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Assessing Foundational Literacy and Numeracy Outcomes in Haryana: A Study of Class IV Hindi and Mathematics Achievement under the NIPUN Bharat Mission

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Abstract- Foundational Literacy and Numeracy (FLN) is a flagship national mission launched under India's National Education Policy (NEP) 2020 and implemented through the NIPUN Bharat programme. Its core objective is to ensure that every child attains grade-level proficiency in basic reading, writing, and arithmetic—including letter and number recognition, reading with comprehension, sentence construction, and foundational operations—by the end of Grade III, recognizing these skills as the gateway to all future learning. This study assessed FLN achievement among 800 Class IV students across 40 government schools in four districts of Haryana—Sirsa, Panchkula, Faridabad, and Jhajjar—using standardized FLN-aligned tests in Hindi and Mathematics. Quantitative analysis through means, SDs, t-tests, and ANOVA revealed a clear pattern: foundational skills are well established, with 90–100% achievement in Varna and Number Recognition. However, higher-order competencies remain moderate, with comprehension, sentence writing, subtraction, and multiplication ranging from 35% to 48.8%. Overall, the findings indicate that FLN interventions have successfully strengthened decoding and number sense, yet universal proficiency is still incomplete. Achieving NEP 2020 goals will require focused remediation in comprehension, writing, and advanced arithmetic, along with strategies to address existing gaps.

Keywords— Foundational Literacy and Numeracy, NIPUN Bharat, Hindi achievement, Mathematics achievement, FLN competencies

I. INTRODUCTION

Foundational Literacy and Numeracy has been declared an urgent national mission under NEP 2020 and operationalized through the NIPUN Bharat Mission. The policy mandates that all children must acquire basic reading, writing, and numeracy skills by the end of the primary stage, as these competencies form the base for all subsequent learning.

In this context, the present study assesses Class IV students' achievement in Hindi and Mathematics across 40 government schools in Haryana. The assessment aligns with FLN learning outcomes and covers core literacy components—Varna recognition, Matra reading, reading fluency, comprehension, sentence writing—and numeracy components—number recognition, bigger/missing numbers, addition, subtraction, multiplication.

The study addresses three objectives:

- To examine component-wise achievement in Hindi and Mathematics under FLN.
- To analyze variations in learning outcomes between Hindi and mathematics.
- To identify strengths, gaps, and implications for FLN implementation in Haryana.

Findings aim to inform educational planning, instructional improvement, and policy decisions for strengthening foundational learning at the elementary level.

1. FLN and Its Position in Haryana

FLN (Foundational Literacy and Numeracy) is a national mission under NEP 2020 and NIPUN Bharat to ensure every child gains basic reading, writing, and numeracy by Grade III. In Haryana, FLN shows strong progress in foundational skills—Varna and Number Recognition exceed 93%. However, higher-order skills like comprehension (35%), sentence writing (39%), and subtraction/multiplication remain weak. About 25–30% students are still below benchmarks.

Haryana has achieved "strong foundations, partial consolidation" and now needs targeted remediation to meet universal FLN goals.

II. RATIONALE OF THE STUDY

The present study is grounded in the urgent national priority set by the National Education Policy (NEP) 2020, which identifies Foundational Literacy and Numeracy (FLN) as the highest developmental goal to be achieved by Grade III. The launch of the NIPUN Bharat Mission operationalized this priority, recognizing that without secure reading, writing, and arithmetic skills, children face cumulative learning deficits that hinder all subsequent education. National surveys such as NAS and ASER have consistently reported that a substantial proportion of students in early grades fail to achieve grade-level FLN competencies, making it imperative to monitor progress at the grassroots level.

Haryana has been actively implementing FLN through state-level training, TLMs, and school-level monitoring. However, systematic, evidence-based data on actual student achievement at the block and district levels remains limited. Policy decisions, teacher support, and remedial interventions require granular insights into which competencies are mastered, where gaps exist, and how large the disparities are across administrative units. While state averages may mask significant local variations, block- and district-wise analysis can reveal pockets of excellence and areas needing urgent attention.

Class IV was chosen as the assessment grade because students are expected to have consolidated FLN skills by the end of Grade III. Measuring achievement at the start of Grade IV therefore provides a realistic check on whether the NIPUN Bharat goal has been met before children transition to higher-order content in upper primary classes. The inclusion of both Hindi and Mathematics ensures a comprehensive view of literacy and numeracy, while the component-wise breakdown—from Varna recognition to comprehension and from number identification to multiplication—helps pinpoint specific instructional strengths and weaknesses.

