An Action Research Report
Session: 2024-25

(Topic of the study)

"Effectiveness of Strategic Practices in addressing difficulties in adding three-digit numbers among class-3 students of Powai Navajyoti LP School, Margherita Education Block, Tinsukia District"

INVESTIGATOR

Nijara Pait
Lecturer, PSTE(Mathematics)
District Institute of Education and Training (DIET)
Tinsukia, Assam

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Certificate

This is to certify that Nijara Pait, Lecturer DIET Tinsukia has worked under my guidance and supervision for her action research "Effectiveness of Strategic Practices in addressing difficulties in adding three-digit numbers among class-3 students of Powai Navajyoti LP School, Margherita Education Block,of Tinsukia District". This study is an authentic and a bona fide research work.

Date: 01/03/2025

Signature: Gogoi

Name: Mrs Sansita Gogoi

Place: Tinsukia

Tinsukia

Principal, DIET

Principal
District Institute of Education
and Training, Tinsukia

Acknowledgement

Action research is an important part of the teaching learning process. It improves the practices of a practitioner and develops quality of the practitioner as well as the students, teacher or the institution. I would like to extend my gratitude to SCERT, Assam and the District Research Committee (DRC), Tinsukia for giving me this opportunity to conduct this action research study "Effectiveness of Strategic Practices in addressing difficulties in adding three-digit numbers among class-3 students of Powai Navajyoti LP School, Margherita Education Block, Tinsukia District". I owe my deepest regards to Principal, DIET Tinsukia for her guidance and support for the completion of this action research. I would like to thank Mr. Jadav Baruah, Head of Powai Navajyoti L P School and assistant teacher Miss Rubina Naik for their co-operation during the action plan. And I also like to offer my thanks to all the teachers and students of Powai Navajyoti L P School. I would like to extend my thanks to all the sample students who have co-operated me throughout the action plan. Without their hard work and support, this plan could not have come to reality. I would like to thank my fellow colleagues of DIET Tinsukia for our academic delineations on the conduct of action research and constant support for the timely completion of the study. And last but not the least, I thank my family members for their endless encouragement.

Nijara Pait

Nijara Pait

Lecturer

DIET Tinsukia

Abstract

This action research study aimed to address the difficulties faced by Class 3 students at Powai Navajyoti LP School in mastering the addition of three-digit numbers. The primary issues identified were a lack of understanding of place value, difficulties in digit alignment, and challenges with carrying over during addition. To improve students' proficiency in these areas, a series of strategic interventions were implemented, including the use of visual aids, grid-boxed notebooks for digit alignment, targeted practice sessions, and individualized feedback. The research employed a quasi-experimental single-group design, utilizing pre-tests and post-tests to evaluate the impact of these interventions. The results demonstrated a significant improvement in students' performance, with the mean score of the post-test increasing from 9.7 to 15.7. This improvement highlights the effectiveness of the strategies in enhancing students' understanding of place value, digit alignment, and carrying over. The study concludes that targeted and strategic remedial practices can effectively address learning challenges in basic arithmetic and foster greater confidence in students' mathematical abilities.

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Chapter-1

Introduction

1.1 Introduction of the present study

Addition is a fundamental mathematical skill that lays the foundation for more complex arithmetic operations. Mastery of addition is essential for students to progress in their mathematical learning and apply these skills to real-life problem-solving situations. However, adding three-digit numbers poses a unique challenge for young learners due to its reliance on concepts like place value, digit alignment, and carrying over. These concepts can be abstract and difficult for students to grasp, especially without the use of effective teaching strategies.

In Class 3, where students are introduced to multi-digit addition, these challenges often result in frequent errors, decreased confidence, and lack of engagement in math lessons. Identifying and addressing these difficulties early is critical to ensuring students build strong mathematical foundations.

1.2 Problem area

The primary problem area of this study is the persistent difficulty faced by Class 3 students at Powai Navajyoti LP School in mastering the addition of three-digit numbers. Despite the foundational importance of addition in mathematics, many students struggle due to the following issues:

1. Lack of Understanding of Place Value:
Students often fail to grasp the hierarchical structure of numbers, making it challenging to correctly add digits in the hundreds, tens, and one's places.
2. Difficulty in Aligning Numbers:
Misalignment of digits during addition leads to errors, especially when manually solving problems.
3. Challenges with Carry-Over Operations:
Carrying over numbers when the sum of digits exceeds 9 is a complex step for many learners, leading to incomplete or incorrect solutions.

