



Creative Learning and Teaching

External Interim Technical Report: Jalore Randomized Control Trial Schools

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1. BACKGROUND

To improve learning levels of children—especially girls—and to improve the quality of educational instruction, EG employs child-centric learning and teaching techniques in grade 3, 4 and 5. Field coordinators and Team Balikas (Village volunteers) are trained to do CLT “handholding” in the classrooms. CLT handholding comprises accelerated “catch up” and “peer group learning” methodologies, all part of the CLT “toolkit.” This methodology consists of a 12-week module for every school in the project area. EG conducts a pre-test before the handholding phase and a post-test at the end of the 12-week program.

To measure the impact of the CLT activities, Educate Girls, in collaboration with the University of Michigan, is conducting an impact evaluation in four blocks of Jalore district. This report presents interim results based upon data from the first two academic years of this ongoing evaluation project.

The sample consists of 98 villages containing 230 schools in four blocks: Ahore, Jalore, Jaswantpura and Sayla. Of these 98 villages, 49 were randomly selected as Treatment and 49 as Control villages. Eligible villages were determined from the India DISE data. Eligible villages had at least one primary school, were rural, and under the management of either: Dept of Education, Local Body, Recognized Madarsas, ShikshaKarmi Schools or Sanskrit schools.

Villages were randomly allocated to treatment and control by stratifying on based on block, having electricity, the number of schools, and distance to the block headquarters. This resulted in 117 “Treatment schools” and 113 “Control schools.”

In the Treatment schools, EG implemented its full CLT program, while there was no implementation in the Control schools.

2. DATA AND OUTCOMES

The data and analysis available for this report include:

- a) Baseline enrollment list for treatment and control schools grades 3, 4, 5 in 2011/2012
- b) CLT pre-test data in 2012/2013 academic year
- c) CLT post-test data in 2012/2013 academic year

Our main outcome measures are enrollment in 2012/13, attendance at time 1, attendance at time 2, and 2012/13 CLT pre and post test scores in Hindi, English, and Math. Enrollment in 2012/13 was recorded on the day of the CLT pre-test. Attendance at time 1 and time 2 is measured by presence at school on the day of the CLT pre or post-test, respectively.

3. METHODS

The randomization of villages into treatment and control allow for estimating the causal effect of the CLT program. Our main empirical specification to measure this is:

$$(1) Y_{ij} = \alpha + \beta Treatment_{ij} + \varepsilon_{ij}$$

for student i , living in village j . Here Y is an indicator for our main outcome measures – enrollment in 2012/13, attendance time 1 and 2 in 2012/13, and 2012/13 CLT pre and post test scores in Hindi, English, and Math. Because the treatment was randomized at the village level, we cluster our standard errors by village.

In addition to the main specification (1), we are also interested in how different types of students perform. We estimate:

$$(2) Y_{ij} = \alpha + \beta Treatment_{ij} + \gamma_1 Grade4_{ij} + \gamma_2 SC_{ij} + \gamma_3 ST_{ij} + \gamma_4 OBC_{ij} + \gamma_5 Girl_{ij} + \varepsilon_{ij}$$

SC is an indicator for scheduled caste, ST indicates scheduled tribe, OBC indicates other backward caste. Girl is an indicator that the student is female. In equation (2), we represent the association of each baseline variable with the outcome. Note that these are not causal associations.

To understand how different types of students are affected by the CLT treatment by estimating a fully interacted model:

$$(3) Y_{ij} = \alpha + \beta Treatment_{ij} + \gamma_1 Grade4_{ij} + \gamma_2 SC_{ij} + \gamma_3 ST_{ij} + \gamma_4 OBC_{ij} + \gamma_5 Girl_{ij} + \gamma_6 Grade4 * T_{ij} + \gamma_7 SC * T_{ij} + \gamma_8 ST * T_{ij} + \gamma_9 OBC * T_{ij} + \gamma_{10} boy * T_{ij} + \varepsilon_{ij}$$

In equation (3), we estimate the differential effects of the treatment separately for each indicator.

We condition each specification on having been enrolled in grades 3 or 4 at the baseline in 2011/12. Although we have baseline grade 5 data, we do not have CLT data for grade 6 in the following year. To link baseline enrollment data to the CLT pre and post-test data, we used a matching algorithm to match students by their school, name, grade, and father's name. This process yielded an exact match rate of 76.9 percent of the baseline students. An additional 2.2 percent yielded a “multi-match”. Rather than arbitrarily choosing which students to match in these cases, we leave all multi-matches in the data and weight inversely by the number of matches. All results are robust to excluding multi-matches. The match rate was significantly higher in the treatment schools, which we interpret below as indicating that retention was higher among students in those schools.

4. RESULTS

Baseline balance

Summary

- On most baseline indicators, treatment and control schools have no statistically significant differences; this helps to assure us that randomization was done effectively.

Treatment and control schools and students were balanced at baseline. There are no significant differences in treatment students across gender, caste, type of school (upper or lower secondary), or school characteristics such as having electricity, a computer, or drinking water. Table 1 indicates no significant coefficients on the Treatment variable, and, all coefficients are small in magnitude.

