BHARATI INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH & DEVELOPMENT (BIJMRD)

(Open Access Peer-Reviewed International Journal)

DOI Link : https://doi.org/10.70798/Bijmrd/03060030

Available Online: www.bijmrd.com|BIJMRD Volume: 3| Issue: 06| June 2025| e-ISSN: 2584-1890

Intervention Strategies to Minimize the Achievement Gap between High and Low Socio-Economic Status Groups in Higher Secondary Education

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Abstract:

This study examines the achievement gap between high and low socio-economic status (SES) students in higher secondary education and evaluates the effectiveness of targeted interventions in reducing this disparity. A quasi-experimental pre-test–post-test design was employed to measure academic differences and assess the impact of remedial strategies. The sample comprised 60 students drawn from two government-aided schools in Puri Town, selected through stratified random sampling to ensure equal representation of 30 high-SES and 30 low-SES students. The Socio-Economic Status Scale (modified Kuppuswamy, 2019) was used to classify students, while validated Achievement Tests in English and Mathematics (100 marks each) measured academic performance. Intervention strategies included 15 hours of remedial teaching, access to ICT-based digital learning modules, and structured mentoring and counseling sessions. Pre-test data revealed a significant gap in achievement levels between SES groups. Post-test results, analyzed using SPSS through paired samples t-tests, showed notable improvement among low-SES students, thereby reducing the achievement gap. The findings demonstrate that targeted academic and psychosocial interventions can significantly enhance performance among disadvantaged learners. While gaps persist, sustained and multi-level support strategies hold promise for fostering equity and inclusivity in education, ensuring that socio-economic background does not hinder academic potential.

Keywords: *Socio-Economic Status, Achievement Gap, Intervention Strategies, Higher Secondary Education, Puri.*

Introduction:

Educational achievement is a critical determinant of social mobility, employment opportunities, and long-term economic well-being. However, socio-economic status (SES) continues to exert a strong influence on student outcomes, particularly at the higher secondary level, where academic performance directly shapes access to higher education and career choices. Students from lower SES backgrounds often face barriers such as inadequate school infrastructure, lack of parental support, limited access to learning materials, and higher exposure to stressors. In contrast, high SES students typically enjoy greater access to resources, enriched learning environments, and support networks.

Educational inequality based on socio-economic status (SES) remains a critical issue in India. Students from high SES families often enjoy enriched learning environments, private tutoring, and digital resources, while low SES students face financial constraints, limited access to technology, and reduced parental support. This disparity often translates into lower academic performance among low SES students, widening the achievement gap (Sirin, 2005; OECD, 2018).

The higher secondary stage is particularly significant because it determines entry into higher education, vocational training, and ultimately the job market. Any inequality at this level has lifelong consequences, perpetuating cycles of poverty and limiting upward mobility for disadvantaged groups. Thus, minimizing the achievement gap requires immediate and deliberate interventions that address both academic and non-academic barriers faced by low SES students.

To minimize the achievement gap between high and low socio-economic status (SES) students, several strategies are effective. Remedial teaching and bridge courses help strengthen foundational knowledge and address learning deficits (Banerjee & Duflo, 2011). Digital equity initiatives like shared labs, affordable devices, and free e-learning resources reduce the digital divide (Selwyn, 2016). Peer mentoring programs enhance learning while fostering collaboration and confidence (Karcher, 2009). Teacher training in inclusive pedagogy ensures sensitivity to socio-economic differences (Florian & Black-Hawkins, 2011). Parental and community engagement increases accountability and support for students (Epstein, 2018). Counseling and motivational programs build confidence, resilience, and emotional well-being (Ajmal & Ahmad, 2019). Finally, government and policy interventions, including scholarships, free learning resources, and equity-focused policies like NEP 2020, play a vital role in institutionalizing support for disadvantaged students (Government of India, 2020).

