Library Progress International *Print version ISSN 0970 1052*
Vol.44, No.4, Jul-Dec 2024: P. 1348-1363 *Online version ISSN 2320 317X*

Original Article *Available online at www.bpasjournals.com*

Impact of Remedial Classes for School Students in Faridkot District of Punjab in India

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How to Cite this Article*:* Kumar, V. (2024). Impact of Remedial Classes for School Students in Faridkot District of Punjab in India.*Library Progress International*, 44(4), 1348-1363.

ABSTRACT

Remedial Education can be one of the most effective tools in achieving learning outcomes in the schools across the country. As a policy measure it has, however, not been optimally utilized in the absence of a rigorous evaluation of its implementation. There is a lack of consensus on theoretical framework and implementation modality of remedial education and assessment of its effectiveness in improving learning outcomes. This paper is an evaluation study of the remedial education project undertaken in Faridkot District of Punjab, India to improve conceptual understanding and achieve foundational literacy and numeracy outcomes for students from the poor socio-economic strata of society studying in public funded schools of the state. The study aims to ascertain improvement in learning outcomes of students undergoing remedial education through analyzing their pre-intervention and post-intervention performance on tests designed to measure basic understanding of concepts suited to their grade level. It also aims to establish causal connection between remedial education and learning outcomes improvement through a randomized controlled trial of academically weak students selected through specially designed pre-intervention tests, who were divided into treatment and control groups on account of control group students being unable or unwilling to attend remedial education classes due to unavoidable reasons. The study shows significant improvement in foundational literacy and numeracy outcomes for students up to grade 5; and in conceptual understanding of basic concepts in Maths, Science and English subject for students up to grade 10. The study establishes causal connection between remedial education intervention and improvement in learning outcomes of students. It also establishes positive contribution of remedial education to overall performance of students on other subjects as well, which were not part of remedial education classes, possibly through improving confidence and instilling self-belief in students which led to much improved school attendance and classroom engagement. The results unequivocally support the implementation of remedial education as a much-needed policy measure to address the learning deficit crisis in schools across the country.

KEYWORDS

Remedial Education, Impact Evaluation, Foundational Literacy and Numeracy, Randomized Controlled Trialntroduction

Indian School Education system is facing a massive learning crisis. Though India has achieved universal enrolment in its schools and has made education accessible across gender divides and to most marginalized sections of the society, quality of education being imparted is not up to the mark. Numerous studies have made it quite clear that children are not learning even foundational literacy and numeracy. Based on a study of learning profiles in Indian schools, economists Lant Pritchett and Amanda Beatty estimate that four out of five children who go into a grade not able to read will finish the grade still unable to read. Education survey undertaken by NCERT in 2021 for Classes 3, 5, 8 and 10, has shown that national average percentage of

students for class third was 59%, which declined by 10% to 49% in class fifth. It further declined to 41.9% in class eight and then 37.8% in class 10 (NAS, 2021). This brings to light, the inability of many students to cope with the increasing pressure of syllabus in successive higher classes. Furthermore, the survey on Indian Education by Pratham has found that about 25% of the youth cannot read a Class II level text fluently in their regional language, over half struggle with division problems, only 57.3% can read sentences in English, and over 50% of students in the 14-18 age group face difficulties with elementary division problems (ASER 2023). Even as children struggle with basics, the school curriculum is designed with a view that children have acquired grade-level skills and can progress onwards. This situation gets compounded as the student who has fallen behind the expected learning levels in an earlier grade doesn't catch up and as a consequence struggles even more with the higher-grade curriculum as he moves up. Further, there is a wide variation in student learning levels within a classroom. In the 2018 ASER survey, in the average standard 3 classroom in Himachal Pradesh, 15.5% students could read words but not sentences; another 24% could read a standard 1 text while 47.4% could read a standard 2 text. The result is a significant divergence between rates of learning and curriculum expectations. Another study by Muralidharan and Singh, with a sample of 5000 students spanning grades 1-8 in four districts of Rajasthan, finds that the average rate of learning progress across grades is substantially lower (about half) than envisaged in the syllabus and curricula. As a result, the vast majority of students struggle to cope and, in the process, learn very little. In the face of such dismal picture of learning levels in classrooms across the country, there is a dire need to focus on improving quality of education and it must start from the achievement of foundational literacy and numeracy in students at grade 5 level.

