

An Independent Six-Month Learning-Retention Evaluation of the ALfA Learning Method Programme

in the Tribal Belt of Nandurbar District, Maharashtra
A Comparative Study of Treatment and Control Schools



Independent one-to-one assessment in a Nandurbar government school, March 2026

CONDUCTED BY

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Programme: ALfA (Accelerating Learning for All), DEVI Sansthan — implemented with DIET Nandurbar

Instruments: ASER · ORF · EGMA

Sample: 128 children (64 Treatment + 64 Control; Grades 3 & 4)

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Executive Summary

This report presents an independent evaluation, carried out by Dr. Gunratna Sontakke and the research team from the Department of Anthropology, Savitribai Phule Pune University, of the ALfA (Accelerating Learning for All) Learning Method Programme as implemented in the tribal belt of Nandurbar district, Maharashtra. The ALfA programme is a child-to-child, activity-based foundational-learning pedagogy developed by DEVI Sansthan (Dignity Education Vision International). It was implemented in a set of government schools in Nandurbar in partnership with the local District Institute of Education and Training (DIET).

A distinctive feature of this evaluation is its timing. The Savitribai Phule Pune University team conducted its assessment approximately six months after the ALfA implementation cycle in these schools had been completed and the project's own post-test had been administered. The purpose of the present study is therefore not to measure immediate programme effects, but to examine **how much of the learning was retained six months after implementation ended** — and whether children who learned through ALfA show evidence of a durable, altered learning trajectory relative to peers in comparable control schools.

Using three standardised, internationally recognised assessment instruments — the ASER literacy and numeracy tools, an Oral Reading Fluency (ORF) measure, and the Early Grade Mathematics Assessment (EGMA) — the team assessed 128 children: 64 from ALfA (treatment) schools and 64 from control schools, drawn equally from Grades 3 and 4. The findings show that, even six months after the programme had ended, children from ALfA schools retained markedly stronger literacy, oral reading fluency, and mathematical problem-solving competencies than their control-school peers, particularly in higher-order skills such as story-level reading, subtraction, division, and word problems. A small number of foundational skills (e.g. basic number identification) were comparable across both groups, indicating that the retained advantage was concentrated in the higher-order competencies that ALfA explicitly targets.

These results are consistent with the proposition that ALfA does not merely produce a short-term test bump but helps establish a new and more durable learning trajectory for children in disadvantaged tribal settings. The report recommends that the same cohort be followed again in the next academic year to confirm whether this divergence in trajectory is sustained over a longer horizon. A summary-of-findings table is provided overleaf for an at-a-glance view, followed by the detailed methodology, data analysis, stakeholder case studies, and concluding remarks.

Summary: Findings at a Glance

The table below summarises the six-month retention outcomes across the principal assessment domains. For each domain it shows the share of children in each group reaching the higher-order competency level, together with a standardised effect size (Cohen's h) and whether the difference is statistically significant (chi-square / Fisher test, $p < 0.05$). All figures are computed from the child-level data of 64 treatment and 64 control children.

Higher-order outcome	Control	Treatment (ALfA)	Effect size (h)	Significant?
ASER Literacy — reading at Story level	60.9%	78.1%	0.38	Yes ($p=.045$)
ASER Numeracy — subtraction or division	29.7%	54.7%	0.51	Yes ($p=.018$)
Oral Reading Fluency — 41–60 words/min	15.6%	45.3%	0.66	Yes ($p=.001$)
EGMA Missing Number — scored 6–10 of 10	35.9%	59.4%	0.48	Yes ($p=.013$)
EGMA Addition Level 1 — scored 11–20 of 20	26.6%	46.9%	0.43	Yes ($p=.028$)
EGMA Subtraction Level 1 — scored 11–20 of 20	6.2%	31.2%	0.68	Yes ($p=.001$)
EGMA Word Problems — scored above zero	34.4%	76.6%	0.88	Yes ($p<.001$)
EGMA Number Identification — scored 11–20 of 20	56.2%	56.2%	0.00	No ($p=1.0$)

At a glance: across almost every higher-order domain, ALfA children retained a statistically significant advantage six months after implementation, with effect sizes ranging from small to large. The widest gaps were in Word Problems ($h = 0.88$, large), Subtraction Level 1 and Oral Reading Fluency (both $h \approx 0.67$, medium). The one domain with no difference was the most elementary skill, Number Identification — consistent with the advantage being concentrated in higher-order competencies. (Cohen's h : ≈ 0.2 small, 0.5 medium, 0.8 large.)

1. Problem Statement

Education plays a central role in promoting social equity, human development, and economic transformation, particularly within rural and tribal communities where access to quality learning opportunities remains uneven. In recent years, increasing attention has been directed toward improving foundational literacy and numeracy (FLN) among primary school children in India, especially after national educational surveys repeatedly highlighted low learning outcomes in early-grade education. Large-scale assessments such as ASER, NIPUN Bharat, and other foundational learning studies have consistently demonstrated that a significant proportion of children in elementary schools struggle with basic reading comprehension, arithmetic operations, and problem-solving abilities. These challenges are particularly visible in socio-economically marginalised and tribal regions where structural inequalities, linguistic diversity, poverty, migration, and infrastructural limitations continue to affect children's educational participation and academic achievement.



A pupil at work in a Nandurbar government school. The tribal belt's linguistic diversity and seasonal migration form the backdrop to this study.

Within this context, innovative pedagogical interventions that focus on experiential, activity-based, and child-centred learning have gained increasing importance. The ALfA (Accelerating Learning for All) Learning Method programme emerged as one such intervention designed to strengthen foundational learning through participatory and experiential educational practices. Unlike conventional teacher-centred approaches that often rely heavily on rote memorisation, textbook repetition, and passive classroom instruction, the ALfA programme emphasises active learning, child-to-child paired learning, play-based pedagogy, and the use of low-cost teaching-learning materials. The programme aims to make learning more engaging, contextual, and conceptually meaningful for children by encouraging them to learn through observation, experimentation, collaboration, and hands-on activities.

The present study undertakes a comparative analysis between treatment schools and control schools to examine how durably the ALfA Learning Method programme's gains in students' literacy, numeracy, oral reading fluency, and mathematical problem-solving competencies are retained, six months after the implementation cycle in these schools was completed. The study is situated within rural and tribal schooling contexts where educational disadvantages remain deeply interconnected with broader socio-economic realities. By comparing the learning outcomes of students from treatment and control schools, the research seeks to identify whether activity-based and experiential pedagogical interventions contribute to a lasting change in children's academic development and classroom participation that persists beyond the intervention period.

The quantitative component of the study evaluates student performance across multiple assessment tools, including ASER literacy and numeracy assessments, Oral Reading Fluency (ORF), and the Early Grade Mathematics Assessment (EGMA). These tools provide detailed insights into children's reading levels, arithmetic skills, conceptual understanding, fluency, and problem-solving abilities.

At the same time, the study recognises that educational transformation cannot be fully understood through quantitative indicators alone. Consequently, the research incorporates an extensive qualitative analysis based on classroom observations, teacher interviews, administrative reflections, and guardians' perspectives. This qualitative dimension explores how the programme influenced classroom culture, teacher practices, student engagement, collaborative learning, and perceptions of educational

quality. It further investigates the systemic and institutional barriers affecting the sustainability and scalability of innovative educational interventions within government schooling systems.

The findings of the study are particularly significant within the broader policy discourse surrounding foundational literacy and numeracy, competency-based learning, and the implementation of the National Education Policy (NEP) 2020. The NEP advocates experiential learning, play-based pedagogy, conceptual understanding, and reduced dependence on rote memorisation during early childhood and primary education. In this regard, the ALfA Learning Method reflects several pedagogical principles aligned with contemporary educational reforms aimed at transforming classroom learning processes in India.

2. Research Methodology and Methods

Introduction

The present study was conducted by an independent research team at Savitribai Phule Pune University to examine the **retention of foundational learning** — in literacy, numeracy, oral reading fluency, and mathematical problem-solving — among primary school children in rural and tribal schools who had earlier been taught through the ALfA Learning Method programme. The evaluation was carried out approximately six months after the programme's implementation cycle in these schools had ended, so that the results reflect the learning that endured once the intervention and its immediate post-test had concluded. The study adopted a comprehensive methodological framework combining both quantitative and qualitative research approaches in order to capture not only measurable educational outcomes but also the lived experiences of teachers, students, administrators, and guardians associated with the programme.

Nature and Timing of the Evaluation

This study should be understood as a **six-month learning-retention evaluation**, not as an endline assessment. The ALfA implementation in the participating Nandurbar schools was delivered as a complete instructional cycle, and a post-test was administered at the close of that cycle under the supervision of the local DIET in collaboration with DEVI Sansthan. The Pune University team entered independently, six months after that post-test had elapsed, to assess how much of the learning remained. The central question is therefore one of **durability and trajectory**: do children who learned through ALfA retain their advantage, and do they appear to be on a different, higher learning path than comparable control-group children? To answer this fully, the study recommends a further follow-up assessment of the same children in the next academic year (see Concluding Remarks).

Research Design

The study adopted a mixed-method research design incorporating both quantitative and qualitative approaches. The quantitative component focused on measuring students' retained literacy, numeracy, reading fluency, and mathematical competencies using standardised educational assessment tools. The qualitative component explored classroom processes, pedagogical practices, institutional challenges, teacher experiences, and perceptions regarding the ALfA Learning Method programme.

The research followed a comparative design involving two categories of schools: (1) **Treatment Schools** — schools where the ALfA Learning Method programme had been implemented; and (2) **Control Schools** — schools where the programme was not implemented and conventional teaching-learning practices continued. Throughout this report the second group is referred to consistently as "Control schools".

The study was conducted in rural and tribal educational settings characterised by socio-economic vulnerability, linguistic diversity, limited infrastructural resources, and comparatively low foundational

learning outcomes. The selected schools represented contexts where children often experience educational disadvantages associated with poverty, migration, irregular attendance, parental illiteracy, and limited access to quality educational support.

Sampling and Selection Criteria

A total of 128 students participated in the study, equally divided between treatment and control schools (64 each). Within each group, 32 children were drawn from Grade 3 and 32 from Grade 4, giving a balanced 64:64 split by group and a 64:64 split by grade.

Schools were selected using **purposive sampling**: treatment schools were those in which ALfA had been implemented, and control schools were matched comparison schools in the same tribal block, selected to resemble the treatment schools on locality, medium of instruction (Marathi), school size, and broad socio-economic profile. Within each selected school, students were chosen using **stratified random sampling**, with grade (3 and 4) as the stratification variable. From each grade stratum, the required number of children was drawn at random from the enrolment register of children present on the assessment day, until the target of 32 per grade per group was reached.