Furthermore, the study uses a large, balanced sample of 800 students across 40 schools in four diverse districts—Sirsa, Panchkula, Faridabad, and Jhajjar—to ensure statistical reliability and regional representativeness. Applying descriptive statistics, t-tests, and ANOVA enables the identification of significant inter-block and inter-district differences, quantifying how much of the variation in achievement is attributable to local implementation factors.

Thus, the rationale of this study is threefold: (1) to provide empirical evidence on the current status of FLN achievement in Haryana against NEP 2020 benchmarks; (2) to identify specific skill gaps and administrative units requiring targeted remediation; and (3) to generate actionable data for policymakers, administrators, and teachers to refine FLN strategies, allocate resources equitably, and accelerate progress toward universal foundational learning. Without such diagnostic evidence, FLN efforts risk being uniform rather than responsive, thereby limiting their impact on equity and quality.

III. RESEARCH METHODOLOGY

The present study adopted a descriptive survey research methodology with a quantitative approach. Descriptive survey methodology was chosen because the objective was to systematically assess, analyze, and interpret the existing level of Foundational Literacy and Numeracy (FLN) achievement among Class IV students in Haryana, without manipulating any variables. The methodology aligns with FLN and NIPUN Bharat

guidelines, which require large-scale assessment of learning outcomes to monitor programme implementation. Quantitative techniques were used to measure achievement levels, identify variations, and draw evidence-based conclusions about the status of FLN at block and district levels.

1. Research Method

The study employed the normative survey method using standardized achievement testing, complemented by statistical analysis. The specific methods were:

2. Population

Class IV students in government schools of Haryana implementing FLN.

3. Sample and Sampling Technique

The study comprised 800 Class IV students drawn from 40 government primary schools across Haryana. The design followed a balanced multi-stage structure—4 districts × 2 blocks per district × 5 schools per block × 20 students per school. This large, representative sample ensures statistical reliability for t-tests and ANOVA, captures variation across rural/urban settings and instructional contexts, and enables stable component-wise analysis of FLN skills with adequate cases in each achievement category to draw valid block- and district-level conclusions.

Multi-stage stratified random sampling was employed

- Stage 1: Four districts were selected—Sirsa, Panchkula, Faridabad, and Jhajjar.
- Stage 2: Two blocks were randomly selected from each district, yielding 8 blocks.
- Stage 3: Five schools were randomly selected from each block.
- Stage 4: Twenty Class IV students were randomly selected from each school.

This procedure ensured proportional representation across districts, blocks, and schools, minimizing sampling bias and enhancing generalizability of FLN achievement findings under NIPUN Bharat.

4. Tool Used

Researcher-developed and standardized achievement tests in Hindi and Mathematics aligned with FLN learning outcomes and NIPUN Bharat competencies.

- Hindi Test (55 marks): Varna Recognition (20), Matra Pathan (20), Reading Fluency (6), Comprehension (4), Sentence Writing (5).
- Mathematics Test (40 marks): Number Recognition (6), Bigger Number (3), Missing Number (3), Addition L1&L2 (9), Subtraction L1&L2 (9), Multiplication (4)

5. Administration

Tests conducted in classroom settings under uniform conditions. Standardized scoring keys and marking schemes were followed to ensure objectivity and reliability.

IV. DATA ANALYSIS METHOD

- Descriptive Statistics: Mean, Standard Deviation, and Percentage analysis to determine central tendency, variability, and overall achievement levels.
- Classification: Students categorized as High, Average, and Low achievers based on pre-determined score ranges to identify learning gaps.
- Inferential Statistics: Data were analyzed using an independent samples t-test for two-group comparisons of achievement in Hindi and Maths.
- Component-wise Analysis: Subject and skill-wise breakdown to pinpoint specific strengths and weaknesses in literacy and numeracy.

1. Data Analysis

Scores were tabulated and analyzed using Mean, Standard Deviation, Percentage, t-tests, and one-way ANOVA. Students were classified as High (45–51/55 in Hindi; >36/40 in Maths), Average (30–44/55; 18–36/40), and Low Achievers (<30/55; <18/40). Component-wise comparisons were drawn to meet FLN monitoring needs.

