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Effectiveness of Remedial Teaching on the Academic Engagement of Class 10 Students in Science

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Abstract:

This Action Research investigated the effectiveness of remedial teaching in improving Class 10 students' performance in science concepts. Twenty seven students participated in structured remedial sessions designed to address conceptual weaknesses through active learning, demonstrations and guided practice. A Customized Science Aptitude Test was administered as both pre-test and post-test to measure academic gains. The pre-test was conducted on 29 September 2025 and the post-test on 3 October 2025 after the intervention. Results revealed an increase in mean scores from 14.04 (SD = 3.14) to 15.63 (SD = 3.32) with a computed $t(26) = 1.81$, which was below the critical value of 2.056 ($p > 0.05$). Although statistically insignificant, students demonstrated improved motivation, participation and conceptual understanding. The study concludes that remedial teaching positively impacts students' comprehension and classroom engagement, reinforcing its value as a formative teaching strategy in science education.

Keywords— remedial teaching; science aptitude; science education; action research

INTRODUCTION

As fundamental disciplines in science education, Physics and Chemistry emphasizes not only conceptual understanding but also analytical reasoning and the integration of concepts into practical contexts. Yet for many secondary-level learners, such conceptual barriers often result in learning lags and diminished learner engagement, highlighting the need for structured remedial strategies. Remedial teaching is a structured instructional strategy aimed at addressing these gaps through diagnostic assessment, targeted re-teaching and individualized learning support. It allows teachers to reconstruct learning experiences to ensure that essential concepts are fully understood. Remedial teaching in Physical Science should focus on simplifying difficult concepts, offering individualized attention and reinforcing prior learning to build a stable cognitive base [1].

Research shows that effective remedial programs not only improve test performance but also stimulate learner confidence and motivation. The structured remediation significantly improved students' academic outcomes and their participation in class activities [5]. Academic gains are measurable among low achieving students when intervention programs were systematically implemented [3].

In parallel, the integration of digital and interactive strategies has emerged as a powerful enhancer of remedial learning. The structured pre-test and post-test strategies can effectively track learning gains and maintain student engagement [3]. Building on this foundation, the present study aims to evaluate the impact of remedial teaching on Class 10 students' science performance using a pre-test–post-test design.

STATEMENT OF THE PROBLEM

This study aimed to determine the effectiveness of remedial teaching on the academic performance of Class
10 students in science concepts at Jeevan Vikas Vidyalaya, Devgram. Specifically, it sought to answer:

1. What is the performance of students in the pre-test and post-test following the

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remedial teaching intervention?

2. Is there a significant difference between the pre-test and post-test mean scores of the students?

HYPOTHESIS

The null hypothesis states that there is no significant difference between the pre-test and post-test mean scores of students after the remedial teaching intervention.

REVIEW OF RELATED LITERATURE

Remedial teaching has consistently proven effective in improving academic performance, particularly among learners who struggle with conceptual subjects. Dr. Kalaivani (2016) emphasizes the importance of individualized instruction, timely feedback and simplified content delivery for improving comprehension in Physical Science [1].

In Bhutan, Rai and Penjor (2020) demonstrated that structured remedial classes produced significant improvements in post-test scores ($p = 0.000$) and strengthened students' confidence, motivation and classroom participation. Their findings highlight the value of remediation not just as a corrective tool, but as a transformative learning process.

Francisco et al. (2022) further validate the impact of intervention programs by documenting statistically significant improvements in mathematics performance when systematic remedial strategies were applied.

Modern teaching approaches enhance this effect through technology integration. The pre-test and post-test structures increase learner concentration and provide a measurable way to assess learning effectiveness [3]. These studies provide strong theoretical and empirical grounding for the present research.

I. METHODOLOGY

Research Design

The study employed an Action Research design with a one-group pre-test–post-test structure to evaluate learning gains after remedial teaching. This design is appropriate for classroom-based interventions aiming to assess immediate instructional impact.

Participants

The participants were 27 Class 10 students from Jeevan Vikas Vidyalaya, Devgram, identified as low performers in science based on prior assessment scores. The group represented a range of learning abilities but was homogeneous in academic level.

Instrument

A Customized Science Aptitude Test consisting of 30 multiple choice questions was developed to assess students' understanding of core science concepts. The test focused on:

- Motion and Force
- Pressure and Work
- Heat and Energy
- States of Matter and Density
- Everyday Applications of Science

Procedure

1. Pre-test: Conducted on 29 September 2025 to establish baseline performance.
2. Remedial Teaching: Conducted for two days using demonstrations, guided problem solving and simplified content delivery.
3. Active Learning: Students were encouraged to ask questions, participate in peer explanation activities and solve problems collaboratively.
4. Post-test: Conducted on 3 October 2025 to measure learning gains.
5. Observations were recorded regarding student engagement, confidence and participation.

Each session followed the test-teach-re-teach structure focusing on diagnosing errors, reteaching difficult science concepts and reinforcing understanding through corrective feedback [1].