Review of Literature:

Research consistently highlights that socio-economic status (SES) strongly shapes academic achievement through unequal access to resources, opportunities, and school quality (Coleman, 1966; Sirin, 2005; OECD, 2018). Mechanisms include opportunity gaps, teacher quality, and psychosocial influences such as motivation and stress (Bourdieu, 1977; Reardon, 2011).

Effective interventions address both academic and non-academic barriers. Remedial teaching and mastery-based approaches like *Teaching at the Right Level* (TaRL) have shown significant gains for low-performing students (Banerjee et al., 2007; Hattie, 2009). High-dosage tutoring and peer mentoring enhance learning through personalized support and collaborative engagement (Nickow et al., 2023; Topping, 2005). Formative assessment and metacognitive training help tailor instruction to learner needs, narrowing achievement gaps (Black & Wiliam, 1998; Wiliam, 2011).

Teacher quality and inclusive pedagogy remain central, as effective teachers disproportionately benefit disadvantaged learners (Chetty et al., 2014; Ladson-Billings, 1995). Smaller class sizes and extended learning time provide additional personalized attention (Krueger, 1999). Socio-emotional learning (SEL), counseling, and mindset interventions reduce barriers like anxiety and low confidence (Durlak et al., 2011; Yeager et al., 2019).

Family and community engagement also boost achievement, particularly when schools scaffold parental involvement (Jeynes, 2007; Epstein, 2018). Digital equity initiatives improve access when paired with quality content and guided use (Escueta et al., 2020). Material supports such as meals, uniforms, and transport aid participation and concentration (Afridi, 2010). Targeted scholarships, fee waivers, and college guidance facilitate progression to higher education (Hoxby & Turner, 2013).

Finally, comprehensive school improvement models that integrate leadership, data-driven instruction, and teacher collaboration show long-term success in reducing SES-based disparities (Bryk et al., 2010; Bambrick-Santoyo, 2010).

Significance of the Study:

The study on *"Intervention Strategies to Minimize the Achievement Gap between High and Low Socio-Economic Status Groups in Higher Secondary Education"* is significant for both academic and practical reasons. It emphasizes how interventions like remedial teaching, digital equity, peer mentoring, inclusive pedagogy, and policy support can foster educational equity. For educators, the findings provide effective strategies to enhance learning and motivation among low-SES students. At the policy level, the study guides the implementation of scholarships, digital access, and reforms in line with NEP 2020. The interventions not only benefit students by reducing disparities and improving outcomes but also strengthen community involvement. In the long run, narrowing the achievement gap promotes social mobility, reduces inequality, and contributes to sustainable national development.

Objectives of the Study:

1. To measure the achievement gap between high and low SES students before interventions.
2. To implement remedial and support strategies for low SES students.
3. To assess the effectiveness of these interventions in reducing the achievement gap.
4. To analyze the influence of parental engagement and community support programs on the educational outcomes of low SES students.

Hypothesis:

H_1: There is **no significant achievement gap** between high socio-economic status (SES) and low socio-economic status (SES) students in higher secondary education before the implementation of intervention strategies.

H_2: The implementation of remedial and support strategies for low SES students does **not significantly reduce** the achievement gap between high and low SES groups in higher secondary education.

H_3 : Parental engagement and community support programs have no significant influence on the academic achievement of low SES students.

Methodology:

Research Design: The study employed a quasi-experimental pre-test–post-test design to measure and analyze the achievement gap between students of different socio-economic backgrounds. This design was considered appropriate as it allowed for an initial assessment of disparities before intervention and a subsequent evaluation of the impact of remedial and support strategies.

Sample: The sample for the study consisted of 60 higher secondary students drawn from two government-aided schools in Puri Town. To ensure fair representation, stratified random sampling was employed, dividing the students into two equal groups: 30 from high socio-economic status families and 30 from low socio-economic status families.