The National Education Policy 2020 laid out by the Government of India highlights the importance of providing high quality education for effective utilization of the country's talent and resources for the benefit of the individual, society at large and the country (NEP, 2020). Sustainable Development Goal 4 seeks to 'Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all (United Nations, n.d.). Within Goal 4, Target 4.1 emphasizes on the need to ensure that children complete free, equitable and quality education leading effective learning outcomes (UNESCO, 2023). India's education policy lists down some fundamental principles that are to guide the Indian Education System. Some of these include-recognizing, identifying, and fostering unique capabilities of each student by sensitizing teachers and parents about holistic development of the student, emphasis on conceptual understanding, creativity and critical thinking, focus on regular formative assessment generating two-way feedback to both students and teachers, full equity and inclusion across socio-economic divide.

To tackle widespread learning outcomes crisis in the public schools, District Administration, Faridkot implemented a remedial education project across all grade levels with special focus on achieving foundational literacy and numeracy in students at grade 5. The project involved a specially designed syllabus tailored to bridge learning gaps for students, hiring well-qualified volunteer teachers and providing them continuous training on syllabus and pedagogy, imparting after-school hours remedial education to students selected through a pre-intervention test, scheduling weekly tests to generate feedback for both students and teachers and instilling a sense of ownership among the parents of these academically weak students for their children's education by conducting regular parent-teacher consultative meeting. It was envisioned to address widespread variation in learning levels within a classroom as well as to address the learning gaps of students who had moved to higher grades but were still struggling to understand conceptual skills of lower grades. The project also aspired to address the issue of lack of enabling learning ecosystem in the homes of students from poor socio-economic sections of the society since illiterate, labour working class parents had little time and resources to devote to their children's educational needs and also lacked the vision and aspiration to become an important stakeholder in their children's educational outcomes.

Literature Review

A remedial education program is designed to close the gap between what a learner knows and what he/she is expected to know (Paulin & Mugiraneza, 2023). An overview of the remedial programmes running in different parts of the world has shown that such an intervention has the potential to yield significant positive results. A Catch-up programme in Zambia which undertook capacity building of teachers and administrators and strengthened collaboration between the schools and the community members and revamped their approach to learner-centered teaching found that Grade 4 students who earlier read 4,010 as 'forty-ten', were able to read 4-digit numbers correctly after the programme (Oba, 2022). Research into the effectiveness of remedial education has shown that its effect is the greatest when the tutor is a qualified, well-trained teacher of the pupil (Wasik & Slavin, 1993). Furthermore, a Catch-Up Friday project in Philippines for Grade 10 students found

significant impact of reading proficiency levels classes through its contextualized reading materials, highlighting the importance of tailored interventions and learning resources to enhance reading proficiency (Saro et al., 2024). Additionally, the catch-up programme by Government of Malta (2024, October 1) highlights essential features of these programmes as:

- Customized curriculum, based on the specific needs of the students by allowing students to ask specific questions about concepts that they couldn't ask at school,

- Personalized attention, as the class size is smaller than in a regular session, thus creating space for tailor instruction based on a student's learning style.

- Individualized feedback as access to teachers is easier and immediate feedback can be provided which can help students improve their knowledge and skills.

- Confidence-building as a small group can be a supportive and encouraging environment for students to build their confidence and overcome any challenges and obstacles in subjects that they may be facing.

However, it has been found that to run any such programme effectively, there is a need for an enabling ecosystem like continuous training of teachers and parental involvement in the programme. It has been found that better quality teaching and learning can happen if teachers receive ongoing support to enhance their instructional practices (Liswaniso & Pretorius, 2022). Additionally, it is observed that parents play a significant role in encouraging their low performing children to participate fully in remedial sessions. Apart from providing guidance on homework to their children, parents also handle pupils' problems in line with the requirements of the school and their schoolwork (REB, 2020). Thus, for a catch-up programme, flexibility in the design of the training programme, setting up the training programme in cooperation with the parents and repeatedly emphasizing the importance of parental engagement for the learning of the children in question have been found to be key success factors (Manz et al., 2010). Finally, to evaluate the effectiveness of catch-up programmes, Inter-Agency Network for Education in Emergencies suggests using indicators like number of girls and boys who participated in the programme and percentage of children who improved their knowledge in at least one subject/improved at least one key competency or cross-cutting skill as a result of participation in a catch-up programme (INEE, 2023).

