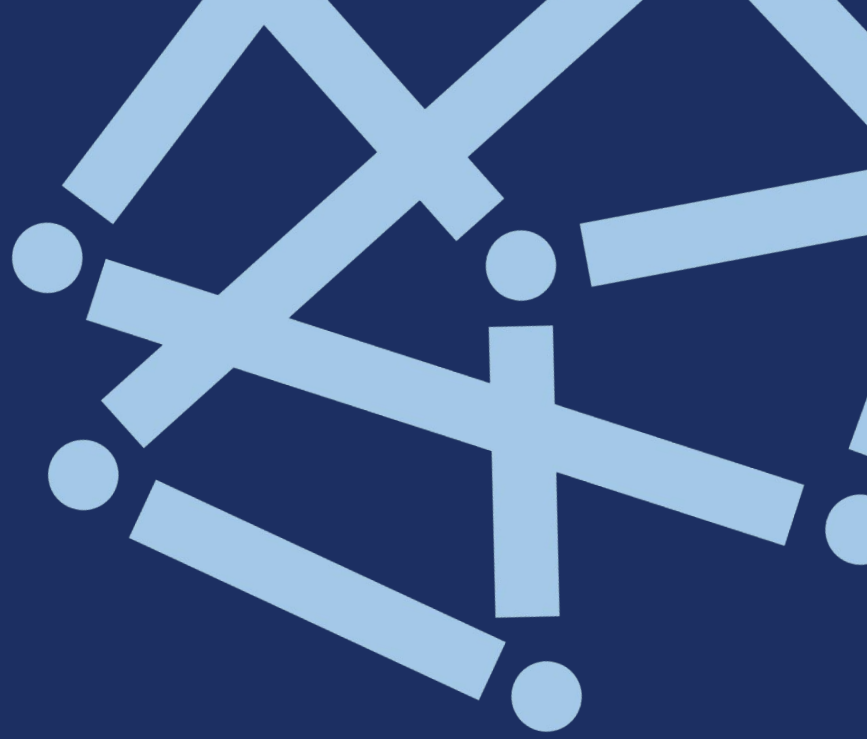
IDinsight



LLF's MLE Evaluation: Baseline Report

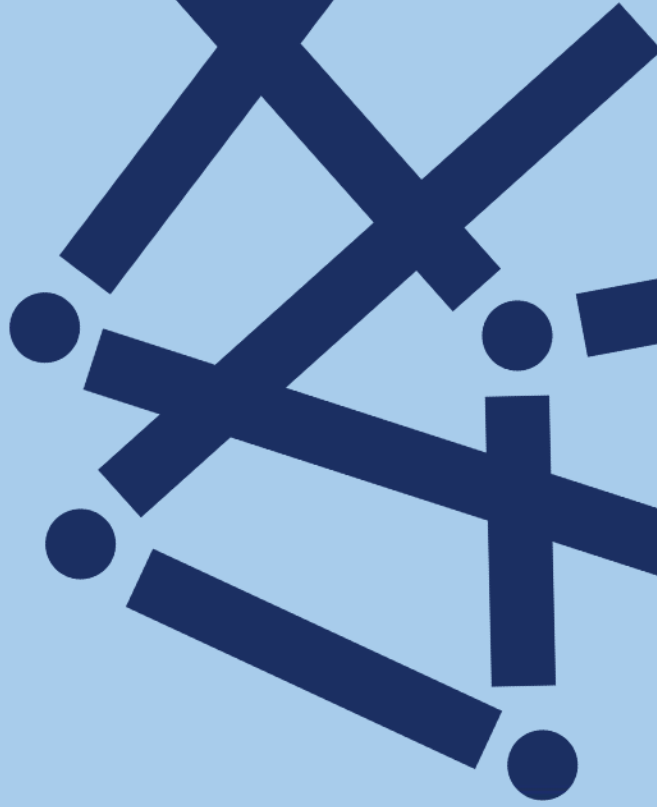
Agenda

1. Introduction to IDinsight
2. Project Context
3. Evaluation Design and Methodology
4. Findings
5. Descriptive Statistics
6. Next Steps

IDinsight uses data and evidence to help leaders combat poverty worldwide.

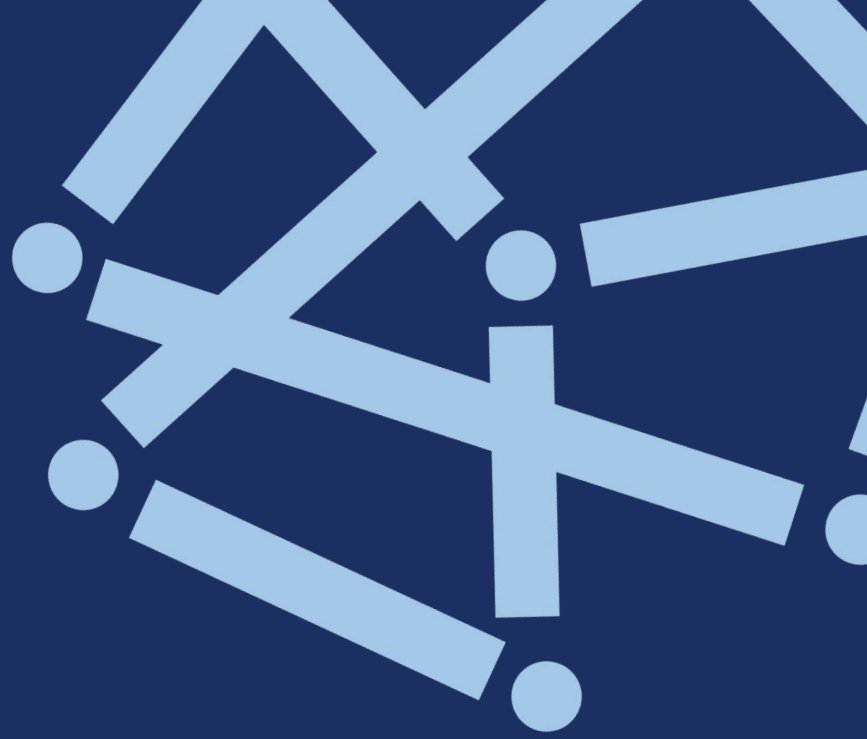
Our collaborations deploy a large analytical toolkit to help clients **design better policies**, rigorously **test what works**, and use evidence to **implement effectively at scale**.

We place special emphasis on using the right tool for the right question, and tailor our rigorous methods to the real-world constraints of decision-makers.



Executive Summary

- **Student Performance:** Majority of students scored close to 0 in most literacy competencies, especially in fluency.
- **Matching:** The treatment and comparison school groups, after first and second stage matching, are well-balanced on all competency scores.
- **Home Language:** Students who speak Hindi perform better in most literacy competencies. Students who speak only Halbi performed significantly worse in most literacy competencies, when compared to students who speak Hindi.
- **Gender:** Female students perform significantly better than the male counterparts in literacy competencies.



Project Context

LLF Multilingual Education Program (2022-25) in Bastar

- The program aims to operationalize the vision of the National Education Policy 2020 and the FLN (Foundational Literacy and Numeracy) Mission-NIPUN Bharat (2021) for **inclusion of children's home languages in teaching and learning in primary classrooms.**

- Major strategies adopted include training of teachers and academic support staff through MLE trainings and strategies that are locally contextualised and developing appropriate learning materials for students in their home language.

- It is a high-quality bilingual education program in 200 schools spread across two blocks of Bastar district– Bastar and Darbha

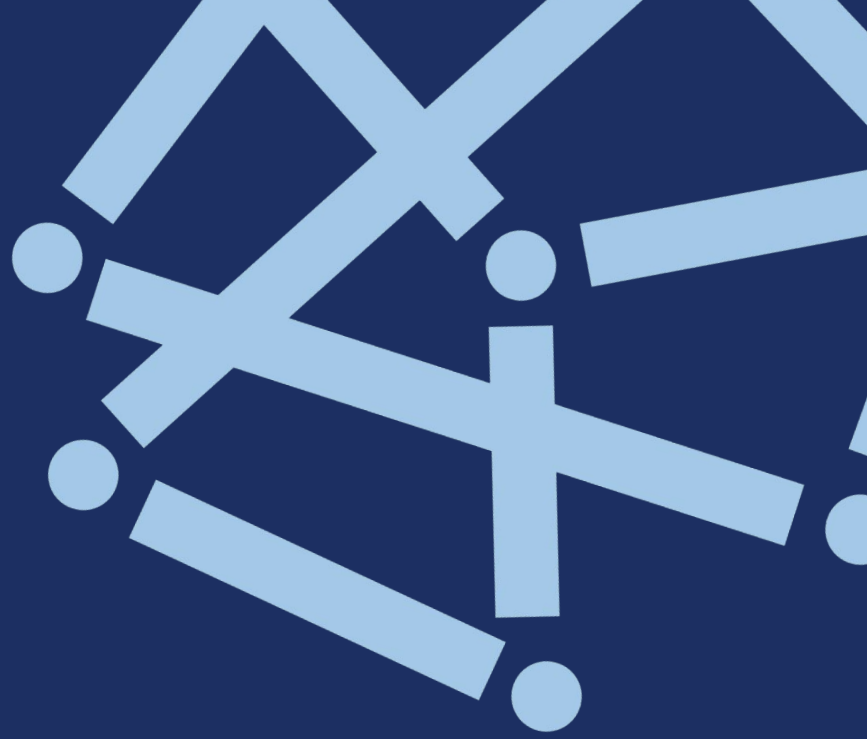
    - Implemented in schools where the children are predominantly from the Halbi (L1) speaking community, and the medium of instruction in the classrooms is Hindi (L2).

Aims of the LLF Bastar Evaluation

This project will serve as a proof-of-concept for similar sociolinguistic situations in the Chhattisgarh state and elsewhere.

- The primary objective of the program is **improvement in students' learning outcomes (SLOs)** in treatment schools, vis-a-vis comparison schools, at the end of Grade 3.

- The objective of the evaluation is to measure improvement in Grade 3 student learning outcomes. For measurement of SLOs, we administer adapted EGRA and EGMA student assessments at baseline and endline.



Evaluation Design and Methodology

The Evaluation

Methodology: Quasi-experimental design, generating a matched comparison group by matching non-treated schools in the district using administrative data and student baseline literacy and numeracy levels.

- Baseline assessment was conducted in Grade 3 with a sample of intervention and comparison schools in December 2022
- Endline assessment will be conducted in Grade 3 in early 2025.

Study Sample

We collected baseline and will collect endline literacy and numeracy assessments of all students present in **grade-3 in each school** in both treatment and comparison groups.

Power Calculations:

- Data from ~**3,000 students** (~300 schools in total will allow us to detect an effect size of 0.21 Standard Deviation (SD) or higher– roughly 30% of an equivalent year of schooling.

- Assumptions:
  - Intraclass correlation of 0.2
  - 0.13 correlation with baseline test scores
  - 80% power
  - 5% significance level
  - One equivalent year of schooling typically maps to 0.6 SD

Matching Strategy

For **first stage matching**, we used the following variables to identify similar comparison schools:

- Total number of students till class 5
- Student classroom ratio
- Electricity availability

This produced 360 matched schools, constructed via matching using a combination of the Government administrative data (UDISE data) and the parameters mentioned above.

- **Treatment Group:** LLF is implementing its program in 200 Halbi-speaking schools in Bastar and Darbha blocks in the Bastar District of Chhattisgarh. In our survey, we covered 168 program schools.
- **Comparison Group:** Selected from Halbi-speaking schools in neighbouring (non-program) blocks in Bastar district. There are currently about 380 such schools. We covered 168 such comparison schools.

