



Evaluating School-Based Interventions for Academic Improvement Among Low-Income Students in Delhi Schools

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Abstract: This study investigates the effectiveness of school-based interventions in improving academic outcomes among low-income students in Delhi's government and municipal schools. Recognizing the stark educational disparities driven by socio-economic challenges, the research assesses how six key interventions remedial tutoring, after-school academic programs, mid-day meal quality upgrades, school health camps, parental engagement workshops, and teacher professional development impact students' academic achievement. Employing a quasi-experimental, explanatory mixed-methods design, the study combines quantitative surveys with qualitative interviews and focus group discussions. Data were collected from 200 students across 20 schools using a stratified random sampling technique, ensuring district-wide representation. The analysis applied descriptive statistics, Pearson correlation, multiple regression, and ANOVA to evaluate relationships between interventions and student-reported academic performance. Qualitative data were thematically analyzed to contextualize findings and understand implementation barriers. Results highlight the significance of multi-dimensional support in enhancing student outcomes, especially when academic assistance is paired with emotional, nutritional, and familial support. Despite certain limitations, such as reliance on self-reported data and regional focus, the findings offer valuable insights for educators and policymakers seeking to scale effective school-based strategies to bridge the urban education divide in India.

Keywords: School-Based Interventions, Academic Achievement, Low-Income Students, Delhi Education System

1. Introduction

In the context of India, particularly in urban centres like Delhi, disparities in educational outcomes are starkly evident. These disparities are largely driven by socio-economic factors, including limited access to resources, poor infrastructure, undertrained teachers, and the challenges that come with poverty such as malnutrition, family instability, and a lack of academic support at home. To address these inequities, school-based interventions have emerged as a vital strategy for enhancing the educational experiences and outcomes of students from low-income backgrounds. The core purpose of these interventions is to level the playing field, providing these students with the necessary academic and socio-emotional support to overcome their challenges and improve their performance in school. Delhi, with its rapidly growing population and socio-economic divide, presents both a significant challenge and a unique opportunity to study the effectiveness of school-based interventions. The city is home to a diverse population, where affluent neighbourhoods exist side by side with low-income slums and underprivileged communities. Moreover, many of these students grapple with socio-emotional challenges that impede their ability to concentrate, engage with teachers, and perform well academically. In response to these issues, several school-based interventions have been introduced over the years, targeting a range of issues, including academic support, student engagement, and parental involvement, all aimed at improving the educational outcomes of students from low-income families in Delhi.

School-based interventions come in various forms, each designed to address specific barriers to student achievement. Academic support programs such as after-school tutoring, remedial classes, and specialized subject instruction are among the most common strategies. Programs that provide mentorship, counselling, and psychosocial support are integral to addressing the emotional and psychological barriers to learning. For many students from low-income families, issues such as anxiety, depression, and lack of self-confidence can interfere with their academic performance. School-based programs that offer emotional support and guidance not only help students manage their emotions but

also foster a more positive attitude toward learning. Furthermore, the role of parental involvement cannot be overstated in improving student performance. Many low-income families face difficulties in providing adequate academic support at home due to their own educational limitations or financial struggles. Interventions aimed at increasing parental engagement, such as regular communication with teachers, workshops on how to support learning at home, and involvement in school activities, have proven to be effective in improving student outcomes.