This problem area impacts not only the academic performance of the students but also their overall attitude towards mathematics. Addressing

these issues through strategic teaching practices is critical to ensuring their success in math and beyond.

1.3 Need of the action research:

During the regular school visit for monitoring and academic support to the schools of the district it was evident that some of the students of class III of Powai Navajyoti LP School are making mistakes in three-digit addition. Addition of numbers correctly is an important part of conceptual understanding and procedural skills. The researcher was concerned because this was a real issue that needed to be dealt with immediately. Hence, the researcher took up this action research to find out the causes behind this issue and come up with immediate solutions for the betterment of the students.

1.4 Objectives of the action research

The objectives of this action research are:

1. To identify the specific difficulties faced by Class 3 students in adding three-digit numbers.
2. To implement strategic practices to address these difficulties.

1.5 Probable causes of the problem

The challenges faced by Class 3 students in adding three-digit numbers may arise due to several reasons. The probable causes include:

1. Limited Understanding of Place Value:

Students may struggle to grasp the concept of hundreds, tens, and ones, making it difficult to correctly align numbers for addition.

2. Inadequate Teaching Methods:

Traditional teaching methods may fail to provide students with a clear, practical understanding of the addition process, especially for multi-digit numbers.

3. Lack of Practice with Carry-Over Operations:

Students may not have sufficient exposure to problems requiring carrying over digits, leading to errors and confusion.

4. Poor Number Alignment Skills:

Misalignment of digits while writing numbers can cause calculation errors, especially when adding manually.

5. Mathematics Anxiety:

Negative attitudes or fear of making mistakes in math may lower students' confidence and engagement in learning.

Identifying and addressing these causes is essential to develop targeted strategies that improve students' understanding and performance in three-digit addition.

1.6 Most probable causes

1. Difficulty in carrying over(regrouping),
2. Poor Number Alignment Skills and
3. Lack of practice of two-digit numbers of the students of Powai Navajyoti LP School.

1.7 Statement of the problem

Effectiveness of Strategic Practices in addressing difficulties in adding three-digit numbers among class-3 students of Powai Navajyoti LP School, Margherita education block, Tinsukia District"

1.8 Action Hypotheses

Strategic practices such as the use of visual aids, manipulatives, and gamified learning strategies significantly improve the ability of Class 3 students at Powai Navajyoti LP School to add three-digit numbers.

The action hypotheses for this study are:

1. The use of visual aids (e.g., charts, diagrams, and number lines) will help students overcome difficulties in understanding place value, leading to improved accuracy in three-digit addition.
2. Incorporating the practice of three-digit addition in a grid-boxed notebook will enhance students' conceptual understanding of carrying over.
4. Targeted practice sessions focusing on digit alignment will reduce errors caused by misalignment during manual calculations.
5. Providing individualized attention and feedback will address the varied learning paces among students, leading to improved overall performance in three-digit addition.

These action hypotheses will guide the interventions to address the identified challenges in adding three-digit numbers effectively.

Chapter-II
Research Methodology and Procedure

Sample: A Sample is a portion of the total population. As the population is small in size so the researcher has considered the whole population as sample for the study. So here the number of populations is 10 and all the 10 students were considered as sample for the study.

Tools and techniques of data collection: The purposes of the research determine whether the survey procedure should be structured or unstructured. Generally, the structured approach is chosen when hypotheses are to be tested while unstructured approach is used when an exploratory study is to be conducted. The structured procedure improves the quality of the data by minimizing the measurement error. There are various tools and techniques for data collection. For example, questionnaire, observation, interview schedule, case study etc. In this study the researcher has tried to apply the best and suitable tool. In this action research the researcher has applied the tool "questionnaire" for the data collection.