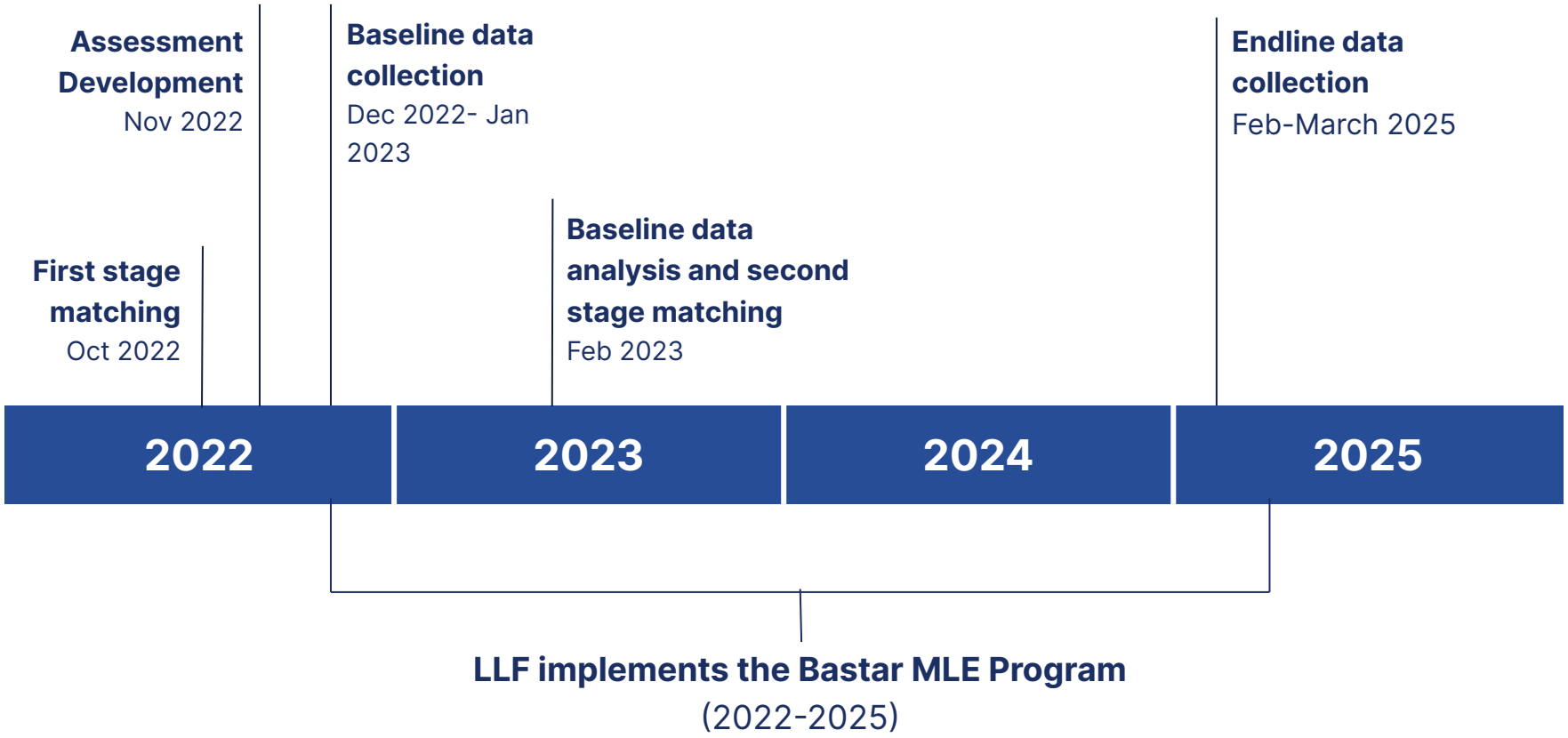
After baseline survey, we performed a **second stage matching** by leveraging the assessment score data we collected. This produced 280 matched schools, split equally across treatment and comparison schools

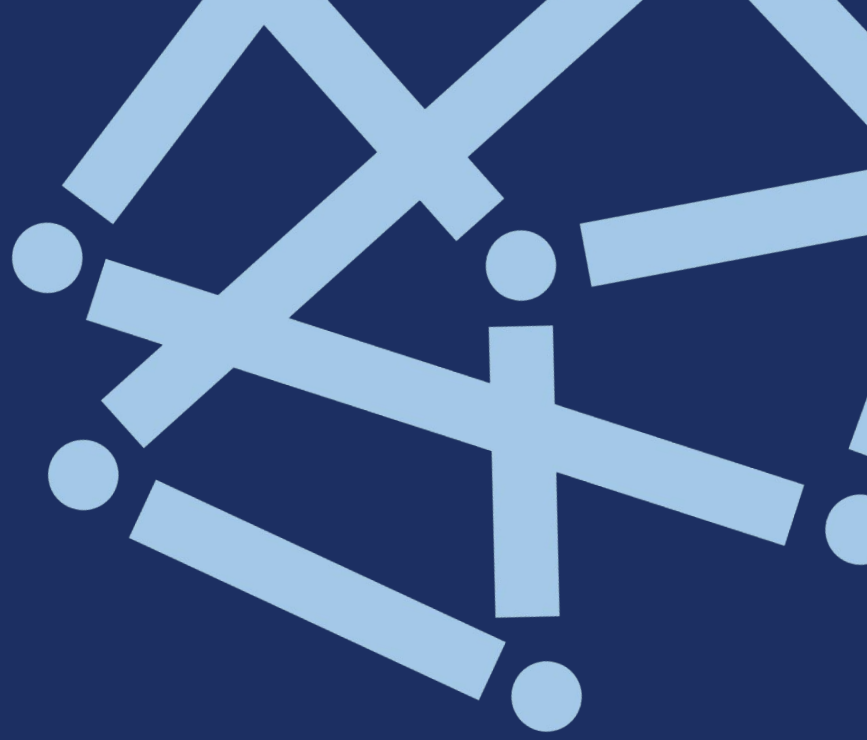
Student Learning Assessment

- We used context and grade appropriate assessment tools for assessing FLN learning outcomes for literacy and numeracy, administered orally and individually to each student.
- The assessments were anchored in the Early Grade Reading Assessments **(EGRA)** and Early Grade Math Assessments **(EGMA)** framework.
- Collected through custom made data collection forms on SurveyCTO.

Literacy task and concept /skill assessed
Oral Vocabulary and Picture Description
Letter Identification – Accuracy
Letter Identification – Fluency
Familiar Word Reading – Accuracy
Familiar Word Reading – Fluency
Listening Comprehension
Oral Reading (Fluency)
Reading Comprehension
Writing - dictated sentences

Evaluation Timeline





Findings

Key Findings

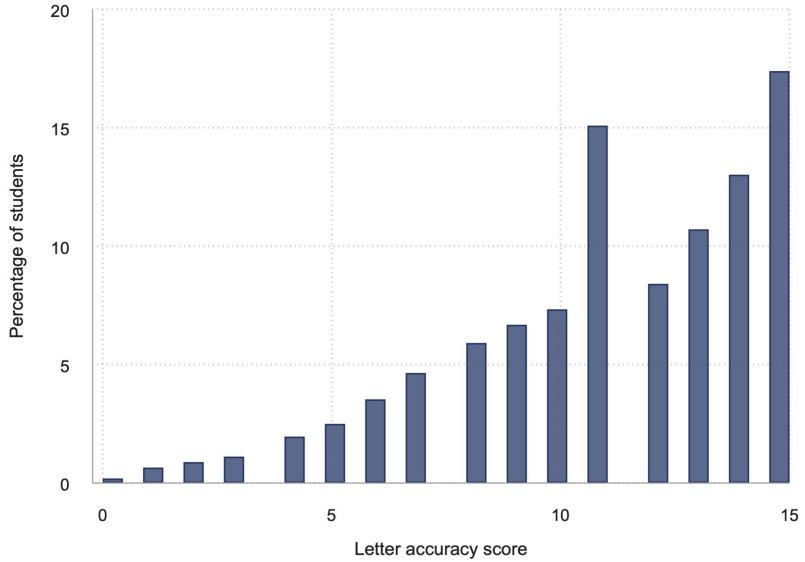
- **Student Performance:** Majority of students scored close to 0 in most literacy competencies, especially in fluency.
- **Matching:** The treatment and comparison school groups, based on first stage matching, are well-balanced on all competency scores.
- **Home Language:** Students who speak Hindi perform better in most literacy competencies. Students who speak only Halbi performed significantly worse in most literacy competencies, when compared to students who speak Hindi.
- **Gender:** We observe that female students perform significantly better than the male counterparts in literacy competencies, but we see no significant difference in numeracy competencies.

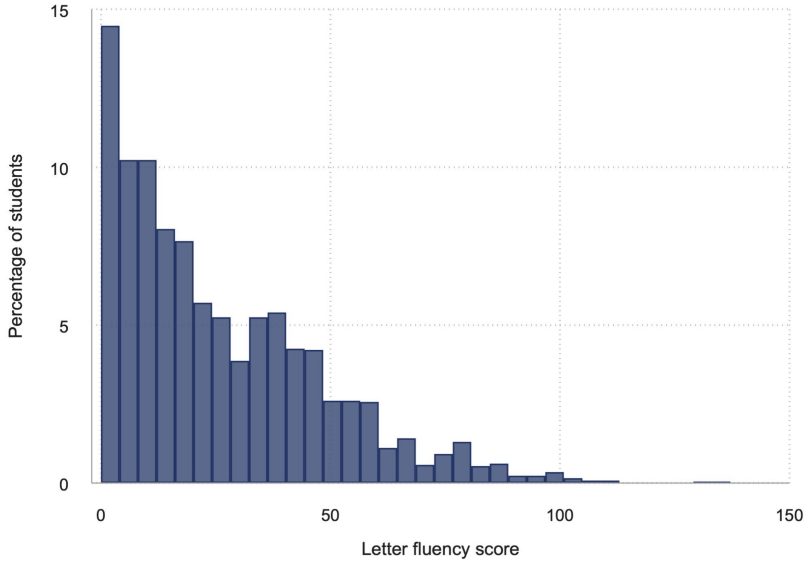
Student performance

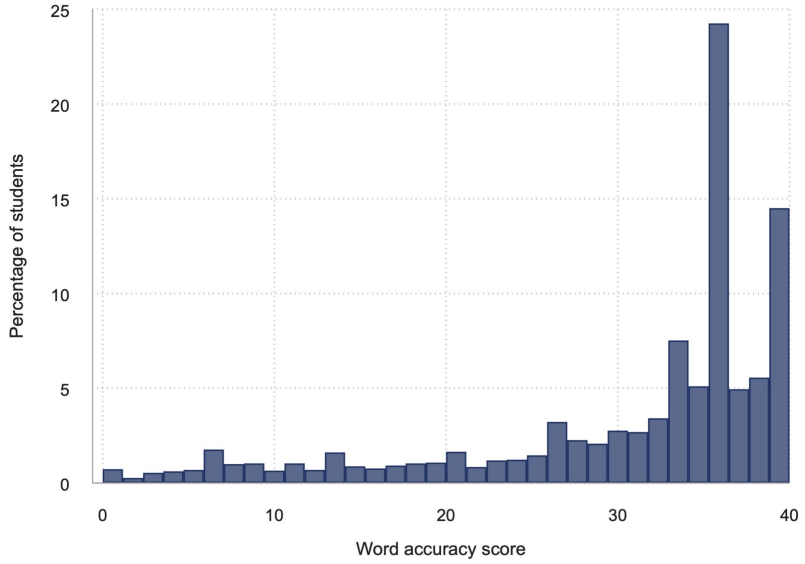
- We see majority students are close to the 0 score in most literacy tasks, especially for fluency, comprehension and dictation scores.
- The students perform relatively better in numeracy tasks, with less proportion of students at the 0 level.
- At endline, after the MLE program, it would be interesting to observe if the learning outcomes improve and the students' score move away from the 0.
- *Interesting to note:* The scores of letter identification accuracy are unusually high across treatment and comparison schools– averaging at a score of 11 out of 15 letters. ASER 2022* found that only 32.8% students at the grade 3 level in Chhattisgarh could read letters and obtain a score greater than 62.5%. Our sample has 78% such students.
- The distribution of EGRA and EGMA scores is quite similar across treatment and comparison groups. The graphs can be found in the annexure.