Near-equal gender representation — 63 boys (49.2%) and 65 girls (50.8%) across the full sample — was achieved by applying gender as a secondary balancing criterion during random selection: where a grade stratum in a school permitted, selection alternated between the boys' and girls' registers so that the running totals of male and female participants remained close to parity. No quota was imposed beyond approximate balance, which is why the final counts differ by two children rather than being exactly equal.

Eligibility criteria for inclusion were: (i) current enrolment in Grade 3 or Grade 4 in a participating school; (ii) presence on the day of assessment; and (iii) for treatment-group children, prior exposure to the ALfA instructional cycle. Children with incomplete assessment records were excluded and replaced through the same random procedure to preserve the target counts.

Assessment Tools and Analysis

Four standardised instruments were used for the quantitative component: (1) the ASER Literacy Assessment, (2) the ASER Numeracy Assessment, (3) the Oral Reading Fluency (ORF) measure, and (4) the Early Grade Mathematics Assessment (EGMA). The comparative interpretation of these findings enabled the study to identify patterns of variation between the two groups. Qualitative data obtained through interviews, observations, and administrative reflections were analysed using thematic analysis.

In brief, each instrument measured the following (the exact items are reproduced in Annex A): the **ASER reading test** places each child at the highest level reached — cannot read letters, letters, words, paragraph, or story; the **ASER numeracy test** similarly records the highest level reached — 1-digit recognition, 2-digit recognition, two-digit subtraction with borrowing, or division; the **Oral Reading Fluency (ORF)** measure asks the child to read a 60-word Marathi word list aloud for 60 seconds and records the number of words read correctly (maximum 60), reported in words-per-minute bands; and the **EGMA** comprises eight timed and untimed tasks scored out of task-specific maxima (see Section 3.4). Each instrument was administered one-to-one in Marathi.

Implementation dosage and interval. The ALfA instructional cycle in these schools ran for 72 working days. The programme's own baseline and post-test were administered around that cycle by the DIET with DEVI Sansthan. The present independent assessment was conducted approximately six months after that post-test, fixing the retention interval that this report measures.

Assessor arrangement. The assessments were administered one-to-one by a team of nine trained assessors, working independently of the implementing organisation. The assessors were **blind to the treatment/control status of the schools** — they were not told which schools had received the ALfA programme and which were comparison schools. Before fieldwork, all assessors received a **two-hour**

training on the use of the ASER, ORF and EGMA tools, delivered jointly by DEVI Sansthan and Dr. Gunratna Sontakke, to standardise administration and scoring.



*One-to-one administration of the reading assessment.
Assessors were blind to each school's treatment or control status.*

Assessor-consistency check. Because each assessor worked in a fixed set of schools, an assessor's scores are partly confounded with the schools — and therefore the group — he or she assessed; with that caveat in mind, a consistency check was run. For each child a single composite score (0–1) was formed by averaging performance across the literacy, numeracy, fluency and arithmetic measures, and assessors were then compared **within the arm they assessed**. The assessors clustered closely: in the treatment arm, every assessor's mean fell within about one standard deviation of the arm mean, and in the control arm all but one did so. The few larger deviations were associated with small numbers of children in particular schools rather than with any one consistently lenient or harsh scorer, and no assessor stood out as an outlier across the board. There was therefore no evidence that differences between assessors drove the treatment–control gap, which was visible across several independent assessors in each arm. (One assessment record did not carry an assessor name and was retained in the totals.)

Thematic coding was used to identify recurring patterns and major themes emerging from stakeholder experiences and classroom observations. The major themes were: (1) Programme effectiveness and pedagogical innovation; (2) Systemic and bureaucratic barriers; (3) Policy implementation and institutional gaps; (4) Resource integration and system complementarity; and (5) Educational quality improvement and dropout-related challenges. The qualitative analysis helped contextualise quantitative findings and provided deeper insight into the social, institutional, and pedagogical dimensions of the programme.

Quantitative analysis. Differences between groups are reported as percentages within each group of 64, accompanied by effect sizes (Cohen's h) and significance tests (chi-square across the level and score distributions; Fisher's exact test for the binary "scored above zero" outcomes) in Section 3.5. The analysis was run on the full child-level dataset; per-measure statistics are provided in the accompanying data workbook.

Ethical Considerations

The study maintained ethical standards throughout the research process. Participation of students, teachers, and guardians was voluntary. Respondents were informed about the purpose of the study, and confidentiality of personal information was maintained during data collection, analysis, and reporting. Special care was taken while conducting assessments and interviews with children to ensure a supportive and non-threatening environment.

Limitations of the Study

- The study was limited to selected treatment and control schools within specific rural and tribal contexts.
- As an independent evaluation conducted six months after implementation, the study captures retained learning at a single point in time; a baseline administered by the Pune team was not part of this design. Comparison therefore rests on the contrast between matched treatment and control groups rather than on a within-team pre/post measurement.
- Certain findings, particularly within the qualitative component, were based on perceptions and experiences of respondents rather than longitudinal measurement.
- Broader structural factors such as migration, poverty, language diversity, and irregular attendance may have influenced learning outcomes beyond the immediate scope of the programme.

3. Data Analysis

3.1 Sample Composition

The two groups were balanced by design. Each arm comprised 64 children, split evenly between Grade 3 and Grade 4 (32 children per grade per arm). Gender was near-balanced overall (63 boys, 65 girls). Because grade is balanced, the analyses below are also broken down by Grade 3 and Grade 4, which makes it possible to compare, for example, ALfA Grade 3 children against business-as-usual (control) Grade 4 children (see Section 3.7).

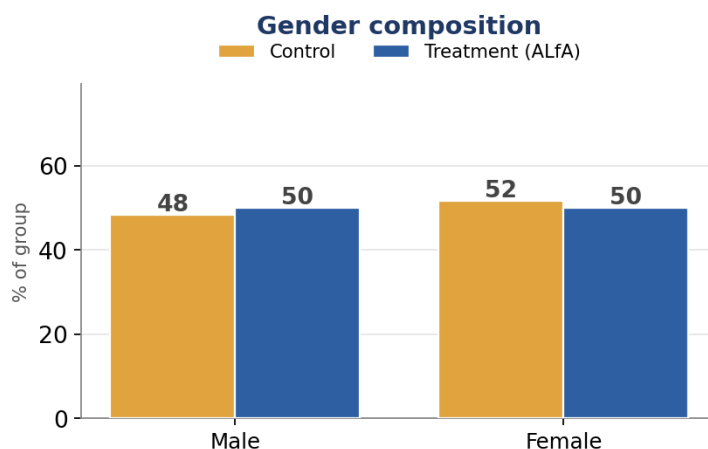


Figure 1 Gender composition of the sample.

Gender	Control	Treatment	% Control	% Treatment
Male	31	32	48.4%	50.0%
Female	33	32	51.6%	50.0%
Total	64	64	100.0%	100.0%

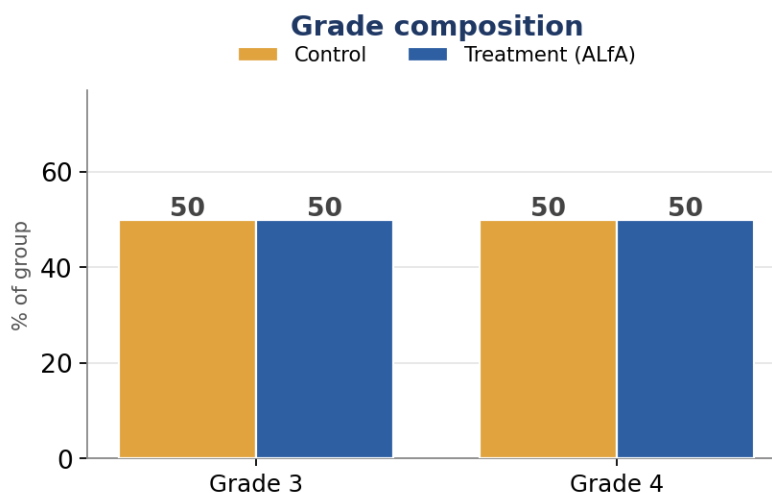


Figure 2. Grade composition of the sample.

Tool: sample description — 32 children per grade in each arm.

Grade	Control	Treatment	% Control	% Treatment
Grade 3	32	32	50.0%	50.0%
Grade 4	32	32	50.0%	50.0%
Total	64	64	100.0%	100.0%

3.2 ASER Tools Analysis

A. ASER Literacy Level

Six months after implementation, ALfA children retained markedly stronger reading than control children, and the grade breakdown is striking: **control Grade 4 children read no better than — indeed slightly behind — control Grade 3 children (53% vs 69% at Story level)**, whereas **ALfA children rose from 75% (Grade 3) to 81% (Grade 4)**. ALfA Grade 3 children already outperform control Grade 4 children.

Level	Control Gr 3	Control Gr 4	ALfA Gr 3	ALfA Gr 4
Cannot read letters	1 (3.1%)	6 (18.8%)	1 (3.1%)	0 (0.0%)
Letters	6 (18.8%)	6 (18.8%)	3 (9.4%)	2 (6.3%)
Words	1 (3.1%)	0 (0.0%)	0 (0.0%)	3 (9.4%)
Paragraph	2 (6.3%)	3 (9.4%)	4 (12.5%)	1 (3.1%)
Story	22 (68.8%)	17 (53.1%)	24 (75.0%)	26 (81.3%)
Total (n)	32	32	32	32

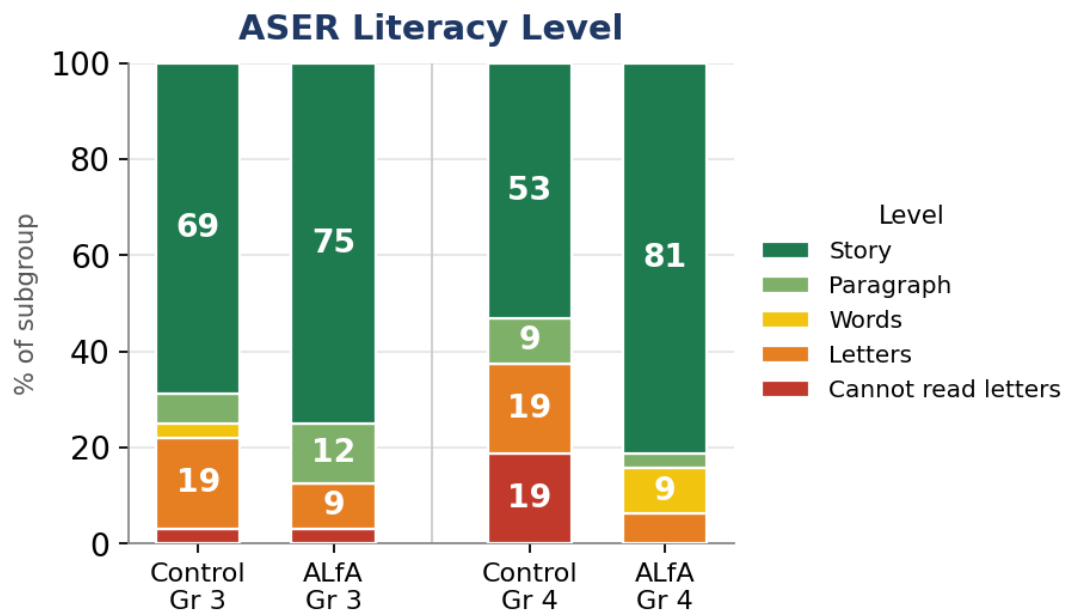


Figure 3. ASER Literacy Level, by arm and grade.

