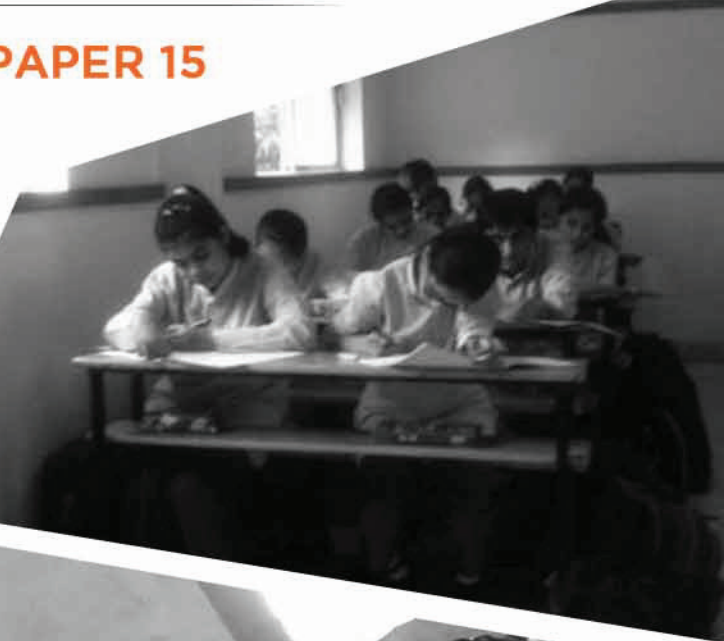
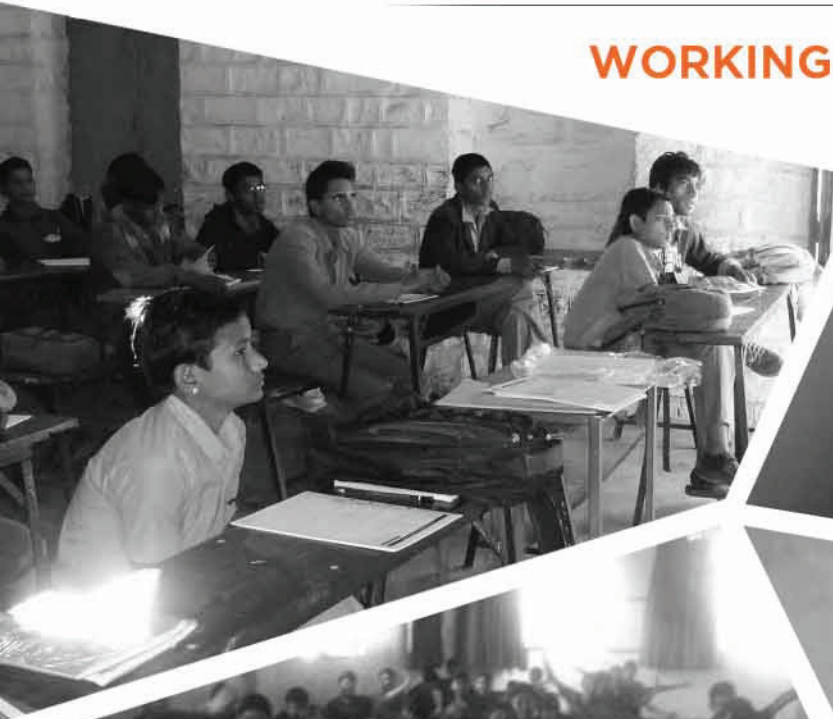