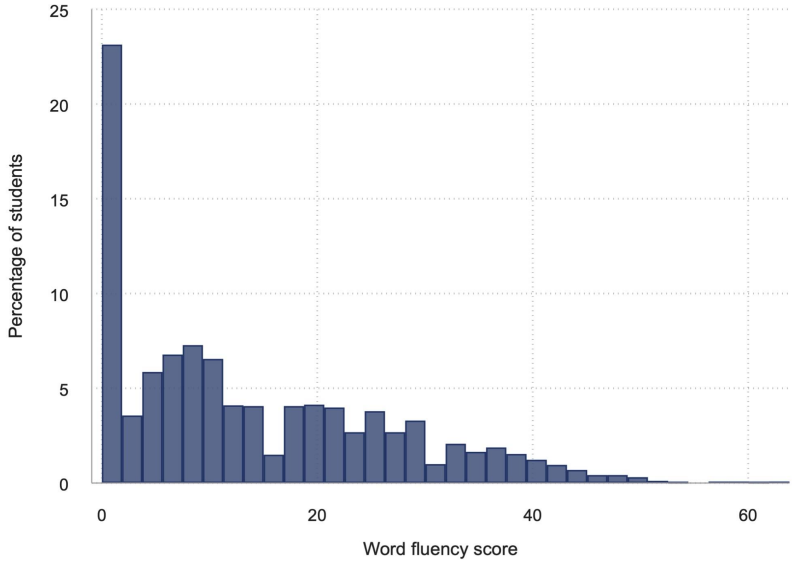
* ASER (Rural) 2022 (https://img.asercentre.org/docs/ASER%202022%20report%20pdfs/All%20India%20documents/aserreport2022.pdf)