Table 1. Baseline Balance

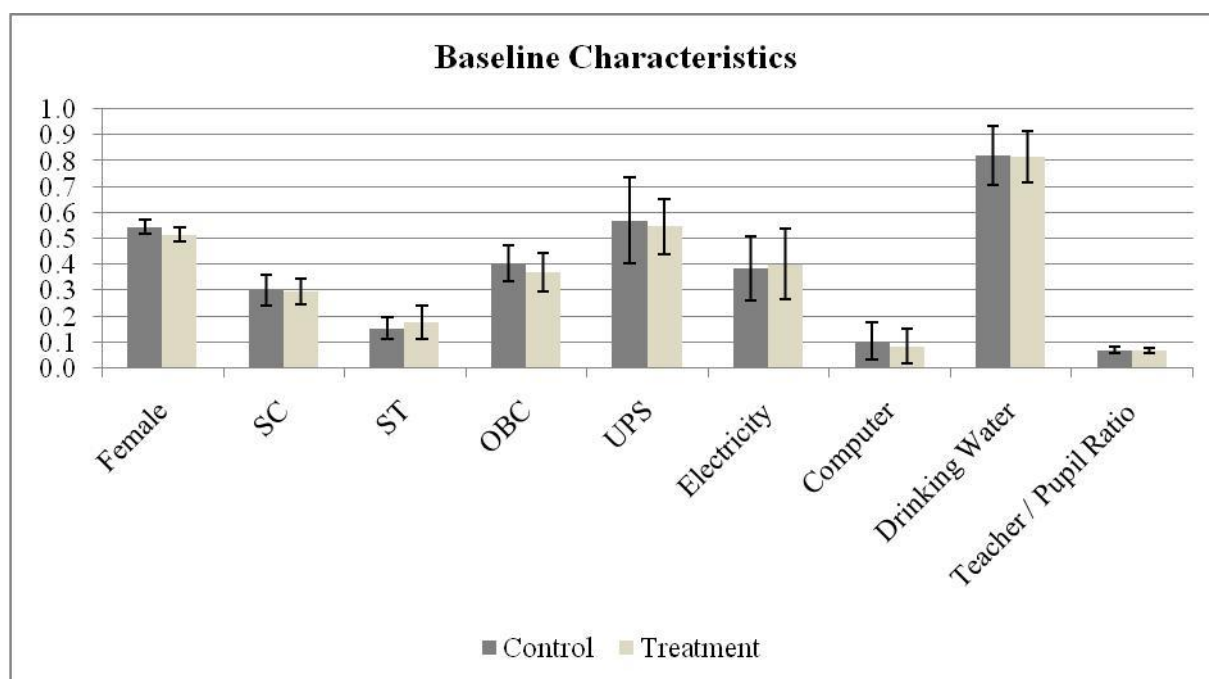
Dependent var:	Female (1)	SC (2)	ST (3)	OBC (4)	UPS (5)	Electricity (6)	Computer (7)	Drinking Water (8)	Teacher / Pupil Ratio (9)
T	-0.030 (0.019)	-0.006 (0.039)	0.022 (0.039)	-0.035 (0.051)	-0.023 (0.099)	0.016 (0.094)	-0.019 (0.050)	-0.004 (0.075)	-0.002 (0.008)
Constant	0.547** *	0.301** *	0.154** *	0.406** *	0.571** *	0.385***	0.105***	0.821** *	0.070** *
	(0.014)	(0.030)	(0.022)	(0.035)	(0.083)	(0.063)	(0.037)	(0.056)	(0.007)
Observations	7,546	7,546	7,546	7,546	5,379	7,520	7,520	7,520	7,546
R-squared	0.001	0.000	0.001	0.001	0.001	0.000	0.001	0.000	0.001
Mean of depvar in control	0.547	0.301	0.154	0.406	0.571	0.385	0.105	0.821	0.070

Notes: Robust standard errors in parentheses, clustered by village and weighted by percent matched.

*** p<0.01, ** p<0.05, * p<0.1 All results are conditional on enrollment in 2011/12

Similarly, Figure 1 graphs the averages of treatment and control characteristics, showing again the baseline balance.

Figure 1



Retention: Enrollment in 2012: Table 2

Summary

- **Educate Girls had a significant effect on retention after one year. Treatment students were 4.2 percentage points (5.5 percent) more likely to be retained.**
- While the program does not target boys, an additional benefit of the program, boys also saw 3.6 percentage point increase in retention rates. Scheduled Castes are also more likely to be retained.
- The increase in retention is driven entirely by OBC girls.

We first present the effects of the treatment on retention, measured as being enrolled in 2012, among those enrolled at baseline. Overall retention in the control is 77.0 percent.

Table 2. Retention in 2012/2013

Dependent var: Retention	All			Boys	Girls
	(1)	(2)	(3)	(4)	(5)
Treatment	0.042*	0.044*	-0.004	0.078	-0.040
	(0.024)	(0.024)	(0.046)	(0.056)	(0.045)
Grade 4		0.002	-0.010	-0.017	-0.007
		(0.014)	(0.021)	(0.027)	(0.025)
Scheduled Caste		0.049**	0.039	0.121***	-0.017
		(0.023)	(0.030)	(0.037)	(0.035)
Scheduled Tribe		0.004	0.006	0.084	-0.049
		(0.032)	(0.042)	(0.061)	(0.044)
Other Backward Caste		0.013	-0.013	0.058*	-0.057
		(0.021)	(0.033)	(0.034)	(0.042)
Girl		0.036***	0.025		
		(0.013)	(0.018)		
Treatment * Grade 4			0.025	0.033	0.022
			(0.028)	(0.037)	(0.032)
Treatment * Scheduled Caste			0.020	-0.078	0.087
			(0.048)	(0.059)	(0.053)
Treatment * Scheduled Tribe			-0.001	-0.071	0.030
			(0.065)	(0.079)	(0.083)
Treatment * Other Backward Caste			0.052	-0.064	0.133***
			(0.044)	(0.060)	(0.048)
Treatment * Girl			0.020		
			(0.026)		
Constant	0.770***	0.729***	0.753***	0.689***	0.820***
	(0.019)	(0.028)	(0.034)	(0.035)	(0.036)
Observations	7,546	7,546	7,546	3,518	4,028
R-squared	0.003	0.007	0.008	0.007	0.011
Mean of depvar in control	0.770	0.770	0.770	0.757	0.781

Notes: Robust standard errors in parentheses, clustered by village and weighted by percent matched.

*** p<0.01, ** p<0.05, * p<0.1

All results are conditional on enrollment in 2011/12

Enrollment in 2012/13 is measured at CLT Pre-tests, conducted from 25 Oct 2012 to 30 Jan 2013