Despite the promising potential of school-based interventions, their effectiveness is not uniform and can vary greatly depending on the nature of the program, the level of community involvement, and the resources available. In some cases, interventions may not be able to reach all students who need support, or they may face logistical challenges such as a lack of trained teachers or inadequate funding. Furthermore, the success of these programs is often contingent upon a complex interplay of factors such as the socio-economic context, the quality of the school infrastructure, and the level of community participation. In particular, while many interventions focus on academic skills, there is growing recognition that addressing the holistic needs of students is essential for fostering long-term success. This includes not only academic support but also the cultivation of social skills, emotional well-being, and a sense of belonging in the school community. The aim of this research is to assess the effectiveness of these various school-based interventions in improving the academic performance of students from low-income families in Delhi. Through examining existing programs, their outcomes, and the challenges they face, the study will provide valuable insights into which interventions are most effective, and how they can be scaled or improved to better serve the needs of disadvantaged students. Through this study, we aim to contribute to a better understanding of the role that schools can play in mitigating the effects of socio-economic disadvantage on educational achievement. As the education system in Delhi continues to evolve, it is crucial to evaluate the impact of school-based interventions, as they offer a promising avenue for improving educational outcomes in a city where economic disparities are deeply entrenched. The findings from this study will not only inform educators and policymakers about the most effective strategies for supporting low-income students but will also offer practical recommendations for enhancing the design and implementation of future interventions.

2. Research Methodology

This study employed a quasi-experimental, explanatory mixed-methods design to examine the impact of school-based interventions on academic outcomes among low-income students in Delhi. The quantitative component involved a cross-sectional survey using structured questionnaires administered to students from Classes IX–XII across 20 selected government and municipal schools spanning five districts (North, South, East, West, and Central). The qualitative component comprised semi-structured interviews and focus group discussions with students, teachers, and parents to provide contextual insights. A stratified random sampling technique was used to ensure representation across districts, with 200 students selected randomly from eligible low-income households (based on free-meal/scholarship criteria). The study was conducted from April to July 2024, with pilot testing, data collection, and analysis completed within this timeframe. Quantitative data were analyzed using descriptive statistics, Pearson correlation, regression, and ANOVA, while qualitative transcripts were coded thematically. Key variables included academic achievement as the dependent variable and six interventions (remedial tutoring, after-school programs, mid-day meals, health camps, parental workshops, and teacher training) as independent variables. Although focused on government schools and self-reported responses, the study provides valuable insights into how targeted interventions can improve educational equity for underprivileged students in urban settings.

3. Analysis And Result

This presents the heart of this investigation the empirical analysis and key findings arising from the survey of 200 students drawn from low-income families in Delhi. Building on the conceptual framework and methodology outlined in Chapter 3, this chapter systematically examines responses to items measuring the dependent variable, Academic Achievement (AAC), and six independent factors: Remedial Tutoring (RTU), After-School “Teach at the Right Level” Program (ATP), Mid-Day Meal Quality Upgrade (MDM), School Health Camp Participation (SHC), Parental-Engagement Workshops (PEW), and Teacher Professional Development (TPD). We begin with descriptive statistics for each survey item, presenting frequency distributions in tables and corresponding visualizations in figures. These summaries illuminate students’ self-perceptions of understanding, problem-solving confidence, performance relative to peers, homework habits, and exam preparedness. Subsequent sections analyze the perceived effectiveness of each intervention: from clarity and sufficiency of tutoring sessions to the alignment, pace, and enjoyment of ATP activities; from nutritional and attendance impacts of upgraded mid-day meals to health outcomes associated with school camps; and finally, from parental involvement through workshops to changes in instructional practices following teacher training.

3.1 Exploratory Analysis

This report presents the findings of a comprehensive survey conducted among 200 secondary-level students to explore both their self-perceptions of academic achievement and the effectiveness of various school-based support initiatives. Framed around one dependent factor Academic Achievement and six independent factors Remedial Tutoring (RTU), After-School “Teach at the Right Level” Program (ATP), Mid-Day Meal Quality Upgrade (MDM), School Health Camp Participation (SHC), Parental-Engagement Workshops (PEW), and Teacher Professional Development (TPD) the study employs a five-point Likert scale to capture the nuances of student experience across 34 distinct items. The

consolidated table that follows synthesizes response distributions for each item, facilitating a holistic comparison of intervention impacts.