STRENGTHENING INNOVATION AND PRACTICE IN SECONDARY EDUCATION THROUGH A BENCHMARKING STUDY OF STUDENT LEARNING OUTCOMES

WORKING PAPER 15



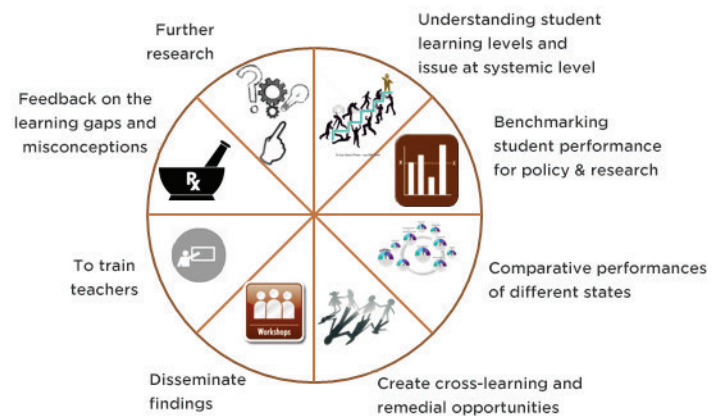
RECOGNIZING THE NEED FOR RESEARCH IN SECONDARY SCHOOLS

India's participation in Programme for International Student Assessment (PISA) for 15 year old students in 2009 showed that our brightest ones were nearly 1 standard deviation behind the best students of the world, while our average students were 0.5 standard deviation behind the world's weakest students. As a country we need to address the quality of learning effectively and, - fundamental issues need to be recognised. These issues are:- rote learning, lack of data-based evidence,- and the absence of systematic monitoring. Assessments of student learning have now gained prominence for this purpose. However there is a paucity of data on learning outcomes at the secondary level. With these issues in mind, MacArthur Foundation - commissioned Educational Initiatives to conduct an assessment to benchmark learning levels in secondary schools - grades 9 & 10 - in Gujarat, Maharashtra and Rajasthan in 2013-14. The Study covered more than 50,000 Students across 800 Government & Affordable Private Schools (APS). The subjects covered were Mathematics and Language.

The Programme for International Student Assessment (PISA) is a worldwide study by the Organisation for Economic Co-operation and Development (OECD) in member and non-member nations of 15-year-old school pupils' scholastic performance on mathematics, science, and reading. Of the 74 countries tested in the PISA 2009 cycle, the two Indian states (Himachal Pradesh and Tamil Nadu) came up 72nd and 73rd out of 74 in both reading and mathematics, and 73rd and 74th in science.

Standard deviation (SD) shows the extent of variation in scores from the average score.

Project Objectives



STUDY COVERAGE

Grades 9 and 10 Students were assessed in Language (Gujarati, Marathi and Hindi in respective states) and Mathematics.

Duration of Assessment - October 2013 to January 2014

Sr.No.	School Type	Gujarat (7 Districts)		Maharashtra (9 Districts)		Rajasthan (8 Districts)	
		Total Schools	Total Students	Total Schools	Total Students	Total Schools	Total Students
1	Government	198	14,159	259	18,205	269	16,074
2	Affordable Private Schools	27	2,098	27	2,022	35	2,104

**Affordable Private Schools (APS) are schools where the monthly student fees is less than INR 1000.*

ASSESSMENT PROCESS AND OUTCOME

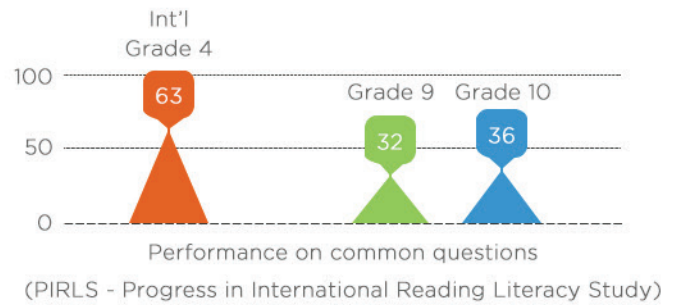
The same test paper was used for both grades 9 and 10 to measure learning gains. The test papers were developed specifically to detect learning difficulties and understand the levels of learning.



WIDE GAPS IN EXPECTED PROFICIENCY AND CURRENT LEARNING LEVELS

Reading and Comprehension

Only **35%** of 9th & 10th grades are able to read at grade 4 level



STUDENTS CAN

Read and understand use of tenses

14 If everyone _____ their paintings, we can move on to the next activity.

- A will finish
- B is finishing
- C has finished**
- D had finished

Option	Grade 9	Grade 10
A	6.3%	4.4%
B	6.1%	5.3%
C	80.0%	84.4%
D	5.8%	4.5%

Testing use of past perfect tense

and also understand simple vocabulary

3 My friend _____ me by telling my secret to someone else.

- A trusted
- B betrayed**
- C feared
- D helped

Option	Grade 9	Grade 10
A	1.9%	1.5%
B	91.5%	93.0%
C	4.3%	3.8%
D	1.7%	0.9%

Simple vocabulary

but they CANNOT understand context and form of a passage

40 This passage is in the form of a/an _____

- A review**
- B interview
- C conversation
- D biography

Option	Grade 9	Grade 10
A	15.4%	14.8%
B	19.9%	18.8%
C	20.0%	18.0%
D	41.2%	45.0%

Understanding context and form of a passage

or interchange direct and indirect speech

44 The response is beyond anything my dad and I had hoped for, says Hrithik.

- A Hrithik said that their response was beyond anything his dad and he hoped for.
- B Hrithik said that the response is beyond anything his dad and he hoped for.
- C Hrithik said that the response was beyond anything his dad and he hoped for.**
- D Hrithik said that the response is beyond anything he and his ever dad hoped for.