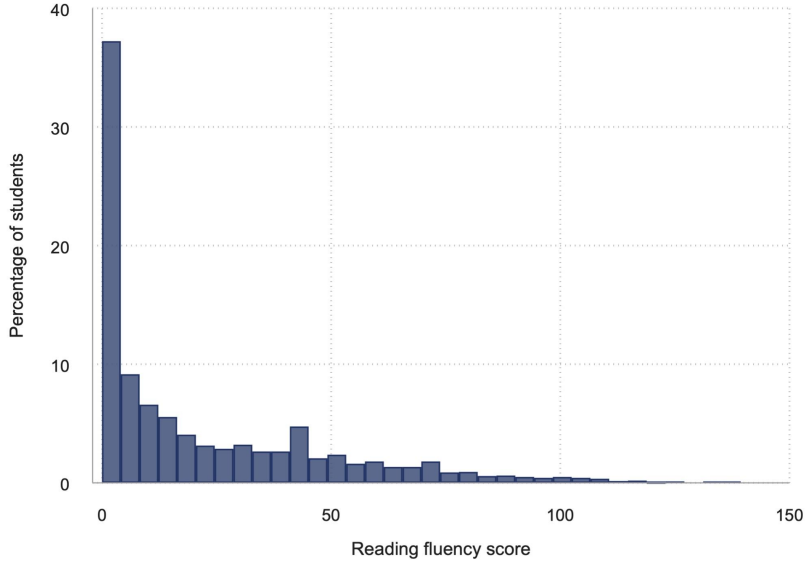
Student performance: EGRA tasks

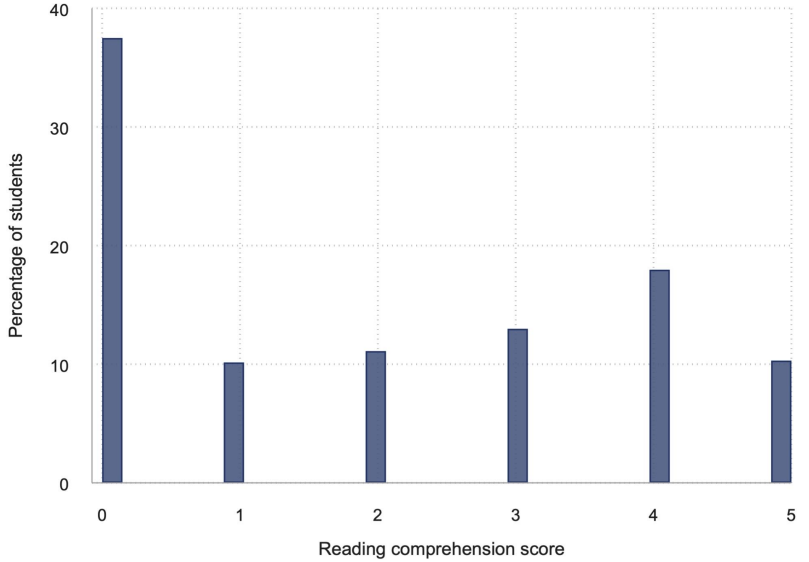


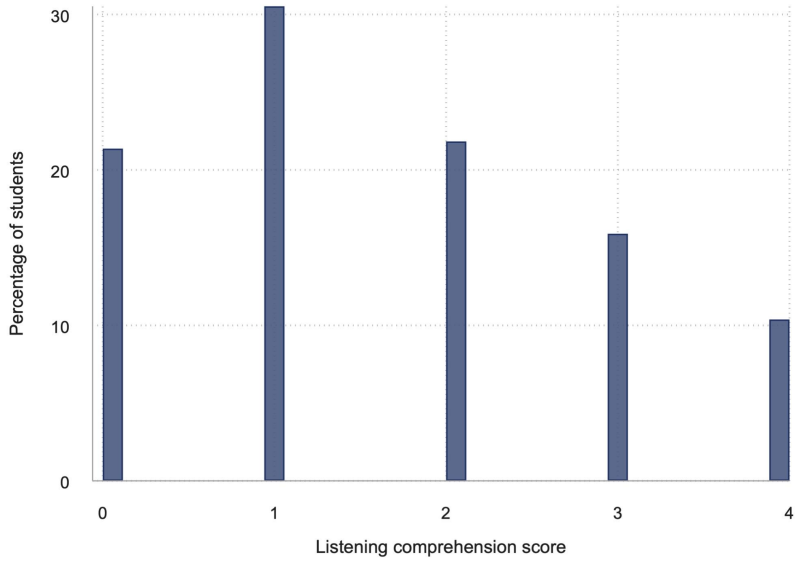


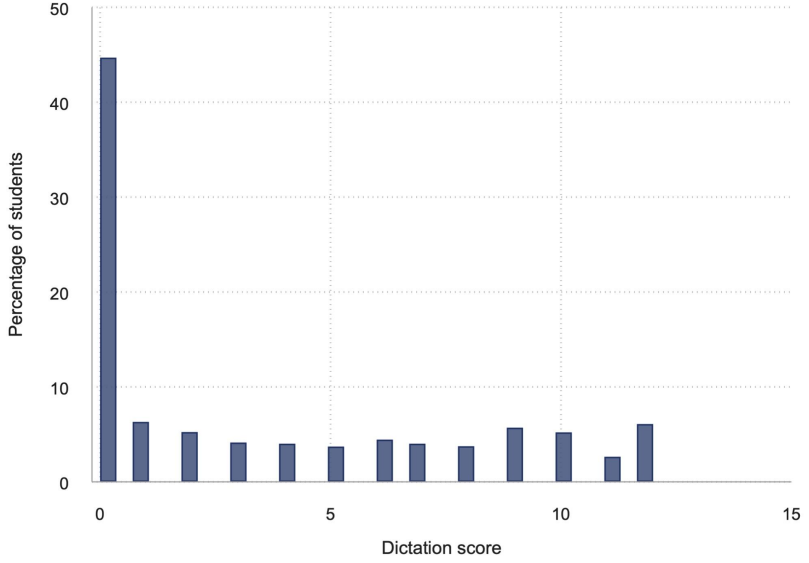




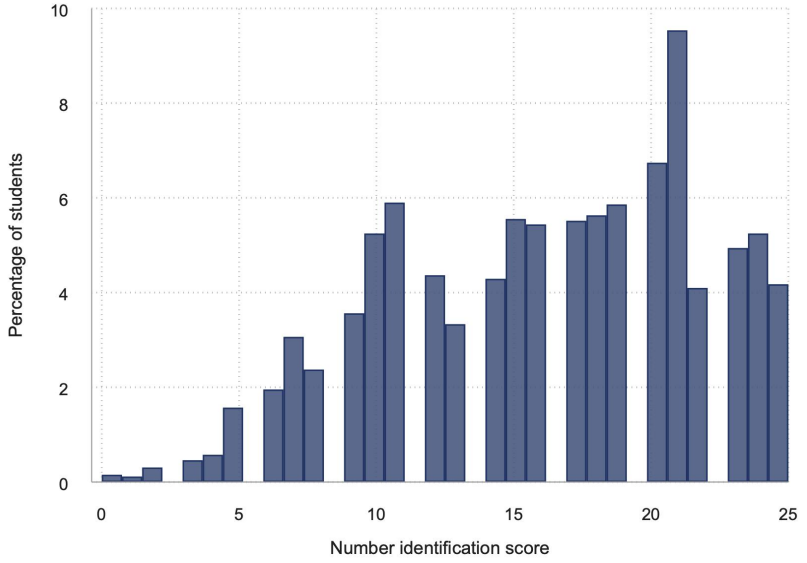

Percentage of students
40
30
20
10
0
0
50
100
150
Reading fluency score

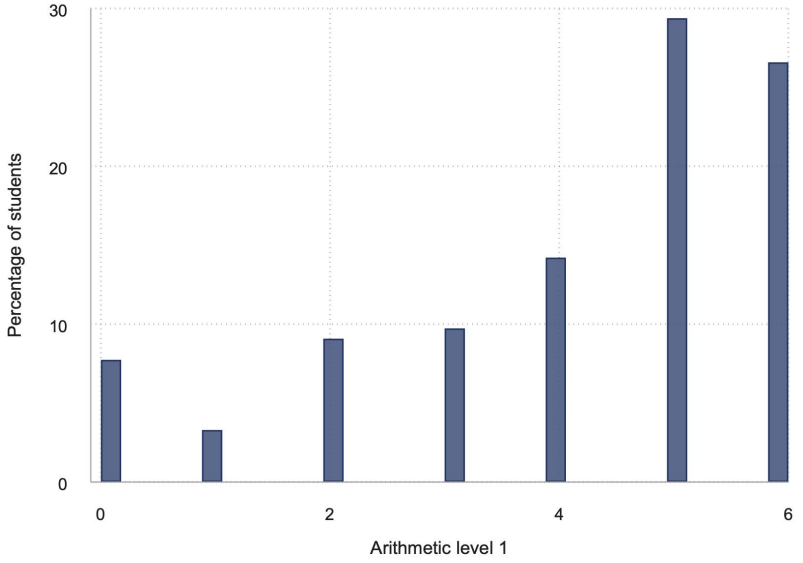

Percentage of students
40
30
20
10
0
0
1
2
3
4
5
Reading comprehension score

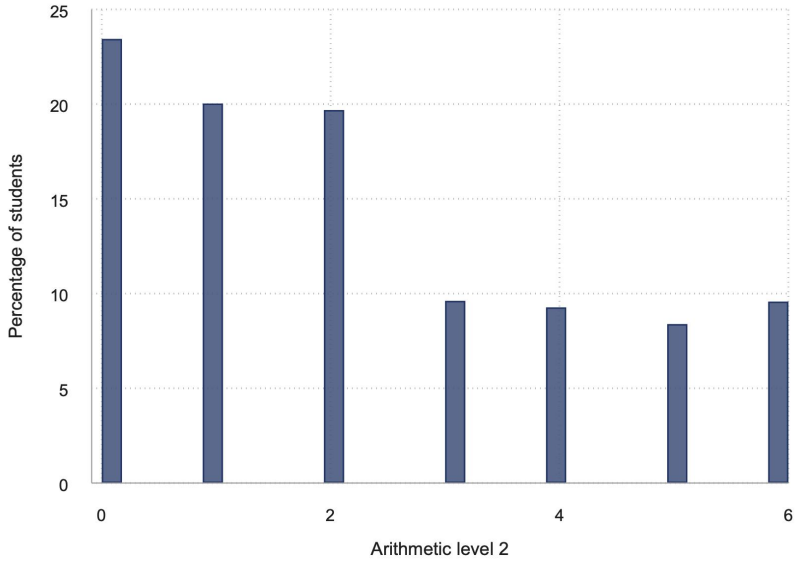

Percentage of students
30
20
10
0
0
1
2
3
4
Listening comprehension score

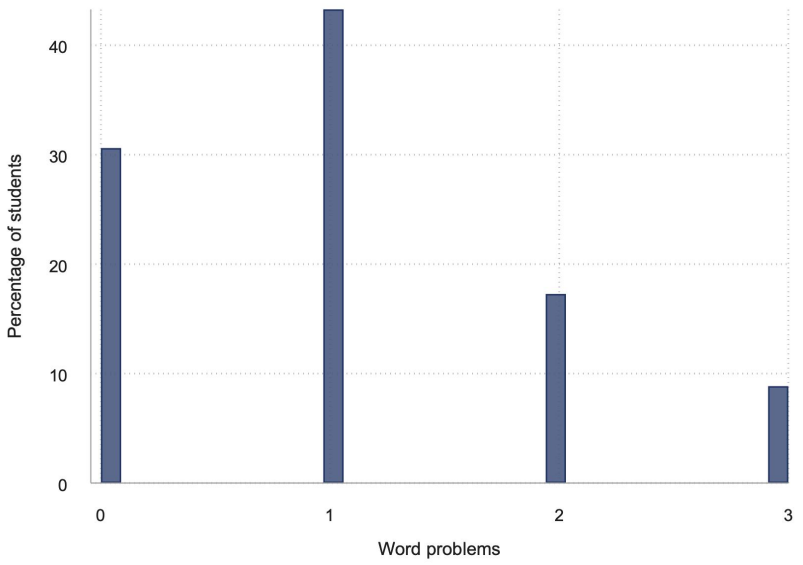

Percentage of students
50
40
30
20
10
0
0
5
10
15
Dictation score

Student performance: EGMA tasks









First stage matching: No significant differences in scores between treatment and comparison groups

Variable	Comparison	Treatment	Difference
EGRA (max score)	**N = 1278**	**N = 1303**	
Vocabulary (9)	7.73	7.88	-0.15
Letter identification accuracy (15)	11.06	11.12	-0.06
Letters per minute	25.75	26.84	-1.09
Word reading accuracy (40)	30.73	30.70	0.03
Words per minute	13.98	14.84	-0.86
Listening comprehension (4)	1.59	1.65	-0.06
Oral reading fluency per minute	22.25	23.04	-0.79
Reading comprehension (5)	1.84	2.02	-0.18
Dictation (12)	3.35	3.69	-0.34
EGMA (max score)			
Number identification (25)	16.03	16.33	-0.30
Arithmetic Level 1 (6)	4.14	4.14	0.00
Arithmetic Level 2 (6)	2.20	2.30	-0.10
Word problems (3)	1.02	1.06	-0.04

Notes: The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Second stage matching

We used 16 variables in total to perform the matching, of which 13 variables were assessment scores and 3 were those used in the first stage matching.

Among the 338 schools surveyed in baseline, we have obtained **280 schools, split equally across treatment and comparison schools, where we do not find any significant difference** on the matching variables at a 5% significance level.

More details on the second stage matching process can be found in the annexure of the report.

Second Stage Matching

Variable	Comparison school	Treatment school	Difference	Significance
Vocabulary score	7.76	7.82	-0.06	(-)
Letter accuracy	11.15	11.13	0.02	(-)
Letter fluency	27.14	26.84	0.30	(-)
Word accuracy	30.86	30.80	0.06	(-)
Word fluency	14.80	14.78	0.02	(-)
Listening	1.61	1.66	-0.05	(-)
Reading fluency	23.90	22.99	0.91	(-)
Reading comprehension	1.96	1.99	-0.03	(-)
Dictation	3.61	3.69	-0.08	(-)
Number identification	16.29	16.31	-0.02	(-)
Arithmetic score 1	4.20	4.17	0.03	(-)
Arithmetic score 2	2.26	2.31	-0.05	(-)
Word Problem	1.03	1.05	-0.02	(-)
Total EGRA score	123.05	121.98	1.07	(-)
Total EGMA score	23.78	23.84	-0.06	(-)
Proportion of students who speak Hindi	0.46	0.49	-0.03	(-)
Proportion of students who speak Halbi	0.70	0.71	-0.01	(-)
Student classroom ratio	21.44	20.67	0.77	(-)
Electricity available	0.86	0.84	0.02	(-)
Total number of students till class 5	61.46	61.35	0.11	(-)

Pairwise t-tests run across 140 comparison and treatment schools

Student home language

- As expected, **students who speak Hindi** perform better at most literacy competencies, as compared to students who don't speak Hindi.
- We observe that **students who speak only Halbi** performed significantly worse in most literacy competencies like vocabulary, letter fluency, word accuracy, reading comprehension and dictation, when compared to students who speak Hindi as a home language. The results can be found in the annexure.
- Below is the home language distribution of our sample:

Student Home Language	Overall	Comparison	Treatment
Only Hindi	24 %	24 %	24 %
Only Halbi	49 %	48 %	50 %
Both Hindi and Halbi	23 %	23 %	23 %
Neither Hindi nor Halbi	4 %	5 %	3 %

The above observations can make a case for implementing MLE in schools. At endline, it would be interesting to see if we observe a higher improvement in scores for non-Hindi, Halbi speaking students, since the intervention targets to bridge this language gap.

It is important to note the distinction between students who *speak only Hindi* as a home language (row 1) and students who *speak Hindi* (which includes students who speak only Hindi and both Hindi and Halbi– rows 1 + 3 in the table). Similarly for students who speak only Halbi vs students who speak Halbi.

Students who speak Halbi but not Hindi performed significantly worse than Hindi speaking students in most literacy competencies

Variable	Students who speak Hindi	Students who speak only Halbi and no Hindi	Significance
EGRA (max score)	**N = 1217**	**N = 1261**	
Vocabulary (9)	8.14	7.53	0.61 ***
Letter identification accuracy (15)	11.06	11.17	-0.11
Letters per minute	27.64	25.39	2.25 ***
Word reading accuracy (40)	31.17	30.34	0.83 **
Words per minute	15.02	14.12	0.90
Listening comprehension (4)	1.68	1.60	0.08
Oral reading fluency per minute	23.75	21.96	1.79
Reading comprehension (5)	2.10	1.81	0.29 ***
Dictation (12)	3.80	3.33	0.47 ***
EGMA (max score)			
Number identification (25)	16.40	16.05	0.35
Arithmetic Level 1 (6)	4.08	4.17	-0.09
Arithmetic Level 2 (6)	2.25	2.24	0.01
Word problems (3)	1.06	1.03	0.03

Notes: The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.
Here, we are looking at the 'only Halbi' group vs 'Only Hindi + both Hindi and Halbi' group.

Gender

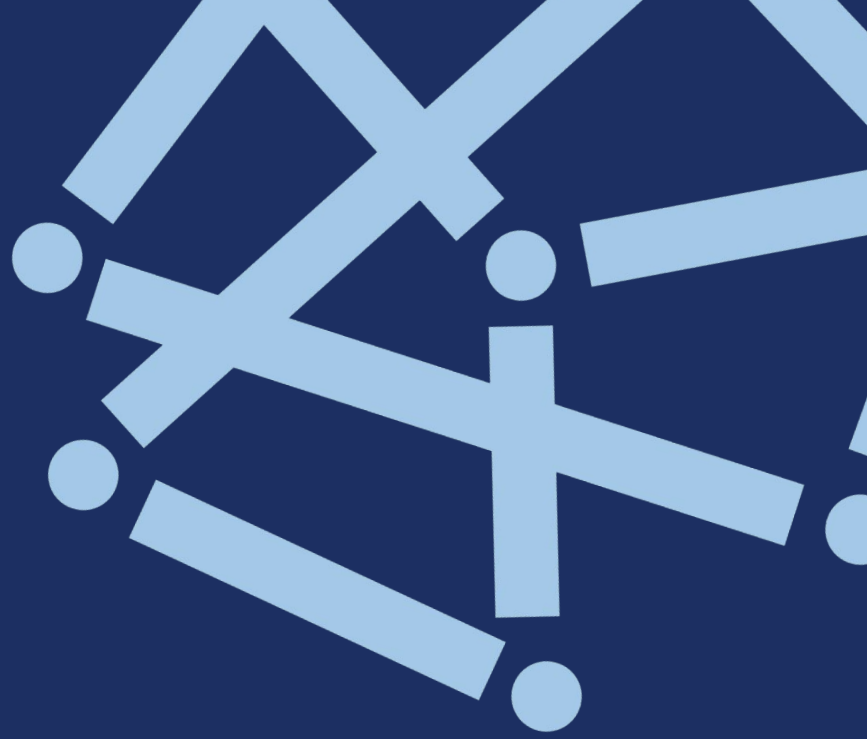
The treatment and comparison school samples are well-balanced in terms of the gender distribution.

Gender	Overall	Comparison	Treatment
Female proportion	51.22 %	51.5 %	50 %
Male proportion	48.78 %	48.5 %	50 %

Female students perform significantly better in most literacy competencies (and have an higher total EGRA score), as compared to their male counterparts, in both treatment and comparison schools.

Female students perform significantly better in most literacy competencies

Variable	Male (N)	Female (N)	Difference
EGRA (max score)	**N = 1259**	**N = 1322**	
Vocabulary (9)	7.75	7.87	-0.12
Letter identification accuracy (15)	10.92	11.26	-0.34 ***
Letters per minute	24.18	28.32	-4.14 ***
Word reading accuracy (40)	30.44	30.98	-0.54
Words per minute	13.33	15.45	-2.12 ***
Listening comprehension (4)	1.66	1.59	0.07
Oral reading fluency per minute	19.28	25.86	-6.58 ***
Reading comprehension (5)	1.80	2.06	-0.26 ***
Dictation (12)	3.11	3.92	-0.81 ***
EGMA (max score)			
Number identification (25)	16.32	16.05	0.27
Arithmetic Level 1 (6)	4.18	4.11	0.07
Arithmetic Level 2 (6)	2.21	2.29	-0.08
Word problems (3)	1.03	1.05	-0.02



Descriptive Statistics

Distribution of total scores

Variable (max score)	Comparison (N=1278)	Treatment (N=1303)	Difference
Total EGRA score (525)	118.53	122.08	-3.55
Total EGMA score (40)	23.39 (1278)	23.83	-0.44

