

Case study - Action Research on multiplication algorithm in grade 5



Background about school: Our school is in the heart of the town with a good environment. 132 student are studying in our school.

Some key areas of interest: I am interested in Math and English. In Math, I focused on developing the conceptual understanding using concrete materials such as TLM's and math manipulatives.

Why I was interested in joining the teachers' circle: Teachers' Circle provided a platform to share my ideas and learnings with other teachers and in-turn receive their ideas for my professional development.

Summary of the different things I did last year: I have been handling the same set of students for the past two years. So it has been easy for me because I know their strengths and weaknesses.

In this academic year, I did lots of activities in all my subject areas. Mathematics laboratory is the highlight of my classroom. My colleagues also made use of the math lab materials. I designed many group activities for my children of grade 5 to learn various mathematic concepts like angles and its categories, fractions and types of fractions, decimals, patterns, area and perimeters and multiplication and division algorithms.

Gomathy. R

Savarayalu Nayagar Govt. Girls
Primary School

Student strength – 132

Teacher strength – 8

Activities for grouping and regrouping using the base ten blocks and sticks laid the foundation step for the concept of place value. This has strengthened my students' ability to do the four basic operations.

I had sent my children to appear for a National Level Talent Examination. And I used to take special classes during the lunch break to prepare them on topics such as simple interest, profit and loss, percentages etc. This experience helped my student to appear for the Navodhaya Selections test 2016. I am very hopeful that my students will soon participate in the National Talent Search Examination. I also did an action research in my classroom on Multiplication and made a presentation in our zonal level CRC meetings.

Experience Sharing

Purpose

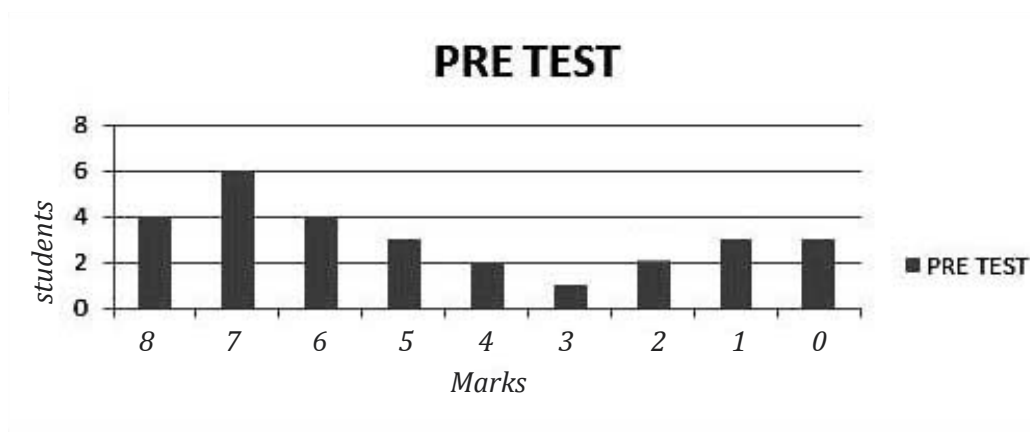
I wanted to identify and rectify the errors made by grade 5 students in the multiplication algorithm while doing long multiplication. The curricular expectation is for students to be able to multiply bigger numbers following the multiplication algorithm.

How I prepared to work on this objective

I wanted my student to meet the curricular expectation as defined in the NCF curriculum document. In order to achieve this, I did an Action Research on multiplication algorithm.

Pretest and finding: I conducted a pre-test to find out the errors made by students while doing multiplication. I gave eight multiplication sums for 28 girls of my class and the bar diagram below depicts the results.

Bar diagram



Note: Marks obtained by the student out of 8

Process

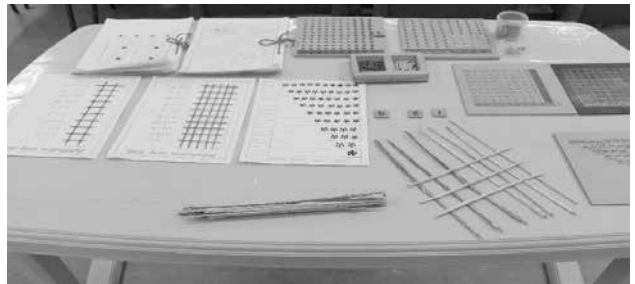
I classified the errors into six categories as follows:

- Place value errors
 - does not know grouping and regrouping
 - makes mistakes in the carryover process
 - Not placing the digit in the respective place while multiplying
- Zero error
 - Difficulty in understanding the meaning of zero
- Identity error
- Digit error
- Problem in multiplication table .
 - Difficulty in memorizing the table and does not know a particular table e.g. Table of 7.
- Problem in addition

Summary of teaching and assessment approach

Based on the findings from the pre-test, I planned my remedial teaching process to bridge the gaps in understanding.

Remedial teaching was given based on the students' needs, focusing on the types of errors done by them.



TLM and worksheets for multiplication materials that was used by students

What was the experience

1. In zero error, students mixed up the role of zero during addition and multiplication. So I used concrete materials to explain the different roles of zero in addition and multiplication.