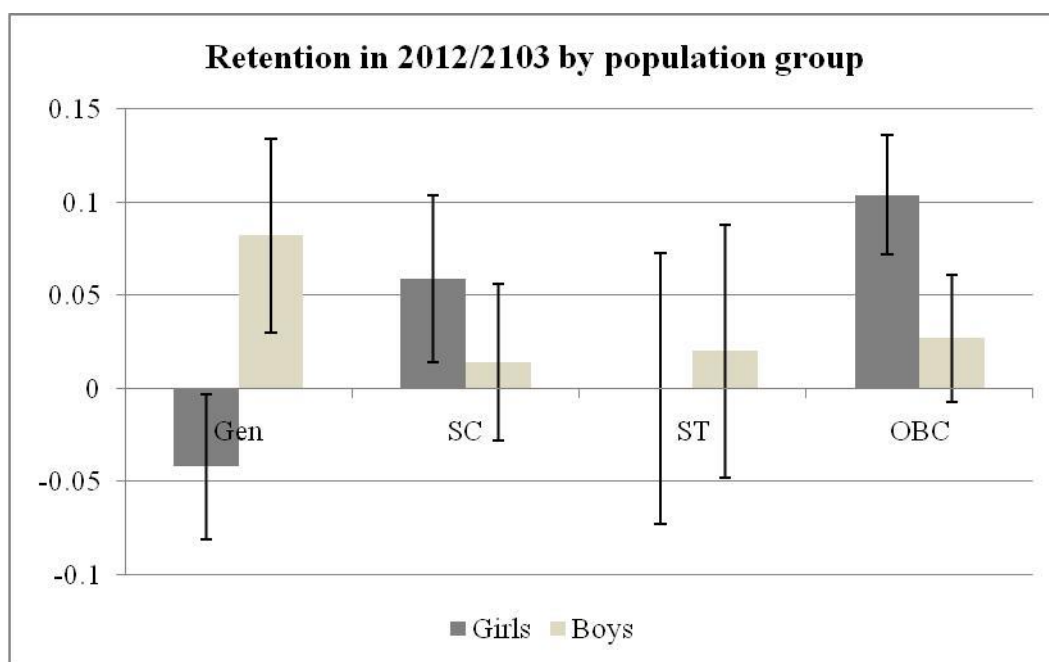
Column 1 of Table 2 indicates that students in treatment schools are 4.2 percentage points more likely to be enrolled one year later, a 5.5 percent increase in enrollment from the control. This gain is robust to including controls for caste, grade, and gender (Column 2). Note there are no differences in the likelihood of being enrolled between grades, scheduled tribe, or other backward caste.

On the other hand, scheduled caste students are 4.9 percentage points more likely to be enrolled and boys are 3.6 percentage points less likely to be enrolled. Note that in this case, it seems that boys, rather than girls are disadvantaged in terms of retention. The third column of Table 2 presents the estimates from equation (3) above and shows how the treatment interacts with student characteristics. The entire treatment effect on enrollment is driven by other backward castes, and this effect is driven entirely by OBC girls (Columns 4 and 5).

Analysis by population group provides a more subtle view of the effects of the program. This can be seen as well below in Figure 2, which graphs the treatment effect by population group for boys and girls. For girls, who are the target group, the largest gains are for schedule castes and other backward castes in terms of retention. The program does not directly target boys except in classroom CLT hand-holding, even than the program has largest effects on retention for boys those are from general category.

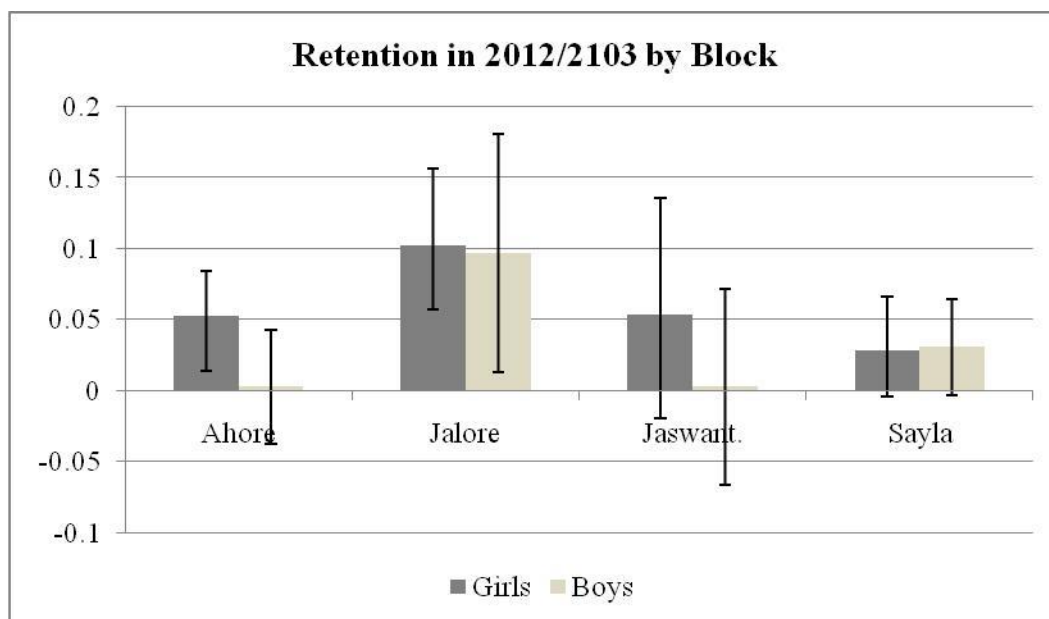
Further, this effect, on OBC girls for example, is very large at 10.4 percentage points. Overall, the program has benefited girls in a effective way in terms of retention.

Figure 2



As discussed above, Educate Girls’ program in the RCT villages led to a marginally-significant 4.2 percentage point increase in retention among all students in the first year. While no individual block saw a significant increase in the first year, the increase is much larger in Jalore, where there was a 9.9 percentage point increase in attendance. The other three blocks experienced an increase of approximately 3 percentage points each. There were few differences among each block across boys and girls.