The Intervention

The project was designed and implemented to provide learning support to the academically weak students by supplementing their school hours learning with after-school classes. Some important features of this intervention were: a) It was a convergence of the Rural Development department, Urban Development department and Education department as an effort towards making local communities take ownership of funding of remedial education needs of the students belonging to poor socio-economic sections of the society. b) It was implemented across 205 primary and 154 secondary schools and 9650 academically weak students enrolled for the classes as per pre-assessment done on identifying learning gaps. c) 423 highly qualified local educational volunteers having masters and Bachelor of Education degrees were selected by a team headed by the school principals. d) Syllabus was designed by the subject matter experts based on learning outcomes identified by NAS for primary and secondary classes and based on learning gaps identified during pre-assessment. e) Volunteer teachers were trained continually on the syllabus and teaching pedagogy by the subject matter experts who regularly visited these classes and provided critical feedbacks. f) Weekly formative assessments as per the previous week's syllabus to continuously assess the progress of students and provide feedback to students and teachers. g) Weekly parent- teacher meeting for the parents of the students attending these classes was scheduled to ensure that parents were briefed continually on their wards' performance and to instill a sense of hope, vision and accountability for their ward's education. h) Voluntary provision of nutritious snacks/meals by involving the community to ensure that students get much needed nutrition and they are incentivized to stay back after school for these supplemental education classes. Key Features of the Intervention have been shown in Figure 1.

Needs Assessment

Students were found to be not studying after school hours due to lack of cultural capital in poor households. Parents are important stakeholders in the system and yet they often remain disconnected from and disinterested in their children's education. Due to low literacy levels and demanding hard labour jobs, they are unable to

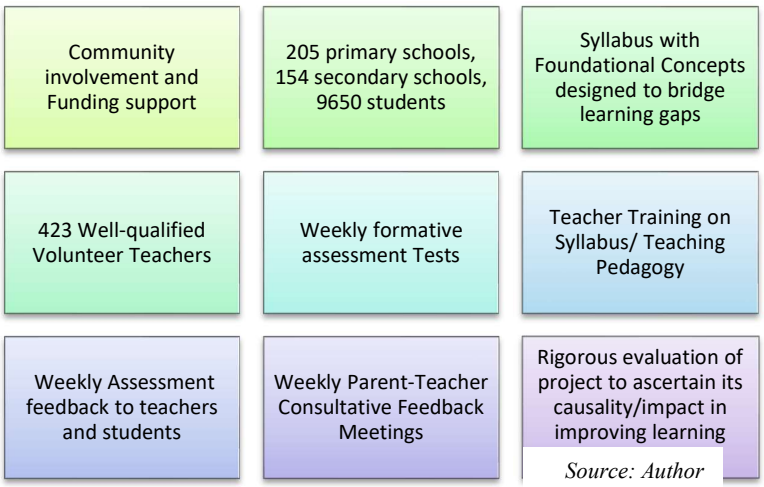


Figure 1 Key Features of the Intervention

give their time and attention to fulfil after-school learning needs of their children and are unable to monitor their performance in the various tests throughout the year. This highlights the need for a continuous feedback loop for the parents so that they can supplement a child's school learning.

On a daily basis regular teachers need to focus on completing the syllabus and often the academically weaker students are left behind. Further, due to pressure of syllabus and need to cater to entire classroom, these weaker students are unable to catch up with their better performing peers and the learning gaps get bigger as they progress to higher grades. This results in a sense of disenchantment among students and they develop a lack of self-belief which adversely affects their classroom engagement. It seemed pertinent to provide special attention to academically weak students and design a remedial syllabus that clarifies some basic concepts and provides exclusive additional learning enrichment to bring them up to the level of their better performing peers and build their self-confidence.

The remedial classes intervention aimed to solve these problems by undertaking a collaborative and participative interaction with all key stakeholders, designing and implementing a concept-based curriculum, and putting up a monitoring and feedback system in place which would facilitate continuous learning and improvement throughout the time period of the project. Pre-intervention consultations and workshops were conducted with school principals, teachers and district education officers to conduct the needs assessment and learning challenges being faced by academically weak students from the most vulnerable and marginalized sections of the society. An overview of the needs assessment conducted has been shown in Figure 2.

Objective

The objective of this paper is to ascertain the impact of remedial education in improving learning outcomes of students. Towards this objective, assessment scores of students before intervention and after intervention were compared to decipher the effect of the intervention. To isolate the impact of remedial education and establish