E.g. 1

40
32

72

E.g. 2 40×32

80
120

1280

- Place value errors were rectified using Base Ten Block materials from our math lab. These materials are very much useful to teach grouping and regrouping of numbers. So this helped in rectifying place value errors.
- Children were given checked sheets to get sufficient practice in multiplication. Grid method is splitting the given number and then multiplying them.

E.g. $43 \times 65 = ?$ $43 \times 65 = (40+3) \times (60 + 5)$

This methods is nothing but the expanded form of the long multiplication. Students compared both

X	40	3
60	2400	180
5	200	15

2400		43 X 65
200		-----
180		215
15		258
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2795		2795
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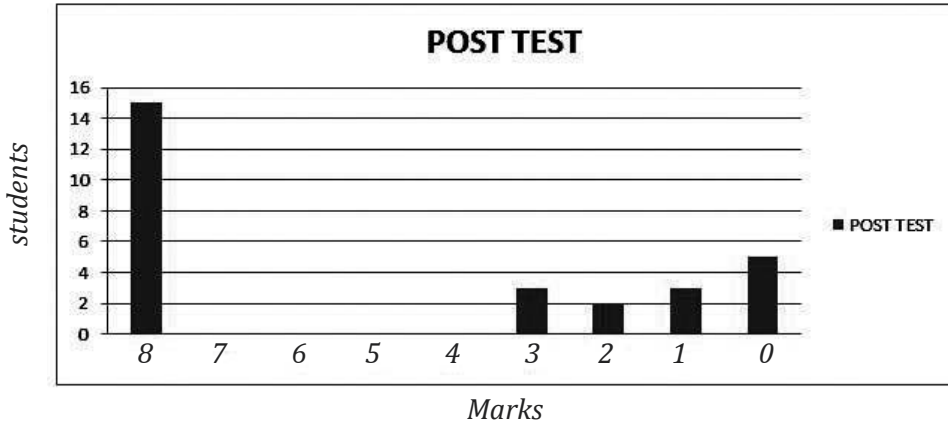
methods and realized that they are similar in nature.

After giving special attention to each child, I divided the class into eight heterogeneous groups and asked them to do multiplication in group. This group activity is very effective and played an important role in the process of our remedial teaching.

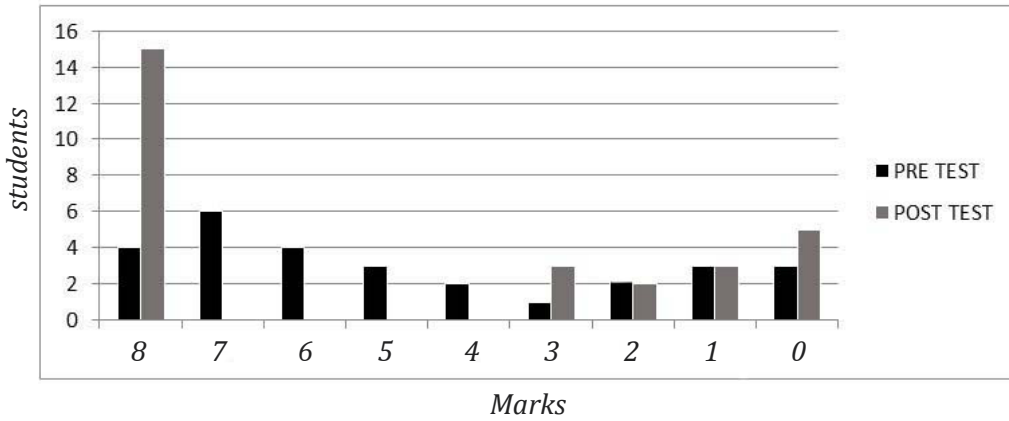
Post Test:

After the remedial measures, I conducted a post test and the result are here in the bar diagram given below

Analysis of the post test revealed that students who made place value errors, zero error and identity error were brought to the first level. Children who have already learned addition in an algorithmic way got the opportunity to deepen their understanding of place-value which lead to understanding and solving multiplication algorithm (Heege 1983). Two out of Twenty eight student do not know multiplication. They have very little understanding of multiplication and need more practice in multiplication table. Some grouping activities were given to familiarize them in tables and multiplication. I used worksheets for the same and they are now learning multiplication table of 6.



Here is pretest and post test comparison



Test	8 out of 8- correct answer	> 5 correct	>3 correct	0-2 correct
Pretest	4	13	3	8
Posttest	15	0	3	10

Way forward

I am going to concentrate on number sense and how children understand the concept of zero. How learning happens while teaching number from 1 to 10.

Children are learning so many concepts such as counting, grouping, place value, addition, subtraction and zero when they learn numbers from 1 to 10. I want to understand how this learning happens. I have already started doing action research in math and have documented it. I will continue my work in the above mentioned areas.

Ref : Hans Ter Heege (1983), The Multiplication Algorithm: An Integrated Approach, For the Learning of Mathematics, Vol. 3, No. 3 (Mar., 1983), pp. 29-34 Published by: FLM Publishing Association Stable URL: <http://www.jstor.org/stable/40247833>