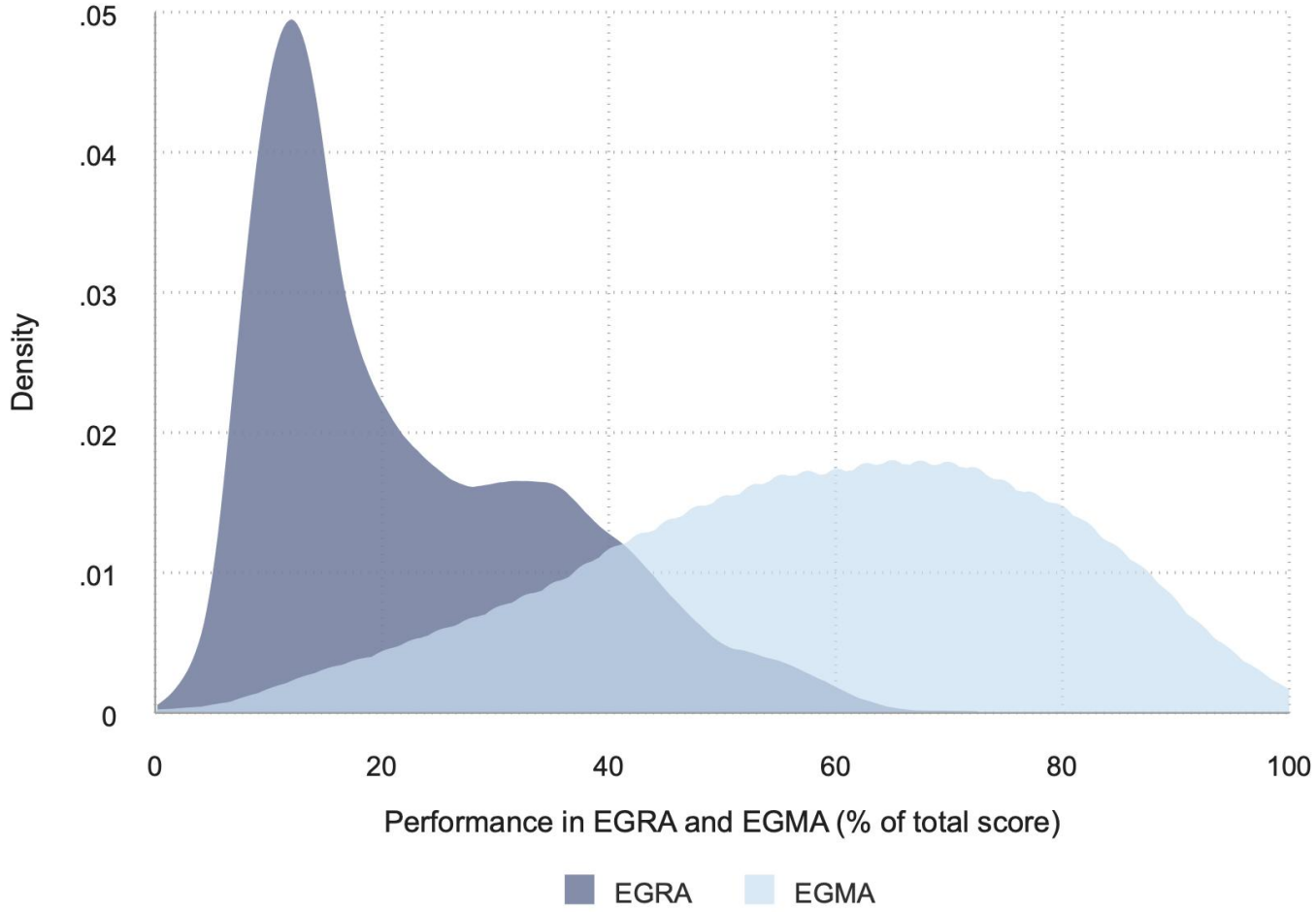
Notes: The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

The **total EGRA score** is calculated as a sum of all literacy task scores. The maximum score possible in EGRA is 525.

The **total EGMA score** is calculated as a sum of all numeracy task scores, ranging from 0 to 40, 40 being the maximum possible score for EGMA.

Here, we have cut-off the maximum possible scores in reading fluency task at 140 words per minute (98th percentile), letter fluency at 200 items per minute (99th percentile) and word fluency at 100 words per minute (98.75th percentile). The cutoffs were determined with the rationale that it is unrealistic for a student to complete all items in a timed task in less than 30 seconds (out of 60 seconds). This indicates to a technical error in data collection by the enumerators. We have dropped the outliers that don't meet these cutoffs.

Distribution: Total scores



When we look at relative scores of students in EGRA and EGMA (calculated by scaling down a student's total score by the max possible score), we observe that students perform better in numeracy competencies, with most students scoring above the 50% mark. In EGRA, most students scored between 0-20%.

Descriptive Analysis Parameters

We compared student assessment scores ("learning competencies") across the following subgroups:

- Gender
- Students' home languages: Hindi and Halbi
- Multigrade classrooms
- Student-teacher ratio (RTE Act-2009 norms)
- Single teacher schools
- Geographical location: blockwise

Sample size distribution

Subgroup	Percent of sample students	Comparison	Treatment
Gender: Female students	51%	52%	50%
Students' home language:			
Only Hindi	24 %	24 %	24 %
Only Halbi	49 %	48 %	50 %
Both Hindi and Halbi	23 %	23 %	23 %
Neither Hindi nor Halbi	4 %	5 %	3 %
Students in multigrade classrooms	84%	81%	88%
Students in classrooms with student-teacher ratio <= 30	20%	17%	23%
Students in single teacher schools	27%	38%	17%
Students in schools in Bastar block	60%	33%	87%

Analysis summary table

Parameter	Parameter = 0	Parameter = 1	Difference
Gender	**Male**	**Female**	
Total EGRA score	112.65 (1255)	127.63 (1316)	-14.98 ***
Total EGMA score	23.73 (1259)	23.50 (1322)	0.23
Student home language: Halbi vs Hindi	**Non-Halbi**	**Halbi**	
Total EGRA score	124.51 (1214)	117.64 (1254)	6.87 **
Total EGMA score	23.79 (1217)	23.50 (1261)	0.29
Student home language: Hindi vs non-Hindi	**Non-Hindi**	**Hindi**	
Total EGRA score	116.57 (1357)	124.51 (1214)	-7.94 ***
Total EGMA score	23.45 (1364)	23.79 (1217)	-0.34
Bastar block	**Non-Bastar**	**Bastar**	
Total EGRA score	117.44 (1030)	122.24 (1541)	-4.80 *
Total EGMA score	23.58 (1032)	23.63 (1549)	-0.05
Multigrade classroom	**Single grade**	**Multigrade**	
Total EGRA score	118.90 (272)	117.90 (1422)	1.00
Total EGMA score	23.41 (273)	23.11 (1425)	0.30
Single teacher schools	**Multi teacher**	**Single teacher**	
Total EGRA score	121.67 (1862)	116.86 (697)	4.81
Total EGMA score	23.80 (1869)	23.07 (700)	0.73 **
Student-teacher ratio <=30	**Student-teacher ratio > 30**	**Student-teacher ratio <=30**	
Total EGRA score	119.65 (2065)	123.06 (506)	-3.41
Total EGMA score	23.47 (2074)	24.20 (507)	-0.73 *

Single teacher schools

- We see that **students in single teacher schools perform worse than students in multi-teacher schools in some literacy competencies.**

- When we compare student scores in treatment and comparison schools for just single-teacher schools, we notice no significant difference in the average school competency scores.

- When we compare student scores between single-teacher and multi-teacher schools in just the treatment group, we notice no significant differences in the scores.

Students in single-teacher schools perform worse in some competencies

Variable	More than one teacher (N)	Single teacher (N)	Significance
EGRA (max score)	**N=1869**	**N=700**	
Vocabulary (9)	7.95	7.41	0.54 ***
Letter identification accuracy (15)	11.16	10.92	0.24
Letters per minute	26.80	25.05	1.75 *
Word reading accuracy (40)	30.93	30.05	0.88 **
Words per minute	14.48	14.29	0.19
Listening comprehension (4)	1.62	1.64	-0.02
Oral reading fluency per minute	22.82	22.21	0.61
Reading comprehension (5)	1.97	1.82	0.15
Dictation (12)	3.64	3.21	0.43 **
EGMA (max score)			
Number identification (25)	16.34	15.70	0.64 ***
Arithmetic Level 1 (6)	4.15	4.13	0.02
Arithmetic Level 2 (6)	2.27	2.21	0.06
Word problems (3)	1.05	1.03	0.02

Notes: The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Multigrade Classrooms and Student-teacher ratio

- Out of the 210 schools for which we have this data on, **82.8% (174) schools have multigrade classrooms**. In our study's context, a multigrade classroom is defined as: whenever students of multiple grades sit in the same physical space/classroom, and may be exposed to the MLE program lessons and materials.

- The RTE Act- 2009 mandates that for the primary school, the **student-teacher ratio should be 30:1 or below**. In our sample of 338 schools for which we have this information, only **~23% schools** met this requirement.

- Contrary to our expectations, students in **multi-grade classrooms** and students in classrooms with **student-teacher ratio** higher than 30:1 do not perform worse than the other students in literacy and numeracy competencies.

Notes: We started collecting information on whether schools had multigrade classrooms or not at a later point in our data collection exercise, and therefore don't have this information for the entire sample of 338 schools.

No major significant differences in students performance between multigrade and single grade classrooms

Variable	Single grade	Multigrade	Significance
EGRA (max score)	**N=273**	**N=1425**	
Vocabulary (9)	8.07	7.74	0.33 **
Letter identification accuracy (15)	11.12	10.99	0.13
Letters per minute	25.28	25.48	-0.20
Word reading accuracy (40)	30.29	30.41	-0.12
Words per minute	13.87	14.31	-0.44
Listening comprehension (4)	1.57	1.56	0.01
Oral reading fluency per minute	23.21	22.27	0.94
Reading comprehension (5)	2.05	1.80	0.25 **
Dictation (12)	3.19	3.21	-0.02
EGMA (max score)			
Number identification (25)	15.95	15.83	0.12
Arithmetic Level 1 (6)	4.03	4.16	-0.13
Arithmetic Level 2 (6)	2.24	2.17	0.07
Word problems (3)	1.19	0.96	0.23 ***

Notes: The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

No major significant differences in students performance between schools with student-teacher

Variable	Ratio > 30	Ratio <= 30	Significance
EGRA (max score)	**N=2074**	**N=507**	
Vocabulary (9)	7.74	8.11	-0.37 ***
Letter identification accuracy (15)	11.08	11.13	-0.05
Letters per minute	26.27	26.41	-0.14
Word reading accuracy (40)	30.68	30.88	-0.20
Words per minute	14.38	14.55	-0.17
Listening comprehension (4)	1.60	1.70	-0.10
Oral reading fluency per minute	22.23	24.37	-2.14
Reading comprehension (5)	1.91	2.03	-0.12
Dictation (12)	3.47	3.74	-0.27
EGMA (max score)			
Number identification (25)	16.12	16.44	-0.32
Arithmetic Level 1 (6)	4.11	4.29	-0.18 **
Arithmetic Level 2 (6)	2.22	2.38	-0.16 *
Word problems (3)	1.03	1.09	-0.06

Notes: The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

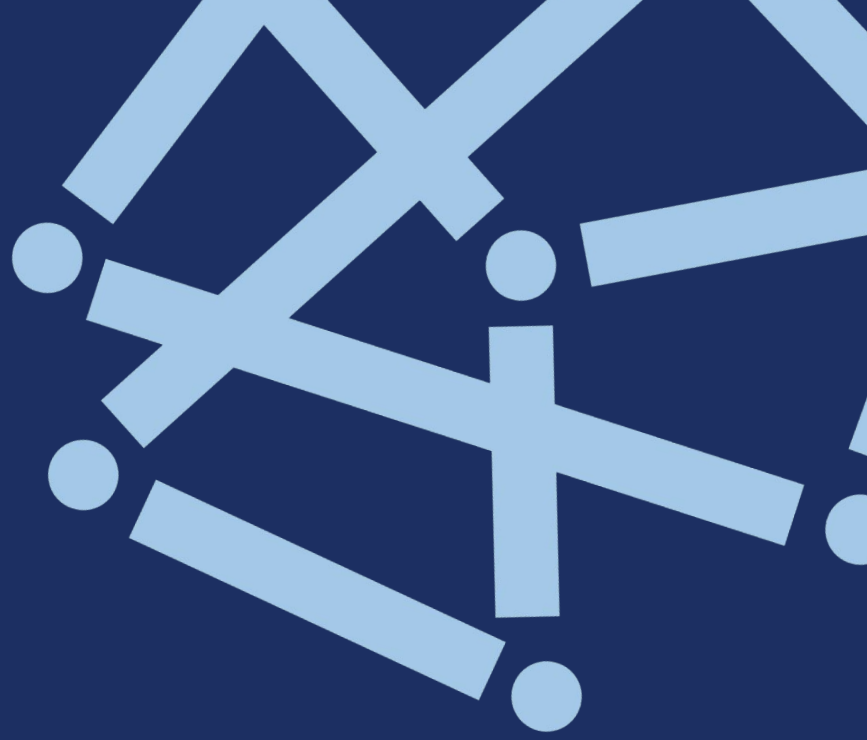
Block-wise: Bastar vs non-Bastar

- 203 schools from baseline are in Bastar, while the rest 134 schools are in non-Bastar blocks.
- We observe that **students in schools in the Bastar block perform significantly better** in a few literacy competencies, when compared to the performance of students from schools in other blocks like Darbha.
- In Bastar block, we don't observe any significant differences in any competency score between treatment and comparison schools.

