The Effect of Teacher Training and Community Literacy Programming on Teacher and Student Outcomes

ABCD Conference

December 9, 2024

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Motivation

- Across the developing world, low mastery of basic literacy skills remains a persistent challenge.
  - For example, in Bangladesh, the 2022 National Student Assessment showed more than half of students in grade three and above had not mastered basic skills in Bangla and mathematics.

- Weak or suboptimal pedagogical skills by teachers are often identified as a contributing factor to these low scores.

- COVID-19 exacerbated the problem due to long school closures – students lost 88% of their expected learning per year.

Motivation, cont.

- In Mozambique, the site of this study, primary completion is below 40%; one of the lowest in the world (Mambo et al, 2019).
- Schools were closed for approximately one year due to COVID-related disruptions.
- Following the re-opening of schools, students automatically progressed to the next grade without learning material.
- Teachers and schools sought to condense two grades into one.

Literature

- Early grade reading programs show mixed results across contexts but are generally effective over a short period.
- They can increase scores, with effects up to the equivalent of 3 years of schooling (Graham and Kelley, 2019).
- Teacher training programs are a very popular intervention; evidence suggests they are effective if they are:
  - Of sufficient length, are face-to-face, and are subject specific (Popova, 2021 – review).
  - Followed up with continued support and coaching (Cilliers et al 2019).
- Parental involvement does not necessarily have positive effects, given limited literacy on the part of parents.

Literature

- There are mixed results on out-of-the-classroom interventions like cross-age tutoring (Romero et al, 2018), safe learning spaces (Mensch, 2019), mentoring (Falk, Kosse, & Pinger, 2020) or providing parents with strategies to help their children learn (Romero et al, 2021; Barrera-Osario, 2020).
- Learning camps have been more effective (Banerjee et al, 2016 – India; Banerjee et al, 2008 – India).
- A recent paper by Björkman Nyqvist and Guariso (2022) suggests complementarities between in and out of school interventions
  - In school study groups and out of school learning camps.
  - Neither effective on their own, effective when delivered together.

Contribution

- We evaluate the **combination** of two interventions targeting the enhancement of early grade reading skills in Nampula province, Mozambique.
  - Teacher training on early grade literacy and learning materials.
  - Reading camps led by local volunteers with the support of a dedicated teacher.

- Both are conducted by World Vision as part of Unlock Literacy (UL).

- The interventions are evaluated in a randomized trial with randomization at the school level.

Preview of Findings

- Imperfect compliance:
  - Only 55-60% of teachers attended trainings.
  - Reading camps were implemented with more fidelity.

- Outcomes:
  - We observed small improvements in some components of reading – stronger for the bottom of the learning distribution.
  - Stronger impacts for the reading camps.
  - No impacts on student attendance, dropout, or teacher attendance.
  - Teachers do not have better knowledge of key pedagogical concepts or change their teaching methods.

The Unlock Literacy Program

Teacher Training in Early-Grade Reading Skills:

- Emphasis on five core reading skills: letter knowledge, sounding out words, vocabulary development, reading fluency, and comprehension.
- Comprehensive training package including instruction, practice, follow-up guidance, workshops, and refresher training.
- Teaching materials in Emakhuwa (the vernacular) with locally-relevant content.
- Training for school directors to monitor teacher attendance systematically.

The Unlock Literacy Program

Community Engagement for Reading Support:

- Training and activities to boost community involvement in supporting reading.
- Creation of reading camps (RCs) led by literate teenage volunteers to conduct engaging reading exercises outside of school and inspire students to read (with a dedicated teacher at the school to support reading camps).
- To meet weekly, tailor instruction to ability levels, use engaging local materials, and use interactive learning methods.
- Encourage support from the school council and the school district (ZIP).

