



Middle Schools Study: Enrollment and learning

About the study ¹

The **Middle Schools Study** is a three-year longitudinal study (2012-2015) that tracked the post-primary educational trajectories of close to 6,000 children in Std VI-VIII in the age group 11-16 years. Conducted in Nalanda district in Bihar and Satara district in Maharashtra, the study generates new evidence regarding home- and school-based factors that enable or constrain access to quality post primary education in India.

Study design

60 villages in Nalanda and 71 villages in Satara were sampled from the Census 2001 village directory using Probability Proportional to Size (PPS).² In each village, house listing was done to create a sampling frame. Ten girls and ten boys enrolled in Std VI, in Std VII and in Std VIII were sampled. Additionally, ten girls and ten boys who were not enrolled in school were sampled in each village. These children were then tracked over the following year, including a baseline and endline learning assessment.

This Enrollment and Learning summary reports key findings for the 5,754 sampled children who were enrolled in school (Std VI, VII or VIII) at the time of the baseline field visit in 2013.



¹ For more information about this study, see: <http://www.asercentre.org/p/119.html>

² Villages in Satara had far fewer children on average than those in Nalanda. In order to generate a sufficiently large sample of children in each target group, additional villages were sampled in Satara.

Did sampled middle school children make the expected progress in school from one year to the next?

In terms of enrollment, yes they did. Overall, 96% of sampled children transitioned to the expected grade in the new academic year (i.e. from Std VI to Std VII, from Std VII to Std VIII or from Std VIII to Std IX). This is not surprising given the no-detention provisions of the RTE Act (2009), which applies to Std I through VIII (Table 1).

- However, transition patterns were different in these two states. In Satara, almost all children (more than 95%) made the ‘expected’ transition – that is, they moved one grade higher in the next academic year. In Nalanda 88% children made the ‘expected’ transition, while other children moved to higher or lower grades or dropped out of school.
- Overall, only a small proportion of children in middle school dropped out in the intervening year between baseline and endline. This is not surprising given the no-detention policy through grade 8. Dropout was higher in Nalanda than in Satara. But in both districts, the dropout rate was highest among Std VIII students who would have transitioned to secondary school in the next academic year.

Table 1: Proportion of sampled children transitioning to different grades at endline

District	Grade in 2013	N	Attrition (%)	% Children who transitioned to:			Dropped out (%)	Total (%)
				Expected grade	Lower/ same grade	Higher Grade		
Nalanda	Std VI	940	2.9	87.5	3.4	3.3	2.9	100
	Std VII	1,043	2.1	89.0	2.2	3.6	3.2	100
	Std VIII	949	3.2	88.7	2.7	0.0	5.4	100
Satara	Std VI	901	1.4	96.8	0.11	1.1	0.6	100
	Std VII	941	1.9	97.2	0.3	0.1	0.4	100
	Std VIII	977	1.8	95.8	0.9	0.0	1.4	100

What about progress in learning?

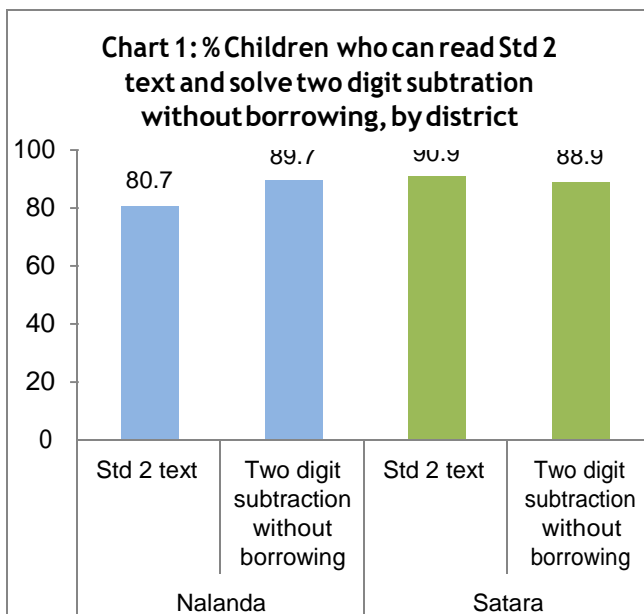
Looking first at **foundational skills** in reading and arithmetic, during the baseline assessment when sampled children were in Std VI-VIII, more than one out of every ten children did not have the reading and arithmetic skills that are usually taught in Std II.