B. ASER Numeracy Level

ALfA children reached the higher operations (subtraction, division) more often. The grade breakdown shows the ALfA advantage widening by Grade 4, where ALfA children move strongly into subtraction and division.

Level	Control Gr 3	Control Gr 4	ALfA Gr 3	ALfA Gr 4
Recognises 1-digit	10 (31.3%)	10 (31.3%)	11 (34.4%)	3 (9.4%)
Recognises 2-digit	13 (40.6%)	12 (37.5%)	8 (25.0%)	7 (21.9%)
Subtraction	9 (28.1%)	6 (18.8%)	12 (37.5%)	9 (28.1%)
Division	0 (0.0%)	4 (12.5%)	1 (3.1%)	13 (40.6%)
Total (n)	32	32	32	32

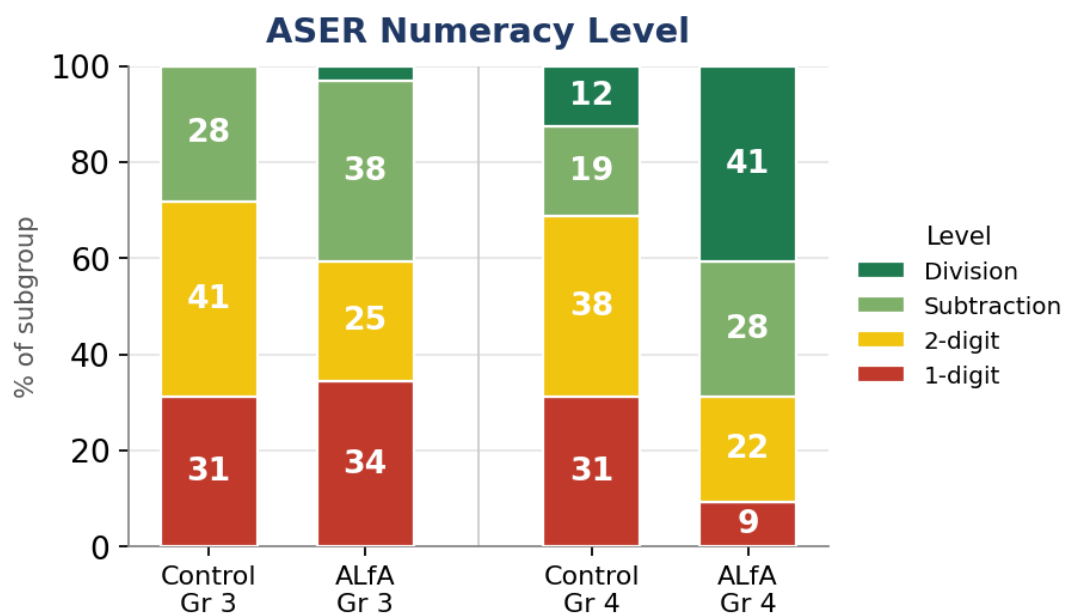


Figure 4. ASER Numeracy Level, by arm and grade. Tool: ASER numeracy test (Marathi); highest level reached.

3.3 Oral Reading Fluency Analysis

ALfA children were far more likely to reach the top fluency band (41–60 wpm). By grade, the ALfA advantage grows: ALfA Grade 4 children are the most fluent group, while control fluency barely changes between grades.

A child completing an assessment sheet during the independent evaluation.



Level	Control Gr 3	Control Gr 4	ALfA Gr 3	ALfA Gr 4
0–20 wpm	12 (37.5%)	15 (46.9%)	12 (37.5%)	8 (25.0%)
21–40 wpm	15 (46.9%)	12 (37.5%)	10 (31.3%)	5 (15.6%)
41–60 wpm	5 (15.6%)	5 (15.6%)	10 (31.3%)	19 (59.4%)
Total (n)	32	32	32	32

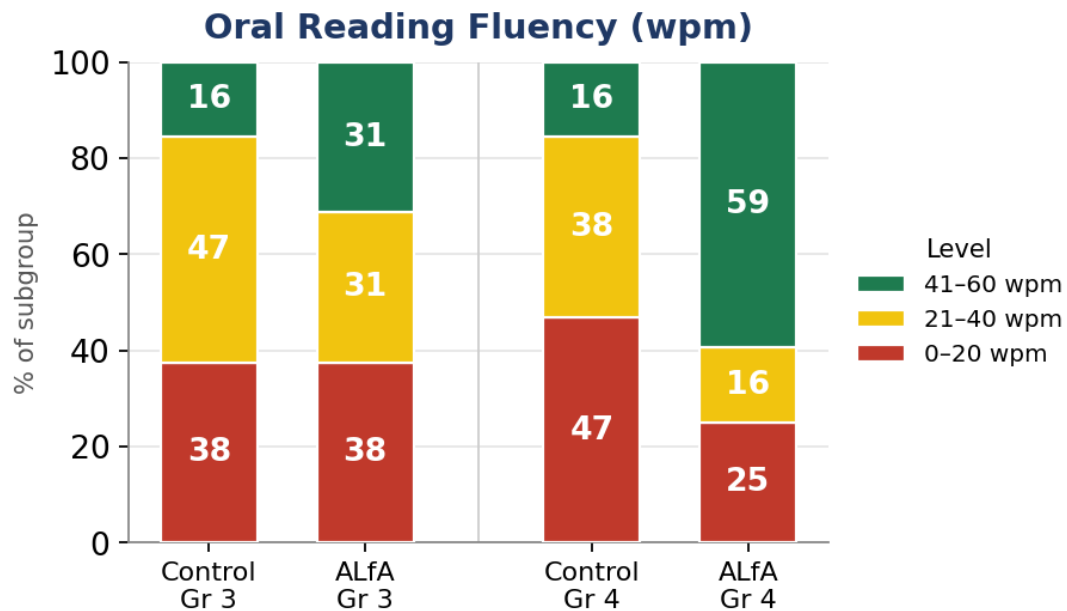


Figure 5. Oral Reading Fluency (words/min), by arm and grade.
Tool: ORF — a 60-word Marathi list read for 60 seconds; words read correctly per minute (max 60).

3.4 Early Grade Mathematics Assessment (EGMA) Analysis

The EGMA comprised eight tasks: number identification, smaller & bigger, missing number, addition Level I and II, subtraction Level I and II, and word problems.

Number Identification

The most elementary skill — reading numbers aloud — was the same across arms and grades, confirming the retained advantage is concentrated in higher-order skills.

Level	Control Gr 3	Control Gr 4	ALfA Gr 3	ALfA Gr 4
Scored 0–10 (of 20)	14 (43.8%)	14 (43.8%)	21 (65.6%)	7 (21.9%)
Scored 11–20 (of 20)	18 (56.3%)	18 (56.3%)	11 (34.4%)	25 (78.1%)
Total (n)	32	32	32	32

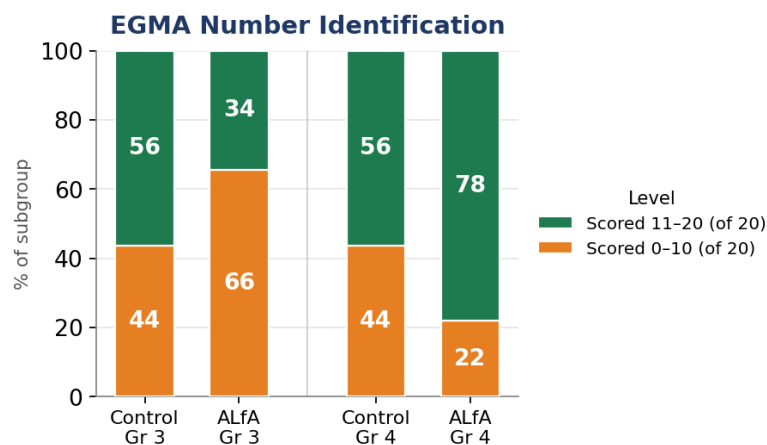


Figure 6. EGMA Number Identification, by arm and grade.

Tool: EGMA Task 1 — read 20 numbers aloud in 60 seconds (max 20).

Smaller & Bigger Number

Level	Control Gr 3	Control Gr 4	ALfA Gr 3	ALfA Gr 4
Scored 0–5 (of 10)	10 (31.3%)	9 (28.1%)	9 (28.1%)	4 (12.5%)
Scored 6–10 (of 10)	22 (68.8%)	23 (71.9%)	23 (71.9%)	28 (87.5%)
Total (n)	32	32	32	32

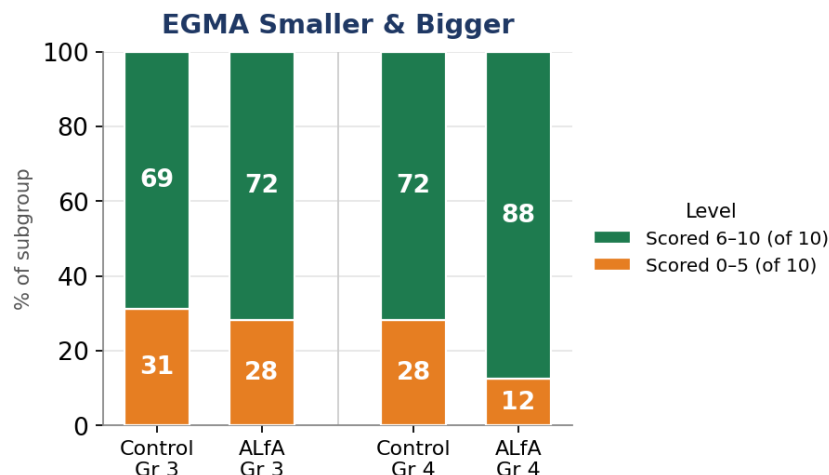


Figure 7. EGMA Smaller & Bigger, by arm and grade.