Questionnaire is the structured set of questions and it is considered as one of best tool for data collection. Questionnaire is a document that contains a set of questions and the answers to which are to be provided personally by the respondent.

For this action research the researcher has made questionnaires for the sample i.e. grade III students, consist of 20 questions on the topic "Addition of numbers". The questionnaires consist of both open ended and close ended questions as well as structured and unstructured questions. The size of the questionnaire was middle-sized and it is personally administered to subjects to complete in the presence of the researcher or his/her assistant.

Sample questionnaire of the study is enclosed at the last page.

Implementation of the action plan: The researcher has started the implementation of the action plan as pre-planned as follows-

Action details and time-chart: the researcher has started the action research from September 2024 to January 2025.

Table 1

Sl. No.	Name of action	Tools	Method	No. of days
1	Preparation of pre-test	Test items, Manual work	Analysis, synthesis	05
2	Pre-test	Test-papers, Ans. Scripts	Written test	01
3	Analysis of pre-test	Recording	Analysis, systematization	02
4	Preparation of strategies for intervention	Scheme, TLM	Analysis, systematization	10
5	Intervention	Sums from textbook, sums from outside the book,	Discussion, activity, practice of different sums, feedback	20
6	Recapitulation	Intervention points	Discussion and explanation	01
7	Post-test	Test-papers, Ans. Scripts	Written test	01
8	Analysis of post-test, comparison, Data-formation, Report making, Reporting	Writing, data computation, D.T.P, Photo state, bindings etc.	Analysis, simple statistical method	10
9	Total no. of days			50

Research Design: Quasi-Experimental single group pre-test, post-test design has been used for the action research.

Chapter-III
Methods and procedure for collection of data

To conduct the action research the researcher has used the following methods:

Pre-test: Pre-tests are a non-graded assessment tools used to determine pre-existing subject knowledge. Basically, pre-tests are administered prior to a course to determine the knowledge baseline. A questionnaire has been set for pre-test, which consist of basic questions on addition of two-digit and three-digit numbers.

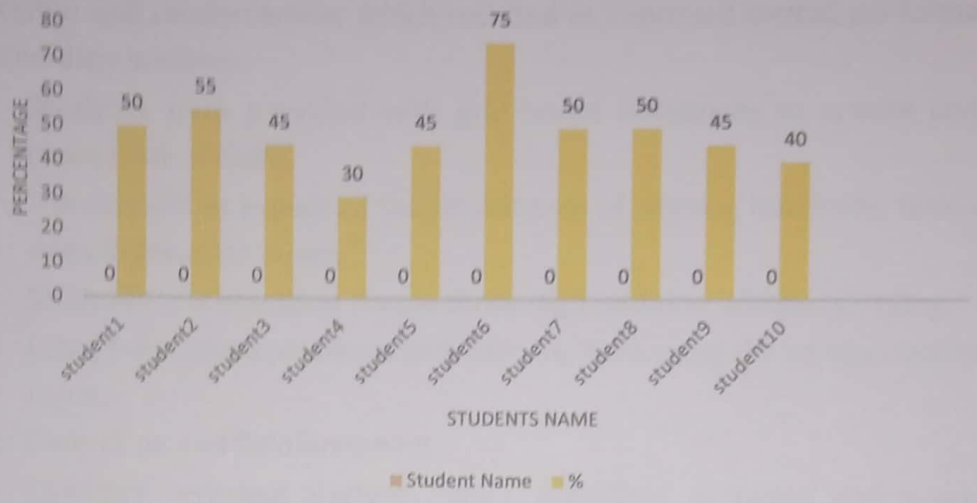
The pre-test score are as follows:

Table 2

Sl. No.	Student Name (N)	Marks Obtain(X)	Total Marks	%
1	Student-1	10	20	50
2	Student-2	11	20	55
3	Student-3	09	20	45
4	Student-4	06	20	30
5	Student-5	09	20	45
6	Student-6	15	20	75
7	Student-7	10	20	50
8	Student-8	10	20	50
9	Student-9	09	20	45
10.	Students-10	08	20	40
Total	$\sum X = 97$			

$$\text{Mean} = \sum \frac{X}{N}$$
$$= 97/10$$
$$= 9.7$$

Fig-1
Pre-Test Score Percentage



After the Pre-Test result the researcher has found some issues with the students. The researcher has discussed the issue with the head of the school and arranged for the remedial measure. Before doing the remedial measure, the researcher went to the students and had some verbal conversation to find out the causes behind their mistakes about addition.

