & Non-formal Education
(Institute of Advanced Studies in Education)
Faculty of Education
Jamia Millia Islamia
New Delhi

Objectives

- To map the various ways used by children to solve mathematical problems.
- To study the cognitive processes of children while solving mathematical problems.
- To study the extent to which teachers are aware of various ways of solving mathematical problems.

Major Findings of the Study

On the basis of analysis done, major findings of the study were as follows

- Marking scheme supplied by the department also represented standard way of solving and did not have any instruction regarding the solution as per alternative way.
- After analyzing the answer scripts of class V it was found that all the students used typical school type ways means standard ways to solve the multiplication and division questions and not a single student tried to come up with alternative ways for the computation or solution.
- Mostly children written down the answer directly without showing any written recoding for computation which create ambiguity to understand the thinking process of students or what are the process they used to reach the solution.
- It was found that children used multiple ways i.e. tallies or lines, pictures, group of 10s, known facts, row method, column method, number lines, count all, count on, counting forward, counting backward, decomposition and composition, doubling, halving, number line and mental method etc. to solve the basic operations.
- Analysis also shown that children also know various other names for the arithmetic operations like for addition they use *plus, jma, jod, ikatha krna*, for subtraction they use *minus, ghata, kam krna, katna*, for multiplication they use *multiply, times, guna, cross wala, tables padna*, for division they use *divide, sharing, batna, kaatna*, which directly or indirectly helped them to solve the problems.
- Interaction and discussion revealed that children learn these strategies from different sources like school, tuition, home, market etc. The study found that working in groups with the children can facilitate cognitive gain in the mathematical problem solving.
- During interaction children mentioned when we need to find out the answer in lesser time we go for standard ways while when we have more time we go for alternative ways.

Moreover alternative ways gave more clarity and understanding regarding the process and number sense.

- Data shown that they visualized standard as well as alternative ways in their mind through imagination of numbers or some other objects and solve the mathematical problems in their mind itself and directly gave the answer to the question. Children explained and shown recording for the process of computation to reach the solution when they ask for doing so.
- Two teachers mentioned that they tried to teach through alternative ways mentioned in the textbook and also gave space to thinking of children to solve the problems although these sometimes become very enriching to us as well and learn something from our students.

Conclusion

Before concluding, the main point needs to be mentioned here that ‘knowledge is a cumulative and accumulated over the years and researcher studied the children present knowledge base which is a result of lots of engagement of the children.’

This study strengthened the theoretical background of multiple ways, and propagates the use of alternative ways of learning and teaching of mathematics to ensure that these add value to further improvement in mathematics understanding. Mathematics content was transacted in the traditional way and the approach to teaching learning mathematics though changing but still emphasis was given on the mechanistic and conventional way of teaching.

Every method is important as some of the children understand with standard strategies while others comprehend with other alternative strategies therefore there must be multiple of ways so that conceptual understanding can be maintained and developed.

Lastly, final point gave deep insights into the study that apart from classroom teaching, children are learning mathematics, doing mathematics, and thinking about the mathematics, and also tried to trace out the mathematical ways to solve the problems related with basic operations. Somewhere or the other these are the sign of mathematisation. Now there is a call of the hour that within classroom and outside classroom knowledge related with basic operations needs to be connected for better understanding and quality of mathematics’ learning.