2. Overall Achievement in Hindi

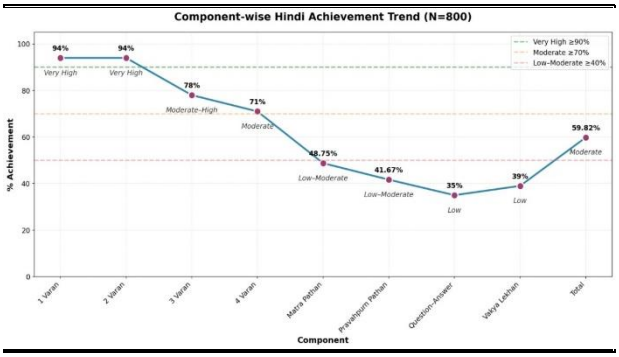
The mean Hindi score across 800 students was 32.9 out of 55 (59.82%), with SD = 12.41, indicating moderate achievement and high variability.

Table 1: Component-wise Hindi Achievement (N=800)

Component	Mean	% Achievement	FLN Level
1 Varan	4.70/5	94%	Very High
2 Varan	4.70/5	94%	Very High
3 Varan	3.90/5	78%	Moderate–High
4 Varan	3.55/5	71%	Moderate
Matra Pathan	9.75/20	48.75%	Low–Moderate
Pravahpurn Pathan	2.50/6	41.67%	Low–Moderate
Question–Answer	1.40/4	35%	Low
Vakya Lekhan	1.95/5	39%	Low
Total	32.90/55	59.82%	Moderate

Approximately 35–40% students were High Achievers, 30–35% Average, and 25–30% Low Achievers. Varna recognition was a clear strength, while Matra reading, fluency, comprehension, and sentence writing emerged as bottlenecks.

Graph 1 shows component-wise Hindi achievement under Foundational Literacy and Numeracy (FLN) for Class IV students in Haryana.



Graph 1: Component-wise Hindi Achievement

The graph shows a steep declining trend in Hindi achievement as skills progress from basic to advanced. Performance starts at Very High 94% for foundational letter recognition and falls to Low 35% for comprehension-based tasks. The overall achievement of 59.82% Moderate masks this wide disparity because strong early scores average out very weak later scores.

Component-wise Hindi Achievement Pattern

Foundational Skills are Strong: Students show Very High mastery in 1 Varan and 2 Varan at 94%, with Moderate–High to Moderate levels in 3 Varan 78% and 4 Varan 71%. Single-letter and simple multi-letter recognition is the strongest FLN domain.

Transition Skills are the Breaking Point: Achievement drops sharply to 48.75% Low–Moderate at Matra Pathan, a 22-point fall from 4 Varan. Students can identify consonants and vowels but struggle to combine them with matras, making this the most critical intervention gap.

Higher-Order Skills are Critically Weak: Fluency 41.67%, Question–Answer 35%, and Sentence Writing 39% all fall in Low to Low–Moderate bands. Only 1 in 3 students can answer comprehension questions and fewer than 2 in 5 can write a sentence, showing that decoding skills are not translating into functional literacy.

FLN Benchmark Analysis: The three dashed benchmark lines make the gaps obvious: Five of nine components fall below 50% achievement. This is a classic "decode without comprehension" profile. The data shows students are being taught letters well but not how to use them. The 59-point gap between 1 Varan 94% and Question–Answer 35% means foundational literacy is not translating into functional literacy.

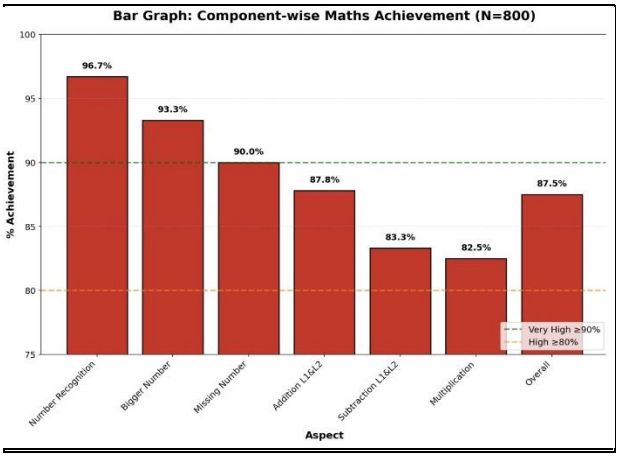
3. Overall Achievement in Mathematics

Table 2 displays Component-wise Maths Achievement for 800 Class IV students in Haryana, measured under the Foundational Literacy and Numeracy (FLN) framework. It reports % achievement and FLN levels across six core maths skills plus the overall score.