Intervention:

From the Pre-Test result the researcher found that maximum of the students was not able to solve the three-digit addition given to them. Therefore, to overcome the problem the researcher took few classes on the topic addition of two-digit numbers and three-digit numbers by using visual aids. The researcher also has set structured practice sessions for the students with the help of the class teacher. To address the difficulties faced by class-3 students in

adding three-digit numbers, the researcher also has incorporated the practice of three-digit addition in a grid-boxed notebook that enhanced students' conceptual understanding of carrying over. The researcher has set targeted practice sessions focusing on digit alignment which reduced errors caused by misalignment during manual calculations. The researcher provided individualized attention and feedback, accommodating students' diverse learning paces, set guided practice on addition, and incorporated error correction and reinforcement which resulted in improved overall performance in three-digit addition.

- Students were provided with grid-boxed notebooks to ensure correct placement of digits.
- The researcher explained the importance of aligning hundreds, tens, and ones in separate boxes.
- Students first practiced simple three-digit addition without carrying.
- Later, they solved problems with carrying over, using the grid to track extra digits.

Error Correction and Reinforcement

- Teachers reviewed students' work, identified mistakes, and provided immediate feedback.
- Students repeated incorrect sums to reinforce correct methods.

Post-Test: A post test was conducted to evaluate the effectiveness of the action research, resulting in improved overall performance in three-digit addition.

The post-test scores are as follows along with percentage.

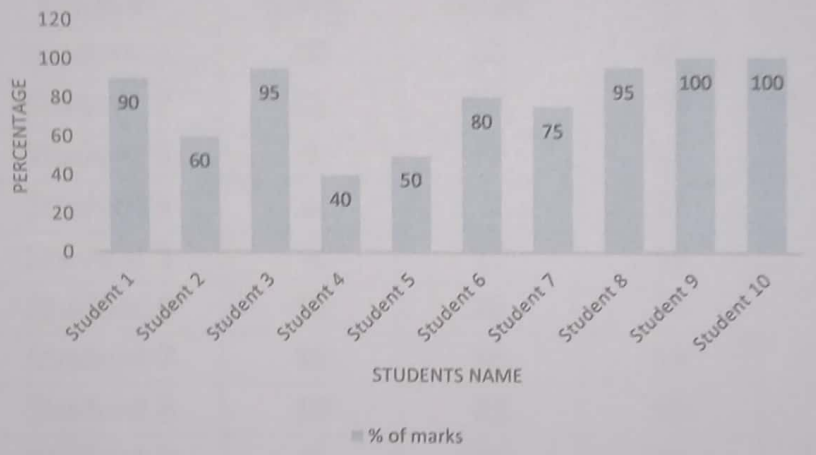
Table 3

Sl. No.	Student Name (N)	Mark Obtain(X)	Total marks	% of marks
1	Student 1	18	20	90.00
2	Student 2	12	20	60.00
3	Student 3	19	20	95.00
4	Student 4	8	20	40.00

5	Student 5	10	20	50.00
6	Student 6	16	20	80.00
7	Student 7	15	20	75.00
8	Student 8	19	20	95.00
9	Student 9	20	20	100.00
10	Student 10	20	20	100.00
	$N = 10$	$\sum X = 157$		

$$\text{Mean of post-test} = \sum \frac{X}{N}$$
$$= \frac{157}{10}$$
$$= 15.7$$

Fig-2
Post test Score percentage



Chapter-IV
Analysis and Interpretation

As the action research was to complete within a given period of time, so the researcher has tried to conduct the Pre-test, remedial measure and the post-test and also the analysis and evaluation part within the time as given below:

Data analysis:

Following are the data collected from the target group during the pre-test and post-test.

Following Table shows comparison between the Pre-Test and Post-Test Scores and their Percentages.