Tool: EGMA Task 2 — say which number is bigger (max 10).

Missing Number

ALfA children, especially in Grade 4, were far more likely to score in the upper band.

Level	Control Gr 3	Control Gr 4	ALfA Gr 3	ALfA Gr 4
Scored 0–5 (of 10)	25 (78.1%)	16 (50.0%)	19 (59.4%)	7 (21.9%)
Scored 6–10 (of 10)	7 (21.9%)	16 (50.0%)	13 (40.6%)	25 (78.1%)
Total (n)	32	32	32	32

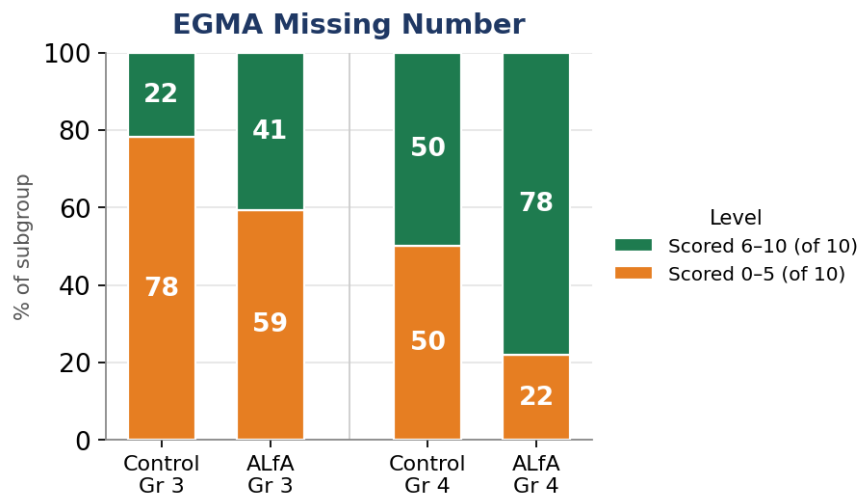


Figure 8. EGMA Missing Number, by arm and grade.
Tool: EGMA Task 3 — supply the missing number in a sequence (max 10).

Addition Level I

Level	Control Gr 3	Control Gr 4	ALfA Gr 3	ALfA Gr 4
Scored 0–10 (of 20)	27 (84.4%)	20 (62.5%)	25 (78.1%)	9 (28.1%)
Scored 11–20 (of 20)	5 (15.6%)	12 (37.5%)	7 (21.9%)	23 (71.9%)
Total (n)	32	32	32	32

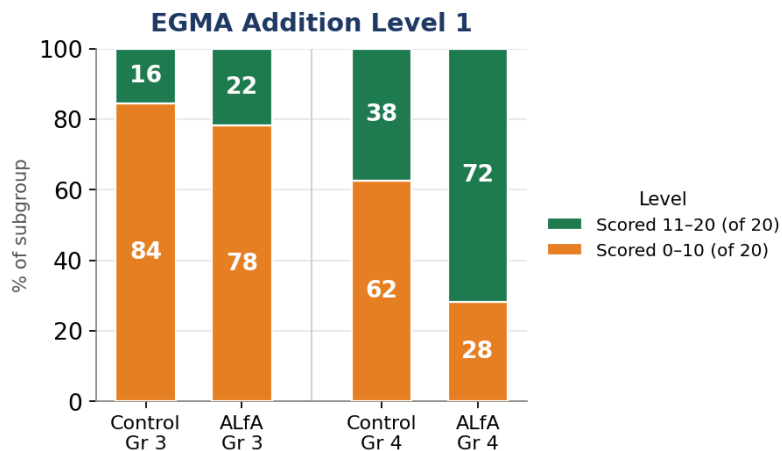


Figure 9. EGMA Addition Level 1, by arm and grade.
Tool: EGMA Task 4A — 20 single-digit sums in 60 seconds (max 20). Bands = sums correct.

Addition Level II

On harder two-digit addition, ALfA Grade 3 children already match or exceed control Grade 4 children.

Level	Control Gr 3	Control Gr 4	ALfA Gr 3	ALfA Gr 4
0	19 (59.4%)	12 (37.5%)	8 (25.0%)	4 (12.5%)
1	1 (3.1%)	0 (0.0%)	1 (3.1%)	6 (18.8%)
2	2 (6.3%)	2 (6.3%)	8 (25.0%)	3 (9.4%)
3	4 (12.5%)	5 (15.6%)	5 (15.6%)	2 (6.3%)
4	2 (6.3%)	4 (12.5%)	4 (12.5%)	3 (9.4%)
5	4 (12.5%)	8 (25.0%)	6 (18.8%)	14 (43.8%)
Total (n)	32	31	32	32

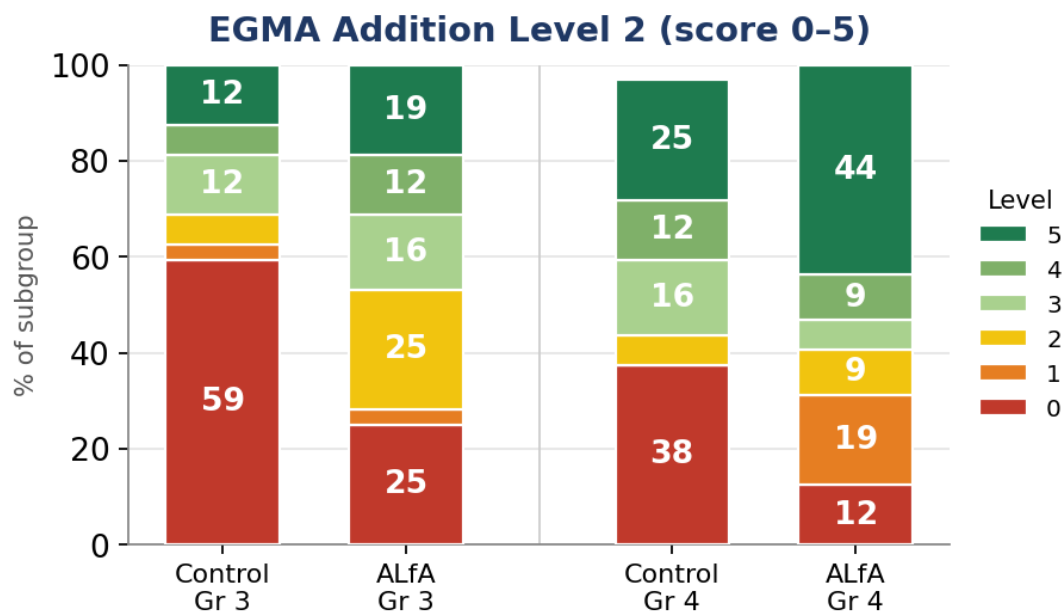
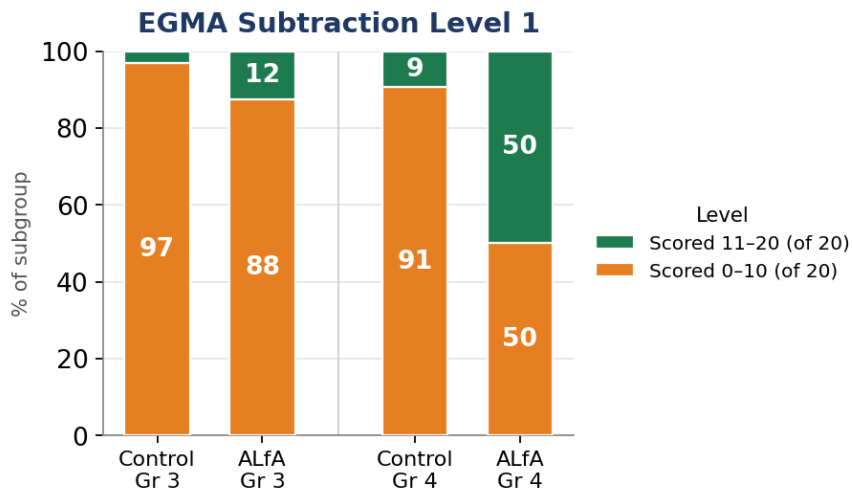


Figure 10. EGMA Addition Level 2, by arm and grade.

Tool: EGMA Task 4B — 5 two-digit sums with carrying (max 5). One control child mis-keyed “6”, capped at 5.

Subtraction Level I



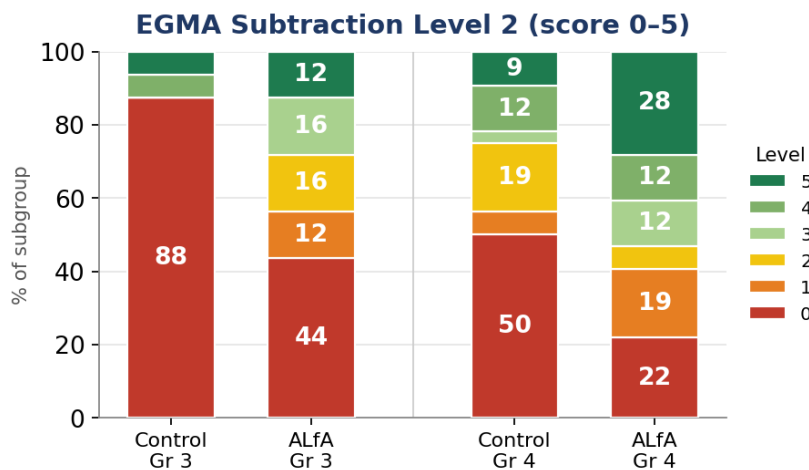
A large, durable gap: ALfA children reached the higher band far more often, and ALfA Grade 3 children already exceed control Grade 4 children.

Figure 11. EGMA Subtraction Level 1, by arm and grade.

Tool: EGMA Task 5A — 20 single-digit subtractions in 60 seconds (max 20).
Chi-square $p < .001$.