Figure 3

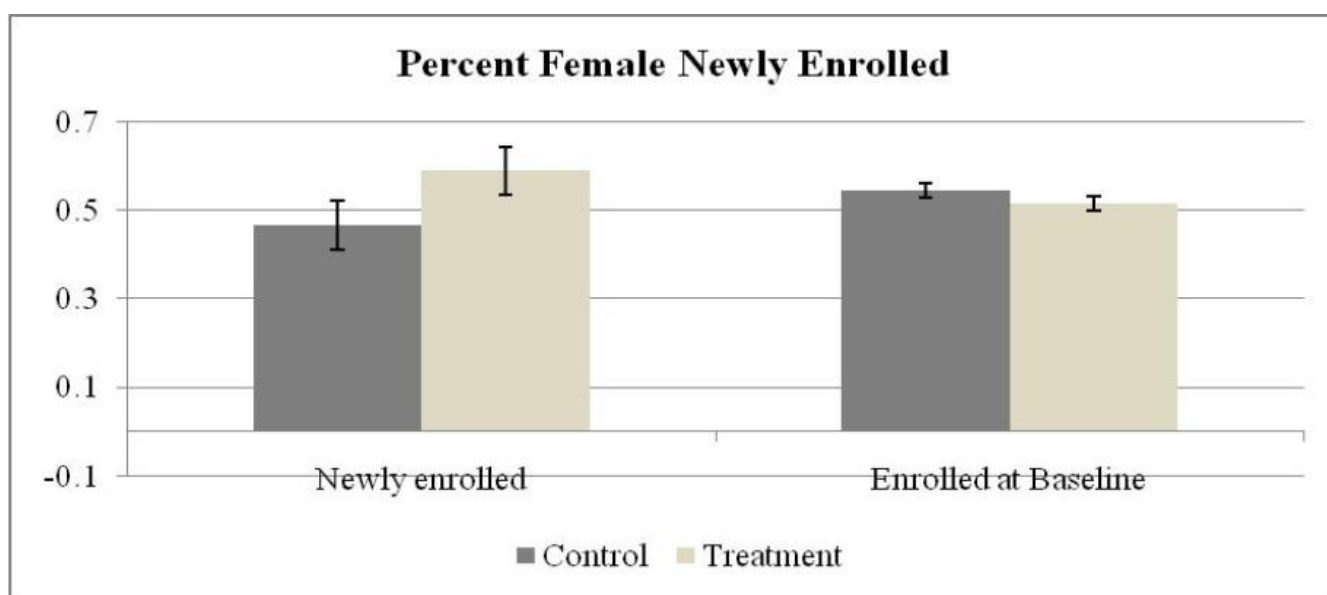


New Enrollment in 2012
Summary

- Educate Girls enrolled a higher percentage of girls as they are the main target of the program.

It is worthwhile noting that one of Educate Girls’ main goals is to increase enrollment of girls particularly in the first year of the program. We can examine new enrollment in 2012/2013 in the Figure below. **While there are no significant differences in overall enrollment rates, the proportion of new girls enrolled was significantly higher in treatment schools. Thus, EG program in terms of girl’s enrollment is effective.**

Figure 4



Attendance: Present for CLT pre and post-test in 2012: Table 3

Summary

- **After one year of implementation of the Educate Girls program in the treatment in 2011/12, there was no significant impact of the program on attendance. In this analysis, impact measurement on attendance is based on data taken on only two days, at the time of pre and post tests. For, any conclusion about the program impact on attendance more data related to attendance will be required. Educate Girls is effective at enrolling the girls, but need to work in increasing overall attendance.**
- Scheduled tribes are significantly less likely to be present, while boys are more likely.

We next present the effect of the CLT program on attendance during two visits in 2012/2013 academic year. Overall attendance at visit one among the control is 54.3 percent. Across each specification, there are no significant effects, nor any estimates of moderate magnitude, of the program on attendance. Attendance at visit two shows similar results.

Figure 5

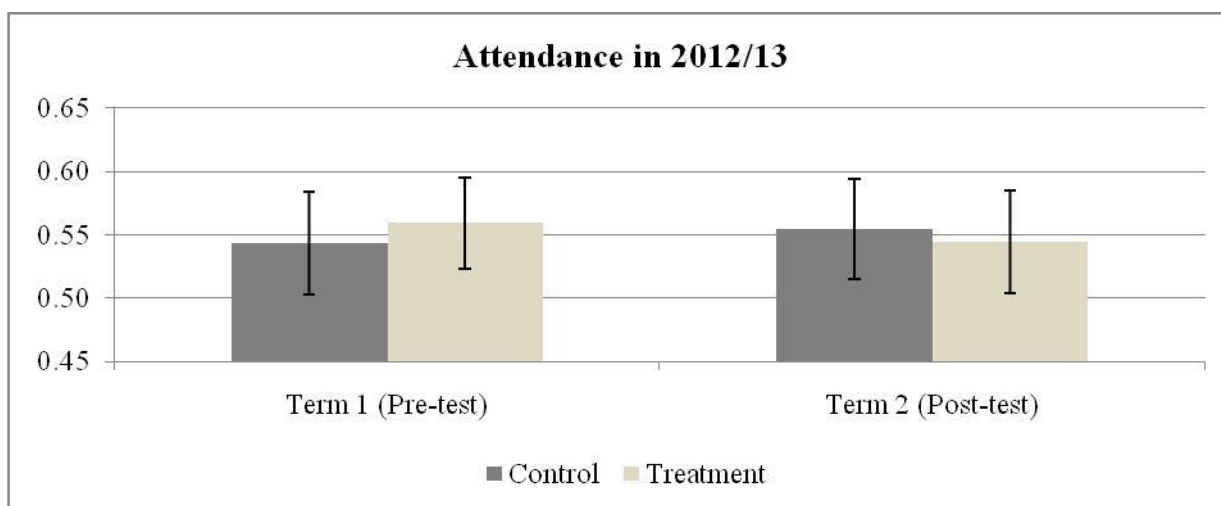


Table 3 shows the regression equations for attendance. Although scheduled tribes are 18 to 20 percentage points less likely to attend and boys are 3 to 4 percentage points more likely to be in attendance, there are no differential treatment effects among any student characteristic.