Block Name	Treatment Program schools	Comparison schools
Bakawand	0	12
Bastar	146	58
Darbha	22	22
Lohandiguda	0	24
Tokapal	0	52

Students in schools in the Bastar block perform significantly better in a few literacy competencies

Variable	Non-Bastar	Bastar (N)	Difference
EGRA (max score)	**N=1032**	**N=1549**	
Vocabulary (9)	7.72	7.87	-0.15 *
Letter identification accuracy (15)	11.06	11.11	-0.05
Letters per minute	25.45	26.86	-1.41
Word reading accuracy (40)	30.50	30.86	-0.36
Words per minute	13.91	14.75	-0.84
Listening comprehension (4)	1.55	1.67	-0.12 ***
Oral reading fluency per minute	22.01	23.07	-1.06
Reading comprehension (5)	1.86	1.98	-0.12 *
Dictation (12)	3.27	3.69	-0.42 ***
EGMA (max score)			
Number identification (25)	16.11	16.23	-0.12
Arithmetic Level 1 (6)	4.20	4.10	0.10
Arithmetic Level 2 (6)	2.27	2.23	0.04
Word problems (3)	1.00	1.06	-0.06 *



Next Steps

Endline

We plan to conduct **endline data collection** process and analysis towards the end of the program cycle, in **February/March 2025** in both program and comparison schools.

The endline assessment will be conducted with the then class 3 children in the same schools where baseline assessment was done.

After the endline we can analyse and compare the learning gains in program and comparison schools.

Analysis Plan

To estimate the impact, we will use a **difference-in-differences (regression) analysis**, comparing the relative change in learning levels (from baseline to endline) between treatment and comparison groups, controlling for relevant covariates (such as age, gender and other data we collect).

Also important to understand whether local language learning has positive or negative impacts in other subjects, such as basic numeracy.

- For example, intensive focus on literacy may crowd out instructional time spent on mathematics, and therefore negatively impact numeracy.

- In contrast, improved literacy may facilitate improved learning in other subjects through, for example, cognitive development, improved motivation, and better understanding of concepts, instructions, or problems that require reading. We therefore propose assessing foundational numeracy SLOs in addition to foundational literacy SLOs.

This analysis would be secondary and not the primary indicator of program success.

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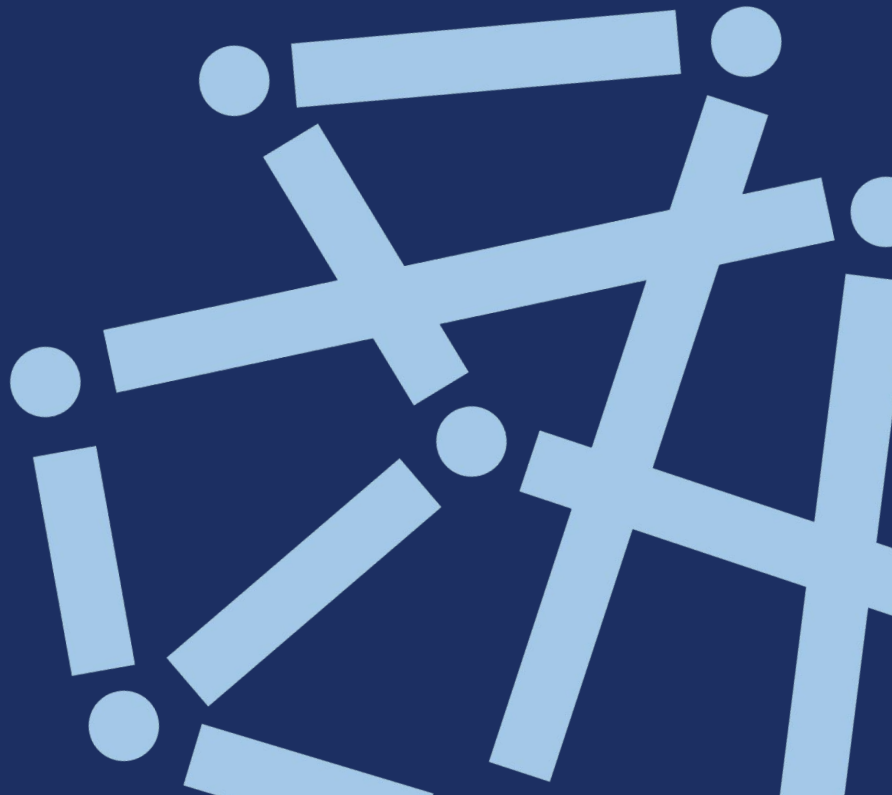
Thank you



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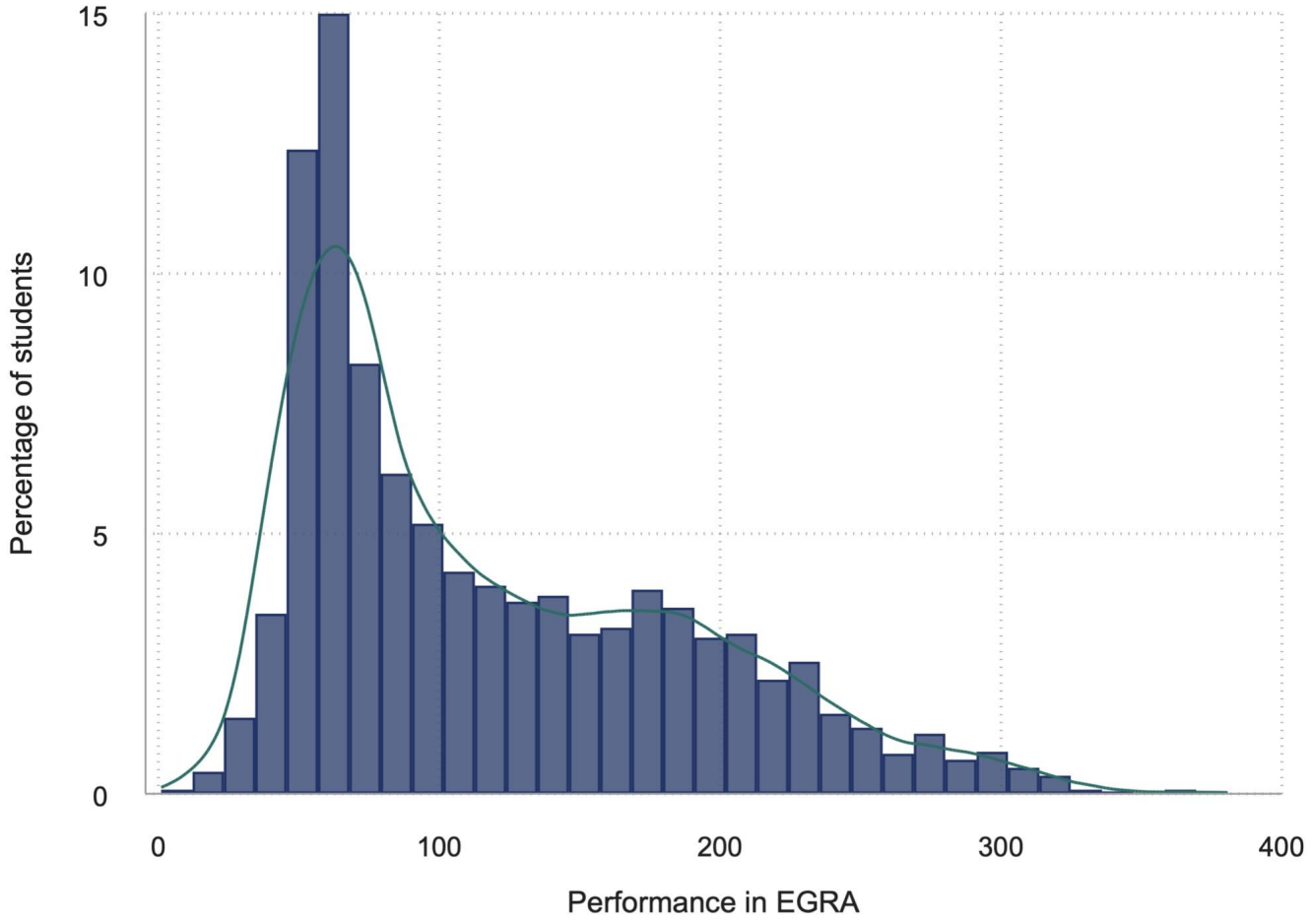
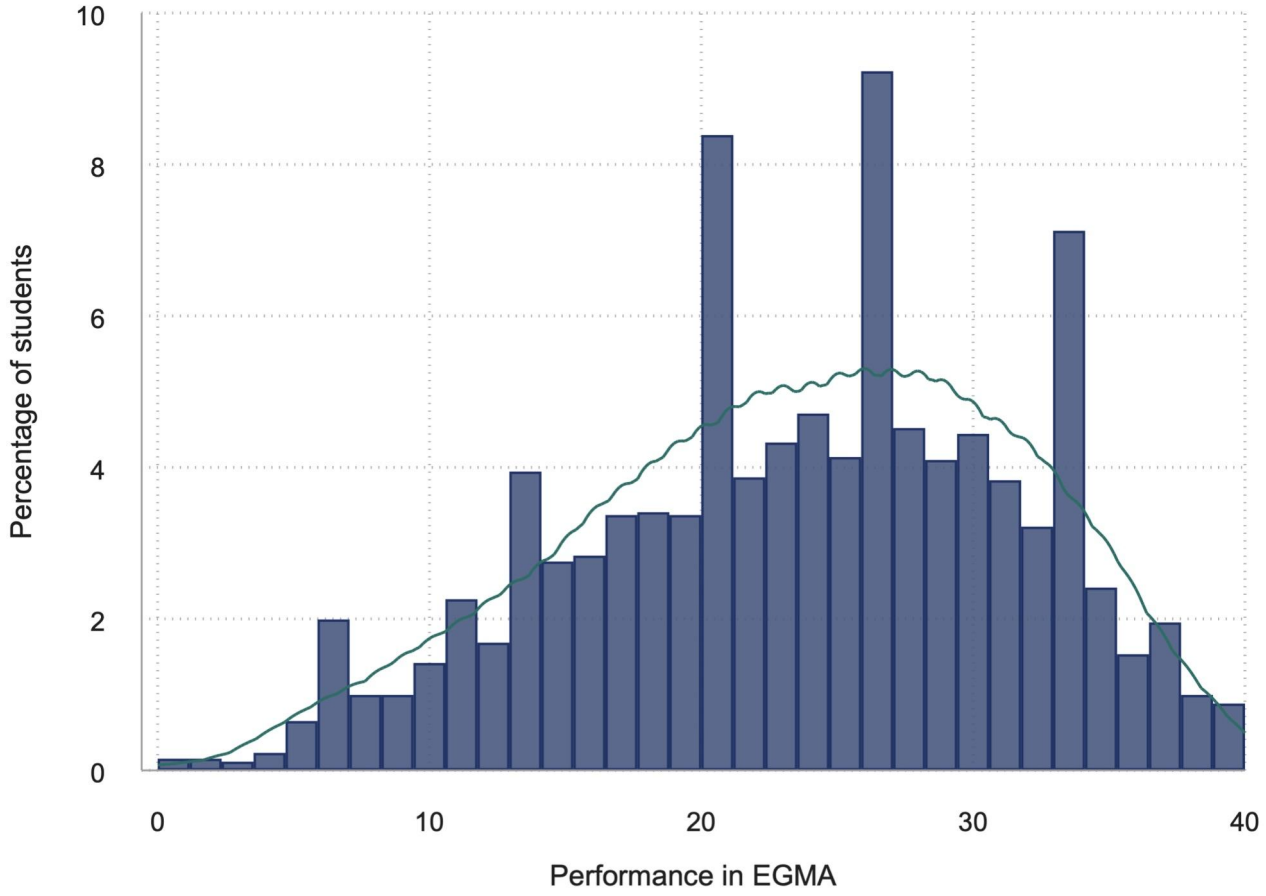
Annexure