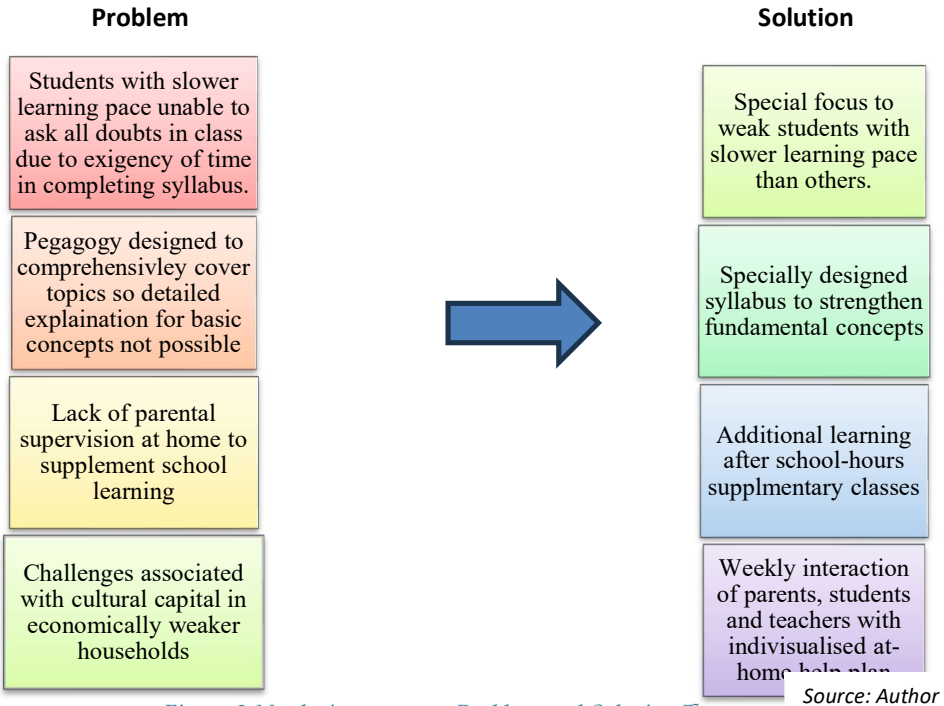


Figure 2 Needs Assessment- Problem and Solution Tree

a causal connection, assessment scores of students undergoing intervention were compared with those students who were eligible for intervention based on their pre-assessment but did not choose or were unable to undertake these remedial education classes. Also, impact of remedial education on the overall performance of students in other subjects not being covered under remedial education was also evaluated.

Research Methodology

This paper is based on primary data collected from the schools in which remedial classes were implemented. Data has been analyzed for 2577 primary school students and 1698 secondary students who undertook remedial classes. The sample size has been arrived at considering the population size of 3909 secondary school students and 4741 primary school students who were part of the intervention. Schools as well as students in the sample have been randomly selected after taking care of confounding variables like socio-economic conditions of the families which may have affected the assessment scores.

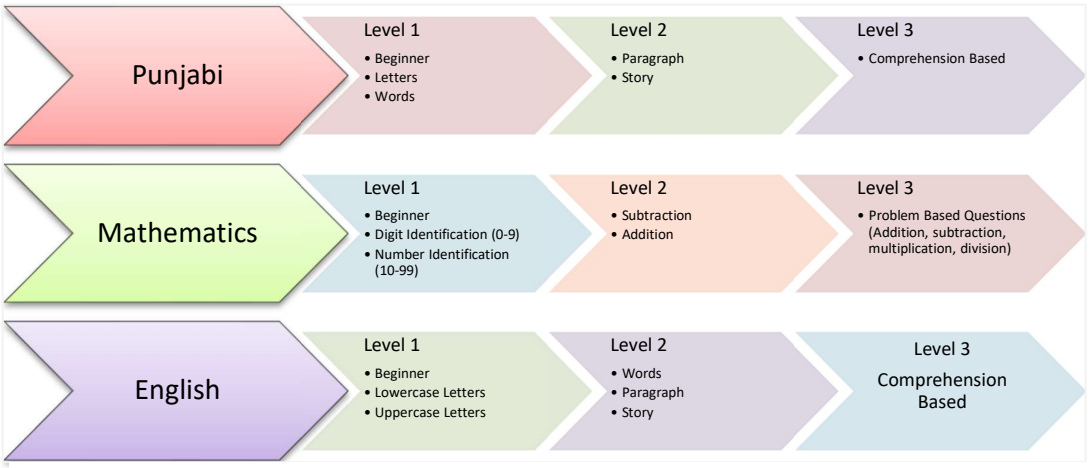
Schools provided data of remedial students' pre-intervention and post-intervention assessment tests. Data of intended treatment group students who had qualified for remedial education based on their pre-intervention assessment tests but didn't undergo remedial education served as control group for undertaking randomized controlled trial to establish causal relation. Assessment test averages have been used to examine Objective 1 and regression analysis of test scores has been used to evaluate Objective 2.

Findings

Objective 1: To compare performance of students on assessment tests before and after remedial classes intervention

Primary Schools Performance Outcome

Remedial classes were undertaken for students of classes 1 to 5 in Punjabi, English and Mathematics. In the languages, students of primary schools are marked on their ability to decipher letters, words, paragraphs, story and such, whereas in mathematics their basic numerical and problem-solving skills are assessed as show in Figure 3. The analysis was done based on the percentage of students who showed improvement in their learning from the base level to the next higher levels. Comparison has been done for results of students in the assessment



Source: Mission Samarth

Figure 3: Marking Scheme for Primary Schools

exams conducted before the intervention period and results of the assessment exams conducted after the intervention period, that is, July and December

of the academic year respectively. Table 1, 2 and 3 show the results for classes 1& 2 which calculates percentage of students who progressed from their base level of language reading and writing to the next higher level after undergoing remedial education.