Option	Grade 9	Grade 10
A	26.9%	28.8%
B	22.2%	20.9%
C	22.5%	23.3%
D	25.0%	24.4%

Direct and indirect speech

Questions were asked in Gujarati, Marathi and Hindi

Writing Ability

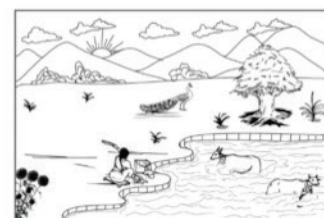
Common problems seen in the writing tasks were:

- Inability to express their ideas cohesively
- Inability to write grade-appropriate sentences
- Improper articulation
- Disjointed idea-sets
- Use of colloquial terms
- Limited vocabulary
- Errors in spellings, grammar and syntax

1448
scripts
analyzed

Secondary education reform needs to start at Grade 5-6 level.
Trying to tackle this at Grade 8-9 level is too late.



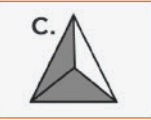

ACTUAL QUESTION ASKED IN THE TEST.



54 Write 5 sentences about this picture.

WIDE GAPS IN EXPECTED PROFICIENCY AND CURRENT LEARNING LEVELS

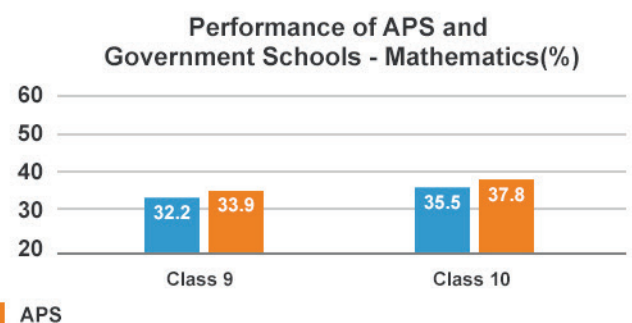
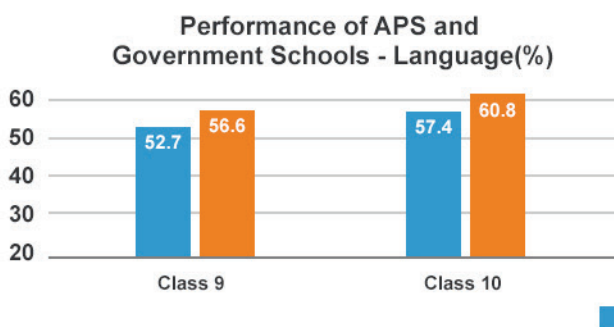
Students exhibited weak understanding of concepts in Mathematics. Secondary school students performed very poorly even on questions asked from lower grades 6 and 7.

GRADE	TOPIC	QUESTION	PERFORMANCE	
			GRADE 9	GRADE 10
6	Fractions	<p>Which of the following has more than 60% of the figure shaded?</p> <p>A. </p> <p>B. </p> <p>C. </p> <p>D. </p>	52%	67%
6	Decimals	<p>In which of the following are the decimal fractions arranged from the smallest to the largest?</p> <p>A. 2.5, 2.03, 2.07 B. 2.03, 2.5, 2.07</p> <p>C. 2.03, 2.07, 2.5 D. 2.07, 2.03, 2.5</p>	25%	32%
7	Area & Perimeter	<p>What is the circumference of a circle whose diameter is 18 cm?</p> <p>A. 9π B. 18π</p> <p>C. 36π D. 81π</p>	26%	24%
7	Profit & Loss	<p>Sonu buys a toy for Rs. 150 and sells it for Rs. 375. What is his profit or loss percentage?</p> <p>A. 250% Loss B. 250% Profit</p> <p>C. 150% Loss D. 150% Profit</p>	24%	29%

Questions were asked in Gujarati, Marathi and Hindi

LEARNING LEVELS IN BOTH APS AND GOVERNMENT SCHOOLS ARE VERY LOW

Over 1000 students were tested from each grade 9 and 10 from APS. These schools charged less than Rs. 1000 per month to students. Overall APS and Government schools show similar performance.