Level	Control Gr 3	Control Gr 4	ALfA Gr 3	ALfA Gr 4
Scored 0–10 (of 20)	31 (96.9%)	29 (90.6%)	28 (87.5%)	16 (50.0%)
Scored 11–20 (of 20)	1 (3.1%)	3 (9.4%)	4 (12.5%)	16 (50.0%)
Total (n)	32	32	32	32

Subtraction Level II



On two-digit subtraction with borrowing, control children — especially Grade 3 — largely score zero, while ALfA children spread across the full range.

Figure 12. EGMA Subtraction Level 2, by arm and grade.

Tool: EGMA Task 5B — 5 two-digit subtractions with borrowing (max 5).

Level	Control Gr 3	Control Gr 4	ALfA Gr 3	ALfA Gr 4
0	28 (87.5%)	16 (50.0%)	14 (43.8%)	7 (21.9%)
1	0 (0.0%)	2 (6.3%)	4 (12.5%)	6 (18.8%)
2	0 (0.0%)	6 (18.8%)	5 (15.6%)	2 (6.3%)
3	0 (0.0%)	1 (3.1%)	5 (15.6%)	4 (12.5%)
4	2 (6.3%)	4 (12.5%)	0 (0.0%)	4 (12.5%)
5	2 (6.3%)	3 (9.4%)	4 (12.5%)	9 (28.1%)
Total (n)	32	32	32	32

Word Problems

The largest gap of all: most control children (especially Grade 3) scored zero, while ALfA children solved across the full range.

Level	Control Gr 3	Control Gr 4	ALfA Gr 3	ALfA Gr 4
0	28 (87.5%)	14 (43.8%)	11 (34.4%)	4 (12.5%)
1	0 (0.0%)	0 (0.0%)	2 (6.3%)	0 (0.0%)
2	0 (0.0%)	0 (0.0%)	4 (12.5%)	3 (9.4%)
3	2 (6.3%)	1 (3.1%)	3 (9.4%)	6 (18.8%)
4	0 (0.0%)	3 (9.4%)	2 (6.3%)	3 (9.4%)
5	0 (0.0%)	6 (18.8%)	5 (15.6%)	4 (12.5%)
6	2 (6.3%)	8 (25.0%)	5 (15.6%)	12 (37.5%)
Total (n)	32	32	32	32

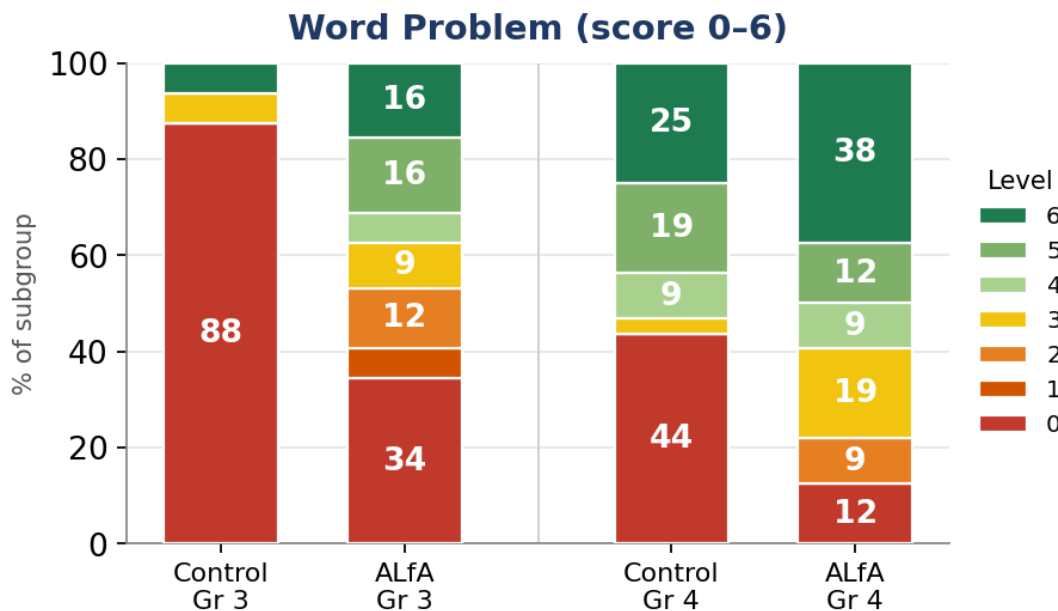


Figure 13. Word Problems, by arm and grade.

Tool: EGMA Task 6 — 6 spoken Marathi word problems (max 6). Chi-square $p < .001$, Cohen's h (scored>0) = 0.88.

3.5 Magnitude and Significance of the Differences

To indicate the magnitude of the differences and whether they are statistically reliable, the table reports, for the headline higher-order outcomes, the effect size (Cohen's h) and a significance test (chi-square across the level distribution, or Fisher's exact test for binary outcomes). By convention, $h \approx 0.2$ small, 0.5 medium, 0.8 large. Computed from the child-level data (64 per arm).

Higher-order outcome	Control	Treatment (ALfA)	Effect size (h)	Significance
ASER — reading at Story level	60.9%	78.1%	0.38 (small)	$p = .045$ *
ASER — numeracy at subtraction or division	29.7%	54.7%	0.51 (medium)	$p = .018$ *
ORF — top fluency band (41–60 wpm)	15.6%	45.3%	0.66 (medium)	$p = .001$ **
EGMA Missing Number — scored 6–10 of 10	35.9%	59.4%	0.48 (small)	$p = .013$ *
EGMA Addition L1 — scored 11–20 of 20	26.6%	46.9%	0.43 (small)	$p = .028$ *
EGMA Subtraction L1 — scored 11–20 of 20	6.2%	31.2%	0.68 (medium)	$p < .001$ ***
EGMA Word problems — scored above zero	34.4%	76.6%	0.88 (large)	$p < .001$ ***
EGMA Number Identification — scored 11–20	56.2%	56.2%	0.00 (none)	$p = 1.0$ (n.s.)

Seven of the eight headline outcomes show a statistically significant ALfA advantage, with effect sizes from small to large (word problems $h = 0.88$). The one non-significant result is Number Identification — the most elementary skill — reinforcing that the retained advantage is concentrated in higher-order competencies. Full per-measure statistics are in the accompanying data workbook.

3.6 School-Level Results

Because the design has only four schools per arm, it is worth checking that the averages are not driven by one school. Every ALfA school reaches at least 62% Story-level reading; control schools are more variable (Koparli reads well but has very low fluency; Kolade is weak throughout). The charts below show three indicative outcomes by school.

School	Arm	% at Story	% ORF 41–60	% Add L1 11–20
Z.P. School Bahadwad Tal	ALfA	88%	62%	44%
Z.P. School Dhandhane	ALfA	62%	31%	25%
Z.P. School Tokartalav	ALfA	62%	25%	50%
Z.P. School Umarde BK	ALfA	100%	62%	69%
Z.P. School Kolade	Control	18%	0%	12%
Z.P. School Koparli	Control	94%	6%	56%
Z.P. School Nandarkhe	Control	60%	20%	13%
Z.P. School Waghale	Control	75%	38%	25%

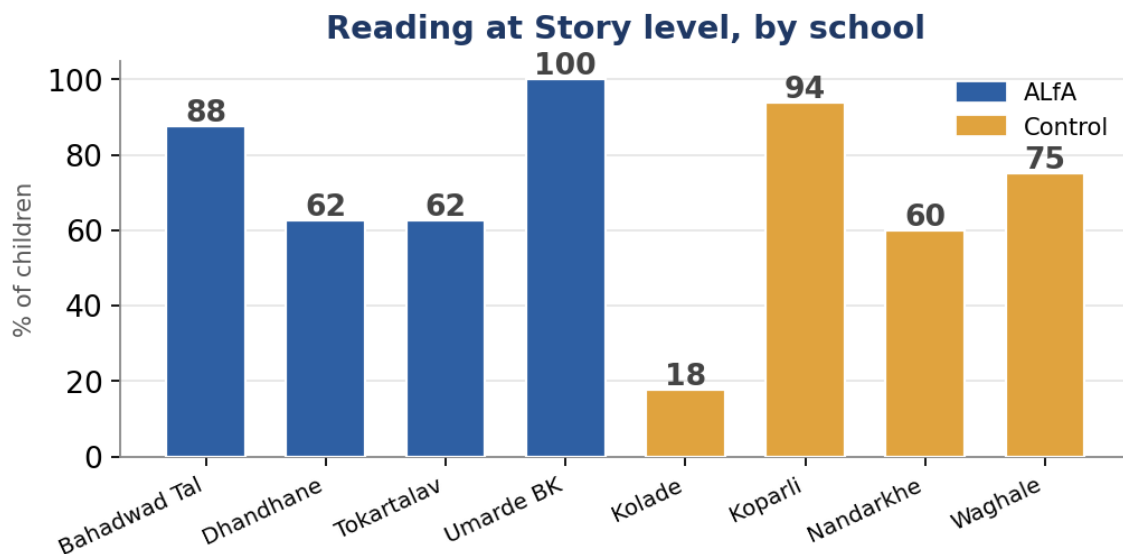


Figure 14. Reading at Story level, by school. Tool: ASER reading test; % of each school's children at Story level.

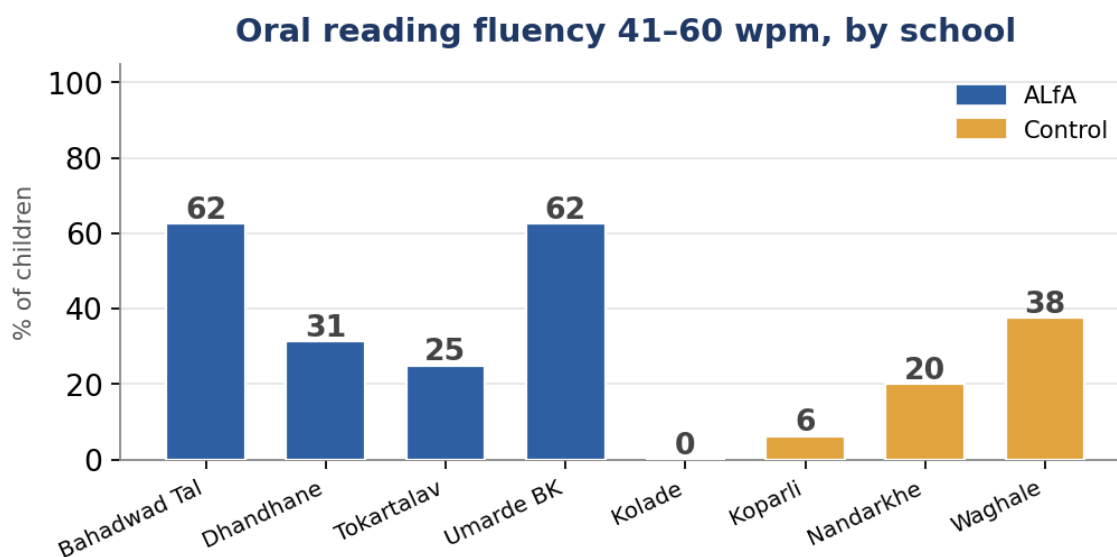


Figure 15. Oral reading fluency (41–60 wpm), by school. Tool: ORF; % of each school's children in the top fluency band.

