

# Student Learning Study

## Executive Summary

Status of Student Learning across 18 States of India in Urban and Rural schools



We acknowledge the support given by the states for conducting the study.

The study is conceived and executed by:



**Educational Initiatives Pvt. Ltd.**  
[www.ei-india.com](http://www.ei-india.com)

The study is supported by:



## ACKNOWLEDGEMENT



From the Authors:

Student Learning Study would not have been possible without the help and support of a large number of people.

We would like to specifically thank the State Governments for giving permissions to freely conduct the study in the schools for classes 4, 6 and 8.

We also thank the suggestions received from Ministry of Human Resource, India; NCERT, EdCIL and Technical Consultant Group of SSA on different aspects of the study design.

We would like to acknowledge the support from Prof. Arun C. Mehta and the National University of Educational Planning and Administration (NUEPA) for providing the raw student enrolment data of the different states for enabling sampling. We also thank the state officials who supplemented this data wherever required.

We thank the support from Prof. Bimal Roy and Prof. Saurabh Ghosh, Indian Statistical Institute, Kolkata for guidance on the sampling plan for the study.

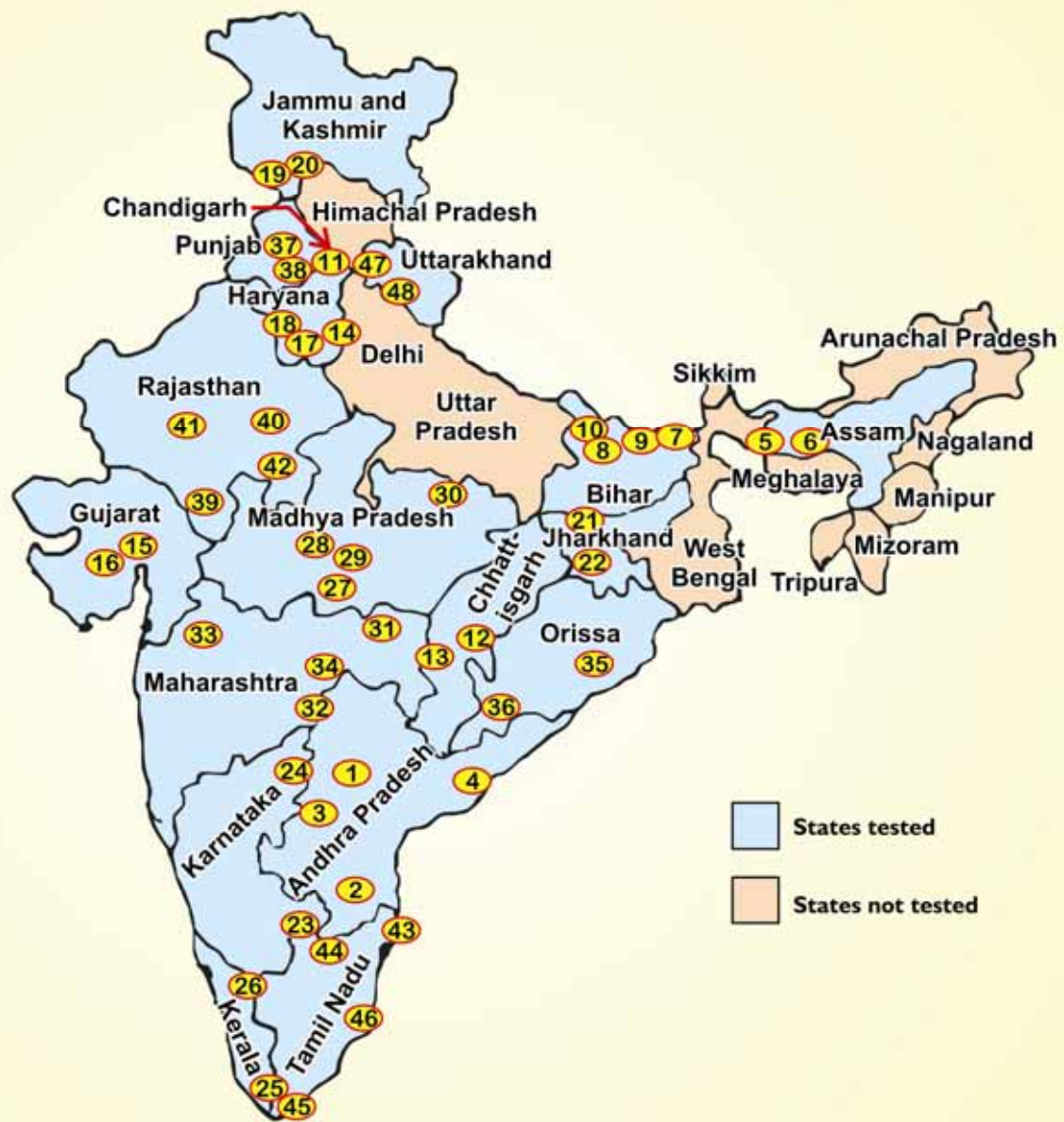
We thank Dr. Daniel Grath, Dr. Eugene Owen, Dr. Steve Norman from the National Centre of Educational Statistics, Washington and Dr. Keith Rust, sampling referee for PISA for guidance and suggestions on the sampling based on their experience from large scale assessments such as the NAEP, TIMSS and PISA. We would like to acknowledge the suggestions provided by Dr. Amita Chudgar, Michigan State University for collection of background variables.