Table 1: Performance Outcome for Class 1&2; Punjabi

Reading						
Reading	Beginner	Letter	Word	Sentence	Incremental Change from base level to higher levels	At the Same Level
Beginner	0%	10%	38%	0%	48%	0%
Letter	-	14%	10%	0%	10%	14%
Word	-	-	29%	0%	0%	29%
Sentence	-	-	-	0%	0%	0%
					58%	42%
Writing						
Writing	Beginner	Letter	Word	Sentence	Incremental Change from base level to higher levels	At the Same Level
Beginner	0%	5%	43%	0%	48%	0%
Letter	-	19%	24%	0%	24%	19%

Word	-	-	10%	0%	0%	10%
Sentence	-	-	-	0%	0%	0%
					72%	28%

Key Inference:

- 58 % of class 1 &2 students who took remedial classes saw improvement in their reading ability from their previous levels in Punjabi.
- 72% of class 1 &2 students who took remedial classes saw improvement in their writing ability from their previous levels in Punjabi.

Table 2: Performance Outcome for Class 1&2; English

Reading						
	Beginner	Small Letter	Capital Letter	Word	Incremental Change from base level to higher levels	At the Same Level
Beginner	0%	24%	14%	24%	62%	0%
Small Letter		29%	0%	0%	0%	28.6%
Capital Letter			0%	0%	0%	0%
Word				10%		9.5%
					62%	38%

Writing						
	Beginner	Small Letter	Capital Letter	Word	Incremental Change from	At the Same Level
Beginner	0%	24%	14%	24%	62%	0%
Small Letter		38%	0%	0%	0%	38%
Capital			0%	0%	0%	0%
Word				0%	9%	0%
					62%	38%

Key Inference:

- 62% of class 1 &2 students who took remedial classes saw improvement in their reading ability from the previous level in English.
- 62% of class 1 & 2 students who took remedial classes saw improvement in their writing ability from the previous level in English.

Table 3: Performance Outcome for Class 1&2; Mathematics

Numerical Ability						
	Beginner	0 to 9	10 to 99	>100	Incremental Change from base level to higher levels	At the Same Level
Beginner	0%	0%	33%	0%	33%	0%
0 to 9		0%	33%	0%	33%	0%
10 to 99			24%	10%	10%	24%
					76%	24%

Problem Solving					
	Beginner	Addition and Subtraction	Problem Based Questions	Incremental Change from base level to higher levels	At the Same Level
Beginner	0%	48%	0%	48%	0%
Addition and Subtraction		52%	0%	0%	52%
Problem Based Questions			0%	0%	0%
				48%	52%

Key Inference:

- 76% of class 1 &2 students who took remedial classes saw an improvement in their numerical ability in Mathematics.
- 48 % of class 1 &2 students who took remedial classes saw an improvement in their problem-solving ability in Mathematics.

Table 4, 5 and 6 show the results for classes 3, 4, and 5 which calculates percentage of students who progressed from their base level of language reading and writing to the next higher level after undergoing remedial education.

Table 4: Performance Outcome for Class 3,4&5; Punjabi

Reading								
	Beginner	Letter	Word	Sentence	Paragraph	Story	Incremental Change from base level to higher levels	At the Same Level
Beginner	1.7%	4.2%	2.3%	0.2%	0.3%	0.0%	7%	2%
Letter		11.5%	18.0%	1.3%	5.8%	0.6%	26%	11%

Word			15.0%	6.4%	16.8%	3.0%	26%	15%
Sentence				1.5%	1.2%	1.1%	2%	1%
Paragraph					4.4%	3.3%	3%	4%
Story						1.5%	-	2%
							64%	36%
Writing								
Writing	Beginner	Letter	Word	Sentence	Paragraph	Story	Incremental Change from base level to higher levels	At the Same Level
Beginner	2.1%	4.8%	2.0%	0.3%	0.3%	0.0%	7.3%	2.1%
Letter		17.0%	21.8%	5.5%	1.3%	0.0%	28.5%	17.0%
Word			18.7%	16.5%	2.7%	0.1%	19.2%	18.7%
Sentence				6.0%	0.5%	0.1%	0.6%	6.0%
Paragraph					0.3%	0.3%	0.3%	0.3%
Story						0.0%	0.0%	0.0%
							56%	44%
Key Inference: - 64 % of class 3,4 and 5 students who took remedial classes saw improvement in their reading ability from the previous level in Punjabi. - 56% of class 3,4 and 5 students who took remedial classes saw improvement in their writing ability from the previous level in Punjabi.								