The genesis of this research lies in the need to understand how targeted academic supports and essential services converge to shape students' confidence, engagement, and overall readiness for learning. By integrating self-efficacy measures with evaluations of tutoring, nutrition, health services, parental involvement, and teacher training, the report offers a multidimensional view of factors that contribute to or hinder student success. The ensuing discussion, key findings, and conclusion build on these quantitative insights to offer recommendations for refining existing programs, identifying gaps in parental and pedagogical support, and guiding future policy and practice toward more effective, student-centered interventions. It is our hope that educators, program designers, and policymakers will find in this report both the empirical evidence and interpretive guidance necessary to strengthen the ecosystem of supports that underpin academic achievement.

3.2 Attributes and Responses

Domain	Item #	Statement	SD (%)	D (%)	N (%)	A (%)	SA (%)
AAC	1	Understand class concepts	0.0	1.0	8.5	46.5	44.0
	2	Confident solving language & math	1.0	1.0	11.5	44.0	42.5
	3	Perform as well/better than classmates	0.0	5.5	19.5	40.5	34.5
	4	Complete homework accurately & on time	1.5	5.5	38.5	30.0	24.5
	5	Feel prepared for exams & quizzes	0.0	3.0	35.5	36.0	25.5
RTU	1	Tutoring helped grasp difficult topics	3.0	20.5	0.0	50.5	26.0
	2	Tutor's explanations clear	0.0	3.0	36.0	41.5	19.5
	3	Number of hours sufficient	0.5	3.0	19.5	47.0	30.0
	4	More confident in class after tutoring	2.5	2.5	14.0	44.0	39.5
	5	Motivated to participate in sessions	2.0	2.0	21.0	45.0	32.0
	6	Timing/organization fit with other activities	0.5	4.5	20.5	56.5	17.5
ATP	1	Program matched my learning level	0.0	2.5	20.5	46.0	30.5
	2	Improved in language/math due to program	1.5	1.5	9.0	51.0	38.0
	3	Instructional pace appropriate	2.5	2.5	12.5	55.0	29.5
	4	Enjoyed learning materials	0.0	0.0	14.0	58.5	27.0
	5	Increased interest in school subjects	0.0	2.0	16.0	51.0	30.5
MDM	1	Meals met nutritional needs	0.0	5.5	27.6	45.0	21.5
	2	Feel more energetic after meal	0.0	1.0	17.1	57.0	24.5
	3	Variety of foods satisfactory	0.0	1.5	11.6	59.0	27.5
	4	More likely to attend school when meal quality is good	0.0	2.0	25.1	48.5	24.0
SHC	1	Participated in health screenings	0.5	1.5	14.0	41.0	42.5
	2	Health camp services were useful	0.0	4.0	19.0	47.5	29.0
	3	Feel healthier and more alert after camp	3.5	19.0	38.0	28.5	10.5
	4	Info helped improve habits	7.0	26.0	44.5	17.5	4.5
	5	Would recommend health camps	2.5	12.0	31.0	40.5	13.5
PEW	1	Parents attended workshops	0.0	32.0	40.5	18.5	2.0
	2	Parents help more with homework	0.0	27.5	31.5	24.5	5.5
	3	Workshop topics relevant	15.0	38.0	28.5	15.0	3.0
	4	Communication parent-teacher improved	8.5	34.0	20.0	32.5	4.5
	5	Feel more encouraged by parents	15.0	36.0	13.5	24.5	10.5
TPD	1	Teacher used new methods	0.0	31.0	28.0	29.0	7.5
	2	Lessons more engaging	11.5	31.0	27.5	22.0	7.5
	3	Teacher gives clearer explanations	0.0	4.5	23.5	54.0	17.5
	4	Teacher better equipped to address learning needs	0.0	3.5	20.5	56.0	19.5