We would like to express our gratitude to the Google Org team for their continued support throughout the study.

Lastly, but in no way least, we were able to conduct the study smoothly because of the support and encouragement provided by the students and teachers to the field team who worked tirelessly to roll out the assessment under standardised conditions.

MR. SRIDHAR RAJAGOPALAN  
(Managing Director)

MS. VYJAYANTHI SANKAR  
(Vice President – Large Scale Assessments)



### LEGEND

<b>Andhra Pradesh</b>	<b>Delhi</b>	<b>Kerala</b>	<b>Punjab</b>
1 Hyderabad	14 Delhi	25 Thiruvananthapuram	37 Ludhiana
2 Kadapa	<b>Gujarat</b>	26 Waynad	38 Sangrur
3 Mahabubnagar	15 Ahmedabad	<b>Madhya Pradesh</b>	<b>Rajasthan</b>
4 West Godavari	16 Surendranagar	27 Betul	39 Dungarpur
<b>Assam</b>	<b>Haryana</b>	28 Bhopal	40 Jaipur
5 Dhubri	17 Gurgaon	29 Hoshangabad	41 Jodhpur
6 Kamrup	18 Rewari	30 Panna	42 Tonk
<b>Bihar</b>	<b>Jammu and Kashmir</b>	<b>Maharashtra</b>	<b>Tamil Nadu</b>
7 Araria	19 Jammu	31 Nagpur	43 Chennai
8 Patna	20 Kathua	32 Nanded	44 Dharmapuri
9 Saharsa	<b>Jharkhand</b>	33 Nashik	45 Kanniyakumari
10 Saran	21 Chatra	34 Yavatmal	46 Pudokottai
<b>Chandigarh</b>	22 Ranchi	<b>Orissa</b>	<b>Uttarakhand</b>
11 Chandigarh	<b>Karnataka</b>	35 Khordha	47 Dehradun
<b>Chhattisgarh</b>	23 Bangalore	36 Koraput	48 Tehri Garhwal
12 Raipur	24 Gulbarga		
13 Rajnandgaon			

The Student Learning Study conducted by Educational Initiatives covered 18 major states of India. Between 2 and 4 districts were sampled in each state. Over 100,000 students of classes 4, 6 and 8 from 2,000 schools took tests in Maths and Language in 13 different mediums of instructions.

## EXECUTIVE SUMMARY



How do we measure the quality of school education? World over, governments and citizens alike seem to agree that good *quality* education (rather than mere school attendance) is powerfully related to individual outcomes in the labour market, enhancing economic growth of a nation and reducing inequality in society (Hanushek and Woessmann 2007; Vegas and Petrow, 2008; World Bank, 2007).