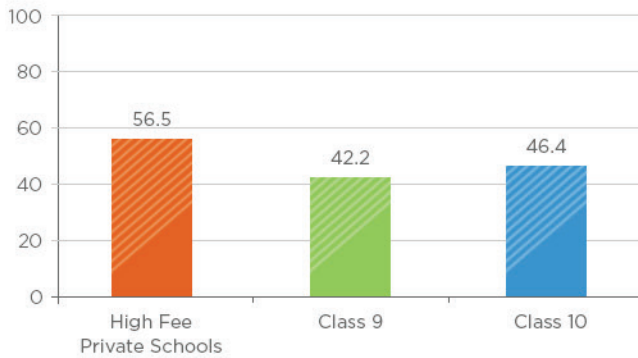


PERFORMANCE COMPARISON

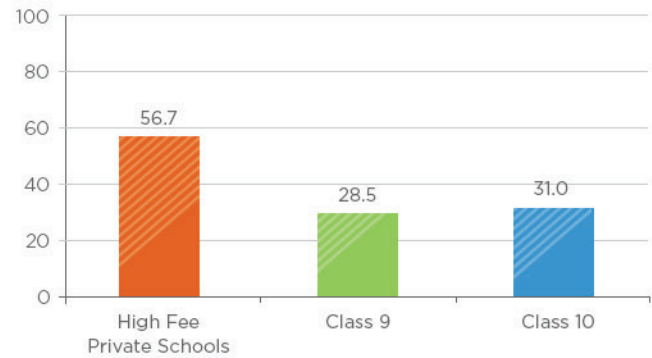
• Private Schools vs Government Schools

A comparative analysis was undertaken between the performance of government schools in Gujarat, Maharashtra and Rajasthan and the performance of high fee private schools (assessed through ASSET, a large scale diagnostic assessment taken by nearly 3.5 lakh students of private schools across the country) in Language and Mathematics. The analysis is based on 17 common questions in Language and 15 questions in Mathematics.

Comparative performance of Government Schools with Private Schools - Language



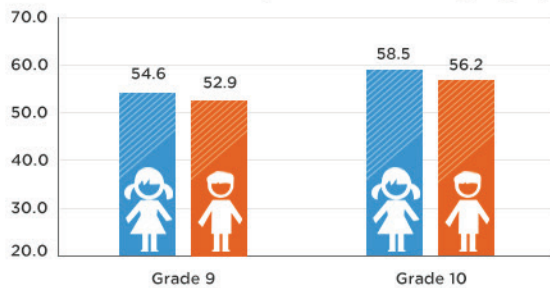
Comparative performance of Government Schools with Private Schools - Mathematics



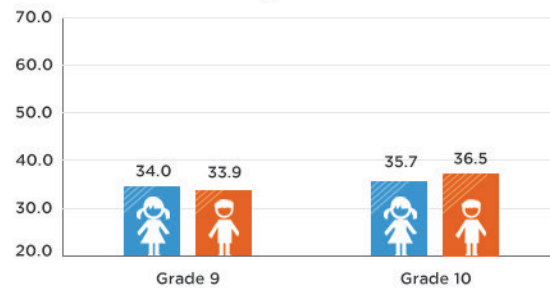
• Boys vs Girls

At the overall level, girls have scored higher than boys in Language, but the differences are not meaningful (substantial). Boys and girls have similar learning levels in Mathematics.

Performance of Boys and Girls - Language (%)



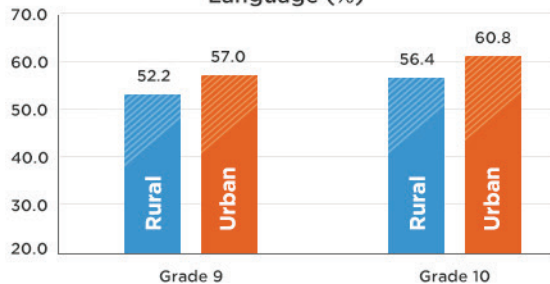
Performance of Boys and Girls - Mathematics (%)



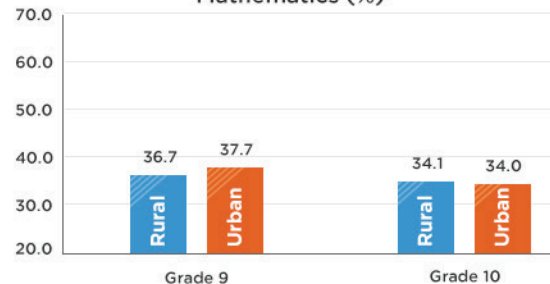
• Government Rural Schools vs Government Urban Schools

Urban school students have performed better than rural school students in Language. In Mathematics, performance levels of rural and urban school students were similar in both grades 9 and 10.