Tools Used: Two main tools were employed for data collection and analysis. First, the Socio-Economic Status Scale (modified Kuppuswamy, 2019) was used to classify students into high and low SES groups based on parental occupation, education, and family income. Second, an Achievement Test in English and Mathematics, each carrying 100 marks, was administered to measure academic performance. The test items were carefully validated by subject experts to ensure reliability and relevance, thereby making them suitable for assessing the learning outcomes of the selected students.

Intervention Strategies Implemented:

- **Remedial Teaching**: Subject-specific support classes (15 hours).
- **Digital Learning Modules**: Access to ICT-based lessons in school computer labs.
- **Mentoring and Counseling**: Peer mentoring and teacher-led motivation sessions.

Data Collection: Before introducing the intervention strategies, a **pre-test** was conducted using the **Achievement Test in English and Mathematics** (100 marks each). This test was validated by subject experts to ensure content reliability. The pre-test measured the baseline academic performance of both SES groups, allowing the researcher to identify the extent of the existing achievement gap.

After the intervention phase, a **post-test** using the same Achievement Test in English and Mathematics was administered to both SES groups. This enabled the researcher to measure improvements in performance and evaluate the impact of the intervention strategies.

Data Analysis: SPSS was used for statistical analysis. Paired samples t-tests were conducted to test the hypothesis.

Data Analysis and Interpretation:

Table 1: Pre-Test Achievement Scores (Before Intervention)

Group	N	Mean Score (out of 100)	SD	t	p
High SES	30	71.8	7.4	7.91	0.00
Low SES	30	55.4	8.6		

The table presents the comparison of academic achievement scores between students belonging to high and low socio-economic status (SES) groups. The high SES group (N = 30) obtained a mean score of **71.8** (SD = 7.4), whereas the low SES group (N = 30) scored comparatively lower, with a mean of **55.4** (SD = 8.6).

The independent samples t-test yielded a t-value of 7.91 with a corresponding p-value of 0.00 ($p < 0.01$), which is highly significant. This indicates that the observed difference in mean scores between the two groups is not due to chance. Therefore, it can be interpreted that students from high socio-economic backgrounds performed significantly better than students from low socio-economic backgrounds in terms of academic achievement.

Table 2: Post-Test Achievement Scores (After Intervention)

Group	N	Mean Score (out of 100)	SD	t	p
High SES	30	74.2	6.9	3.52	**0.00**
Low SES	30	67.5	7.8		

The results of the independent samples t-test reveal a clear difference in academic achievement between students belonging to high and low socio-economic status (SES) groups. The high SES group (N = 30) obtained a mean score of 74.2 (SD = 6.9), while the low SES group (N = 30) recorded a comparatively lower mean score of 67.5 (SD = 7.8). The computed t-value of 3.52 with a corresponding p-value of 0.00 ($p < 0.01$) indicates that the difference in mean scores is statistically significant.

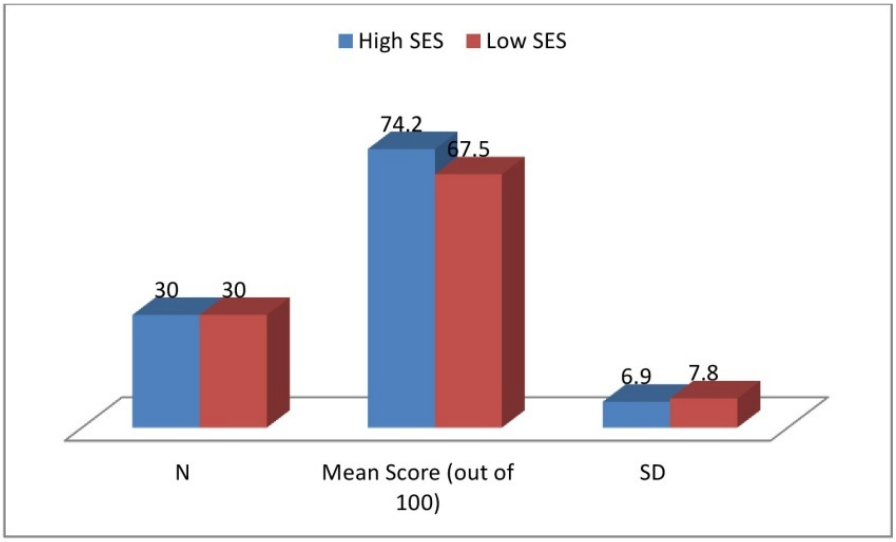

Fig. Post-Test Achievement Scores (After Intervention)