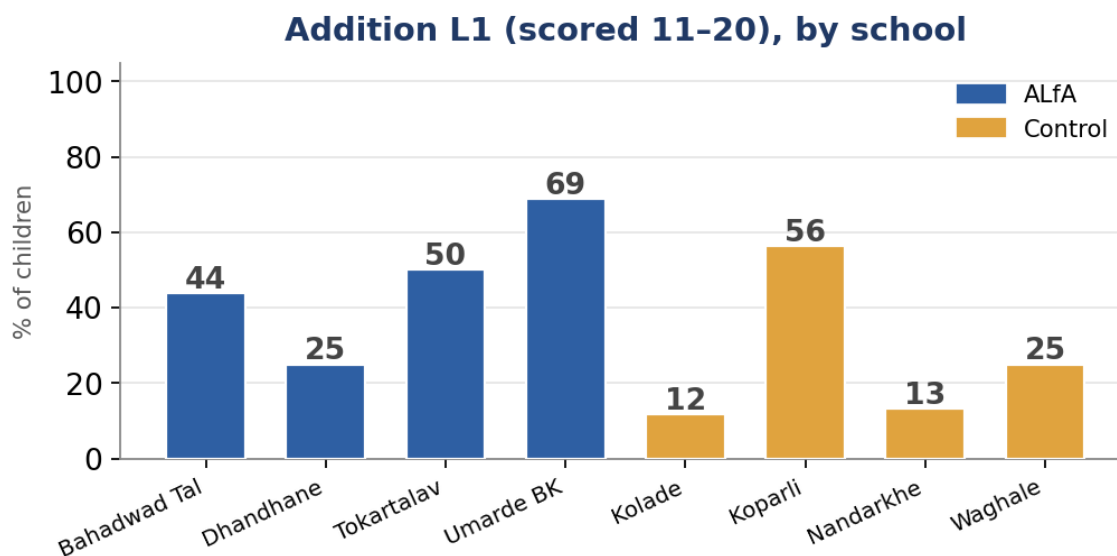


Figure 16. Addition Level 1 (scored 11–20), by school. Tool: EGMA Task 4A; % of each school's children in the higher band.

3.7 A Pseudo-Longitudinal View: How Many Years of Schooling Did ALfA Add?

Because the sample is balanced across Grade 3 and Grade 4, we can use the difference between control Grade 3 and control Grade 4 as a rough proxy for what one additional year of ordinary (“business-as-usual”) schooling adds, and then ask how far ALfA moved children relative to that yardstick. This is a **pseudo-longitudinal, grade-equivalent** approximation — not a true longitudinal measurement — and should be read with caution given the small subgroups (32 children each) and cross-sectional design; the planned next-year follow-up of the same children would replace it with a real trajectory.

Measure (mean score)	Ctrl Gr 3	Ctrl Gr 4	ALfA Gr 3	ALfA Gr 4	ALfA Gr-3 boost ≈ schooling years
ASER Literacy level (0–4)	3.19	2.59	3.47	3.59	control did not progress*
ASER Numeracy level (1–4)	1.97	2.12	2.09	3.00	≈ 0.8 BAU year(s)
Oral reading fluency (approx wpm)	25.62	23.75	28.75	36.88	control did not progress*
EGMA Addition L2 (0–5)	1.41	2.53	2.44	3.12	≈ 0.9 BAU year(s)
EGMA Subtraction L2 (0–5)	0.56	1.50	1.53	2.59	≈ 1 BAU year(s)
Word problems (0–6)	0.56	2.91	2.56	4.00	≈ 0.9 BAU year(s)

Read carefully, the table tells a consistent story. On the arithmetic and word-problem measures where ordinary schooling did add something between Grade 3 and Grade 4, a single ~72-day ALfA cycle moved Grade 3 children by roughly **0.8 to 1.0 of a business-as-usual school year** (numeracy ≈ 0.8, Addition L2 ≈ 0.9, Subtraction L2 ≈ 1.0, word problems ≈ 0.9). On reading and oral fluency the effect is arguably larger: in control schools Grade 4 children scored at or below Grade 3 children — the foundational stagnation that FLN policy is designed to break — while **ALfA Grade 3 children already read and decode better than control Grade 4 children**. In other words, on these skills the ALfA cohort is effectively more than a school year ahead of where the ordinary trajectory would place them.

These figures are deliberately approximate and are offered to aid interpretation, not as precise causal estimates. The cleanest confirmation would come from re-assessing the same children next year (Section 6), turning this grade-equivalent snapshot into a genuine learning trajectory.

4. Case Study of Major Stakeholders

The qualitative component of this evaluation drew on interviews and reflections from key informants at the district level, together with the perspectives of classroom teachers and parents. Responses were analysed thematically. Five themes recurred across stakeholders: (1) programme effectiveness and pedagogical innovation; (2) systemic and bureaucratic barriers; (3) policy implementation and institutional gaps; (4) resource integration and system complementarity; and (5) the distinction between improving educational quality and addressing dropout. The accounts below are organised around these themes.

Part 1: The Officers - Education Officer, CEO, and Director (DIET, Nandurbar)

The key informants — the Education Officer (Nandurbar), the Chief Executive Officer (Zilha Parishad), and the Director of the District Institute of Education and Training (DIET, Nandurbar) — described a layered process of educational change unfolding within a socio-economically marginalised and institutionally constrained context. In their accounts the ALfA programme functioned simultaneously as a pedagogical intervention, a mechanism for restructuring classroom interaction, a process of teacher motivation, and an implicit critique of conventional schooling.

“त्यांनी दाखवलेले निकाल खूप आशादायक आहेत. हे निकाल व्यावहारिक शिक्षण आणि कौशल्य विकासावर आधारित आहेत, आणि थोड्या वेगळ्या शैक्षणिक पद्धतीवर आधारित आहेत.”

“The results they have demonstrated are very promising. These results are rooted in practical learning and skill development, and are based on a slightly different pedagogical methodology.”

— Naman Goyal, Chief Executive Officer, Zilla Parishad, Nandurbar

Theme 1 — Programme effectiveness and pedagogical innovation

Respondents characterised conventional instruction in the district as heavily dependent on rote memorisation and repetition of textbook content, in which children often remain passive recipients of information. The ALfA Learning Method was seen to disrupt this pattern by reorganising the classroom around activity-based, child-to-child paired, and experiential learning. Informants repeatedly observed that children who had previously been withdrawn or disengaged became visibly more active — asking questions more freely, speaking in class, and interacting with peers during learning tasks. This was described as a shift away from what one informant characterised as the “banking” model of education, in which knowledge is deposited into passive learners, toward a more participatory, learner-centred classroom.

“ट्रीटमेंट शाळांचे निकाल निश्चितपणे चांगले होते. यातून सकारात्मक परिणाम मिळाले. क्रियाकलाप प्रभावी आहेत; काम करण्याची पद्धत कौतुकास्पद आहे. दैनंदिन वस्तूंचा वापर करून फेकून देता येण्याजोग्या पासून टिकाऊ साहित्यापर्यंत शिकवणे उत्कृष्ट होते. खेळ, मनोरंजन आणि शिक्षण होते, आणि विद्यार्थ्यांनी स्वतंत्रपणे शिकत घेतले.”

“The results from the treatment schools were, of course, good. Positive outcomes emerged from it. The activities are effective; the working style is commendable. Teaching through everyday objects, from disposable to durable materials, was excellent. There was play, entertainment, and learning, and the students learned independently.”

— Irfan Pathan, Education Officer, Nandurbar

A recurring strength in their accounts was the emphasis on conceptual understanding built through direct engagement with concrete materials. Mathematical ideas such as counting, place value, addition, subtraction, sequencing, and division were said to become far easier to grasp when children physically manipulated objects rather than memorising procedures — an observation the informants linked to

broadly constructivist ideas about how young children learn. They also valued the programme's reliance on low-cost, locally adaptable materials, which they regarded as well suited to resource-constrained government schools.

“अल्फा शिक्षण पद्धत विद्यार्थ्यांमध्ये स्वयं-निर्देशित आणि सहकार्यामधून शिकण्याचे वर्तन विकसित करते. मुलांच्या वर्तनात आणखी एक आयाम दिसतो — ते त्यांच्या सहकार्याशी कसे संवाद साधतात. सहकार्यामधून शिकणे ही सध्याची अपेक्षा असल्याने, मुले गट क्रियाकलापांद्वारे एकमेकांना शिकवतात, हे देखील अपेक्षित शैक्षणिक पद्धतीशी सुसंगत आहे.”

“The ALfA Learning Method fosters self-directed and peer-to-peer learning behaviours among students. There is another dimension evident in children's behaviour — the way they interact with their peers. Since peer learning is the current expectation, with children teaching one another through group activities, this too aligns with expected pedagogy.”

— Officer, District Institute of Education and Training (DIET), Nandurbar

Theme 2 — Systemic and bureaucratic barriers

Alongside this optimism, informants were candid about the structural constraints within which any classroom innovation must operate. They pointed to bureaucratic and administrative processes that slow the adoption and scaling of grassroots pedagogical innovations, the heavy non-teaching workload carried by government teachers, and the difficulty of sustaining new practices once external support is withdrawn. The concern was less about the merits of ALfA than about whether the wider system has the flexibility and continuity to absorb and sustain it at scale.

Theme 3 — Policy implementation and institutional gaps

Informants situated the programme within the national policy environment — the National Education Policy 2020 and the NIPUN Bharat mission on foundational literacy and numeracy — and noted a familiar gap between policy intent and classroom reality. While these policies articulate a clear commitment to experiential, competency-based early learning, teachers must simultaneously cover the prescribed government syllabus and meet existing examination expectations. Read in the language of this evaluation, the informants were describing an implementation gap between what policy prescribes and what the daily classroom can deliver — precisely the space that a concrete, low-cost pedagogy like ALfA is positioned to fill.