Table 3. Attendance at CLT Pre and Post-test 2012/13

Dependent var:	CLT Pre-Test Attendance			CLT Post-Test Attendance			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Treatment	0.016 (0.027)	0.018 (0.025)	0.020 (0.055)	-0.010 (0.029)	-0.011 (0.028)	-0.009 (0.028)	0.022 (0.046)
Grade 4		0.009 (0.014)	0.009 (0.021)			0.008 (0.013)	0.012 (0.019)
Scheduled Caste		-0.036 (0.028)	-0.035 (0.034)			-0.018 (0.026)	0.007 (0.035)
Scheduled Tribe		0.205*** (0.035)	0.179*** (0.048)			0.178*** (0.033)	-0.103** (0.041)
Other Backward Caste		-0.029 (0.027)	-0.039 (0.035)			-0.048* (0.027)	-0.050 (0.035)
Girl		-0.037** (0.015)	-0.036* (0.021)			-0.030** (0.013)	-0.041** (0.018)
Treatment * Grade 4			-0.001 (0.028)				-0.009 (0.026)
Treatment * Scheduled Caste			-0.002 (0.057)				-0.052 (0.050)
Treatment * Scheduled Tribe			-0.049 (0.070)				-0.144** (0.061)
Treatment * Other Backward Caste			0.022 (0.054)				0.005 (0.050)
Treatment * Girl			-0.003 (0.031)				0.019 (0.026)
Attended CLT Pre-test					0.572*** (0.023)		
Treatment * Attended Pre-test					-0.015 (0.032)		
Constant	0.543*** (0.021)	0.614*** (0.032)	0.613*** (0.035)	0.554*** (0.020)	0.243*** (0.021)	0.620*** (0.030)	0.605*** (0.033)
Observations	7,546	7,546	7,546	7,546	7,546	7,546	7,546
R-squared	0.000	0.019	0.020	0.000	0.319	0.014	0.017
Mean of depvar in control	0.543	0.543	0.543	0.554	0.554	0.554	0.554

Notes: Robust standard errors in parentheses, clustered by village and weighted by percent matched. *** p<0.01, ** p<0.05, * p<0.1

Pre-tests were conducted from 25 Oct 2012 to 30 Jan 2013 Post-tests were conducted from 5 March to 26 March 2013 All results are conditional on enrollment in 2011/12

There was no overall treatment effect, or differential effect among sub-groups (with the exception of scheduled tribe). Attendance was not significantly increased for any group. There are no significant changes in attendance at either pre- or post-test in any geographic block.

CLT Learning outcomes: Tables 4, 5, and 6

Summary

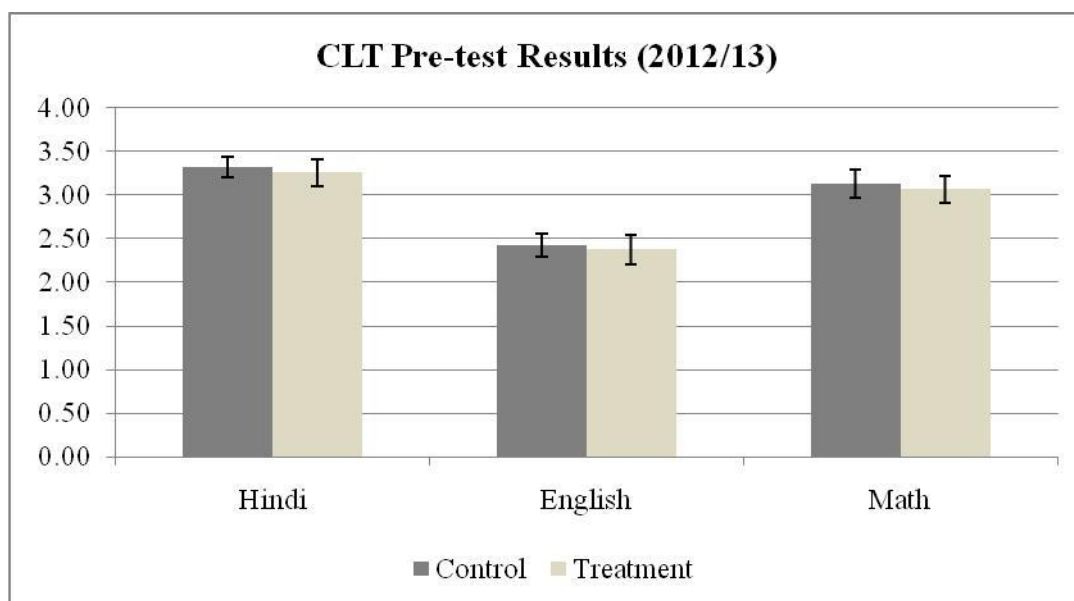
- **At the start of the project in 2011/12 and implementation of the Educate Girls program in the treatment in the same year, there was no significant impact of the program on learning. This could be due to lack of initial effect, or lack of persistent effects. Future data collected from registers will help to clarify this.**
- **There were large gains in learning in year two of the evaluation in 2012/13. Most of the gains accrued to students who were in the upper end of the distribution.**

Turning next to test results, we quantify results on a scale ranging from 1-5, with five being the highest possible score. Test results are presented separately by subject, Hindi, English, or Math.

Recall that the CLT program began in 2011/12 and that the CLT pre-tests were administered one year later, after the 2011-12 CLT program, but before the 2012-13 CLT program. Thus, the treatment students in our sample were exposed to one year of the program.

The results find no significant effects of the program on 2012/13 CLT pre-test results as shown by Figure 6 which compares average results in the treatment to the control.

Figure 6



Turning to the regression results in Table 4, in each subject, the point estimates on the treatment indicator are negative, and not statistically significant. Including controls indicates that schedule tribes and other backward castes are not performing well on each subject exam, and boys are performing significantly better than girls. Further, it appears that girls fare significantly lower at learning level as measured by the “treatment” effect on the pre-test scores, especially in Hindi and Math.

Table 4: CLT Pre-test Results

Dependent var:	Hindi			English			Math		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treatment	-0.061 (0.096)	-0.067 (0.093)	0.094 (0.134)	-0.044 (0.106)	-0.047 (0.105)	-0.078 (0.117)	-0.064 (0.110)	-0.069 (0.107)	0.041 (0.149)
Grade 4		0.322*** (0.040)	0.362*** (0.054)		0.189*** (0.034)	0.253*** (0.053)		0.272*** (0.040)	0.309*** (0.051)
Scheduled Caste		-0.066 (0.071)	-0.019 (0.110)		-0.009 (0.065)	-0.053 (0.095)		-0.073 (0.068)	-0.038 (0.103)
Scheduled Tribe		0.345*** (0.083)	-0.308** (0.117)		-0.176** (0.076)	-0.156 (0.121)		0.284*** (0.071)	-0.255** (0.106)
OBC		-0.110* (0.062)	-0.111 (0.078)		-0.041 (0.059)	-0.146* (0.075)		-0.117* (0.070)	-0.135 (0.094)
Girl		0.170*** (0.044)	-0.082 (0.061)		-0.082* (0.042)	-0.066 (0.056)		0.134*** (0.040)	-0.071 (0.047)
Treatment * Grade 4			-0.080 (0.078)			-0.127* (0.066)			-0.073 (0.078)
Treatment * SC			-0.086 (0.141)			0.092 (0.131)			-0.064 (0.135)
Treatment * ST			-0.080 (0.163)			-0.036 (0.149)			-0.061 (0.142)
Treatment * OBC			0.011 (0.123)			0.215* (0.111)			0.044 (0.139)
Treatment * Girl			-0.176** (0.085)			-0.041 (0.082)			-0.129* (0.077)
Constant	3.320*** (0.059)	3.369*** (0.085)	3.285*** (0.098)	2.420*** (0.067)	2.417*** (0.082)	2.434*** (0.096)	3.133*** (0.079)	3.184*** (0.097)	3.126*** (0.103)
Observations	4,155	4,155	4,155	4,155	4,155	4,155	4,155	4,155	4,155
R-squared	0.001	0.038	0.041	0.001	0.017	0.022	0.001	0.030	0.032
Mean of depvar in control	3.320	3.320	3.320	2.420	2.420	2.420	3.133	3.133	3.133