Qualitative observations were made during the two remedial sessions to capture student behavior, participation and responsiveness. It was noted that students were actively engaged in the learning process, frequently asked questions to clarify concepts and showed increased enthusiasm compared to the pre-test phase. Many learners demonstrated visible improvement in understanding and confidence

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as misconceptions were addressed through direct explanation and corrective feedback.

Statistical Treatment

- Mean (M) and Standard Deviation (SD) were used to describe score distribution.
- A paired t-test was applied to determine whether the difference between pre-test and post-test mean scores was statistically significant at the 0.05 level.
- This aligns with the quantitative evaluation approach [2, 3].

II. RESULTS AND DISCUSSION

TABLE 1: DESCRIPTIVE STATISTICS OF PRE-TEST AND POST-TEST SCORES

Test	N	ΣX	Mean (M)	S.D.
Pre-test	27	379	14.04	3.14
Post-test	27	422	15.63	3.32

The post-test mean was 1.59 points higher than the pre-test mean, indicating improved comprehension following the intervention.

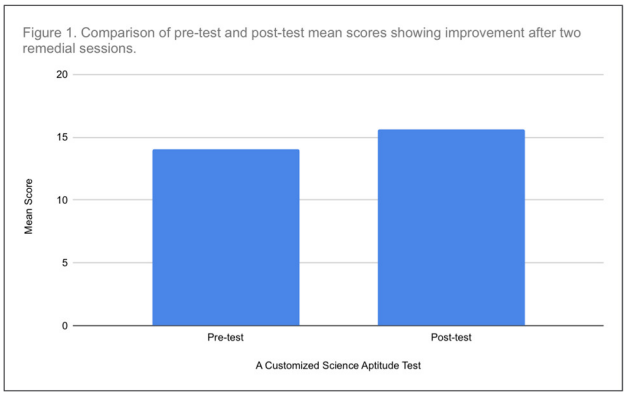

Fig. 1. Bar graph showing mean values regarding Pre-test and Post-test of A Customized Science Aptitude Test.

TABLE 2: T-TEST ANALYSIS

Statistic	Value
Mean Difference	1.59
Computed t-value	1.81
Degrees of Freedom	26
Critical t (0.05)	2.056
Decision	Not Significant

Although the computed t-value did not reach statistical significance, the increase in scores reflects meaningful learning gains. Students were observed to be more confident, participative and focused during post-test administration.

These findings are consistent with Rai and Penjor (2020), who reported that remedial teaching enhances learner confidence and classroom engagement even when numerical gains are moderate.

The pre-test/post-test design was adapted from prior validated models [3, 5] that employ formative evaluation to measure learning progression.

The study outcomes though statistically modest are pedagogically consistent with Francisco et al. (2022), who established that structured intervention programs effectively enhance student learning outcomes and should be sustained through reflective practice.

III. CONCLUSION

The results of this study show that remedial teaching had a positive effect on students' academic performance and engagement in science. Although statistical significance was not achieved, the observed improvement in mean scores along with qualitative indicators such as increased motivation and active participation highlights its educational value. Remedial teaching thus emerges as a formative approach that bridges cognitive gaps, enhances student confidence and stimulates interest in science learning. Future research should continue refining these strategies for sustainable academic improvement.

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PEDAGOGICAL IMPLICATIONS

1. Remedial teaching should be integrated as a core formative assessment practice rather than a peripheral activity.
2. Diagnostic testing should be used to identify conceptual weaknesses early.
3. Pre-test and post-test structures can effectively measure instructional impact [3].

RECOMMENDATIONS

1. Increase the duration and intensity of remedial sessions to amplify learning gains.
2. Integrate digital tools and interactive strategies to strengthen engagement.
3. Combine quantitative results with qualitative measures such as student reflections.
4. Conduct future studies with control groups to establish stronger statistical significance.

IV. ACKNOWLEDGMENT

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REFERENCES

1.Dr.S.Kalaivani Remedial Teaching For Slow Learners In Physical

SCIENCE .International Journal of Scientific Research, Vol : 5, Issue : 5 MAY 2016

2.Francisco, J. G., Alova, C. A. R., Alova, I. M. C., & Apohen, S. L. (2022). Performance of Grade 8 Students in Mathematics Intervention Program. International Journal of Multidisciplinary: Applied Business and Education Research, 3(9), 1742–1748. https://doi.org/10.11594/ijmaber.03.09.14

3.Hapsari, Prema & Natasha, Ratih & Latief, Shofiyah & Nasruddin, & Wahid, Syarifuddin. (2021). Implementation of Quizziz as a Pretest and Post-Test to Evaluate the Effectiveness of Small Group Learning. 10.2991/assehr.k.210930.030.

4.Shivaraju, P. T., Manu, . G., M, . V. & Savkar, .

M.K. (2017) Evaluating the effectiveness of pre- and post-test model of learning in a medical school. National Journal of Physiology, Pharmacy and Pharmacology, 7 (9), 947-951. doi:10.5455/ njppp.2017.7.0412802052017

5.The Impact of Remedial Class on Students'Learning Achievement. (2020). Contemporary Education and Teaching Research, 1(2), 27-34.