Distribution of total scores: EGRA



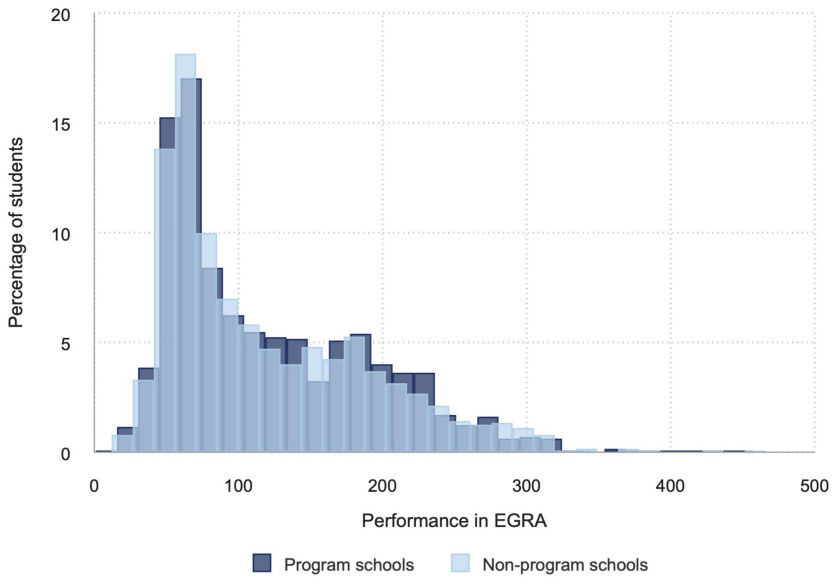
The total EGRA scores, calculated as a sum of all literacy task scores, range from 12 to 466 in our sample. The median score is 97.

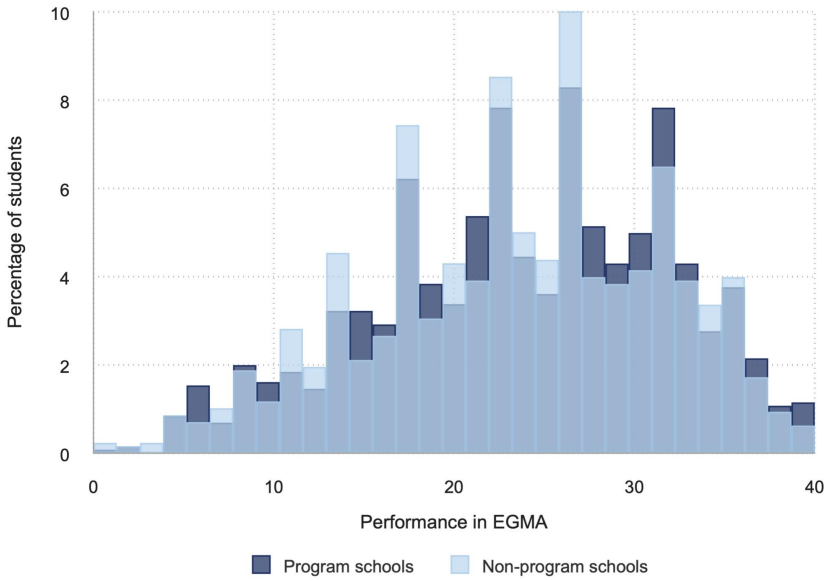
Distribution of total scores: EGMA



The total EGMA scores, calculated as a sum of all numeracy task scores, range from 0 to 40 (40 being the maximum possible score for EGMA) in our sample. The median score is 24.

Student performance: Program vs Non-program schools



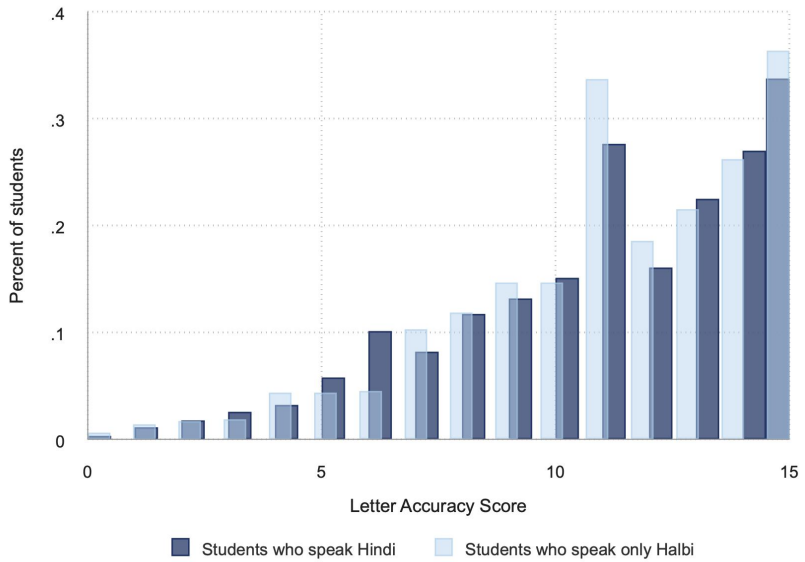


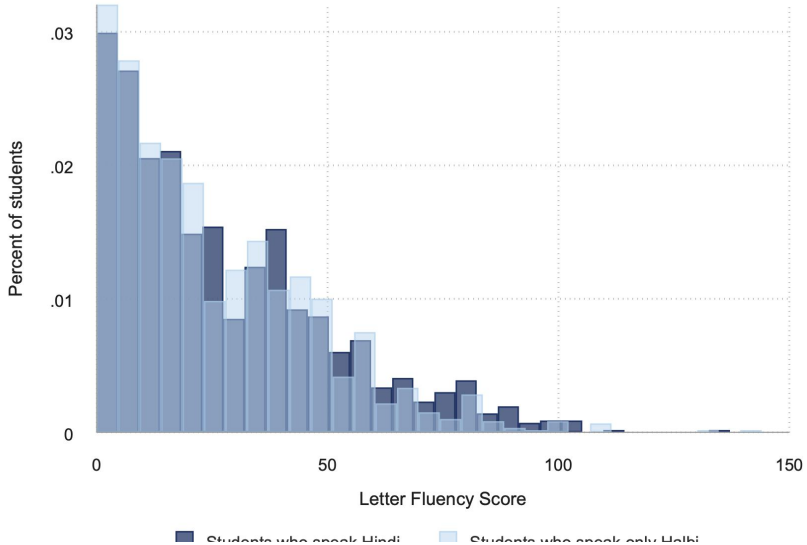
The distribution of EGRA and EGMA scores is quite similar across treatment and comparison groups.

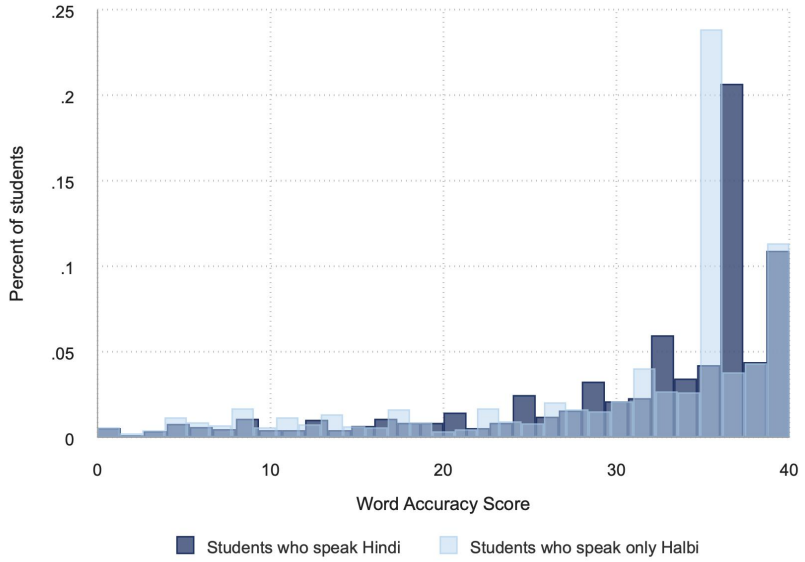
Proportion of students with score 0 in the assessment tasks

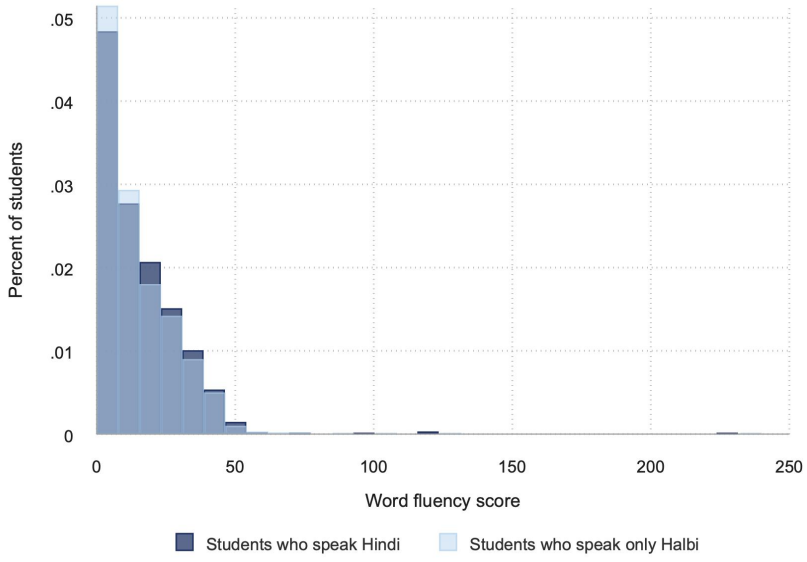
Task	Proportion of students with score 0
Vocabulary	1.82%
Letter identification accuracy	0.23%
Letters per minute	6.55%
Word reading accuracy	0.58%
Words per minute	20.15%
Listening comprehension	21.5%
Oral reading fluency per minute	25.46%
Reading comprehension	37.93%
Dictation	44.94%
Number identification	0.15%
Arithmetic Level 1	7.75%
Arithmetic Level 2	23.48%
Word problems	30.84%

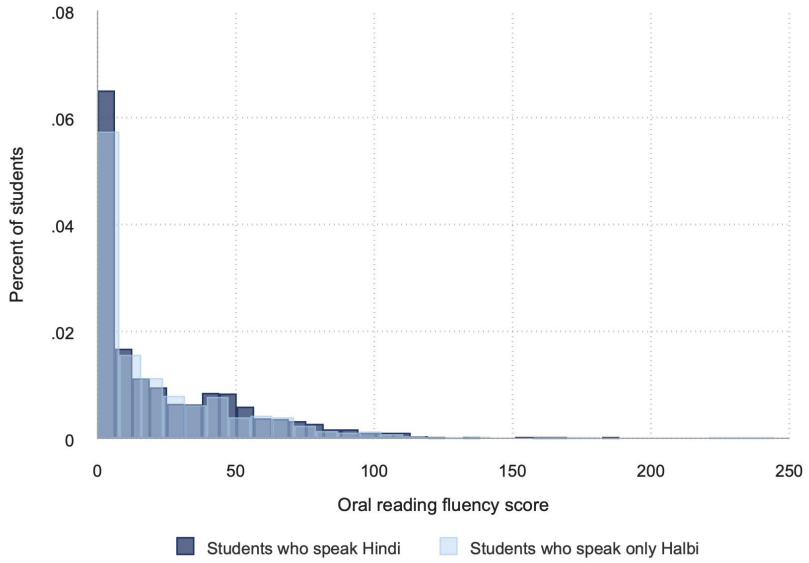
Student performance in EGRA tasks by home language