Table 5: Performance Outcome for Class 3,4&5; English

Reading								
Reading	Beginner	Letter	Word	Sentence	Paragraph	Story	Incremental Change from base level to higher levels	At the Same Level
Beginner	2.2%	6.2%	1.8%	0.2%	0.2%	0.0%	8.4%	2.2%
Letter		26.9%	30.9%	3.9%	0.3%	0.0%	35.2%	26.9%
Word			16.3%	8.1%	0.7%	0.3%	9.1%	16.3%
Sentence				1.3%	0.2%	0.1%	0.3%	1.3%
Paragraph					0.2%	0.0%	0.0%	0.2%
Story						0.1%	0.0%	0.1%
							53%	47%

Writing								
Writing	Beginner	Letter	Word	Sentence	Paragraph	Story	Incremental Change from base level to higher levels	At the Same Level
Beginner	2.6%	6.9%	2.1%	0.5%	0.0%	0.0%	9.6%	2.6%
Letter		33.7%	30.1%	3.3%	0.0%	0.0%	33.5%	33.7%
Word			14.3%	5.2%	0.1%	0.0%	5.3%	14.3%
Sentence				1.0%	0.0%	0.0%	0.0%	1.0%
Paragraph					0.0%	0.1%	0.1%	0.0%
Story						0.0%	-	0.0%
							48%	52%

Key Inference:

- 53 % of class 3,4 and 5 students who took remedial classes saw improvement in their reading ability from the previous level in English.
- 48% of class 3,4 and 5 students who took remedial classes saw improvement in their writing ability from the previous level in English.

Table 6: Performance Outcome for Class 3,4&5; Mathematics

Numerical Ability						
Reading	Beginner	0 to 9	10 to 99	>100	Incremental Change from base level to higher levels	At the Same Level
Beginner	1.7%	0.3 %	3.5%	0.4%	4.2%	1.7%
0 to 9		0.6 %	3.6%	0.7%	4.3%	0.6%
10 to 99			54.8%	23.8 %	23.8%	54.8%
>100				10.5 %	0.0%	10.5%
					32%	68%

Problem Solving					
Writing	Beginner	Addition and Subtraction	Problem Based Questions	Incremental Change from base level to higher levels	At the Same Level
Beginner	2.7%	7.0%	1.3%	8.3%	2.7%

Addition and Subtraction		50.7%	27.6%	27.6%	50.7%
Problem Based Questions			10.7%	0.0%	10.7%
				36%	64%

Key Inference:

- 32 % of class 3,4 and 5 students who took remedial classes saw an improvement in their numerical ability in Mathematics.
- 36 % of class 3,4 and 5 students who took remedial classes saw an improvement in their problem-solving ability in Mathematics.

Key Inference from evaluation of remedial education intervention in Primary Schools

1. About 50-70% of the students who were provided remedial classes showed improved performance in their reading, writing and numerical abilities.
2. Languages showed more improvement than mathematics.
3. Many students were at beginner level of languages and maths even in classes 3, 4 and 5
4. Problem-solving skills of most students is lagging behind even at class 5 level.
5. Problem-solving skills for classes 1 and 2 are not evident in the evaluation, may need for more innovative methods of measuring like games and abacus.

Secondary Schools Performance Outcome

Remedial education was implemented in classes 6, 7, 8 and 9 of all secondary schools in three subjects viz. English, Science and Maths as these subjects form the core and influence student's performance on other subjects as well. Table 7 shows the results after the comparison of assessment tests conducted at pre-intervention and post-intervention stages of remedial education project. It is evident that the remedial education intervention led to a significant improvement of 12 percentage points in overall performance of students undergoing these classes whereas performance of students on remedial subjects was even better.

Table 7: Average Percentage of Marks of Secondary Students Before and After Remedial classes

	Before	After
Total Percentage*	*46*	*58*
English	*40*	*58*
Maths	*40*	*56*
Science	44	60

Source: Author

**Note: Total percentage is inclusive of marks in non-remedial subjects as well.*

Table 8 below shows percentage of students who experienced improvement in their average percentage of marks and by how much. The left column for each subject shows the range of marks of improvement, whereas the right column shows percentage of students that fall within that range. It is evident that more than 60% students saw an improvement in the marks of remedial subjects ranging from 1% to 25%.