Box 1: Selected questions from the tests of basic reading and math

सावन का महीना था। आसमान में बहुत से काले बादल छाए थे। ठंडी-ठंडी हवा चल रही थी। मैंने सोचा, आज झूला झूलते हैं। बड़े भैया एक मोटी सी रस्सी लेकर आए। हमने उसे पेड़ से लटका कर झूला बनाया। सब ने मिलकर खूब झूला झूला। बहुत सारे बच्चे आकर मजे से खेलने लगे। खेलते-खेलते रात हो गई।

54	77
- 22	- 46

48
- 36



- The highest level of the **reading** assessment comprised a Std II level text (Box 1). During the baseline assessment, 14% children in Std VI, VII and VIII were unable to read at this level.
- More middle school children had foundational reading skills in Satara than in Nalanda. But even in Satara, one out of every ten children could not read at Std II level. In Nalanda, two out of every ten could not do so (Chart 1).
- The highest level of the **math** assessment consisted of a two-digit by two-digit subtraction problem without borrowing, usually taught in Std II (Box 1). In both districts, one out of every ten students could not do this sum (Chart 1).

If children did not have foundational reading and arithmetic skills during the baseline assessment, they were unlikely to acquire them during the subsequent year (Table 2).

- Of the 714 children who did not have Std II level reading abilities in the baseline, more than half had not acquired them a year later (53%).
- Similarly, of the 463 children who did not have Std II level math abilities in the baseline, more than half had not acquired them a year later (52%).

Table 2: Sampled children’s acquisition of basic reading and math abilities between baseline and endline (%)

Endline Baseline	Language Floor test (Std II level)			Math Floor test (Std II level)		
	Did not clear endline	Cleared endline	Total	Did not clear endline	Cleared endline	Total
Did not clear baseline	53.4 (381)	46.6 (333)	100 (714)	52.1 (241)	47.9 (222)	100 (463)
Cleared baseline	2.6 (103)	97.4 (3,843)	100 (3,946)	3.4 (144)	96.6 (4,053)	100 (4,197)
Total	10.4 (484)	89.6 (4,176)	100 (4,660)	8.3 (385)	91.7 (4,275)	100 (4,660)



What do we know about the children who lacked foundational skills?

Data from this study shows clearly that students in Std VI, VII and VIII who came from disadvantaged backgrounds were more likely to lack foundational reading and/or math skills (Table 3).

Children without these basic skills were more often girls than boys. They came from disadvantaged social and economic backgrounds relative to their peers. And they were far more likely to have parents who had not been to school, making learning support in the household difficult.

Table 3: % Sampled children with and without foundational reading and math skill abilities, by selected individual/household characteristics

	Students <u>without</u> foundational skills in reading or math or both (N=968)	Students <u>with</u> foundational skills in both reading and math (N=4,679)
% Students who:		
Were girls	53.7	48.8
Were from lowest SES quartile	29.7	17.3
Were from highest SES quartile	17.8	34.2
Belonged to General social category	18.5	29.7
Belonged to SC social category	16.8	11.2
Had mothers who never attended school	64.2	38.1
Had mothers who studied beyond Std VIII	12.9	34.2
Had fathers who never attended school	33.0	15.1
Had fathers who studied beyond Std VIII	35.9	59.4

Are children who lack foundational skills more likely to drop out of middle school?

Yes. Given the no-detention policy through Std VIII, the proportion of children who dropped out is small. But children who could not read or do math at Std II level were far more likely to drop out than those who did have these abilities. This is true in both Nalanda and Satara (Table 4).

Table 4: Proportion of sampled children who dropped out of school by end line, by foundational learning levels

Level of foundational skills	Nalanda		Satara	
	Number of children at baseline	% Students who dropped out between baseline and endline	Number of children at baseline	% Students who dropped out between baseline and endline
Without foundational skills in reading or math or both	599	8.2	369	1.9
With foundational skills in both reading and math	2,291	2.6	2,388	0.6

What about higher level competencies?

During both baseline and endline field visits, sampled children who had the foundational skills reported above were invited to take more advanced assessments in language, math, English and science. These comprised written pen-paper tests of approximately 90 minutes duration each, with items ranging in difficulty from Std IV to Std VII level. Since pen and paper tests were voluntary, not all children turned up. Nonetheless, across both districts, an average of about 1,200 children took each of these four subject tests.³

In this section, we discuss learning outcomes among those children who were in Std VI, VII or VIII during the baseline visit and had transitioned to a higher grade during the next academic year, since this group of children could reasonably be expected to have mastered higher level competencies.