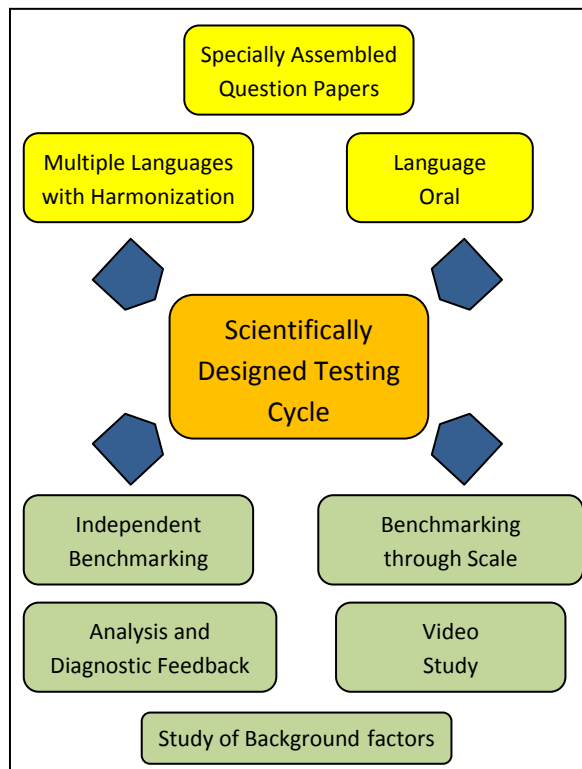
Student Learning Study (SLS) is a benchmarking study of student learning conducted by Educational Initiatives (EI), with financial support from Google.org, USA. The study has been carried out in 48 districts in 18 states and 1 Union territory of India. About 1.6 lac students studying in classes 4, 6 and 8 in 2399 selected government schools were sampled (101643 students actually took the tests – the others were absent on the day of testing) and tested in Language and Maths through common test papers in 13 language versions. The study also collected background information from the students, teachers, head teachers and schools to detect relationships between these factors and student learning.

Other studies like Pratham's ASER (ASER 2005-09) and NCERT's achievement surveys (NAS, 2008) have revealed low student learning levels. The current study is different in 3 important ways – the test design is more sophisticated and checks for student understanding (not just procedural learning). It is independently conducted by a single external agency (EI) and the analysis includes advanced methods like Scale Anchoring. We believe that detailed data helps to devise remedies and solutions in addition to highlighting the problem.

Features	EI SLS	ASER	NCERT Study
Class-wise tests	Class wise tests	Common test	Class wise tests
Single Agency	Facilitated and carried out by Educational Initiatives	Facilitated by Pratham and carried out by local organizations or institutions in different districts	Facilitated by NCERT and carried out by the different states
Tests in School	In classrooms	In homes	In classrooms
Classes tested	Classes 4,6,8	Ages 6 -14	Classes 3,5,7
Coverage	Urban and Rural	Rural	Urban and Rural
Testing Tools	Full length included all competencies; multiple choice and free response questions involving written answers; additionally oral reading tested	Short test with items in oral reading, subtraction, telling time and currency tasks	Full length, entirely multiple choice questions, written responses limited to few in Language paper
Analysis	Achievement data of states with detailed diagnostic feedback capturing learning gaps and misconceptions	Achievement data of states	Achievement data of states
Scale Anchoring	Scale Anchoring using modern Item Response Theory (IRT) to release benchmarks on what students know and do at different ability levels	No Scale Anchoring	No Scale Anchoring

**About the Study:** The study is probably the biggest of its kind in one country. It was conducted between January and September 2009 in 18 states across India. The main features of the study are:

- Scientifically developed full-length class-specific tests in language and maths designed to test not just recall or procedure but understanding and application.
- Equivalent test forms developed in 13 languages for testing in classes 4, 6 and 8 in the different states.
- Test conducted with permission from state governments. 3 states (HP, UP and WB) could not be covered due to lack or delay in receipt of permission.
- Apart from written component, oral reading test conducted on a sample of students.
- Detailed analysis and diagnostic feedback including benchmarks through Scale Anchoring. A video study was conducted in 3 states to analyse student misconceptions.



## MAIN FINDINGS

- 1. Learning levels are extremely low.** In the lower classes, a fair amount of 'rote-based' or 'procedural' learning is evident in very basic numeracy skills such as number sequencing, operations of whole numbers involving 1 or 2 digits; naming of numbers; reading clock time, understanding currency, etc. Even among procedural questions; students are able to comparatively handle only 'straightforward'<sup>1</sup> questions that are closer to what one would practise from a typical textbook and not when they are slightly atypical. In higher classes, students are falling behind in all learning, even procedural. Responses to some questions suggest that students are probably coping through learning happening outside the class. For example, in class 6, while more students could add the fractions  $2\frac{1}{2}$  and  $1\frac{1}{2}$  in a word problem using a real life context, fewer of them could add the same when asked as a straightforward addition question as ' $2\frac{1}{2} + 1\frac{1}{2} = \underline{\quad}$ '.
- 2. Learning taking place is not 'Learning with understanding' and a number of misconceptions exist among students on the concepts learnt.** The learning that is happening seems to be procedural or rote-based and not one of 'Learning with Understanding' as students find it difficult to answer questions that require a deeper understanding of the concept.