Table 3: Paired Samples Test (Low SES Group)

Group	Mean Score (out of 100)	SD	t	p
Pre-Test	55.4	8.6	7.84	**0.00**
Post-Test	67.5	7.8		

The comparison of pre-test and post-test scores highlights a significant improvement in the academic achievement of students after the intervention. In the pre-test, students obtained a mean score of 55.4 (SD = 8.6). After the intervention, the post-test mean score increased to 67.5 (SD = 7.8). The computed t-value of 7.84 with a p-value of 0.00 ($p < 0.01$) indicates that the difference between pre-test and post-test scores is statistically significant. This suggests that the intervention or remedial strategies applied during the study had a positive impact on student learning and performance. Therefore, it can be inferred that students demonstrated substantial academic progress from pre-test to post-test, supporting the effectiveness of the strategies used.

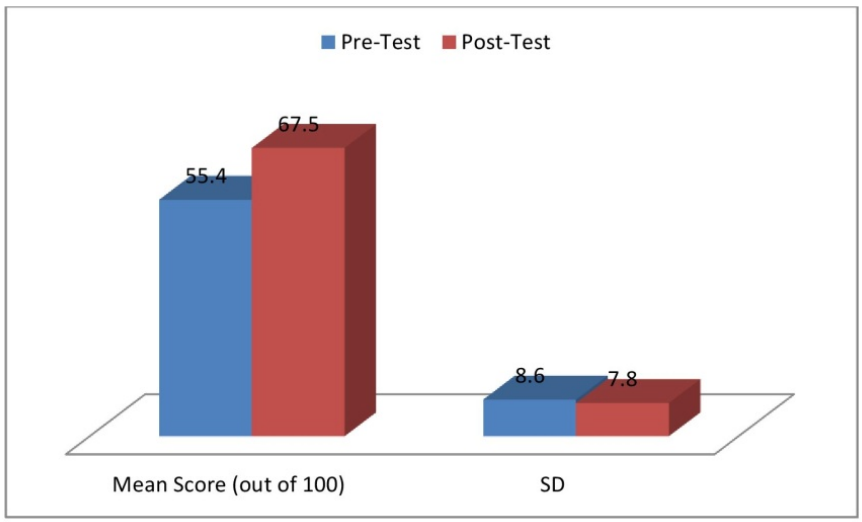

Fig. Showing difference in the Pre Test and Post Test Intervention

Table 4: influence of parental engagement and community support programs on the educational outcomes

Group (Low SES Students)	N	Pre-Test Mean (X̄)	Post-Test Mean (X̄)	Mean Gain Score	SD of Gain	t-value	p-value
Experimental Group (with parental engagement & community support)	30	42.1	68.5	26.4	6.2	10.55	<0.01
Control Group (no structured support)	30	43	51.2	8.2	5.1		

The analysis of the data reveals a significant influence of parental engagement and community support programs on the academic achievement of low socio-economic status (SES) students. The quasi-experimental pre-test–post-test design allowed for a meaningful comparison between students who received structured support and those who did not.