Mathematics. Children who took the written test in mathematics had previously passed the screener that tested basic number knowledge and arithmetic operations. However, even in upper primary grades, children's number sense does not always extend to three- and four-digit numbers. For example, these data show that during the baseline assessment, 2 out of every 10 children could not identify the largest number in a series of four-digit numbers (Box 2). A year later, when children were in Std VII or higher, 1 out of every 10 still could not do so. The fact that even after 6 or more years of schooling, 10% of students cannot solve this question is cause for alarm.

Box 2: Question on identifying the largest number from the given set

Q2. दी गई संख्याओं में से सबसे बड़ी संख्या पर गोला लगाएँ:	c) 6511, 7621, 5239, 4997
उदाहरण: 23, 42, 33, 11	

As reported above, the highest competency tested in the math screener was a 2-digit by 2-digit subtraction without borrowing. All children who took the written assessment could therefore solve this type of problem. As in the case of number sense, however, children's mastery of the basic competency does not extend to more complex problems. Although almost all children attempted the question shown in Box 3 below, even by the endline assessment (when children were in Std VII-IX), just half of tested children could solve a four by three digit subtraction with borrowing, usually taught in Std III. Equally striking is the enormous difference between the two districts in children's ability to solve this sum correctly.

³ Average number across all test administrations. While the one-on-one screening assessment was conducted during visits to sampled children's homes, children volunteered to take the more advanced assessments, which were held at predefined locations in the community. Thus, the number of children taking each test varied by district (Nalanda vs Satara), by test administration (baseline vs endline), and by subject (language, math, English, science).

Box 3: Proportion of sampled children who could solve a subtraction sum

Q3. हल करें:		Q3.a) Four by three digit subtraction with borrowing (Std III level)				
District	Missing	Incorrect	Correct	Total	N	
Nalanda	1.53	36.21	62.25	100	1828	
Satara	3.11	57.85	39.04	100	1898	

Children's lack of mastery of subtraction problems in numeric format is also visible in the poor results on word problems testing the same competency. In the endline assessment, barely half of all tested children could correctly solve the following question: "Anuradha read 18 pages of a book. Anuradha read 10 pages more than Mukesh. How many pages did Mukesh read?" Children are commonly exposed to similar simple word problems in Std IV.

The written math assessment also tested more advanced math competencies. For every item tested, the proportion of children who were able to solve the problem correctly increased in the year between baseline and endline. In other words, children do learn over time. But in both districts the proportion of correct responses decreases steadily with the difficulty of the item. Given that the most difficult question on the math written assessment was pegged at Std VII level, even by the endline, most children's math capability continued to fall woefully short of curriculum expectations for their current grade (Table 5).

Table 5: Competency-wise share in the mean scores in the endline math written assessment

Competency	Total marks (%)	Average obtained (%)	
		Nalanda	Satara
Understanding numbers/ number sense	10.8	7.9	8.2
Basic mathematical operations	10.8	6.2	5.0
Number system	15.4	8.4	7.7
Number pattern recognition	4.6	3.3	3.0
Mathematical operations	9.2	5.2	3.1
Word problems	4.6	2.6	2.5
Ratio	7.7	2.9	1.7
Geometry	18.5	11.3	10.5
Algebra	7.7	3.1	2.1
Measurement	4.6	3.9	2.9
Mensuration	4.6	1.7	1.0
LCM	1.5	1.1	0.2
Total	100	44.7	39.5

Language. Children who took the written language assessment had successfully completed the basic reading task included in the language screener, in which the highest level tested was a simple Std II level ‘story’. The written test went considerably beyond basic reading ability, addressing competencies such as reading comprehension, creative writing, vocabulary, grammar and spelling.

Some examples of reading comprehension tasks are discussed below. These questions were based on a fictional narrative text similar to chapters commonly found in Std IV textbooks.