Performance of Rural and Urban School - Language (%)

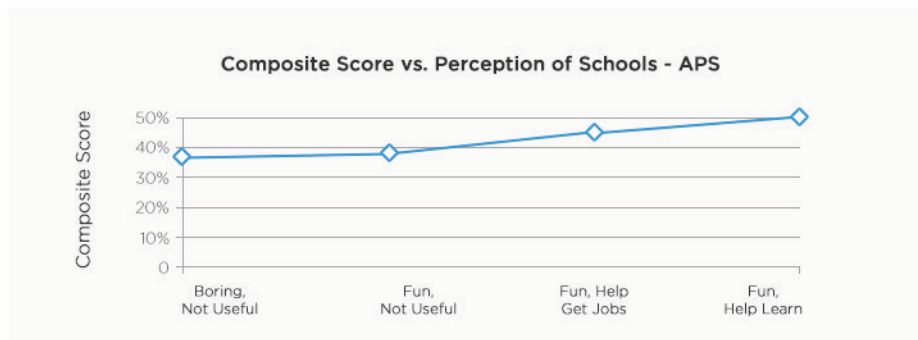
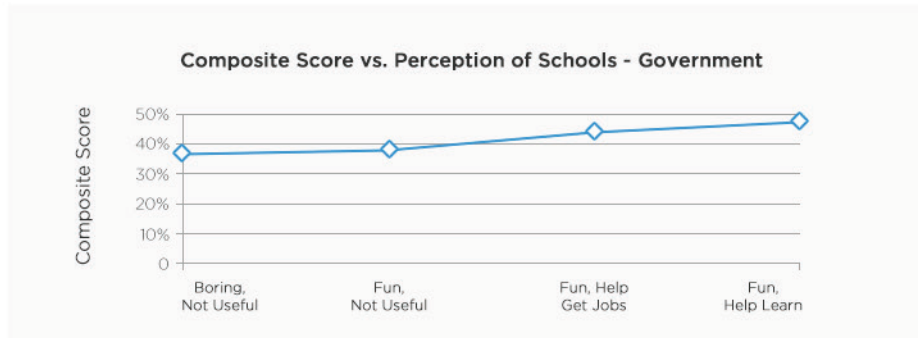


Performance of Rural and Urban School - Mathematics (%)



STUDENT PERCEPTION OF SCHOOLS

There is a marked difference in average Language & Mathematics scores between students who consider schools as 'Boring & Not useful' vs. students who find schools as 'Fun and helping them learn/get jobs'.



RECOMMENDATIONS BASED ON FINDINGS FROM THE STUDY

1. Build systemic and institutional capacity by establishing a 'Science of Learning' Centre:

The focus of the Science of Learning Centre would be to create the 'body of knowledge' which will then drive textbooks and material preparation, teacher training and assessments. The best individuals from the state (and from outside) should be identified and given the goal of building such a body of knowledge in a phased manner. They should be supported adequately through training and exposure to different models to take this initiative ahead



2. Reform interventions to start early in primary grades:

With low learning levels even on concepts covered two-three grades lower, reform in secondary education requires action starting several years earlier when children are in primary school. These include improving teacher practice by providing need-based trainings, clearing misconceptions in student learning and developing better academic support.

3. Use technology in education for personalized learning in secondary schools:

One of the key findings from the study has been that the learning levels of students in grades 9 and 10 are significantly heterogeneous. In the same classroom, children with similar age and demographics are at grade levels ranging from 4 to 10. In such a scenario it becomes very difficult for teachers to cater to each and every child. Technology for personalized learning can play a fundamental role in helping each child learn from what they know at a pace that they can retain an interest in learning.



Students learning on Mindspark at their own pace and also clearing misconceptions with the help individualised attention provided by Mindspark.

4. Targeted program and campaign to build the habit of reading:

Building an interest in books and developing the habit of reading among learners can significantly help in improving learning outcomes and creating an educated and empowered society at large. Book exhibitions, reading clubs (in school and communities), competitions such as debates and elocutions, events where students discuss their favourite book, library visits can help in promoting the habit of reading and thinking about what has been read. State-wide campaigns that promote and reward reading can also be effective.