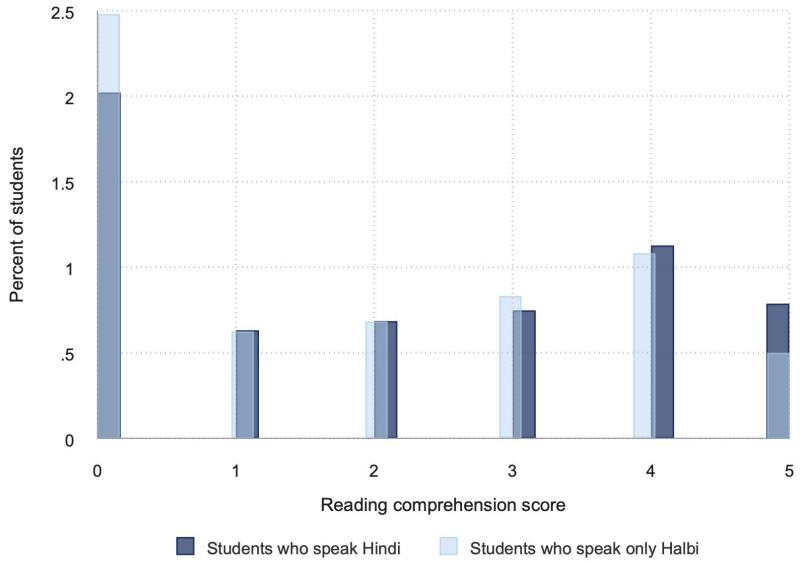


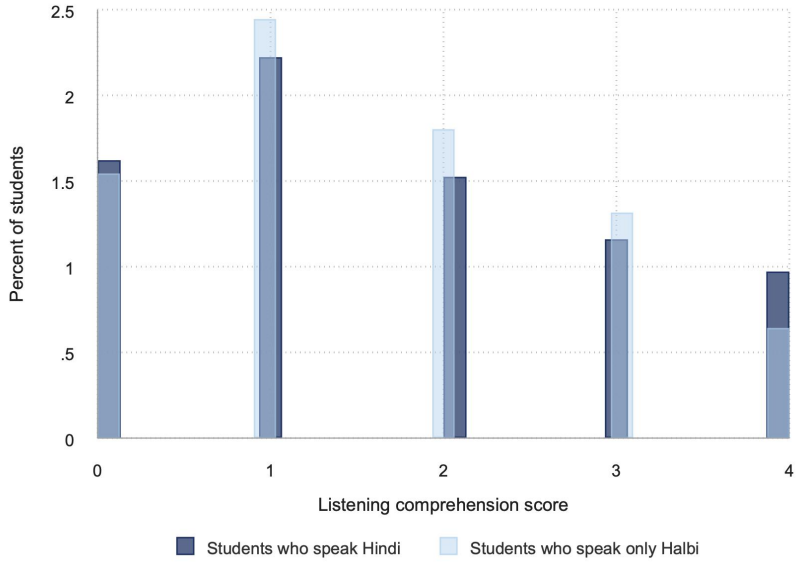


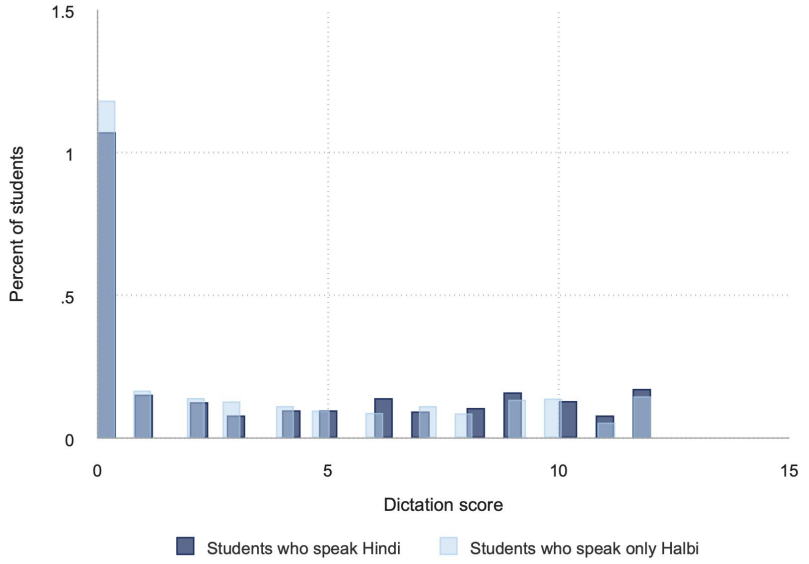





.08
.06
.04
.02
0
Percent of students
0
50
100
150
200
250
Oral reading fluency score
Students who speak Hindi
Students who speak only Halbi


2.5
2
1.5
1
.5
0
Percent of students
0
1
2
3
4
5
Reading comprehension score
Students who speak Hindi
Students who speak only Halbi


2.5
2
1.5
1
.5
0
Percent of students
0
1
2
3
4
Listening comprehension score
Students who speak Hindi
Students who speak only Halbi


1.5
1
.5
0
Percent of students
0
5
10
15
Dictation score
Students who speak Hindi
Students who speak only Halbi

Second Stage Matching

- In an effort to narrow down the treatment and comparison school pairs, we performed a second stage matching by leveraging the assessment score data we collected in the baseline survey.

- We used 16 variables in total to perform the matching, of which 13 variables were assessment scores and 3 were those used in the first stage matching.

- While the exact matching methodology is yet to be finalized, we have obtained encouraging results by utilizing a genetic algorithm.

- Among the 338 schools surveyed in baseline, we have obtained 280 schools, split equally across treatment and comparison schools, where we do not find any significant difference on the matching variables at a 5% significance level.

Second Stage Matching

As a secondary check, we also ran pairwise t-tests on the school level EGRA and EGMA scores. Here too, we find that there is no significant difference in scores.

Assessment	Control school	Treatment school	Difference	Significance
Total EGRA score	122.58	122.65	-0.07	(-)
Total EGMA score	23.93	23.78	0.15	(-)

We will continue to develop the matching methodology. The final algorithm will be based on the balance of the school level characteristics and the total number of schools we are interested in surveying during endline data collection.

Students who speak Hindi perform better at most literacy competencies

Variable	Students who don't speak Hindi	Students who speak Hindi	Significance
EGRA (max score)	**N = 1364**	**N = 1217**	
Vocabulary (9)	7.51	8.14	-0.63 ***
Letter identification accuracy (15)	11.12	11.06	0.06
Letters per minute	25.10	27.64	-2.54 ***
Word reading accuracy (40)	30.31	31.17	-0.86 **
Words per minute	13.88	15.02	-1.14 *
Listening comprehension (4)	1.57	1.68	-0.11 **
Oral reading fluency per minute	21.67	23.75	-2.08 *
Reading comprehension (5)	1.78	2.10	-0.32 ***
Dictation (12)	3.28	3.80	-0.52 ***
EGMA (max score)			
Number identification (25)	15.99	16.40	-0.41 *
Arithmetic Level 1 (6)	4.20	4.08	0.12
Arithmetic Level 2 (6)	2.25	2.25	0.00
Word problems (3)	1.02	1.06	-0.04

Notes: The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Gender: Treatment vs Comparison

Variable	Male			Female		
EGRA (max score)	**Treatment (N=609)**	**Comparison (N=650)**	**Difference**	**Treatment (N=669)**	**Comparison (N=653)**	**Difference**
Vocabulary (9)	7.70	7.79	-0.09	7.77	7.97	-0.20
Letter identification accuracy (15)	10.95	10.89	0.06	11.16	11.35	-0.19
Letters per minute	23.81	24.53	-0.72	27.51	29.14	-1.63
Word reading accuracy (40)	30.17	30.69	-0.52	31.24	30.72	0.52
Words per minute	13.33	13.33	0.00	14.57	16.34	-1.77
Listening comprehension (4)	1.61	1.69	-0.08	1.57	1.61	-0.04
Oral reading fluency per minute	19.64	18.93	0.71	24.62	27.12	-2.50
Reading comprehension (5)	1.69	1.90	-0.21	1.98	2.14	-0.16
Dictation (12)	3.00	3.21	-0.21	3.67	4.17	-0.50
EGMA (max score)						
Number identification (25)	16.32	16.32	0.00	15.77	16.34	-0.57
Arithmetic Level 1 (6)	4.16	4.19	-0.03	4.13	4.09	0.04
Arithmetic Level 2 (6)	2.14	2.27	-0.13	2.25	2.33	-0.08
Word problems (3)	0.99	1.07	-0.08	1.04	1.06	-0.02

Notes: The value displayed for t-tests are the differences in the means across the groups. ***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Bastar school: Treatment vs Control

Variable	Comparison (N)	Treatment (N)	Difference
EGRA (max score)			
Vocabulary (9)	7.6950 (55)	7.7640 (55)	-0.0690
Letter identification accuracy (15)	11.1490 (55)	11.0230 (55)	0.1260
Letters per minute	27.6700 (55)	33.1630 (55)	-5.4930
Word reading accuracy (40)	31.5220 (55)	30.2550 (55)	1.2670
Words per minute	16.4850 (55)	22.8470 (55)	-6.3620
Listening comprehension (4)	1.6950 (55)	1.6860 (55)	0.0090
Oral reading fluency per minute	26.6950 (55)	38.2680 (55)	-11.5730
Reading comprehension (5)	1.8330 (55)	2.1610 (55)	-0.3280
Dictation (12)	3.3650 (53)	3.7290 (53)	-0.3640
EGMA (max score)			
Number identification (25)	16.2810 (55)	16.0690 (55)	0.2120
Arithmetic Level 1 (6)	4.0460 (55)	4.0180 (55)	0.0280
Arithmetic Level 2 (6)	2.1910 (55)	2.4710 (55)	-0.2800
Word problems (3)	1.0080 (55)	1.0630 (55)	-0.0550

Access to Electricity

Access to electricity in the school was one of the variables we used for first stage matching. Students in schools with electricity perform better than the others in certain competencies.

Variable	No Electricity (N)	Electricity (N)	Difference
EGRA (max score)			
Vocabulary (9)	7.70 (401)	7.83 (2180)	-0.13
Letter identification accuracy (15)	10.73 (400)	11.16 (2175)	-0.43 **
Letters per minute	24.09 (401)	26.71 (2180)	-2.62 **
Word reading accuracy (40)	30.18 (401)	30.82 (2175)	-0.64
Words per minute	13.50 (401)	14.58 (2180)	-1.08
Listening comprehension (4)	1.66 (401)	1.61 (2180)	0.05
Oral reading fluency per minute	20.00 (401)	23.14 (2180)	-3.14 **
Reading comprehension (5)	1.80 (401)	1.95 (2180)	-0.15
Dictation (12)	3.17 (401)	3.59 (2180)	-0.42 *
EGMA (max score)			
Number identification (25)	16.29 (401)	16.16 (2180)	0.13
Arithmetic Level 1 (6)	4.23 (401)	4.13 (2180)	0.10
Arithmetic Level 2 (6)	2.15 (401)	2.27 (2180)	-0.12
Word problems (3)	0.96 (401)	1.05 (2180)	-0.09 *