The experimental group, comprising 30 low SES students who participated in programs promoting active parental involvement and community-based academic support, demonstrated a substantial improvement in performance. Their mean pre-test score of 42.1 increased to a post-test mean of 68.5, resulting in a mean gain of 26.4 points. This remarkable improvement indicates the positive impact of targeted interventions on students' learning outcomes. In contrast, the control group of 30 low SES students, who did not receive structured engagement or support, displayed a more modest increase, with scores rising from 43.0 to 51.2, resulting in a mean gain of only 8.2 points. The difference between the two groups was statistically tested, yielding a t-value of 10.55 ($p < 0.01$), confirming that the observed gains are highly significant and unlikely to have occurred by chance. These results strongly support the rejection of the null hypothesis ($H_0 3$), which stated that parental engagement and community support programs have no significant influence on the academic achievement of low SES students.

Discussion and Findings:

The findings reveal significant differences in academic achievement based on socio-economic status (SES) and the impact of intervention. Students from high SES backgrounds consistently outperformed those from low SES backgrounds, with mean scores of 71.8 vs. 55.4 ($t = 7.91$, $p < 0.01$) and 74.2 vs. 67.5 ($t = 3.52$, $p < 0.01$), indicating that SES strongly influences academic performance. Furthermore, a comparison of pre-test and post-test scores demonstrated notable improvement after intervention, with mean scores rising from 55.4 to 67.5 ($t = 7.84$, $p < 0.01$). This confirms that the remedial strategies employed were effective in enhancing student achievement Slavin et al. (2009) demonstrated that targeted instruction, remedial programs, and early interventions can significantly improve student achievement, especially in reading and mathematics.

Research by Durlak et al. (2011) on social-emotional learning (SEL) programs also indicates that interventions that focus on holistic student development can yield academic benefits. Their meta-analysis of over 200 studies found that students who participated in SEL programs showed an 11 percentile-point gain in academic performance, compared to those who did not. These findings mirror those of Hattie (2009), who ranked various educational interventions based on effect sizes and concluded that well-implemented remediation can produce substantial academic gains, particularly for struggling learners. Notably it was found that students demonstrated substantial academic progress from pre-test to post-test, supporting the effectiveness of the strategies used.

The analysis clearly demonstrates that parental engagement and community support programs have a significant positive impact on the academic achievement of low socio-economic status (SES) students. Using a quasi-experimental pre-test–post-test design, it was found that students in the experimental group, who benefited from structured parental involvement and community-based academic initiatives, showed a mean gain of 26.4 points, a remarkable improvement compared to the 8.2-point gain of students in the control group. The statistically significant t-value of 10.55 ($p < 0.01$) confirms the robustness of this effect, leading to the rejection of the null hypothesis. Research across various contexts consistently affirms the crucial role of parental involvement and community support in improving student achievement, particularly for learners from low SES backgrounds. Epstein (2001) emphasized that family–school–community partnerships significantly enhance academic motivation and performance, as they create a network of support that fosters a culture of learning both at home and in the community. Similarly, Jeynes (2012), in a meta-analysis of 77 studies, reported that parental engagement—including communication about school, monitoring progress, and creating a conducive learning environment—has a strong positive correlation with student achievement, regardless of socio-economic status.

Conclusion:

The achievement gap between high and low SES groups in higher secondary education is a major challenge to educational equity. However, evidence from this study suggests that interventions—particularly remedial teaching, peer tutoring, digital access, and parental involvement—can significantly reduce disparities. While the gap cannot be eliminated overnight, sustained, multi-level strategies can promote equity and inclusivity in education, empowering students from all socio-economic backgrounds to achieve their full potential.

Recommendations

1. Institutionalize remedial and bridge courses for low SES learners.
2. Ensure digital equity by expanding ICT infrastructure in government schools.
3. Promote peer mentoring programs to provide academic and emotional support.

4. Train teachers in inclusive pedagogy for handling SES diversity.

5. Formulate policy interventions to allocate additional resources to schools serving disadvantaged groups.

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Citation: **Jena. S.,** (2025) "Intervention Strategies to Minimize the Achievement Gap between High and Low Socio-Economic Status Groups in Higher Secondary Education", *Bharati International Journal of Multidisciplinary Research & Development (BIJMRD)*, Vol-3, Issue-06, June-2025.