1 (R) नन्ना को “नखरैलू” नाम किसने दिया?

a) मम्मी जी

b) जयन्त फूफा

c) नानी जी

d) अशोक चाचा

e) उत्तर पता नहीं

A ‘direct retrieve’ comprehension question is one where the answer to the question is provided in the text. The child only needs to find the answer in the passage provided. Even by the endline assessment (children were in Std VII-IX at the time), **30% children were unable to answer this question correctly.**

2 (I) नन्ना का नाम “नन्ना नखरैलू” क्यों पड़ा?

a) क्योंकि वह किसी की भी बात में हँस मिला लेता था

b) क्योंकि वह हर बार बहुत ज़िद करता था

c) क्योंकि वह हर किसी के साथ बदमाशी किया करता था

d) क्योंकि वह अपनी बात न माने जाने पर गुस्सा हो जाता था

e) उत्तर पता नहीं

A slightly more difficult question based on the same text requires the child to first understand the text and then derive the answer from the information provided. In the endline, **over half of all students were unable to answer this question correctly.**

5 (I) नन्ना ने चाहते हुए भी चाट खाने से मना क्यों किया?

a) क्योंकि उसे हर एक बात पर खुशामद करवाने की आदत थी

b) क्योंकि वह नानाजी की शर्त का पालन कर रहा था

c) क्योंकि उसे चाट नहीं आइसक्रीम पसंद थी

d) क्योंकि वह नानाजी से डरता था और उन्होंने उसे डांटा भी था

e) उत्तर पता नहीं

In this example, the child needs to interpret the question and draw on her own knowledge and opinions in order to answer it. In the endline, **almost two thirds of tested children could not answer this question correctly.**

To summarize, more students were able to answer the easier direct retrieval questions than those that required them to integrate, interpret, and/or evaluate the information provided in the text. Further, correct responses to the easier narrative text were more common than those to the more difficult informative text. However, the proportion of students able to provide correct answers even to the easiest questions is very low, given that the questions are based on a Std IV level text.

Several conclusions emerge from analysis of data from the language assessment.

- First, in every case children’s responses improved between baseline and endline: the proportion of missing data decreases and that of correct answers increases. As in the case of mathematics, this is clear evidence that children’s learning does improve over time, although it remains significantly below grade level.
- Second, children performed better in competency categories such as understanding of idioms, vocabulary, grammar and conjunctions than in categories that required comprehension. This suggests that strategies encouraging students to understand, analyse and interrogate curriculum content are poorly implemented in classrooms.
- Third, differences in language learning outcomes between Satara and Nalanda are surprisingly low: at endline, there was just a 3 percentage point difference in mean scores between them. Given the differences between these locations on most important socioeconomic and educational indicators, this finding suggests that models of teaching-learning are relatively impervious to the larger socioeconomic context in which they take place.

Conclusions

Data from this study shows that once children have fallen behind in their understanding or ability, it is difficult for them to catch up later on. Children's learning outcomes in their current grade largely determine learning outcomes in the subsequent grade. In a regression framework, baseline test scores are a very good predictor of end-line scores.⁴

Children are stuck in a 'low learning trap'. The above finding has enormous implications for a system in which children progress from one grade to the next automatically, whether or not they have progressed enough to be able to cope with higher level curricula. Data from this study shows that large proportions of children transition to higher grades without even foundational language and math proficiency. Even when they have foundational skills, children's grasp of higher level competencies is extremely deficient relative to curriculum expectations.

There is cause for serious concern in both states. In both districts included in this study, significant proportions of upper-primary children who made grade appropriate transitions could not read a Std II level text fluently or solve simple subtraction problems. The mismatch between curriculum expectations and children's ability is as great in the more economically and educationally backward Nalanda in Bihar as in as the less disadvantaged Satara in Maharashtra.

Secondary schools have to deal with an enormous cumulative burden of children's learning deficits. Guaranteeing quality secondary education for all children requires that these issues be urgently addressed. With the shift in focus from inputs to outcomes and from primary to secondary education, the 6th Joint Review Mission (JRM) of the Rashtriya Madhyamik Shiksha Mission (RMSA) has stressed the need for surveys looking at overall and subject-wise learning levels. In addition to the many policy issues highlighted by its findings, this study can also provide a variety of insights into how such assessments can be designed and conducted.

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⁴ Various factors related to the child's own characteristics, her home and parent characteristics, as well those pertaining to enrollment and school management type were placed in a multivariate framework incorporating school-level and state-level fixed effects to assess their relative contribution towards learning outcomes. Many of the correlates of learning outcomes are insignificant in a multivariate analysis which includes baseline score, but become significant when baseline scores are excluded from the analysis.