Table 8: Percentage of Students Who Saw Incremental Change in Marks

English	Maths	Science

Incremental change in marks between 1 to 25	66%	Incremental change in marks between 1 to 25	59%	Incremental change in marks between 1 to 25	61%
Incremental change in marks between 26 to 55	15%	Incremental change in marks between 26 to 70	19%	Incremental change in marks between 26 to 50	16%
No Incremental Change	19%	No Incremental Change	22%	No Incremental Change	23%

Source: Author

Checking for Significance of Result

At this point it is also pertinent to check for significance of our result to analyse Objective 1. We thus check if there is any significant increase in the total percentage of marks of students before and after the intervention using a paired t-test. We construct the hypothesis as follows:

H_0: $\bar{X}t_1 = \bar{X}\,t_0$

H_1: $\bar{X}_{t1} > \bar{X}_{t0}$

Where, $\bar{X}$= *Mean of percentage,* t_1= *Time period after intervention,* t_0= *Time period before intervention.*

The output is shown below in Table 9. In order to examine if the increase in performance is of statistical significance we check for one-tail test as highlighted in the table below. The p value is less than 0.05. *So, we reject the null hypothesis*. Which means that the results are statistically significant and average performance in time period t_1 is greater than average performance in time period t_2, **implying that the remedial classes were effective**.

Table 9: Half Yearly Vs Final Marks of Remedial classes Students (t-Test: Paired Two Sample for Means)

	Variable 1	Variable 2
Mean	0.458631978	0.575441555
Variance	0.023974416	0.022880119
Observations	698	698
Pearson Correlation	0.832132197	
Hypothesized Mean Difference	0	
Df	697	
t Stat	-34.77388609	
P(T<=t) one-tail	1.0085E-154	
t Critical one-tail	1.647042736	
P(T<=t) two-tail	2.0171E-154	
t Critical two-tail	1.963373348	

Source: Author

Objective 2: To evaluate the impact of remedial classes subjects on overall performance of students

In order to evaluate if the remedial education intervention was of larger benefit to the students beyond improving their performance on the subjects taught in remedial education only, it is important to know how much influence remedial education classes on these remedial subjects have on the performance of a student on non-remedial subjects. To do so, we undertake a multiple regression analysis and define the following equation:

$Y=a+bX$

Where,

Y= Dependent variable (Total Marks), X= Independent Variable (Remedial classes subjects marks)

a= Constant y-intercept (Sum of other subjects in this case)

b= Slope coefficients for the explanatory variables

The regression output of the model is given in Table 10 below.

Table 10: Regression Statistic- Impact of Remedial classes Subjects on Overall Performance

Regression Statistics	
Multiple R	0.912323
R Square	0.832333
Adjusted R Square	0.832092
Standard Error	40.32566
Observations	698

Source: Author

This shows that 83% of the observations of the dependent variable are explained by the independent variables. Implying that **there is significant influence of the remedial education classes subjects on the overall performance of the students.**

Table 11: ANOVA- Reliability of the Model

	df	SS	MS	F	Significance F
Regression	1	5618510	5618510	3455.081	4.2E-272
Residual	696	1131806	1626.159		
Total	697	6750316			

Source: Author

Table 11 above shows the reliability of the model. Significance F here is less than 0.05 so we reject the null hypothesis that all regression coefficients are zero, which shows that the model is reliable.

During the intervention it was also found that, some students who were considered for the pretest and needed remedial intervention could not attend the classes due to various reasons like timing of the class, distance from schools and inability of parents to support after school learning. Marks of such students were compared with those who undertook the remedial classes and it was found that there was a difference of about 25% in the average marks between the two groups. If the students who attended the remedial classes are considered as treatment group and the students who could not attend are considered the control group, we can see the treatment effect as shown in Figure 4.