5. Implement a student progress tracking system:

This should be a learning data management system that sits on a basic data system which has information on every school, teacher and student. The learning data management system would track Student Progress with time (or possibly for schools or regions initially).

6. Campaign to educate teachers, parents and students to recognize importance of learning with understanding:

Starting with widespread dissemination of the findings of this report among teachers and others, we think there is a need and an opportunity to initiate a debate on issues like rote learning and learning with understanding, so that teachers and gradually parents internalise these issues and recognise the importance of learning with understanding. This can be achieved through seminars, events within schools and towns, television shows, and internet, including the use of social networking sites.

7. Research on learning through student interviews - to provide insights to teachers and curriculum makers on common student difficulties, and help improve teaching practices:

It is important to recognise that understanding what students already know and think about a concept before it is taught or while it is being taught is an important aspect of teaching. While large scale assessment provides detailed performance data and the patterns underlying student responses, they may not fully explain why students choose a particular option or answer in a particular way. In order to uncover that, one approach is to simply ask students questions in a student interview, without guiding the student to the answer. These interviews are typically conducted in the class itself by trained interviewers. It is common in research studies to conduct individual interviews and use the transcripts. One advantage of the whole class interaction is that it allows for discussions among students. These interviews are video recorded and then disseminated to schools where they are used mainly for teacher feedback and training.



VOTE OF THANKS

We would like to thank the officials of Gujarat Secondary and Higher Secondary Education Board Gujarat; Education Department, Rajasthan and Directorate of Education Secondary and Higher Secondary, Maharashtra. The study would not have been possible without the kind support, guidance and help of many individuals from the departments.

We are highly indebted to Secretary Gujarat Secondary and Higher Secondary Education Board Gujarat, Principal Secretary Education, Rajasthan, and Director Secondary Education and Higher Secondary Education, Maharashtra for their guidance and constant support for successful roll out of Diagnostic Assessments.

Special gratitude is due to all the DEOs for their kind co-operation and the great support which helped us to roll out the assessments. We were able to carry out the assessments smoothly because of the great support provided by the evaluators which carried out the test administration.

Last, but not the least, we are very thankful to the students, teachers and principals of the schools of Gujarat, Rajasthan and Maharashtra that participated in this Diagnostic Assessments.

THIS STUDY WAS SUPPORTED BY

MacArthur Foundation

The **John D. and Catherine T. MacArthur** Foundation supports creative people and effective institutions committed to building a more just, verdant, and peaceful world. In addition to selecting the MacArthur Fellows, the Foundation works to defend human rights, advance global conservation and security, make cities better places, and understand how technology is affecting children and society.

ABOUT EI

PROJECTS OF EI:

Gujarat Gunotsav and diagnostic (Since 2011): EI has been involved in supporting the existing 'Gunotsav' programme for 33,900 primary schools in Gujarat. The programme has also been extended to cover over 9000 Secondary schools. For the project, EI supported in Gunotsav design, question making, analysis, monitoring of remedial programme, student learning videos and dissemination workshops.

Mindspark Centres for Students from low income Families (since 2012): EI is piloting Mindspark Learning Centres in slum neighbourhoods in Delhi. In addition to Mindspark - Hindi, students also benefit from small group instructions designed to bring them up to grade-level learning at these centres. Two pilot centres were inaugurated in July, 2012 in partnership with the Central Square Foundation. On successful completion of pilot, this has been scaled to 4 centres.

Evaluation of Activity-Based Learning as a means of Child-Friendly Education – UNICEF (2013-2015): The project is a research study commissioned by UNICEF to evaluate the activity based learning methodology being adopted in schools in 7 states in India - Madhya Pradesh, Rajasthan, Gujarat, Jharkhand, Tamil Nadu, Karnataka and Andhra Pradesh.

Assessments of Student Learning in Government Schools of Bihar (2014-2015): The study covers classes 3, 5 and 7 for Language (Hindi) and Maths. Baseline Line Diagnostic Assessment was conducted in the month of March 2014, covering around 1 lakh students. Mid-Line Teacher Led Self Assessments of Student Learning covered over 58 lakh students across Bihar was conducted in September 2014.

Haryana Statewide Assessments – Diagnostic Assessments and Census Assessments (2015): The study covers classes 3, 5 and 8 for Language (Hindi) and Maths. The First Phase - Baseline Line Diagnostic Assessment will cover around 80 thousand students. The second phase - Census Assessments of Student Learning will cover approximately 24 lakh children across Haryana.