Notes: Robust standard errors in parentheses, clustered by village and weighted by percent matched.

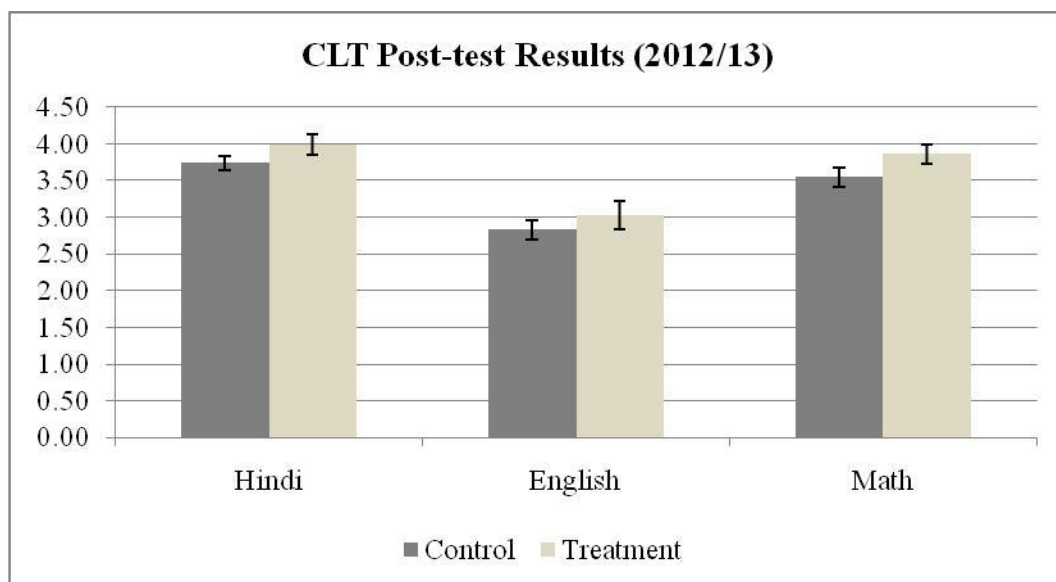
*** p<0.01, ** p<0.05, * p<0.1

All results are conditional on enrollment in 2011/12

Test on a five point Scale

CLT Post test result on the other hand, find significant gains from the CLT program in academic year two. This is due to effective implementation of the program in academic year two.

Figure 7



Regression equation and CLT Post test results are presented in Table 5. The table shows that there is an effective treatment effect of 0.25 in Hindi, 0.20 in English, and 0.32 in Math learning level. These gains are robust to including controls as well. It is interesting to note that boys are performing significantly better than girls. Further, the treatment effect may be smaller for girls in comparison of boys, although these differences are of, at best, marginal significance. CLT program during second year of the program is very effective for both boys and girls. Overall, this is evidence that the program helps to increase the performance of students in an effective manner in Hindi, English and Math scores.

Table 5: CLT Post-test Results

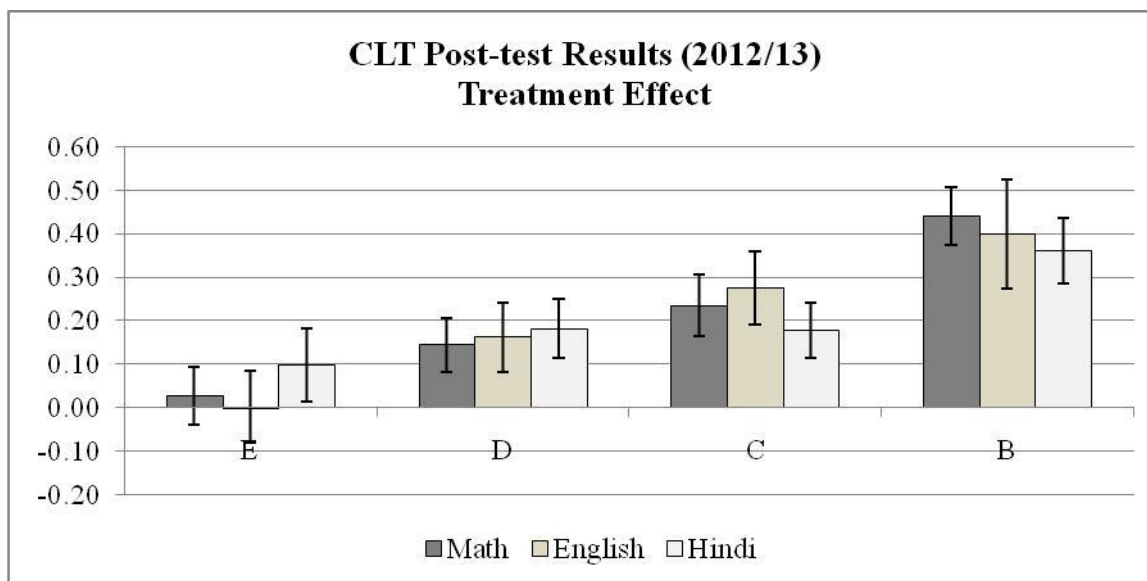
Dependent var: subject	Hindi			English			Math		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Treatment	0.250*** (0.088)	0.240*** (0.088)	0.346** (0.136)	0.199* (0.118)	0.192 (0.117)	0.228* (0.122)	0.320*** (0.093)	0.312*** (0.093)	0.390*** (0.134)
Grade 4		0.217*** (0.039)	0.265*** (0.044)		0.144*** (0.040)	0.138** (0.063)		0.215*** (0.036)	0.258*** (0.049)
Scheduled Caste		-0.147** (0.061)	-0.083 (0.080)		-0.100 (0.068)	-0.049 (0.089)		-0.135** (0.058)	-0.111 (0.095)
Scheduled Tribe		-0.354*** (0.085)	-0.370*** (0.109)		-0.216*** (0.082)	-0.140 (0.093)		-0.291*** (0.067)	0.273*** (0.094)
OBC		-0.093 (0.067)	-0.137* (0.081)		-0.072 (0.063)	-0.149* (0.075)		-0.139** (0.059)	-0.191** (0.087)
Girl		-0.166*** (0.042)	-0.108** (0.052)		-0.119*** (0.040)	-0.077* (0.043)		-0.151*** (0.033)	-0.096** (0.041)
Treatment * Grade 4			-0.096 (0.076)			0.017 (0.080)			-0.088 (0.073)
Treatment * SC			-0.125 (0.117)			-0.105 (0.133)			-0.046 (0.116)
Treatment * ST			0.036 (0.170)			-0.171 (0.161)			-0.040 (0.134)
Treatment * OBC			0.099 (0.132)			0.162 (0.124)			0.113 (0.117)
Treatment * Girl			-0.124 (0.082)			-0.100 (0.076)			-0.119* (0.065)
Constant	3.744*** (0.049)	3.863*** (0.082)	3.810*** (0.090)	2.833*** (0.068)	2.919*** (0.083)	2.903*** (0.085)	3.546*** (0.065)	3.664*** (0.090)	3.625*** (0.111)
Observations	4,147	4,147	4,147	4,147	4,147	4,147	4,147	4,147	4,147
R-squared	0.017	0.046	0.049	0.013	0.028	0.034	0.030	0.056	0.059
Mean of depvar in control	3.744	3.744	3.744	2.833	2.833	2.833	3.546	3.546	3.546