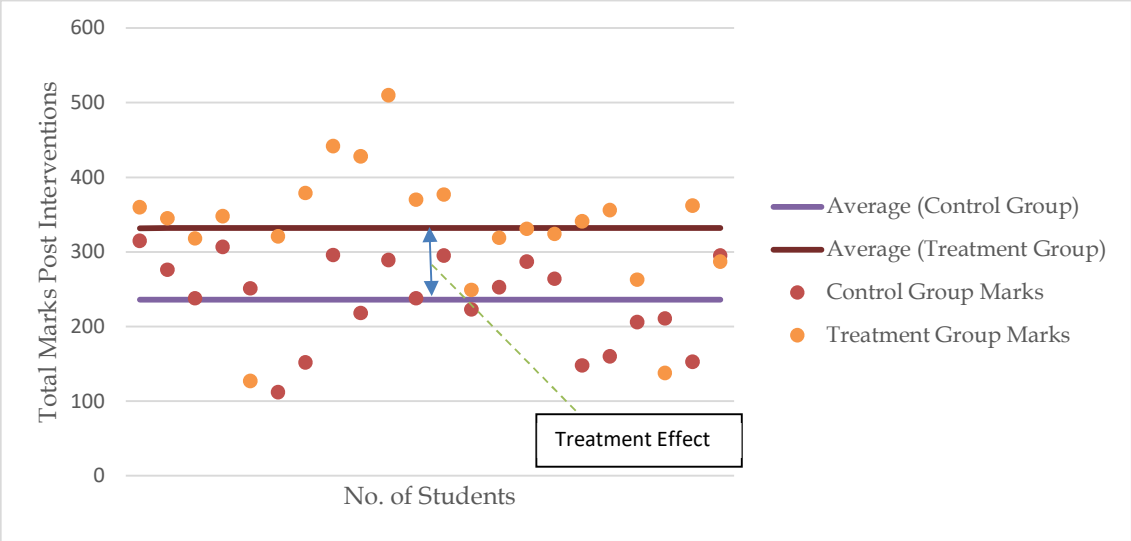


Figure 4: Comparison Between Academic Performance of Treatment and Control Group

Qualitative Findings from Field Observations

In addition to these quantitative measurements on improvement in performance of students undergoing remedial education, it has been observed that the intervention led to some qualitative outcomes as well, with significant improvements across many spheres of the education delivery system. a) Student attendance has increased significantly casual and habitual absenteeism has reduced drastically. The students are motivated to attend classes due to acquiring a newfound self-confidence on account of improvement in learning outcomes. b) Learning outcomes have improved as measured from the performance on post-intervention assessment tests and from the teacher's feedback from regular classrooms. c) Student's active involvement in the classroom has increased considerably. d) Parental involvement and their sense of accountability for the education of their children has increased significantly. e) Involvement of Local Communities through their funding of this remedial education program has instilled a sense of in the villages. The villagers feel more responsible for taking care of the needs of the especially poor households whose children were suffering from major handicaps on account of poor cultural capital in their homes.

The project is being run by schools that have an awareness of the challenges on the ground. They are also aware of the issues related to last-mile delivery and how to cater to them. As suggested by the principals, weekly parent-volunteer interaction was organized on Saturdays. In these meetings, parents have conveyed the challenges they used to face in getting tuition for their students which were far off and also were very costly. Given that the remedial classes coaching was free of cost, they have removed such barriers to education. Parents were seen actively attending Parent-Teacher Meetings (PTMs) and taking ownership of their student's educational needs. The localized nature of intervention which has been adopted and fully supported by the community has ensured that this intervention augments institution building in the form of community-supported quality education delivery to poor households who don't have the resources to take care of the educational needs of their children.

Conclusion and Way Forward

The Indian school education system is suffering from serious systemic bottlenecks. Till now, the focus of public education delivery has been on providing school infrastructure, improving gross enrolment, reducing absenteeism and drop outs, and the country has largely succeeded on achieving all these goals. However, one adverse fallout of this top-down implemented school education delivery model has been the gross neglect of measurable learning outcomes of its students. As a result, a vast majority of students who are going to schools are actually not learning what they are supposed to be learning. This learning crisis is getting compounded as the students move to higher grades and further on to colleges. To arrest this huge learning crisis, there is a need to overhaul the education delivery system by making all the measurable metrics linked to learning outcomes

instead of physical infrastructure etc. and incentivizing schools through linking school funding with performance of its students. Remedial education, especially at the primary school level, where there is a huge measurable gap between actual learning and expected learning of students from grade 1 to grade 5, becomes all the more important because in the absence of foundational literacy and numeracy knowledge of its students, the education system will collapse from the weight of its own mediocrity.

The remedial education framework needs to be institutionalized within the overall education delivery and made an integral part of learning outcome focused education system. Since grade teachers are the most knowledgeable persons about each student's learning levels, the remedial education programme needs to be delivered through the regular teachers by incorporating and incentivizing this through linking teacher's and school's performance assessment with the learning outcomes of their students. The remedial education curriculum for every grade should be designed for weak students as per the needs assessment conducted at the start of every year. Exclusive focus on strengthening grade level conceptual competency of weaker students in special remedial education classes would help these students be more engaged in regular classroom teaching which in turn would help the teachers teach at a higher level to the entire classroom. This would also address poor learning environment in the homes of students belonging to poor socio-economic strata due lack of cultural capital. Supplemental after-school classes by teachers would compensate for the absence of guidance and enabling environment in such homes. Also, parental engagement and ownership of their children's education is a very crucial factor which has been neglected so far to the detriment of all stakeholders involved in the education delivery system. This needs to be strengthened and a robust two-way feedback and monitoring system needs to be institutionalized so that education delivery as a service is able to understand and fulfil its client's requirements.

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