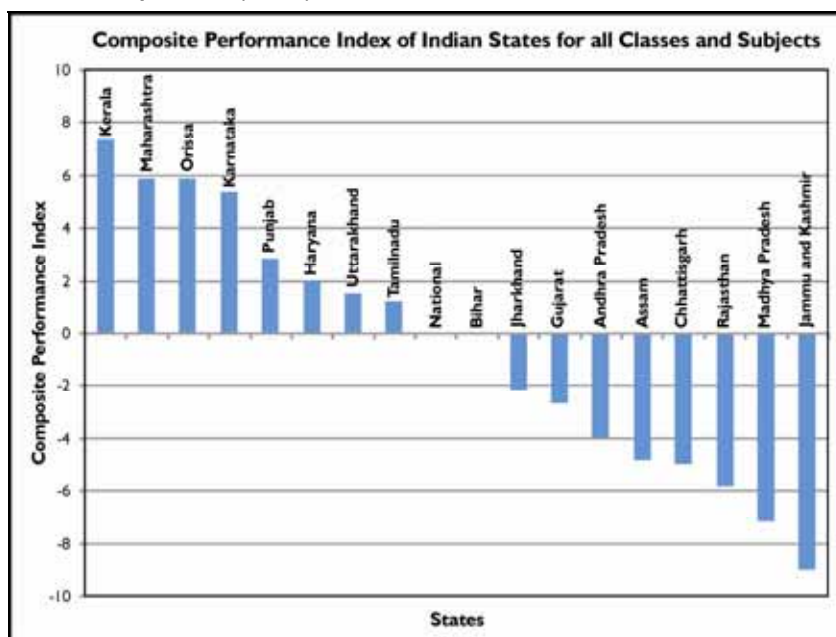
Class 4 Maths	
<p><b>Write the answer.</b></p> $\begin{array}{r} 43 \\ \times 2 \\ \hline \\ \hline \end{array}$	<p><b>Fill in the appropriate number in the box.</b></p> $3 \times \square = 3 + 3 + 3 + 3$
<p><i>Sample Question 25: This is a procedural question that checks for the process of multiplication. <b>67.1%</b> of students answered this correctly.</i></p>	<p><i>Sample Question 26: This is a conceptual question that checks whether the student is able to link multiplication with repeated addition of a number. <b>30.4%</b> of students answered this correctly.</i></p>

<sup>1</sup> A straightforward question is one which has a 'form' as it appears in the textbook. For example, a question that asks what 4 tens and 3 ones is considered straightforward; whereas one that asks what is 5 ones and 4 tens – in which the order is reversed and which tests whether the child has understood the meaning of ones and tens - is considered non-straightforward, though it cannot be considered challenging.

3. **Learning gains seen across classes is slightly incremental and not a large jump.** Student performance in common questions that were used to check learning gains across classes showed that performance increased as students move from class 4 to 6 to 8 in both language and maths. However, the extent of improvement was often slightly incremental and not a large jump as one would expect. In most cases, nearly 40% of students in class 8 do not seem to have acquired class 4 competencies. Many misconceptions that students have in lower classes still continue in higher classes and in some cases were found to even become stronger.
4. **Students find it difficult to express their thoughts in their own words in writing.** Their writing does not go beyond the most basic, tried and tested formulaic sentences they probably trained for while in their lower classes. Their writing shows that they are learning language more as a subject and less as a means of natural communication. The writing has a number of errors in spelling and grammar, and punctuation marks are conspicuous by their absence.
5. **In all the states tested, fewer students were found to comprehend what they read.** For e.g., in the oral reading test, more than 87.1% of students in Gujarat could read a simple word, but only 40.3% could read a short passage and only 22.6% could comprehend the information implicit in the passage they read.
6. **There are significant state-wise differences in student performance.** Based on the relative performance/rank of the states in different classes and subjects, an attempt has been made to consolidate the performance of 17 states. Kerala, Maharashtra, Orissa and Karnataka are clearly performing overall better than the national average. Jammu and Kashmir, Madhya Pradesh and Rajasthan were among the states that ranked among the bottom three overall. Bihar performed the same as national average.