Theme 4 — Resource integration and system complementarity

Because the programme uses inexpensive, locally available materials and works within the regular school day, informants saw it as complementary to — rather than competing with — existing institutional structures and resources. This complementarity was viewed as one of its more attractive features for a district administration with limited discretionary funds, since it does not depend on expensive equipment or major infrastructure.

Theme 5 — Educational quality versus dropout

Finally, informants drew a careful distinction between improving the quality of learning and reducing dropout. They credited ALfA with improving engagement and learning quality, but cautioned that dropout in this tribal belt is driven largely by structural factors beyond the classroom — seasonal migration of families in search of work, livelihood insecurity, the distance and cost of transport to school, and poverty. Linguistic diversity compounds the challenge: many children speak Bhili, Pavri, or other tribal languages and dialects at home that differ from the Marathi medium of instruction, so the early grades carry an additional language barrier. The informants' consistent message was that pedagogical innovation can raise learning levels for the children who are present, but cannot by itself resolve the socio-economic causes of absence and dropout.

Part 2: Teachers and Parents

Teachers' Perspectives

Teachers described the ALfA programme as highly engaging, child-centred, and conceptually effective. The dominant theme in their accounts was experiential learning through physical materials. Teachers observed that children developed stronger conceptual understanding when they interacted directly with simple teaching-learning materials such as ice cream sticks, beans, and picture-based resources. Number concepts such as units, tens, and hundreds were said to become concrete when children grouped and bundled objects — for example, “10 ice cream sticks bundled together form a ten” — turning an abstract idea about place value into something children could see and handle. Similarly, picture-based Marathi materials allowed children to associate images with words and letters, which teachers felt strengthened both decoding and comprehension.



Child solving an EGMA item

Teachers reported clear improvements in reading and writing, particularly in Marathi, with children progressing from recognising pictures and letters toward forming words and reading simple sentences. They attributed much of this to the collaborative, child-to-child paired structure of the method, in which children work in pairs that change from day to day. This rotation was said to reduce fear, encourage quieter children to participate, and build communication and friendship across the class — one teacher remarked that “the whole class has become friends with each other.” Beyond academic skills, teachers described broader developmental gains in confidence, collaboration, communication, critical thinking, creativity, and character (which map onto ALfA’s “8C” / twenty-first-century skills framework), suggesting holistic rather than narrowly examination-oriented development.

In numeracy, teachers reported gains across addition, subtraction, multiplication, and division, with one teacher describing a Grade 3 child who had become able to attempt problems well above grade level. A number of teachers said they wished the programme had continued for longer. This is best read as demand for sustained roll-out and reinforcement rather than as a shortfall in the programme’s core instructional cycle, which is delivered to completion by design. Teachers also described the practical tension of following the NIPUN Bharat framework and the established government syllabus at the same time, underscoring the need to integrate ALfA within already crowded institutional and curricular demands. On balance, teachers expressed strong support for the method and frequently recommended that it begin from Grade 1 and be extended across schools.

Selected teacher voices (verbatim)

The comments below were recorded during the fieldwork interviews and are reproduced verbatim (English translation followed by the Marathi original). They illustrate, in teachers’ own words, the three themes above.

Conceptual mathematics through hands-on materials

“The Math materials were very helpful. Their concepts got cleared with the help of beads and sticks.”

“गणिताचं साहित्य जे भेटलं, त्याचा बराच फायदा झाला. मणी आणि काड्यांचा वापर करून त्यांच्या संकल्पना स्पष्ट होतात.”

“Concepts of units, tens, and hundreds became clear. The ‘window-clicking’ method helped a lot; ten blocks together form a ten.”

“मुलांना एकक, दशक, शतक या कन्सेप्ट क्लिकर झाल्या. खिडकी वाजवणं आणि अशा गोष्टींनी खूप हेल्प झाली. १० ठोकळे एकत्र केल्यावर दशक तयार होतो.”

Collaborative, paired learning

“They work in pairs, so they understand things easily. They help each other with problems.”

“ते जोडीने करतात, त्यामुळे समजायला सोपं जातं. एकमेकांचे प्रॉब्लेम ते समजून घेतात.”

“Children started studying in pairs. Different pairs were formed every day, and the whole class became friends with each other.”

“मुलं पेअरमध्ये अभ्यास करायला लागले. रोज वेगवेगळ्या जोड्या बनल्या मुलांच्या. सगळ्या वर्गाची एकमेकांशी मैत्री झाली.”

Reading through pictures

“Students can read because of information in the form of pictures. The Marathi book was also helpful for moving from pictures to words.”

“चित्ररूप माहितीमुळे मुलं वाचू शकतात. चित्रावरून शब्दावर येण्यासाठी त्याची खूप मदत झाली.”

“They recognised letters, and after that their reading improved. They were able to read through pictures, and their concepts became clear.”

“अक्षर ओळख झाली, त्यानंतर वाचन चांगलं झालं. मुलांना चित्रांमधून वाचता आलं, मुलांच्या कन्सेप्ट क्लिअर झाल्या.”

Parents' Perspectives

Parents expressed a strongly positive view of the programme, centred on their children's increased interest in school, more regular attendance, and visible behavioural development. Many reported that their children now attended school willingly and spoke with enthusiasm about classroom activities, with statements such as “He goes to school every day and studies” and “He likes to study because of the ALfA Programme.” Parents most often understood the method as one in which “children learn through games,” a framing they associated with reduced fear of school and greater enjoyment of learning. Several described increased communication between school and home, as children recounted classroom activities to their families, and many voiced strong aspirations for their children's education and futures.

Taken together, the qualitative accounts converge with the quantitative findings: stakeholders at every level — district administrators, teachers, and parents — described a shift toward more active, confident, and conceptually grounded learning, while also locating that shift realistically within the structural constraints of a tribal, resource-constrained district.

5. Positioning ALfA Among Pedagogical Approaches: Explicit, Systematic Instruction

The retention findings reported above may be read against the current global consensus on how foundational literacy and numeracy (FLN) are actually produced. Worldwide, the case for FLN is now widely accepted and the policy environment has moved — national missions, curricula, assessment systems and dashboards are in place. The under-addressed frontier, as DEVI's concept note argues, is the pedagogy children experience every day: policy defines the destination, but daily classroom practice determines the journey. The relevant question for the next phase of FLN is therefore not only whether policy exists, but what happens in the classroom every day.

5.1 A Comparison of Major Pedagogical Approaches

The table below compares major pedagogical traditions against today's FLN challenge. Entries are framed as contributions and implementation considerations, not as verdicts on any single programme.

Pedagogical approach	Contribution	Limitation / consideration for today's FLN challenge
Traditional teacher-led instruction	Efficient for delivering content to large classes; familiar to teachers and administrators.	Often leaves many children passive, with weak feedback loops; tends to benefit already-confident learners while struggling children go unnoticed.
Montessori / child-centred (from 1907)	Strong on independence, hands-on learning and self-directed exploration; reviews find positive academic and non-academic effects.	Can be resource-intensive; implementation quality varies; not primarily designed for rapid FLN recovery at scale in large government systems.
Direct Instruction (from the 1960s)	Strong evidence for explicit, carefully sequenced teaching; large evidence base from Project Follow Through.	Can become overly scripted if poorly implemented; may underweight peer learning, agency and SEL unless intentionally designed.
Whole language / balanced literacy	Emphasised meaning, literature and engagement with text.	Evidence has shifted toward systematic phonics and structured literacy, especially for early decoding and struggling readers.
Systematic phonics / science of reading	Strong evidence for phonemic awareness, phonics, fluency, vocabulary and comprehension.	Essential but not sufficient alone; must be embedded in oral language, meaning-making, writing, confidence and sustained practice.
Structured pedagogy	Teacher guides, aligned materials, training, coaching and assessment-informed instruction; strong system fit.	Can become compliance-driven if teachers and children are not active agents; quality depends on classroom enactment, not materials alone.
Teaching at the Right Level (TaRL)	Strong evidence base; groups children by learning level and focuses on foundational skills; highly cost-effective.	Often remedial and level-based; requires adaptation to regular timetables, curriculum integration and holistic skill development.
ALfA — Accelerating Learning for All	Combines explicit, systematic literacy and numeracy practice with hands-on, activity-based, paired learning; designed for rapid FLN, inclusion, SEL and 21st-century skills.	An emerging pedagogy still building wider, independent multi-country evidence; benefits from rigorous external evaluation and replication — the role studies such as this one can play.

5.2 ALfA as Explicit, Systematic Instruction

Two of the approaches above — Direct Instruction and systematic phonics / science of reading — share the strongest evidence for **explicit, systematic teaching**: skills are taught directly and in a carefully sequenced order, rather than left for children to infer on their own. ALfA is sometimes described simply as “child-led” or “activity-based,” which understates this dimension. In practice, ALfA delivers explicit, systematic skill-building — but through structured, paired activity rather than teacher monologue. In literacy it uses visual picture-to-sound decoding, systematic phonics through activities, immediate reading and writing, and progressive complexity; in numeracy it moves from kinesthetic and concrete experiences toward abstract understanding and real-world application. In effect, ALfA seeks to keep the explicit, systematic core of Direct Instruction and the science of reading while maximising the active practice time of every child, not only the few who volunteer answers.

The mapping below illustrates how ALfA’s design is intended to address the core reading skills that the explicit, systematic instruction literature identifies as requiring direct teaching:

Core reading skill (taught directly)	How ALfA is designed to address it
Oral language	Random paired talk, explanation and questioning give every child sustained speaking and listening practice — not only those who volunteer.
Phonological awareness	Sound-based activities and picture-to-sound association build awareness of the sounds within words, alongside letter work.
Systematic phonics	Explicit, sequenced letter–sound instruction through the picture-to-sound decoding method, progressing from simple to complex.
Reading fluency	High-volume paired reading and repeated practice build accuracy and speed quickly.
Reading comprehension	Children question, explain and discuss with partners, making meaning rather than only decoding.
Writing	Immediate writing alongside reading from the earliest stage reinforces letter formation, spelling and the other skills.

5.3 What ALfA Adds: Equity, Inclusion, SEL and 21st-Century Skills

Beyond literacy and numeracy outcomes, the concept note frames ALfA as integrating five goals often treated separately: **FLN outcomes** (children read, write, count and reason); **equity** (every child participates, not only the quickest or most confident); **inclusion** (mixed-ability, low-resource and multilingual classrooms engage through peer support and hands-on practice); **SEL and wellbeing** (confidence, voice, belonging, turn-taking and persistence); and **21st-century skills** (collaboration, communication, critical thinking, creativity, citizenship and agency built through the learning process itself). DEVI’s materials capture these as the “8Cs.” Random pairing in particular is presented as an equity mechanism, changing who participates and reducing dependence on prior language advantage — a point that resonates with the linguistic-diversity challenges noted by the Nandurbar key informants in Section 4.