Table 2: Component-wise Maths Achievement (N=800)

Component	% Achievement	FLN Level
Number Recognition	96.7%	Very High
Bigger Number	93.3%	Very High
Missing Number	90.0%	Very High
Addition L1&L2	87.8%	High
Subtraction L1&L2	83.3%	High
Multiplication	82.5%	High
Overall	87.5%	High–Very High

The Maths data for 800 Class IV students shows strong, consistent foundational numeracy: number sense is Very High with Number Recognition 96.7%, Bigger Number 93.3%, and Missing Number 90.0%; arithmetic operations are High with Addition 87.8%, Subtraction 83.3%, and Multiplication 82.5%; and overall achievement is 87.5% High–Very High. The narrow 14.2-point range and all scores above 80% indicate uniform learning with no critical gaps, meaning no urgent remediation is needed. Multiplication is the relative weakness but still secure, so instruction should focus on consolidating High skills to Very High through targeted times-table practice while advancing students to division, fractions, and word problems given their 90%+ number sense base.



Graph 2: Component-wise Maths Achievement

Graph 2 shows consistently strong Maths achievement across all components for N=800 students, with every aspect above 80% and placing the cohort in High to Very High FLN levels. Number sense is exceptional with Number Recognition 96.7%, Bigger Number 93.3%, and Missing Number 90.0% all at Very High ≥90%, while operations remain strong at High level with Addition 87.8%, Subtraction 83.3%, and Multiplication 82.5%. The overall achievement of 87.5% sits in the High–Very High band, and the narrow 14.2-point range with no component below 80% indicates solid, uniform foundational numeracy across the group.

4. Comparison of Hindi Achievement with mathematics

Unlike the Hindi graph where scores crashed from 94% to 35%, Maths shows stability and consistency. The range here is only 14.2 percentage points versus Hindi's 59-point range. Students who can recognize numbers can also largely operate on them. Multiplication at 82.5% is the relative weakness, but it's still 47.5 points higher than Hindi's Question–Answer score of 35%.

Key Findings of the Study

- Hindi Achievement: The mean Hindi score was 32.9/55 (59.82%) with high variability (SD = 12.41). Performance shows a steep 59-point decline from foundational to higher-order skills. Varna recognition is Very High at 94%, but skills crash at Matra Pathan 48.75% and hit a low of 35% in Question–Answer. Five of nine components score below 50%. Approximately 35–40% of students are High Achievers, 30–35% Average, and 25–30% Low Achievers.
- Mathematics Achievement: The mean Maths score reflects an overall 87.5% achievement, placing students in the High–Very High band. All seven components score above 80% with a narrow 14.2-point range. Number sense is Very High (96.7%, 93.3%, 90.0%), and operations are High (87.8%, 83.3%, 82.5%). There are no scores in Moderate or Low bands.
- Hindi vs Maths Contrast: Hindi shows high variability and a "decode without comprehension" pattern with a 59-point range, while Maths shows stability and consistency with only a 14.2-point range. The weakest Maths skill, Multiplication at 82.5%, is still 47.5 points higher

than the weakest Hindi skill, Question–Answer at 35%.

VI. DISCUSSION

The same cohort of 800 Class IV students shows two contrasting FLN profiles. In Hindi, students master letter decoding at 94% but fail at functional literacy, with a critical 22-point drop at Matra Pathan 48.75% and Low to Low–Moderate scores in fluency, comprehension, and writing; the 59.82% Moderate average hides this disparity and high variability (SD = 12.41) suggests inconsistent pedagogy. In Maths, performance is uniformly strong with 90%+ number sense translating into High-level operations, no component below 80%, and tight clustering indicating effective, standardized instruction. The comparison shows the issue is not student ability but subject-specific pedagogy: Hindi instruction isn't bridging phonics to meaning, while Maths instruction successfully links concepts to computation.