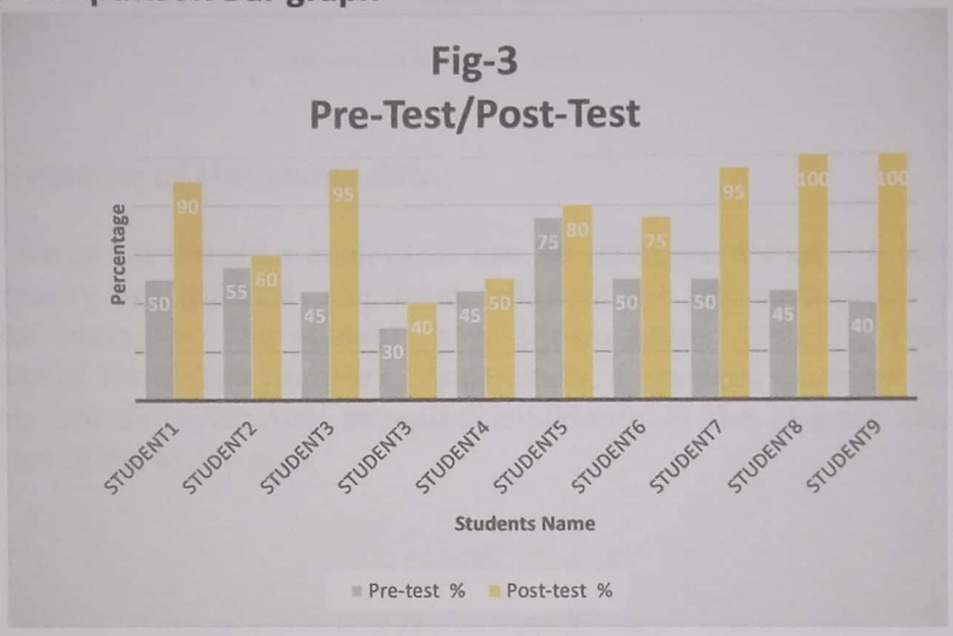
Table 4

Sl. No.	Name of Students	Pre-test Scores	Post-test Scores	Pre-test %	Post-test %
1	Student 1	10	18	50	90
2	Student 2	11	12	55	60
3	Student 3	9	19	45	95
4	Student 4	6	8	30	40
5	Student 5	9	10	45	50
6	Student 6	15	16	75	80
7	Student 7	10	15	50	75
8	Student 8	10	19	50	95
9	Student 9	9	20	45	100
10	Student 10	8	20	40	100
		$\sum X = 97$	$\sum X = 157$		

Mean of Pre-Test = 9.7 **Mean of Post-Test = 15.7**

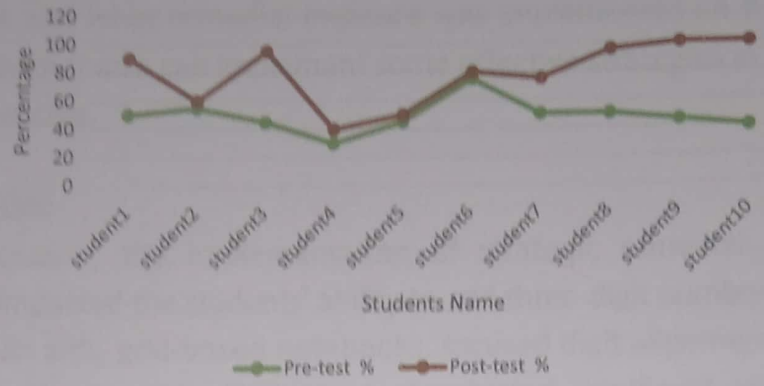
The above data are represented in bar graph and line graph. The graphs are given below:

(a) Comparison Bar graph



(b) Comparison Line graph

Fig-4
Comparison line graph



Interpretation of the above data:

Based on the data analysis, it can be interpreted that the students' performance has gradually improved following the implementation of the remedial measures. The students have shown better scores in the topic "Addition of Three-Digit Numbers." Additionally, it has been observed that the students are demonstrating increased confidence in the chapter after the execution of the action plan.