Notes: Robust standard errors in parentheses, clustered by village and weighted by percent matched. Test scores are on a 1-5 scale. Pre-tests were conducted between 25 Oct 2012 and 30 Jan 2013. All results are conditional on enrollment 2011/12. *** p<0.01, ** p<0.05, * p<0.1

While average effects are important for quantifying the causal effect of the CLT program, it is interesting to see differences in gains by baseline ability. Restricting the sample to those who were enrolled in 2011 and who took both the CLT pre-test and CLT post-test, we graph the average treatment effect on the difference in the likelihood of increasing a grade from the pre to the post-test.

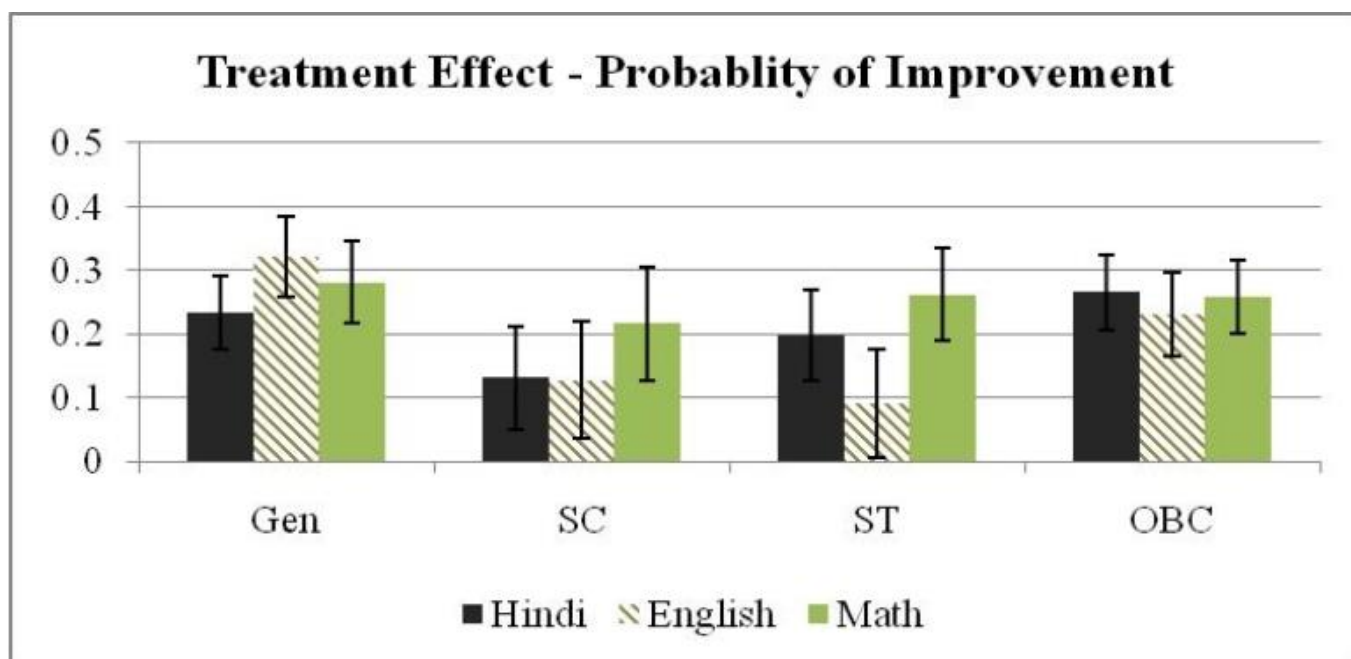
Figure 8 shows the treatment effect by baseline grade. When we examine how the treatment affects the probability of moving up a grade, we see that the majority of the effects are among the highest ability students at the pre-test. For example, in Hindi, 35 percent of those scoring a 'B' at the pretest move up in a grade. Only, 10 percent of those who score an 'E' at the pre-test move up a grade. Our main result is that most of those who are seeing the effects of the CLT treatment are those who are already high performing. Those who gain in lower pre-test scores are able to make larger improvements than students with higher pre-test scores. This is merely a function of the censored scores.

Figure 8



Overall, across all subjects and all population groups, there are gains in the probability of moving up a grade because of the treatment as seen by Figure 9.