VII. CONCLUSION

Under FLN, Class IV students in Haryana demonstrate strong, stable foundational numeracy but uneven foundational literacy. In Mathematics, the cohort performs at High–Very High levels with no critical gaps and is prepared for advancement to division, fractions, and problem solving. Hindi, however, reflects a classic FLN gap: students decode varna at Very High levels yet struggle with comprehension and functional writing, with core skills largely confined to Low–Moderate bands. In conclusion, overall achievement in Hindi under FLN in Haryana remains average. Despite good improvement in varna recognition, performance in matra reading, fluency, comprehension, and writing is only satisfactory, thereby constraining holistic Hindi learning outcomes. Although Class IV students in Haryana demonstrate satisfactory achievement in basic Hindi letter and word recognition, focused interventions are required to strengthen matra reading, reading fluency, reading comprehension, question-answering ability, and writing skills. Addressing these areas through collaborative efforts of teachers, parents, students, and curriculum planners will contribute significantly to achieving the vision of NIPUN Bharat and ensuring meaningful foundational literacy for all learners.

While students demonstrate satisfactory performance in *Hindi varna and word reading, greater attention is required toward **matra reading, reading fluency, comprehension, and writing skills* to achieve the foundational literacy goals of the NIPUN Bharat Mission.

Major Recommendations

For Teachers

- Focus on *matra-based reading* through daily practice.
- Conduct regular *fluency reading sessions* with time-bound activities.
- Promote *reading comprehension* through discussion and questioning.
- Provide frequent *sentence and paragraph writing* exercises.
- Offer remedial support to struggling learners.

For Parents

- Encourage daily reading at home.
- Discuss stories and ask simple questions.
- Motivate children to write short sentences regularly.
- Support and monitor reading and writing practice.

For Students

- Practice matra reading daily.
- Read aloud to improve fluency.
- Focus on understanding while reading.
- Develop regular writing habits.

For Curriculum Developers and Policy Makers

- Increase emphasis on *matra reading, fluency, comprehension, and writing*.
- Include more graded reading and writing activities.
- Strengthen FLN assessments beyond word recognition.
- Provide teacher training focused on literacy development.

Overall, class IV students in Haryana show High–Very High foundational numeracy and are ready for division, fractions, and problem solving, so Math focus should shift to higher-order word problems, real-life applications, and enrichment. Hindi literacy lags with strong varna recognition but weak matra reading, fluency, comprehension, and writing. Coordinated action is needed: teachers should incorporate daily matra practice, timed fluency activities, comprehension questioning, and writing with remedial support; parents should encourage daily reading, discussion, and sentence writing; students should practice matras, read aloud for meaning, and write regularly; and curriculum planners should add graded literacy tasks, strengthen FLN assessments beyond word recognition, and provide teacher training focused on literacy. Together these steps will close the Hindi gap while leveraging numeracy strengths to meet NIPUN Bharat goals.

Educational Implications

For Hindi/Foundational Literacy

- Target the Matra Cliff: The 4 Varan to Matra Pathan drop is the key intervention point. Introduce intensive barakhadi drills, blending practice, and matra-word families before expecting sentence reading.
- Shift from decoding to meaning: With 94% letter recognition but only 35% comprehension, allocate more time to oral language, guided reading, and question–answer practice. Use read-alouds and picture-based comprehension before text-based tasks.
- Scaffold writing: At 39% Vakya Lekhan, start with 2–3 word sentences using picture prompts and oral-to-written transfer, not paragraph writing.
- Differentiate instruction: With SD = 12.41 and 25–30% Low Achievers, create small-group remediation for matra, fluency, and comprehension while extending High Achievers to story writing.

For Mathematics/Foundational Numeracy

- Consolidate to Very High: Push Addition 87.8%, Subtraction 83.3%, and Multiplication 82.5% to ≥90% through daily practice, fact fluency games, and mixed-operation worksheets.
- Advance curriculum: With number sense at 90%+, introduce division concepts, basic fractions, and two-step word problems for all students.
- Maintain uniformity: The narrow 14.2-point range shows consistent teaching. Document and share these Maths pedagogies as a model for Hindi.

For System-Level FLN Monitoring

- Report component-wise, not just totals: The Hindi mean of 59.82% hides that 5/9 skills are below 50%. Dashboard reporting should flag Matra, Fluency, Q&A, and Writing separately.
- Address subject-specific pedagogy: Since the same students differ vastly in Hindi vs Maths, teacher training should focus on Hindi bridging strategies: phonics-to-meaning, oral language first, and comprehension scaffolds.
- Set tiered benchmarks: Use FLN levels to trigger action: Low <40% needs intensive support, Low–Moderate 40–69% needs guided practice, High ≥80% needs advancement.

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