6. Concluding Remarks

This independent evaluation by the Pune University team examined how durably the ALfA (Accelerating Learning for All) Learning Method programme's gains were retained in the tribal schools of Nandurbar, assessed approximately six months after the implementation cycle and its post-test had concluded. Through quantitative assessment and qualitative analysis, the study found that treatment schools consistently retained stronger performance across literacy, numeracy, oral reading fluency, and mathematical problem-solving, especially in higher-order competencies such as story-level reading, subtraction, division, and word problems.

The qualitative findings deepened this picture: teachers described the programme as transformative, shifting classrooms toward activity-based, child-to-child paired, and experiential learning, and reported gains in participation, confidence, collaboration, creativity, and critical thinking. The use of low-cost materials such as ice cream sticks and picture-based resources made abstract concepts accessible in resource-constrained settings. At the same time, structural challenges — bureaucratic approval systems, linguistic diversity, migration, and poverty — continue to shape educational participation beyond the reach of classroom interventions.

Because the advantage observed here persisted six months after the programme ended, the evidence is consistent with ALfA having helped establish a new and more durable learning trajectory for these children, rather than a temporary test-time gain. To confirm this, the study strongly recommends a **longitudinal follow-up of the same cohort in the next academic year**, re-assessing both treatment and control children with equivalent tools. Such follow-up would establish whether the divergence in learning trajectory is sustained, widens, or narrows over time, and would provide robust evidence on the long-term value of activity-based foundational-learning interventions in tribal and rural India.

Annex A. The Assessment Tools — Exact Items Administered (Marathi)

This annex reproduces the actual items children were asked, so it is clear exactly what each chart measures. The ASER reading and numeracy items are the ASER (Marathi) forms; the Oral Reading Fluency word list, the EGMA task scores and timings, and the word problems are those on the Nandurbar third-party assessment sheet (March 2026).

A.1 ASER Reading Test (Literacy)

The child is shown letters, then words, then a short paragraph, then a story, and is placed at the highest level he/she can read. Rule: the child reads any 5 letters (or words) and at least 4 of 5 must be correct to pass that level.

Letters (अक्षरे)

र प त ध य न ल श च व

Words (शब्द)

दिवा चावी पैसा तूप मोती कैरी मोर फुगा मुली हात

Paragraph (परिच्छेद)

दादा गाडी चालवतो. गाडी फार छान आहे. तो गाडी घेऊन येतो. मी गाडीतून गावाला जातो.

(Dada drives the vehicle. The vehicle is very nice. He brings the vehicle. I go to the village by the vehicle.)

Story (गोष्ट) — highest level

दाजी आजोबा आजारी असतात. ते खूप थकलेले दिसतात. हल्ली त्यांना नीट दिसत नाही. आजोबांचा नातू रमेश त्यांची खूप काळजी घेतो. रमेश त्यांना वेळेवर औषध देतो. आजोबांना बरे वाटल्यावर दोघे लांबवर फिरायला जाणार आहेत.

(Grandfather Daji is ill. He looks very tired. These days he cannot see well. His grandson Ramesh takes great care of him and gives him medicine on time. When grandfather feels better, the two of them will go for a long walk. — short narrative read for comprehension.)

Literacy levels coded (lowest to highest): cannot read letters → letters → words → paragraph → story.

A.2 ASER Numeracy Test

The child is placed at the highest numeracy level reached. Rule: read any 5 numbers, at least 4 correct, to pass a recognition level; do any 2 subtraction items (both correct) or any 1 division item (correct) to pass those levels.

1-digit number recognition (अंक ओळख, 1–9)

9 1 4 7 3 6 5 2

2-digit number recognition (संख्या ओळख, 10–99)

96 15 24 61 74 46 39 89 52 27

Subtraction (वजाबाकी) — two-digit, with borrowing

82 – 64 51 – 28 73 – 57 42 – 17 98 – 79 75 – 58

Division (भागाकार)

994 ÷ 8 758 ÷ 6 863 ÷ 7 551 ÷ 4

Numeracy levels coded (lowest to highest): cannot recognise numbers → 1-digit → 2-digit → subtraction → division. This is what Figure 4 / Table 4 report.

A.3 Oral Reading Fluency (ORF) — how it was measured

The assessor sets a 60-second timer and asks the child to read each word in the grid below aloud. Each word read correctly is ticked; words read incorrectly or not reached within 60 seconds are crossed. The score is the **number of words read correctly out of 60** (i.e., words-correct-per-minute). Figure 6 / Table 6 group children into 0–20, 21–40 and 41–60 words-per-minute bands.

घर	पाणी	कच्चा	दिवस	रस्ता	पाटावर
केस	नदी	घर	आजी	तिकडे	आवाज
राजा	हात	नमन	पोपट	पाठवा	रात्र
मोर	आवाज	वॉकर	गप्प	वेणी	काका
फूल	मैदान	आकाश	घोडा	गौतम	आंबा
स्कूल	धडा	खेळ	केशर	चिमा	बाजार
दिवा	गाडी	आवाज	विमल	दुपारी	किनारा
खीर	गाय	सुंदर	बसला	सुरज	भाग्य
धक्का	तारा	भोवरा	बकरी	जेवण	दोरा
केळी	पल	बदके	आमची	राज्य	गुलाब

A.4 EGMA — exact items and how scored

EGMA task (max; timing)	Exact items administered
Task 1 — Number Identification <i>Max 20; 60-second timer</i>	The 20 printed numbers read aloud (one point each): 2, 9, 0, 12, 30, 22, 45, 39, 23, 48, 91, 33, 74, 87, 65, 108, 245, 587, 731, 989.
Task 2 — Smaller & Bigger <i>Max 10; untimed</i>	Say which is bigger: (7, 5) · (11, 24) · (39, 23) · (58, 49) · (65, 67) · (94, 78) · (146, 153) · (287, 534) · (623, 632) · (867, 965).
Task 3 — Missing Number <i>Max 10; untimed</i>	5, 6, 7, __ · 14, 15, __, 17 · 20, __, 40, 50 · __, 300, 400, 500 · 2, 4, 6, __ · 348, 349, __, 351 · 28, __, 24, 22 · 30, 35, __, 45 · 550, 540, 530, __ · 3, 8, __, 18.
Task 4A — Addition Level 1 <i>Max 20; 60-second timer</i>	Single-digit sums: 1+3 · 2+3 · 6+2 · 4+5 · 3+3 · 8+1 · 7+3 · 3+9 · 2+8 · 9+3 · 7+8 · 4+7 · 7+5 · 8+6 · 9+8 · 6+7 · 8+8 · 8+5 · 10+2 · 8+10.
Task 4B — Addition Level 2 <i>Max 5; pencil & paper allowed</i>	Two-digit sums (with carrying): 13+6 · 18+7 · 12+14 · 22+37 · 38+26.
Task 5A — Subtraction Level 1 <i>Max 20; 60-second timer</i>	Single-digit subtractions: 4-3 · 5-3 · 8-2 · 9-5 · 6-3 · 9-1 · 10-3 · 12-9 · 10-8 · 12-3 · 15-8 · 11-7 · 12-5 · 14-6 · 17-8 · 13-7 · 16-8 · 13-5 · 12-2 · 18-10.
Task 5B — Subtraction Level 2 <i>Max 5; pencil & paper allowed</i>	Two-digit subtractions (with borrowing): 19-6 · 25-7 · 26-14 · 59-37 · 64-26.
Task 6 — Word Problems <i>Max 6; spoken in Marathi</i>	Six spoken problems (see below).

Task 6 — the six word problems (समस्या), as read aloud in Marathi

1. बसमध्ये 2 मुले आहेत. आणखी 3 मुले बसमध्ये चढतात. आता बसमध्ये एकूण किती मुले आहेत?
2. बसमध्ये 6 मुले आहेत. त्यापैकी 2 मुले मुलगे आहेत. उरलेली मुले मुली आहेत. बसमध्ये किती मुली आहेत?
3. निळ्या बसमध्ये 2 मुले आहेत. हिरव्या बसमध्ये 8 मुले आहेत. निळ्या बसमध्ये हिरव्या बसइतकीच मुले होण्यासाठी अजून किती मुलांनी निळ्या बसमध्ये चढले पाहिजे?
4. बसमध्ये काही मुले आहेत. आणखी 2 मुले बसमध्ये चढतात. आता बसमध्ये 9 मुले आहेत. सुरुवातीला बसमध्ये किती मुले होती?
5. 12 टॉफ्या आहेत. 4 मुले त्या टॉफ्या समान वाटून घेतात. प्रत्येक मुलाला किती टॉफ्या मिळतात?
6. एका बसमध्ये 5 आसने आहेत. प्रत्येक आसनावर 2 मुले बसलेली आहेत. आता बसमध्ये एकूण किती मुले आहेत?

(In English: 1. 2 children on a bus, 3 more board — how many now? 2. 6 children, 2 are boys, the rest girls — how many girls? 3. Blue bus has 2, green bus has 8 — how many more must board the blue bus to equal the green? 4. Some children on a bus, 2 more board, now 9 — how many at the start? 5. 12 toffees shared equally among 4 children — how many each? 6. A bus has 5 seats, 2 children on each — how many children in total?)

Annex B. Glossary

Term	Meaning
ALfA	Accelerating Learning for All — the activity-based, child-to-child paired foundational-learning programme evaluated here (DEVI Sansthan).
ASER	Annual Status of Education Report tool — a simple, widely used reading and arithmetic test that places a child at the highest level reached.
ORF	Oral Reading Fluency — words read correctly per minute from a word list.
EGMA	Early Grade Mathematics Assessment — a set of eight early-mathematics tasks.
FLN	Foundational Literacy and Numeracy — basic reading, writing and number skills in the early grades.
NIPUN Bharat / NEP 2020	National FLN mission / National Education Policy 2020, which promote experiential, competency-based early learning.
DIET	District Institute of Education and Training — the district teacher-support institution that supervised the implementation post-test.
Cohen's h	A standard effect-size measure for the difference between two proportions ($\approx$ 0.2 small, 0.5 medium, 0.8 large).
Score band	A range of correct answers (e.g. “scored 0–10 of 20”), not a range of numbers tested.

Annex C. References

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