Findings:

- Test score of students have improved in post-test in compared to pre-test.
- Mean score of post-tests (Mean = 15.7) has also been increased significantly in compared to the mean score of pre-tests (Mean = 9.7).
- The hypothesis that strategic practices reduce mistakes in the addition of three-digit numbers by students has been accepted. This indicates that the interventions, such as the use of visual aids, grid-boxed notebooks, focused digit alignment practice, and individualized attention, effectively helped students minimize errors in their addition of three-digit numbers. The strategies have proven to support students in understanding key concepts like place value and carrying over, leading to improved accuracy in their calculations.

The findings were shared with the mathematics teacher of the particular school and the researcher has discussed about the action plan, strategies taken by the researcher and what remedial measure was implemented on the students so that the teacher also can implement some effective strategies in his teaching-learning process.

Conclusion:

In conclusion, the implementation of strategic remedial measures has positively impacted the students' ability to add three-digit numbers. Through the use of visual aids, grid-boxed notebooks, focused digit alignment practice, and individualized attention, students demonstrated significant improvement in both accuracy and confidence. The data indicates that the students' performance gradually increased, as evidenced by their better scores and growing confidence in the topic. These results suggest that targeted interventions, when tailored to students' needs, can effectively enhance their understanding and proficiency in mathematics.

Suggestions:

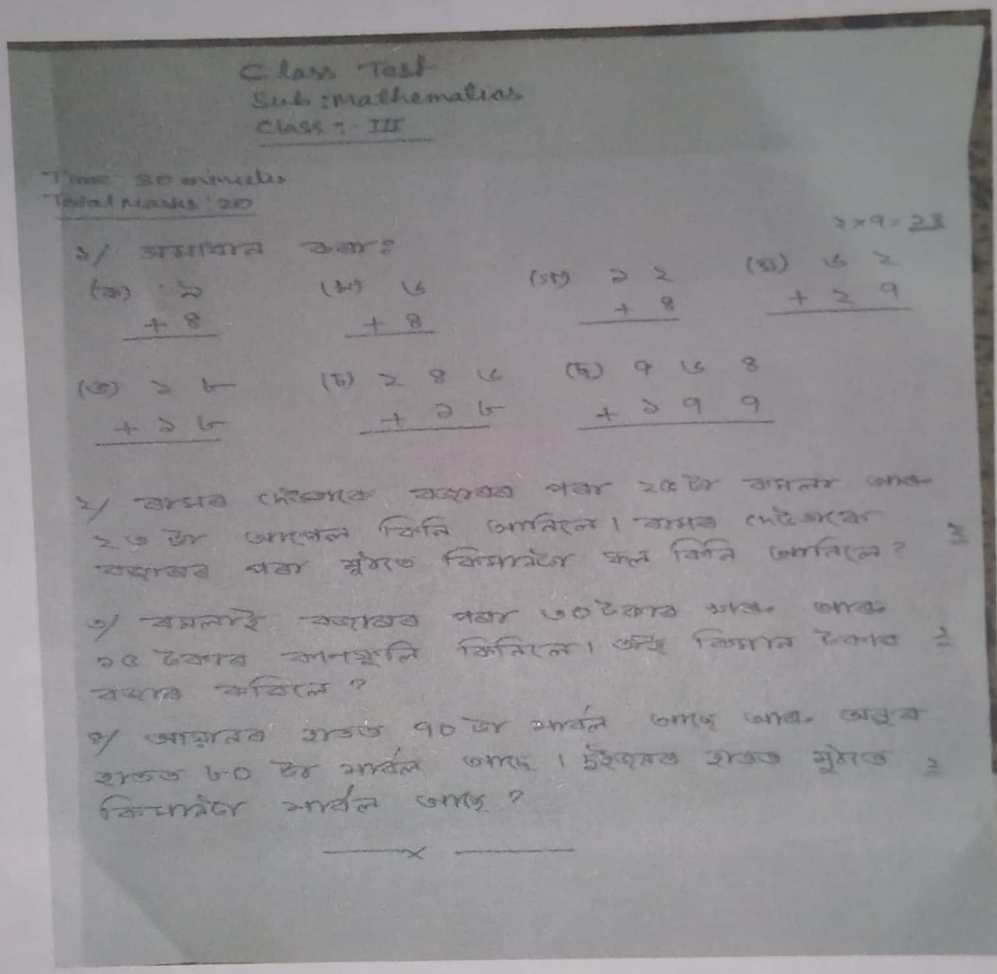
Here are a few suggestions to enhance the study and its findings:

1. Expand the Study: Include a larger, more diverse sample of students to generalize the findings.
2. Long-Term Assessment: Follow up with students to check if the improvements are sustained over time.
3. Use Technology: Integrate digital tools or math apps for interactive learning and instant feedback.
4. Student Feedback: Gather student opinions to understand which methods are most effective.
5. Parental Involvement: Encourage parents to support learning at home for more consistent progress.
6. Target Difficult Areas: Focus on specific challenges in three-digit addition to improve performance.
7. Comparison Group: Compare results with a group not receiving the interventions for stronger evidence.
8. Diversify Teaching Methods: Address different learning styles (visual, auditory, kinesthetics) to enhance learning.

The approaches would help refine the study and provide a broader understanding of effective teaching strategies.

Appendix

Sample Question paper of post test



Class Test
Sub: Mathematics
Class: III

Time: 30 minutes
Total Marks: 20

২×৯=১৪

১/ সমাধান করো:

(ক) ১২ + ৪

(খ) ১৬ + ৪

(গ) ২২ + ৪

(ঘ) ৬২ + ২৯

(ঙ) ২৮ + ১৮

(চ) ২৪৬ + ১৮

(ছ) ৭৬৪ + ১৯৯

২/ রাফার দোকানে বিক্রয়ের পরে ২৫টি কমলা আর ২৩টি আপেল ছিল। বিক্রয় দোকানের বিক্রয়ের পরে মোট কিমার্টের ফল ছিল কয়টি? ১

৩/ কমলাই বিক্রয়ের পরে ৩০টাকার গরু আর ১৫টাকার কলাগুলি কিনিলে। তবে কিমার টাকা ১ বিক্রয় করিলে?

৪/ আয়নার হাতে ৭০টি সার্কেল আছে আর অন্যের হাতে ৮০ টি সার্কেল আছে। দুইজনের হাতে মোট ২ কিমার্টের সার্কেল আছে?

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Photo gallery

The following are some glimpses of action research at Powai Navajyoti LP School.



List of tables

1. Table 1 indicates the action details and time chart.
2. Table 2 indicates the record of marks during the pre-test.
3. Table 3 indicates the record of marks during the post-test.
4. Table 4 indicates the comparison marks of pre-test and post-test

List of Figures

1. Figure-1 Bar Graph of pre-test score percentage.
2. Figure-2 Bar Graph of post-test score percentage.
3. Figure-3 Comparison Bar Graph
4. Figure-4 Comparison Line Graph

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Budget for Action Research: Rs. 20,000

Sl. No.	Item	Cost	Description
1	**Materials for Visual Aids**	Rs. 500	purchase of charts, diagrams, etc.
2	**Grid-Boxed Notebooks for Students**	Rs. 2,500	Cost for 10 grid-boxed notebooks for practice sessions
3	**Printing of Pre-test and Post-test Papers**	Rs. 500	Printing costs for test papers and answer scripts
4	**Stationery Supplies**	Rs. 1,000	Pens, markers, erasers, paper, etc.
5	**Incentives for Students (Rewards)**	Rs. 1,000	Small rewards for students with improved scores
6	**Remedial Teaching Materials**	Rs. 500	Cost for additional study materials and resources
7	**Transportation Costs**	Rs. 9,000	Travel expenses for researcher's visits to the school
8	**Data Analysis Software/Tools**	Rs. 1,000	Software or tools for data computation and analysis
9	**Miscellaneous**	Rs. 2,000	Unexpected or small expenses (photocopying, etc.)
10	**Report Preparation and Binding**	Rs. 2,000	Costs for printing, binding, and preparing final report

This budget ensures that all essential components of the research are covered, including teaching materials, student incentives, transportation, and analysis tools, while staying within the allotted budget of Rs. 20,000.

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