POLICY BRIEF
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South Asia Gender Innovation Lab

EFFECTS OF A MULTIFACETED EDUCATION PROGRAM ON ENROLLMENT, LEARNING, AND GENDER EQUITY: EVIDENCE FROM RAJASTHAN, INDIA*

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SUMMARY

The Sustainable Development Goals set a triple educational objective: improve access to, quality of, and gender equity in education. This note documents the effectiveness of a multifaceted educational program pursuing these three objectives simultaneously. Using an experiment in 229 schools in rural Rajasthan, India, this study measures the effects of the program on students' school participation and academic performance over two years, as well as its heterogeneous impacts by gender and initial learning ability. The findings show that the program increased student enrollment and retention, with the largest effects observed among girls. There is no evidence that the program differentially attracted lower-ability students. There were large learning gains in both years, where the learning outcomes of boys and girls improved equally. These findings suggest that multifaceted interventions can overcome the tradeoffs that often arise when pursuing multiple objectives in educational interventions.

BACKGROUND

The United Nations' Sustainable Development Goal 4 proposes that by 2030 "all girls and boys [should] complete free, equitable, and quality primary and secondary education" (United Nations 2015). This ambitious goal sets three objectives for educational policies: improving free access to, equity in, and quality of learning. It is unlikely a single intervention will make simultaneous progress on all three objectives. For instance, policies that succeed in increasing access to school may not foster quality education. Similarly, interventions that effectively improve educational outcomes for girls may not be equally effective for boys. The interdependence of these objectives calls for multifaceted educational programs.

Though many field programs implement multifaceted interventions, few studies focus on their combined effects. If reducing gender gaps in education starts with enrolling out-of-school girls and preventing dropouts, it becomes even more effective when the newly enrolled students receive quality education and are supported by the school management. However, enrolling marginalized students may challenge the delivery of quality education, for example, by increasing class sizes or changing class compositions. It is important to identify whether multifaceted interventions can overcome such tradeoffs and produce the desired educational outcomes.

This note reports the impacts of an educational program that intertwined interventions targeting the school enrollment and retention of marginalized girls and teaching quality in the state of Rajasthan, India. School-age children in Rajasthan, especially girls, face massive educational barriers. In 2012, 4.6 percent of girls 7–10 years old were not in school in rural Rajasthan, compared with 2.2 percent of boys (Pratham Organization 2012). This gender gap widens as students get older and drop out of school due to strict social norms

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and early marriage, among other reasons. Identifying the tradeoffs associated with bundled educational interventions can help improve the effectiveness of such programs and contribute to narrowing the gender gap in educational prospects of boys and girls.

INTERVENTION AND RESEARCH DESIGN

The intervention evaluated in this study was developed and implemented by an Indian nongovernmental organization (NGO) working with government schools in the state of Rajasthan. The program consists of components that separately target enrollment, retention, and learning. To enhance school participation, the NGO focused on enrolling marginalized girls, who are most affected by strict social norms. The NGO identified out-of-school girls using data from the state government child tracking system, school records, and support from community members. They then led door-to-door enrollment drives, village meetings, and parent sensitization activities to support enrollment and motivate girls to come to school.

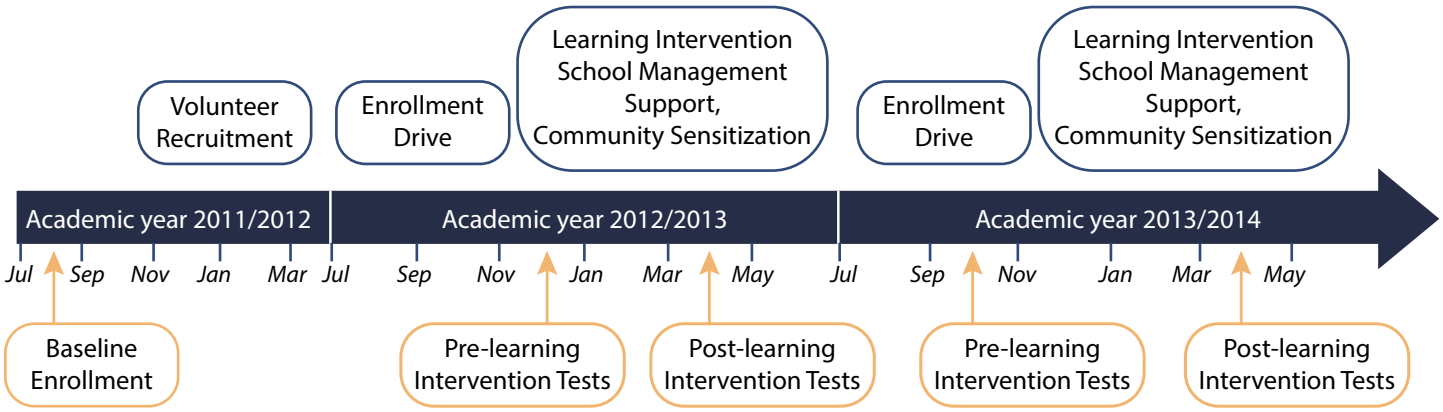
To improve learning in lower primary schools, the NGO implemented a 12-week module focused on interactive teaching methods. These included activity-based, playful learning through games, informed by Creative Learning Techniques, to teach English, Hindi, and math. The latter was complemented by the "Catch Up" methodology for children who are behind their grade level, as well as group work and student involvement. Peer group learning was implemented by gathering students according to their ability, based on Annual Status of Education Report (ASER) assessment tools. In schools with poorer performance, the NGO volunteers provided 2-hour-long in-school lessons for grades three to five, held several days a week for 4–5 months.