A high correlation of 0.85 and above was observed in the performance across the classes and subjects tested in each state. This means that if a state does well in a class or subject compared to other states then it more or less tends to do well compared to other states in other classes and subjects too.

**Graph 1:** Composite performance index of schools of different states

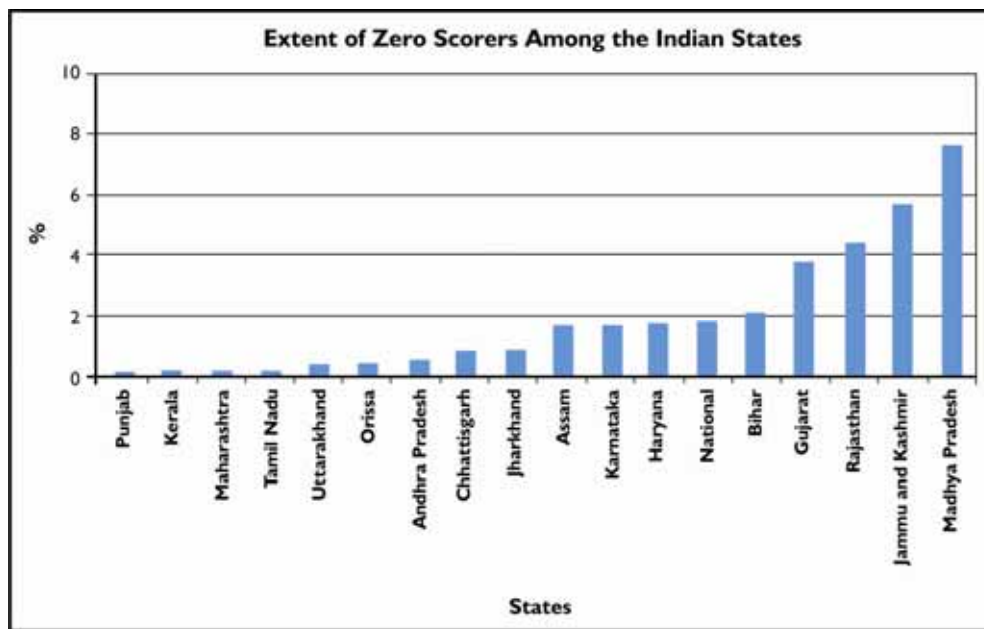


*The union territory of Chandigarh, although tested, has not been included in this comparison. Delhi, though a state, is also not included in this comparison as only class 4 was tested here.*

## 7. Extent of students scoring zero and the overall performance of a state showed differences.

Andhra Pradesh, Assam, Chhattisgarh and Jharkhand, although below the national average, have fewer students not scoring in the test compared to better performing states such as Haryana and Karnataka, indicating that while the states' efforts could be addressing the lowest ability students, it does not provide adequate support for overall improvement of all students. Jammu and Kashmir, Madhya Pradesh and Rajasthan which ranked among the bottom 3 in overall performance also had the highest number of students scoring zero indicating that these students are being left behind in these states.

Graph 2: Students scoring zero in the classes and subjects tested



The union territory of Chandigarh, although tested, has not been included in this comparison. Delhi, though a state, is also not included in this comparison as only class 4 was tested here.