UL: Comparing to Other Programs

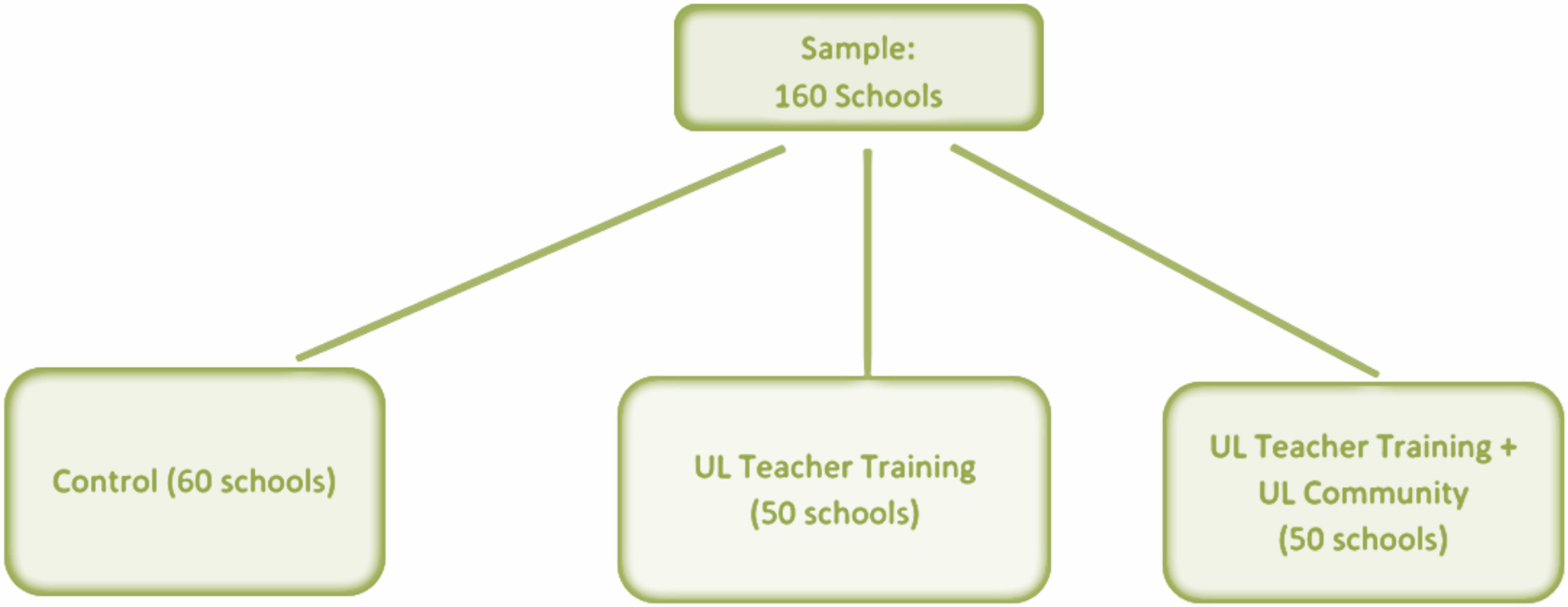
- Compared to other training programs, Unlock Literacy is notably lighter-touch: 2 days of training, one day of follow-up.

- Reading camps are at an intermediate level of intensity.
  - Goal is weekly attendance.
  - However, attendance cannot be enforced.

- If lighter-touch interventions can be effective, this has significant implications for cost-effectiveness and scalability.

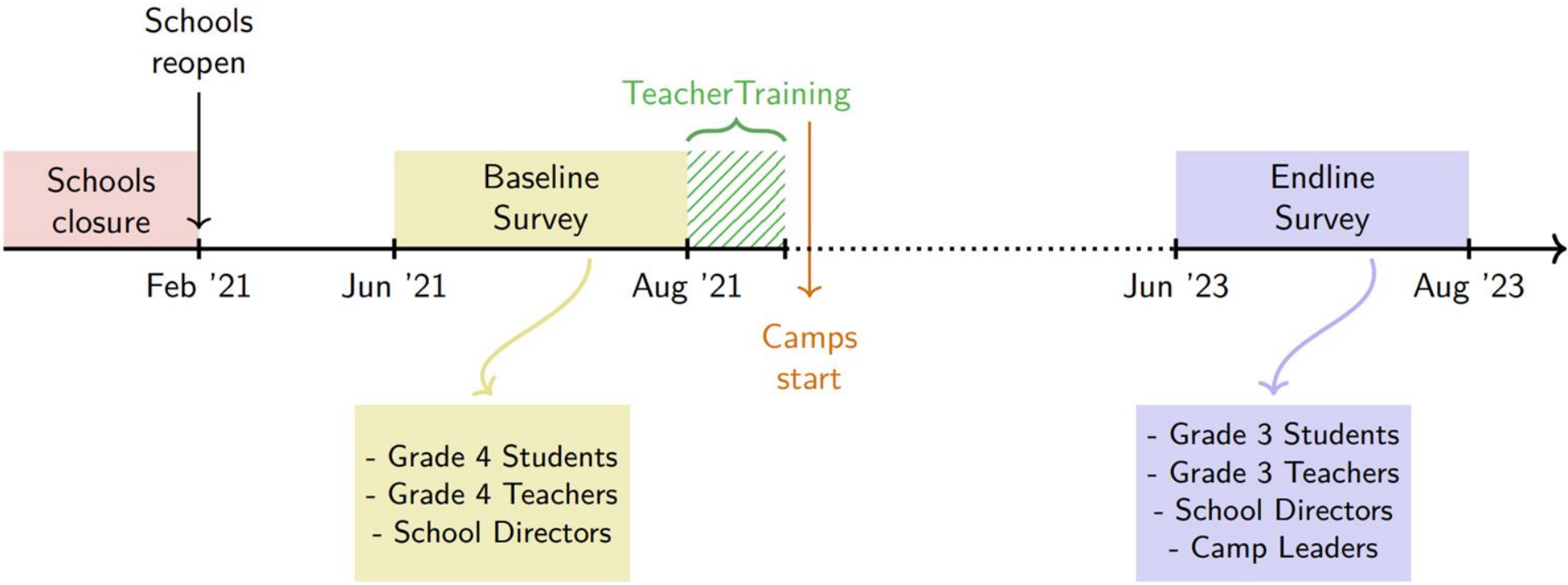
- Accordingly, evaluating more scaled-back interventions can be a useful contribution to the literature.