To measure the effects of the program, this study used a cluster-randomized experiment in 229 primary schools and individual-level panel data on enrollment, retention, attendance, and academic performance (test scores in English, Hindi, and math). The schools were spread across 98 villages, with on average 2.3 government primary schools per village in the program. Villages were randomly assigned to either the control group or the treatment group.

The study collected data on aggregate school-grade-level enrollment from school rosters collected in 2011, 2012, and 2013, as well as data on gender, age, and caste. Also, it used ASER exam results, administered in 2012 and 2013, just before and just after, the learning component of the program was implemented in treatment schools. ASER exams were conducted in Hindi, English, and math. For Hindi and English, students were tested on letters, words, a short paragraph, and a longer story, while the math test assessed knowledge of single- and double-digit number recognition, two-digit subtraction with borrowing, and three-digit by one-digit division. Enumerators assessed the highest level a student could comfortably perform, and tests were scored categorically from A (highest score) to E (lowest). Figure 1 presents a timeline of program and research activities over the course of the study.

The study first evaluated the effect of the program on aggregate school-grade-level enrollment. Then, it analyzed individual-level panel data on retention and test scores in Hindi, English, and math. The data are used to examine whether the program met its objectives: improving enrollment, especially of girls; increasing learning across all abilities; and reducing gender disparities in learning.

Figure 1. Program Timeline and Research Activities



Source: Authors.

FINDINGS

INCREASE IN ENROLLMENT AMONG GIRLS

The program improved girls' enrollment in the two years of implementation (Table 1). The effects are large, representing increases of 7.3 percent and 12.8 percent of girls' enrollment in the first and second year of the program, respectively. That the program's enrollment effects are concentrated among girls is not simply due to girls being underrepresented in schools before the treatment—in fact, there were substantially more girls than boys enrolled even then, where girls accounted for 53.6 percent of all students enrolled in grades 3 and 4 at baseline in 2011.

In contrast, the study finds no evidence of effects on boys' enrollment in the first year of program implementation. In the second year, the effect on enrollment for boys is about half that of girls in magnitude, is not statistically significant on its own, but is also not statistically different from girls. The lack of impact on boys' enrollment can be explained by the door-to-door enrollment campaigns specifically focusing on drop-out or never-enrolled girls. Finally, there is no evidence that the program affected the type of student (high- versus low-ability) who enrolled in treatment schools, suggesting that the enrollment drive attracted students with all levels of academic ability.

Table 1: Treatment effects on enrollment

Panel A: 2012

Population Group:	All Students (1)	Boys (2)	Girls (3)
Treatment	0.666 (0.531)	0.054 (0.293)	0.613* (0.329)
Observations	687	687	687
R-squared	0.732	0.680	0.672
Mean of dep var in control	15.643	7.164	8.479

Panel B: 2013

Population Group:	All Students (1)	Boys (2)	Girls (3)
Treatment	1.558** (0.692)	0.588 (0.375)	0.970** (0.418)
Observations	687	687	687
R-squared	0.634	0.572	0.572
Mean of dep var in control	14.185	6.580	7.604

Source: Authors' calculations using administrative data.
Note: Robust standard errors in parentheses, clustered by village. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is number of students enrolled at the school-grade-level. Sample includes students in grades 3-5 in 229 schools (3 observations per school). Each column is an ordinary least squares regression and includes controls for number of girls and number of boys enrolled at baseline (in grades 3-5, in 2011); average age of students enrolled at baseline (in grades 3-5, in 2011); grade fixed effects (indicators for grade 3, 4, or 5); and treatment-assignment strata fixed effects.

IMPROVED LEARNING AMONG BOYS AND GIRLS

The program resulted in substantial learning gains across all subjects for both boys and girls (Table 2). In the first year of the program, students in treatment schools scored 0.329 standard deviations (SDs) higher on exams conducted after the learning intervention was implemented, across all subjects (0.333 in Hindi, 0.285 in English, and 0.376 in math). Students in treatment schools were also 22.8 percentage points more likely to improve their performance on post-learning intervention tests when compared to pre-learning intervention tests. Effects of the program on post-learning intervention tests in the second year of program implementation are similar, although smaller in magnitude, at 0.206 SDs (0.181 in Hindi, 0.230 in English, and 0.201 in math). The difference between the effects on post-learning tests in the first and second year is not statistically significant (p=0.170).