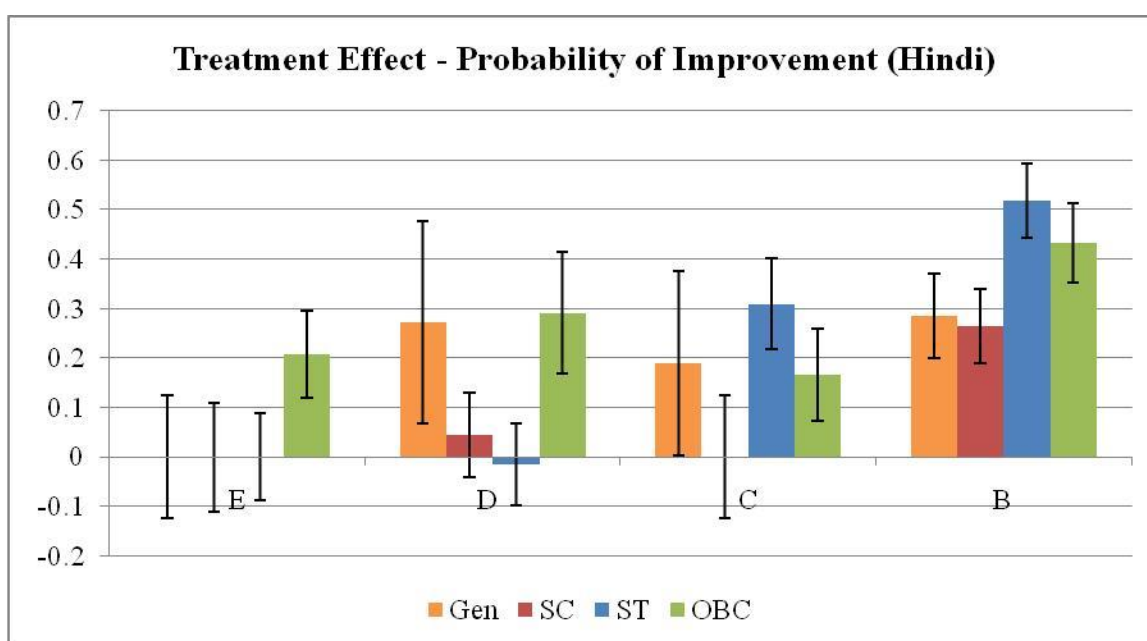
Figure 9



Across population groups, the effects of the program were more concentrated among those with higher test scores. This trend is particularly notable among Scheduled Tribes, in which there is no effect on those who scored E or D on the CLT pre-test but much quite large effects on the probability of grade improvement among those who received C or B.

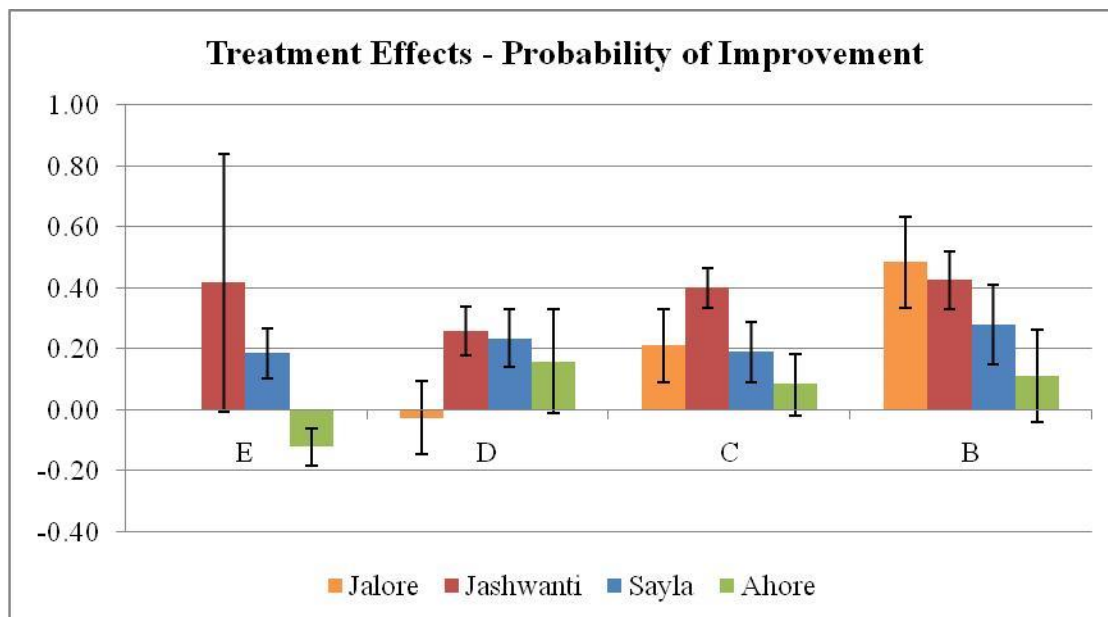
Results are somewhat different for English and Math. In English, the program led to significant increases in grade improvement among General and Other Backward Castes but not among Scheduled Castes or Scheduled Tribes. In Math, all population groups experienced positive and significant improvements in the probability that their score increased between pre- and post-test (Results for English and Math not shown).

Figure 10



Further, there appear to be large differences by block in the effectiveness of the program on increasing test scores. Jalore and Jaswantpura blocks both saw very large and highly significant effects of 43.7 and 36.5 percentage points, respectively, on the probability of Hindi test score increasing. Ahore and Sayla experienced much smaller and insignificant changes of 11.6 and 13.7 percentage points. Results for English and Math are qualitatively similar, with large and highly significant increases in Jalore and Jaswantpura but much smaller increases for Ahore and Sayla.

Figure 11



Looking at the distribution of these effects across pre-test grades suggests that the effects are highly concentrated among those with higher pre-test scores in Jalore, as shown by the graph above. The effects of the program are roughly the same across all pre-test scores in Jaswantpura and Sayla, while the program has very little effect in Ahore block.

7. Recommendations for Evaluation

- (1) There is a need to administer a new additional test for achievement that is not censored at 'A'
- (2) Individual data must continue to be collected, including school register data
- (3) The CLT program was more effective from second year of implementation.

In future, increase focus of the program on vulnerable sections of the children to get powerful impact of the program.