Experimental Design



Stratified with respect to enrolment in 2019 (above/below median) and number of teachers (above/below median).

Timeline


Schools reopen
TeacherTraining
Schools closure
Baseline Survey
Endline Survey
Feb '21
Jun '21
Aug '21
Jun '23
Aug '23
Camps start
- Grade 4 Students
- Grade 4 Teachers
- School Directors
- Grade 3 Students
- Grade 3 Teachers
- School Directors
- Camp Leaders

School sample

- 160 rural public primary schools in Nacarôa and Muecate districts in Nampula province, Mozambique
  - Baseline survey: Jun-Aug 2021
  - Endline Survey: Jul-Aug 2023

- Quantitative interviews with school directors (or deputies), classroom teachers, school cooks, reading camp leaders, and students.

- Early-Grade Reading Assessment (EGRA) to measure students' reading abilities.

Student sample

- The objective was to assess effects of the interventions for third graders, who would have been exposed to two years of pedagogy from trained teachers.

- We use a repeated cross-section design and sample approximately 10 students per grade (total sample of 1,596 students at follow-up.

- At baseline, we sampled grade four students given that these students had completed grade two and essentially omitted grade three due to school closures.

  - Their achievement should be an appropriate proxy for third grade literacy.

Summary Statistics (Demographics)

- Average student age ~10.5 years.

- Almost all students speak Emakhuwa; only 4% speak Portuguese at home.
- Test scores for each section are very low.
  - Average number of letters per minute: 9.8 / 100
  - Average fluency score: 3.86/161 (2.4%)
  - National average: 11.7 (7.3%)
  - Neighboring Tanzania for comparison: 24 (14.9%)

- These characteristics are similar comparing across the two sample districts.