There were no differences in the effect of the program on test scores by gender. While the magnitudes of the treatment effects were larger among boys, these differences were not statistically significant. There were, however, some differences in the effect of the program across academic ability, as measured by performance on pre-learning intervention exams. In the first year of the program, the effects were larger in magnitude among students who performed better on pre-learning intervention tests (although the difference is not statistically significant). In the second year of implementation, the effects of the program were largest in the lower half of the ability distribution. Taken together, these findings suggest that it took the learning intervention some time before promoting catch-up by students with lower abilities.

DISCUSSION AND IMPLICATIONS

The findings discussed in this note indicate that the multifaceted education intervention in rural Rajasthan increased school enrollment and retention, especially among girls, in both years of the program. There was no evidence that the program differentially attracted lower-ability students. The intervention divided the students by their ability, in part to address their individual needs, and the impacts on learning outcomes were positive across all subjects and among both boys and girls.

The program's positive impacts on enrollment and learning suggest that multifaceted interventions can overcome the tradeoffs that often arise when pursuing multiple objectives in educational programs. While it has been argued that the increase in pupil-teacher ratios can hamper a teacher's ability to improve the learning of all students in the aftermath of a successful enrollment or retention drive (Duraisamy et al. 1998), there is a surprising scarcity of rigorous empirical

Table 2: Treatment Effects on Learning by Subject

Panel A: 2012 post-test score	Normalized Test Scores		
Population Group:	All Students (1)	Boys (2)	Girls (3)
Treatment x Hindi	0.333*** (0.088)	0.354*** (0.091)	0.303*** (0.091)
Treatment x English	0.285*** (0.101)	(0.091) 0.298***	0.263** (0.103)
Treatment x math	0.376*** (0.093)	0.409*** (0.098)	0.334*** (0.094)
Observations	17,331	8,451	8,880
R-squared	0.276	0.281	0.284
Mean of dep var in control	0.000	0.040	-0.039
P-value: T x Hindi = T x English	0.545	0.465	0.647
P-value: T x Hindi = T x math	0.407	0.337	0.599
P-value: T x English = T x math	0.259	0.196	0.397

Table 2: Treatment Effects on Learning by Subject

Panel B: 2013 post-test score	Normalized Test Scores		
Population Group:	All Students (1)	Boys (2)	Girls (3)
Treatment x Hindi	0.182* (0.093)	0.185* (0.098)	0.176* (0.092)
Treatment x English	0.231** (0.114)	0.230** (0.110)	0.232* (0.122)
Treatment x math	0.201** (0.096)	0.213** (0.098)	0.190* (0.099)
Observations	15,864	8,139	7,725
R-squared	0.308	0.310	0.318
Mean of dep var in control	0.000	0.005	-0.005
P-value: T x Hindi = T x English	0.482	0.530	0.452
P-value: T x Hindi = T x math	0.625	0.551	0.744
P-value: T x English = T x math	0.681	0.809	0.587

Source: Authors' calculations using administrative and ASER test data.
Note: Robust standard errors in parentheses, clustered by village. *** p<0.01, ** p<0.05, * p<0.1. Dependent variable is normalized test score at the individual-subject-level (3 observations per student). All samples are restricted to test-takers, defined as students who were present for pre-learning and post-learning tests in the year the test was administered (2012 in Panel A, 2013 in Panel B). Outcomes are normalized test scores on the post-learning intervention test at the student-subject-level. Specifications (2), (4), and (6) include control variables. Each column is an OLS regression and includes controls for number of girls and number of boys enrolled at baseline (in grades 3–5, in 2011); average age of students enrolled at baseline (in grades 3–5, in 2011); grade fixed effects (indicators for grade 3, 4, or 5), subject fixed effects (indicators for Hindi, English, or math); interactions of subject fixed effects with each control; and treatment-assignment strata fixed effects.

evidence of these types of tradeoffs. Challenging the tradeoff assumption, a few studies—including Banerjee et al. (2007) and Muralidharan, Singh, and Ganimian (2019)—have shown an absence of correlation between class size and test scores.

This study's main finding, which suggests that access and learning can be promoted simultaneously without a major tradeoff, can be partly explained by the innovative curriculum that complemented the enrollment and retention drive. In particular, the learning curriculum that was a core element of the program may have been especially effective at targeting the pedagogical needs of students and at counterbalancing the possible harmful effects of enrollment on class size. Future interventions can pursue the dual objective of improving both access and learning in primary education by combining enrollment-targeted interventions with interventions that tailor curricula to the individual needs of students by teaching at the right level.

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