### Can different studies report different performance rankings for states?

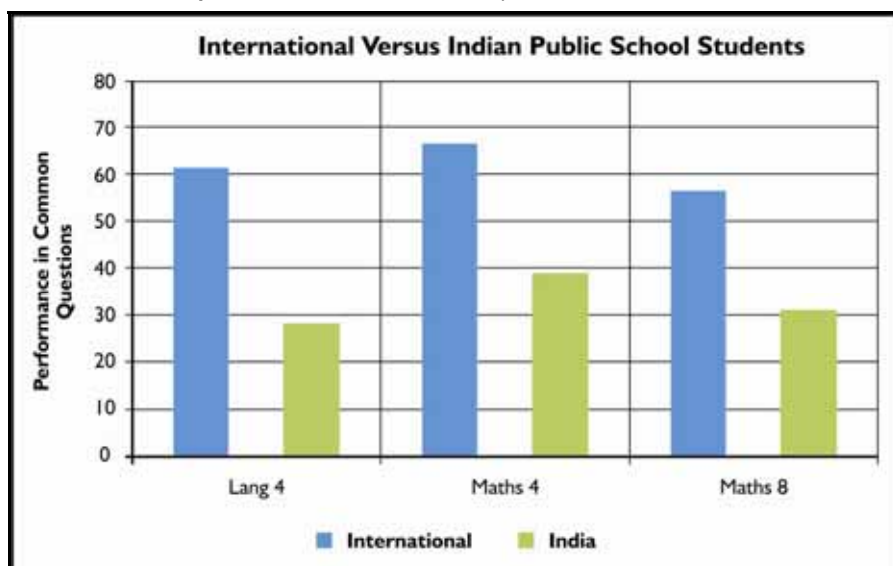
Measuring student learning is a complex exercise and performance reported is influenced by a number of factors. Assuming that the student samples are selected by robust procedures in all studies, test scores would further depend on -

- What is measured?** Test papers used in different studies may not measure identical things. For example, questions could measure rote learning or questions could measure deeper understanding of concepts; and there may be differences in the length of the paper, for a longer paper may mean that more information has been obtained to arrive at conclusions.
- How a test is administered?** The way the test is administered is very important to come to conclusions about student learning. For example, different tests may be administered in a classroom or outside a school environment, testing may be carried out by the teacher who is close to the class or evaluators who have been specifically trained for standardised administration, teams in different states may be synchronised to follow identical processes or different state teams may follow processes that have inherent differences while administering the tests, etc all of which will bring about changes in the test scores.

- The levels of learning of Indian students in government schools in class 4 and class 8 tested is much lower than the international average as represented by studies like Trends in International Maths and Science Study (TIMSS) and Progress in International Reading and Literacy Study (PIRLS). Similarly, on common questions used from an extensive study for private schools<sup>2</sup> in India catering to the elite and upper middle class, students in government schools showed a much lower performance.

<sup>2</sup> Questions were taken from ASSET, a diagnostic assessment test by EI, in which more than 4 lakh students participate from all states of India

**Graph 3:** Performance in common questions from International Tests



**Is it fair to compare school systems that are known to have wide differences in resources and types of students it caters to?**

It is well known that schools in other countries as well as the Indian private elite schools may have richer resources with students from better socio-economic strata, which by themselves may contribute to differences in student learning. When such differences exist, it may not be prudent to compare the outcomes from such systems. Hence the purpose of these comparisons should not be to measure or rank the school systems in terms of performance. However, given the goal for our government school system to achieve the best quality education for students, such comparisons do provide the aspiration level and an idea of the performance level students in these schools could aspire for.

**Class 4 Language**

**Passage Excerpt:**

When Lakhan discovered that he had mice in his house, it did not bother him much at first. But the mice multiplied. They began to bother him. They kept on multiplying and finally there came a time when even he could stand it no

**Why did Lakhan want to get rid of the mice?**

- A. He had always hated mice.
- B. There were too many of them.
- C. They laughed too loudly.
- D. They ate all his cheese.

*Question involves retrieving stated information in the text and making straight forward inferences from it.*

**Sample Question3:** Internationally, **79.0%** of students answered this correctly, while **41.8%** of students from Indian public schools could get this correct.

9. The comparative performance of boys and girls is similar to many international studies – boys seem to do better in maths, although the SLS study reveals that it is a meaningful difference that matters in class 8 only.
10. Analysis of Background factors showed that when students perceive themselves as being good at studies and think of school as a place of fun and learning, they show good performance. The analysis also reveals the importance of inculcating reading habits in student, for spending 30 minutes each day to read material other than textbooks brings about higher achievement. Teacher training is important especially for mathematics teachers for better achievement of students in the subject. Unexpectedly, analysis shows that students whose teachers have an academic degree developed lower scores in both language and mathematics than those who did not have these.