Balance

	Control (C)	Training (T1)	Training + Community (T2)	Diff. (T1)-(C)	Diff. (T2)-(C)	Diff. (T2)-(T1)
Child': Male	0.439	0.500	0.469	0.062	0.030	-0.032
	(0.20)	(0.18)	(0.19)	(0.04)	(0.04)	(0.04)
Child's Age	11.270	11.830	11.334	0.560*	0.064	-0.496*
	(1.16)	(1.48)	(0.77)	(0.26)	(0.20)	(0.24)
Number of Siblings	3.309	3.105	3.470	-0.205	0.161	0.366
	(1.15)	(0.85)	(1.16)	(0.19)	(0.23)	(0.20)
Speaks Portuguese at home	0.017	0.043	0.032	0.026	0.015	-0.011
	(0.04)	(0.10)	(0.06)	(0.02)	(0.01)	(0.02)
Child has books at home	0.726	0.618	0.670	-0.108*	-0.056	0.052
	(0.20)	(0.24)	(0.23)	(0.04)	(0.04)	(0.05)
Asset Index for pupil	0.010	-0.083	0.058	-0.093	0.047	0.141
	(0.48)	(0.49)	(0.43)	(0.09)	(0.09)	(0.09)
Grade 4 class size	28.630	35.696	29.180	7.067	0.550	-6.516
	(4.02)	(33.99)	(6.82)	(4.66)	(1.09)	(4.89)
Director: HS education (or higher)	0.889	0.893	0.900	0.004	0.011	0.007
	(0.32)	(0.31)	(0.30)	(0.06)	(0.06)	(0.06)
Director: Male	0.852	0.875	0.880	0.023	0.028	0.005
	(0.36)	(0.33)	(0.33)	(0.07)	(0.07)	(0.06)
Director's Age	39.370	38.679	36.900	-0.692	-2.470	-1.779
	(7.71)	(7.14)	(7.29)	(1.42)	(1.47)	(1.40)
Director: Years at current school	4.093	3.857	3.300	-0.235	-0.793	-0.557
	(2.93)	(2.53)	(2.10)	(0.52)	(0.50)	(0.46)
Asset Index for School	0.014	-0.149	0.152	-0.163	0.138	0.301
	(1.15)	(1.43)	(0.81)	(0.25)	(0.20)	(0.23)
Teacher: HS education (or higher)	0.759	0.804	0.800	0.044	0.041	-0.004
	(0.43)	(0.40)	(0.40)	(0.08)	(0.08)	(0.08)
Teacher's Age	31.407	32.786	31.180	1.378	-0.227	-1.606
	(6.57)	(8.58)	(5.87)	(1.46)	(1.23)	(1.45)
Teacher: Male	0.315	0.179	0.260	-0.136	-0.055	0.081
	(0.47)	(0.39)	(0.44)	(0.08)	(0.09)	(0.08)
Years as a Teacher	7.444	9.125	6.720	1.681	-0.724	-2.405
	(4.73)	(8.20)	(5.31)	(1.28)	(0.99)	(1.36)

Empirical Specification

$$y_{ist} = \alpha + \beta_1 * T1_s + \beta_2 * T2_s + \beta_3 * y_{s,t-1} + Strata_s + \varepsilon_{is}$$

- y_{ist} is either a school-level (*s*) or student-level (*i*) outcome measured at *endline.*
- *T1:* indicator for school-level assignment to "UL Teacher Training."
- *T2:* indicator for assignment to "UL Teacher Training and Reading Camps."
- Control for $y_{s,t-1}$, *baseline* level of the outcome where available and strata fixed effects.
- Cluster at the school-level.

Exposure to UL interventions

	T: Received UL training (last 2 years)	T: Days of training attended	D: ZIP leader visited this month	D: UL provided reading/learning material	D and T: School Management Index
Training (T1)	0.421***	0.490**	0.079	0.529***	0.333
	(0.081)	(0.248)	(0.078)	(0.082)	(0.206)
Training + RCs (T2)	0.469***	0.575**	0.020	0.497***	-0.075
	(0.084)	(0.258)	(0.084)	(0.086)	(0.207)
Mean of Control)	0.130	1.185	0.759	0.204	-0.094
p-value (T1) vs (T2)	0.617	0.700	0.442	0.720	0.060
N	160	160	160	160	160

- Control: 13% of teachers received training.
- In T1, T2, 55-60% received UL training and an additional half-day on average.
- Only ~70% directors reported receiving UL materials in both T1/T2.
- Impacts not statistically significantly different from each other.

Exposure to reading camps

	Functioning RC in the community	Camp meets 1+ times a week	Received books/learning material	Reading Camp Quality Index	Teacher Support Index
Training (1)	0.223**	0.188**	0.244***	0.728**	0.601**
	(0.090)	(0.087)	(0.085)	(0.293)	(0.249)
Training + RCs (2)	0.721***	0.455***	0.756***	2.342***	1.868***
	(0.063)	(0.088)	(0.064)	(0.221)	(0.223)
Mean of Control	0.278	0.222	0.204	-1.000	-0.794
p-value (1) vs (2)	0.000	0.004	0.000	0.000	0.000
N	160	160	160	160	160

- Reported by RC leader.
- 28% of control communities had reading camps (from prior program). All T2 had RCs.
- Both received books, met frequently, were of high quality, and received support from teachers.
- Exposure is always higher in T2 and statistically different from T1.