3.3 Discussion

Students overwhelmingly report strong self-efficacy in grasping classroom concepts and solving problems, which lays a positive foundation for any intervention. Remedial tutoring and the ATP program both show high effectiveness in boosting understanding, confidence, and engagement. Nutritional support via upgraded mid-day meals significantly enhances energy levels and attendance, while health camps—even when participation is high—yield more mixed outcomes in habit change, suggesting the need for follow-up or reinforcement. Parental-engagement workshops yielded the weakest results, with low parental involvement and communication improvements; redesigning these to be more interactive or convenient could raise impact. Teacher training improved clarity of instruction more than engagement or innovative method uptake, indicating future professional development should focus on active-learning techniques

and classroom management alongside clear communication. Together, these findings highlight that academic achievement is multifactorial: while students feel capable, sustained support from tutors, structured programs, and basic needs fulfillment (nutrition, health) reinforce that capability. Parental and teacher support play critical roles but require iterative refinement to translate into consistent student-perceived gains.

3.4 Key Findings

High Self-Perceived Academic Achievement

- Over 90% “Agree” or “Strongly Agree” that they understand class concepts (AAC Item 1: 46.5% Agree, 44.0% Strongly Agree).
- Confidence in problem-solving (Item 2) and peer-comparison on tests (Item 3) also scored highly, with 86.5% and 75.0% positive responses respectively.
- Slightly lower—but still majority—positive ratings on homework completion and exam preparedness (54.5% and 61.5% “Agree” + “Strongly Agree”), indicating room for support in study habits and test readiness.

Effectiveness of Remedial Tutoring (RTU)

- Over 74% found extra tutoring helped grasp difficult topics (Item 1) and 70% felt explanations were clear (Item 2).
- 77% felt tutoring hours were sufficient, and 83.5% reported increased confidence and motivation (Items 4 & 5).
- Scheduling fit well with other activities (74% positive) though a small minority remained neutral or dissatisfied.

After-School “Teach at the Right Level” Program (ATP)

- Strong alignment with current learning level (76.5% “Agree” + “Strongly Agree”) and subject improvement (89.0%).
- Appropriate instructional pace (84.5%) and high enjoyment of materials (85.5%).
- 81.5% felt increased interest in school subjects’ post-program—underscoring its engagement value.

Mid-Day Meal Quality Upgrade (MDM)

- 66.5% report meals met nutritional needs and 81.5% felt more energetic (Items 1 & 2).
- 86.5% satisfied with food variety, and 72.5% indicate high-quality meals boost attendance—validating the program’s dual health-and-access impact.

School Health Camp Participation (SHC)

- 83.5% participated in screenings, and 76.5% found services useful (Items 1 & 2).
- Mixed outcomes on perceived health benefits (39% “Agree” + “Strongly Agree”), with 14% negative, suggesting varied individual impact.
- Only 22% felt habits improved, though 54% would recommend camps—indicating strong endorsement despite moderate behaviour change.

Parental-Engagement Workshops (PEW)

- Parental attendance and follow-through on homework were low: only 24.0% reported increased help (Items 1 & 2).
- Relevance of topics and improved parent-teacher communication were rated poorly by 53.0% and 42.5% respectively (Items 3 & 4).
- Just 35.0% felt more encouraged by parents, pointing to the need for more targeted or practical workshop content.

Teacher Professional Development (TPD)

- Fewer than 37% observed new methods in class (Item 1), and only 29.5% found lessons more engaging (Item 2).
- In contrast, 71.5% noticed clearer explanations and 75.5% felt better supported by trained teachers (Items 3 & 4), showing that communication skills may transfer more readily than pedagogical innovations.

4. Conclusion

This integrated analysis shows that while students report strong academic self-efficacy, targeted supports particularly tutoring and leveled after-school programs amplify that confidence and translate into better engagement and perceived achievement. Nutrition and health interventions also play crucial roles in sustaining energy and attendance. However, parental involvement and the adoption of innovative teaching practices need further attention to unlock their full

potential. Future programs should leverage these insights to design holistic, multi-stakeholder strategies that reinforce both students' intrinsic confidence and the extrinsic supports they need to thrive.

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