Exposure to reading camps – students

	Currently in a Reading Camp	Attend(ed) RC 1+ times a week	Parental Support Index
Training (1)	-0.026	0.022	0.026
	(0.026)	(0.043)	(0.108)
Training + RCs (2)	0.305***	0.229***	0.114
	(0.043)	(0.048)	(0.117)
Mean of Control	0.082	0.168	-0.041
p-value (1) vs (2)	0.000	0.000	0.437
N	1,596	1,596	1,596

- While RCs exist, attendance is fairly low.
- Students don't get much support from parents.
- Large differences between T1 and T2.

Treatment effects: EGRA scores

	Letter identification (out of 100)	Words (out of 30)	Listening Comprehension (out of 4)	Reading Fluency (out of 161)	Reading Comprehension (out of 4)
Training (1)	1.648	0.176	0.222**	0.667	0.037
	(1.368)	(0.473)	(0.101)	(0.597)	(0.027)
Training + RCs (2)	2.709**	0.675	0.237**	0.942	0.053*
	(1.312)	(0.485)	(0.101)	(0.599)	(0.029)
Mean of Control	9.757	2.679	0.645	3.290	0.073
p-value (1) vs (2)	0.394	0.262	0.893	0.629	0.628
N	1,596	1,596	1,596	1,596	1,594
Any treatment	2.154*	0.417	0.229***	0.800	0.045*
	(1.192)	(0.425)	(0.085)	(0.526)	(0.023)
N	1,596	1,596	1,596	1,596	1,594

- Scores very low. Listening comprehension improved somewhat.
- No different in T1 vs T2.
- P-value for test of any treatment effect across the domains is 0.07.

Treatment effects: Non-zero scores

	Scored non-zero on Letter Identification	Scored non-zero on words	Scored non-zero on Listening Comprehension	Scored non-zero on Reading Fluency	Scored non-zero on Reading Comprehension
Training (1)	0.111**	0.117**	0.083*	0.139***	0.035
	(0.046)	(0.050)	(0.046)	(0.048)	(0.024)
Training + RCs (2)	0.085*	0.110**	0.107**	0.070	0.051**
	(0.047)	(0.050)	(0.044)	(0.049)	(0.026)
Mean of Control	0.578	0.529	0.421	0.656	0.064
p-value (1) vs (2)	0.568	0.885	0.583	0.133	0.568
N	1,596	1,596	1,596	1,596	1,594
Any treatment	0.099**	0.114**	0.095**	0.106**	0.043**
	(0.041)	(0.044)	(0.039)	(0.043)	(0.020)
N	1,596	1,596	1,596	1,596	1,594

- High proportion of students scoring zero - clearer evidence for those at the bottom of the distribution.
- No statistical difference between T1 and T2 impacts in any category.
- P-value for any treatment effect = 0.052.

Outcome: Student attendance

	Present day before school visit	Present day of school visit	Attendance (last 5 school days)	Pupil from baseline dropped out
Training (1)	-0.051	0.018	-0.059	-0.025
	(0.057)	(0.038)	(0.112)	(0.024)
Training + RCs (2)	-0.049	0.017	0.124	-0.020
	(0.040)	(0.034)	(0.102)	(0.027)
Mean for Control	0.913	0.903	4.243	0.117
p-value (1) vs (2)	0.962	0.988	0.063	0.860
N	1,596	1,596	1,596	14,610

- No effects on student attendance or dropout.

Outcome: Teachers

	D: Teacher's attendance (last 5 days)	T: Teacher Quiz Score (out of 12)	Teacher Pedagogical Practice score
Training (1)	0.203	0.015	0.371
	(0.180)	(0.278)	(0.378)
Training + RCs (2)	-0.312	0.257	0.175
	(0.246)	(0.298)	(0.379)
Mean for Control	4.519	7.630	-0.178
p-value (1) vs (2)	0.016	0.334	0.578
N	160	160	160

- No effects on teacher attendance, knowledge of good pedagogical practices, or actual pedagogical practices.

- T2 in fact shows lower attendance.

Interpreting these findings

- In general, a relatively light-touch intervention was not particularly effective in this context.

- Implementation seems to have been somewhat imperfect for training.
  - However, reading camps were implemented with greater fidelity.

- Teachers did not meaningfully shift knowledge or behavior.

- Students show some gains, but the effects are minor.

- Overall, the light-touch strategy in this case seems to be "too light-touch".

Findings in context

- Our findings are consistent with other recent literature suggesting that more intensive training programs are generally more effective.

- Popova et al. (2022) find that teacher trainings are successful when they involve several days of face-to-face training in a row and when there is substantial opportunity for hands-on practice.

- Kerwin and Thornton (2021) find that a reduced-cost pedagogical model was unsuccessful in Uganda (though a more intensive model was effective).

- Much of the recent teacher training literature has emphasized the effectiveness of "teaching at the right level" and/or student tracking.
  - Neither strategy was a part of this program.

Findings in context, cont.

- Our findings are in contrast to recent evidence from India (Björkman Nyqvist and Guariso 2022) suggesting that an intervention encompassing both teacher training and reading camps was highly effective.

- One interpretation is that the training component here had already failed.

- Another interpretation is that the level of parental or community literacy was simply too low, especially among mothers.

    - The literacy rate for adult women in Mozambique remains only around 50%.

Implications for Bangladesh

- Teacher training programs that are too light-touch may not, in general, be particularly effective; some minimal intensity is required to render training effective.

- However, community-based literacy programming could be a valuable supplement if adult literacy rates and parental engagement are sufficient to support this programming.

    - The success in India is promising for other South Asian contexts.

- Continued experimentation with multiple modalities of teacher training and educational enrichment interventions at varying levels of intensity will be a valuable contribution to this literature.

- This entails also careful attention to questions of cost-effectiveness.

Thank you!

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Appendix: Outcomes

The outcomes related to program exposure are:

1. An indicator variable equal to one for reported attendance at Unlock Literacy training (reported by teachers).
2. A continuous variable for the number of days of training reported (reported by teachers).
3. An indicator variable for whether ZIP leader visited school last month (reported by teachers).
4. An indicator variable for receipt of Unlock Literacy materials at the school (reported by teachers and deputy school directors).
5. An index of school management practices, constructed using: an indicator variable equal to one if the school director was present at the start of the day of the school visit (reported by enumerators); an indicator variable equal to one if the school director conducted an observation of teachers at least once over the past month (reported by teachers); an indicator variable equal to one if there was a supervisory visit from district or provincial staff at least once over the past month (reported by school director); an indicator variable equal to one if the school council met at least once over the past month (reported by school director); an indicator variable equal to one if parents contact the school to ask about schoolwork (reported by teachers). The index is constructed using the first component of a principal components analysis.
6. An indicator variable for the presence of a functioning reading camp in the community (reported by teachers and deputy school directors).
7. An indicator variable whether a camp meets more than once a week (reported by the reading camp leader).
8. An indicator whether reading camp receives books and learning material (reported by the reading camp leader).
9. A reading camp quality index comprised of the following variables as reported by the reading camp leader: types of activities, number of sessions, learning materials available, books available, teacher support, school council support, and community support (reported by the reading camp leader). The index is constructed using the first component of a principal components analysis.
10. A teacher support index, comprised of the following binary variables capturing reading camp support provided by the support teacher as reported by deputy school directors: recruited students, assisted reading camp leader with pedagogy, learning materials, or logistics, liaised with the school council, liaised with parents, other support (reported by the reading camp leader). The index is constructed using the first component of a principal components analysis.
11. An indicator variable for reported current attendance/participation in a reading camp (reported by students).
12. An indicator variable equal to one if the student attends a reading camp more than once a week (reported by students).
13. A parental support index comprising binary variables capturing whether parents read to the child, whether they incorporate learning into everyday activities, whether they assist with homework and whether they encourage attendance to the reading camp (reported by students). The index is constructed using the first component of a principal components analysis.

Appendix: Outcomes

The primary outcomes are:

1. The scores on the EGRA (Early Grade Reading Assessment) components: i) letter name identification and reading, ii) familiar words reading, iii) listening comprehension, iv) oral reading fluency, and iv) reading comprehension. Additionally, we report the proportion of students who scored zero in each component.
2. Teacher absenteeism, measured as the number of days reported absent (for reasons that are not sanctioned – for example, vacation and sick days are sanctioned) in the last five school days (reported by deputy school directors).
3. Teacher knowledge of the training curriculum, a score based on a survey-based test of training curriculum items administered to teachers (administered to teachers).
4. Teacher pedagogical practice: scored based on a tool for classroom observation (scored by enumerators).

The secondary outcomes are:

1. An indicator variable equal to one if a student from the baseline sample dropped out of school by the time of the endline survey (reported by the deputy school director).
2. Child absenteeism, measured as the number of children reported absent on the day of the survey, the day prior, and in the past five school days (as reported by students present in the classroom on the day of the school visit).