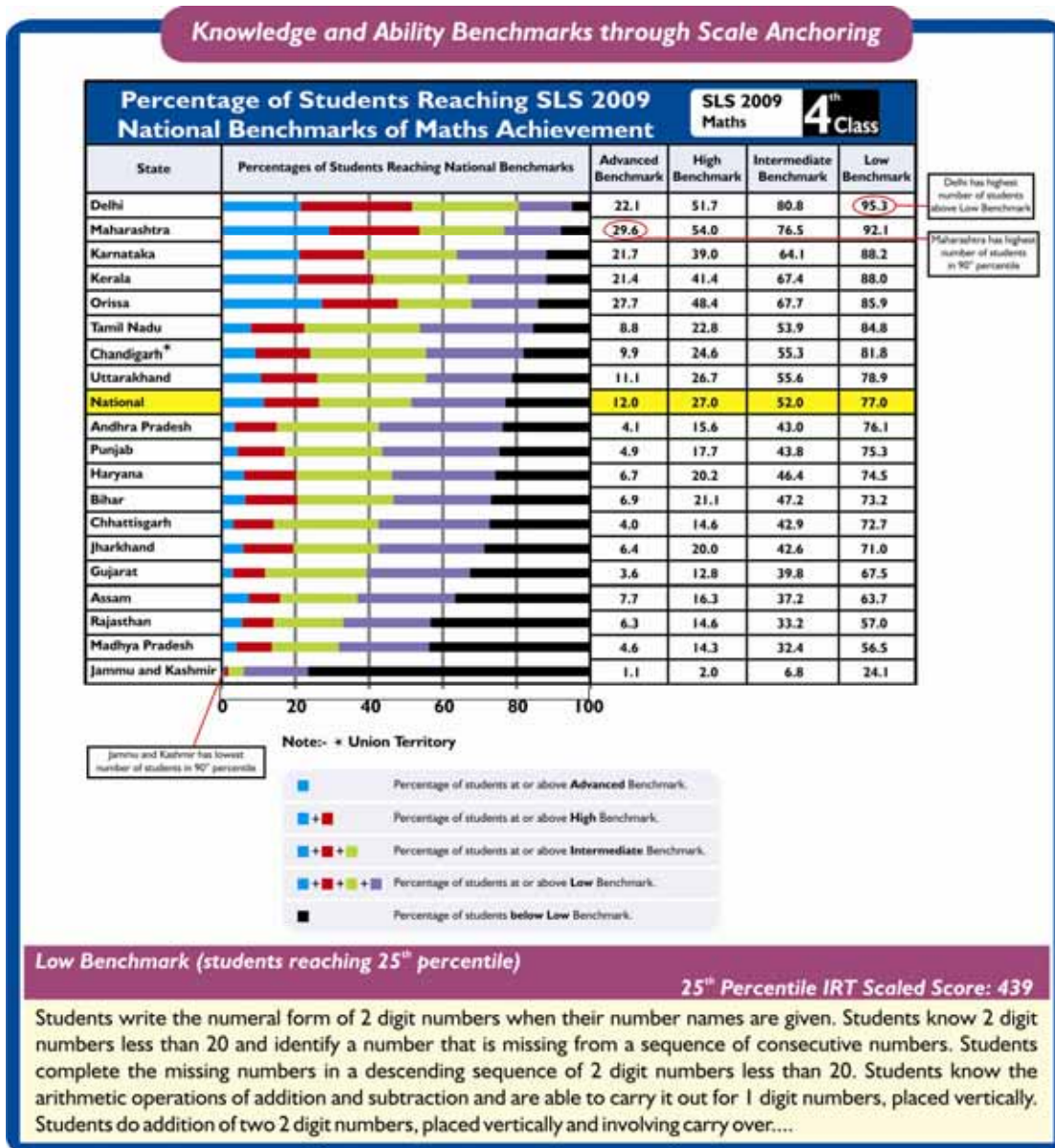
**WHAT IS SO SPECIAL ABOUT SCALE ANCHORING?**

Classroom experience - as well as assessment results - clearly show that students perform at different levels of achievement. Students can even be grouped based on their levels of performance. Neither of these, however, provides us concrete steps on what can be *done* to help students performing at lower levels. If we



could know firstly, *whether* there are specific topics or concepts which students at lower levels of learning are systematically answering incorrectly, and if so, *what* they are, then remediation could focus on those topics.

Graph 4: Performance of different states in Class 4 Maths Benchmarks

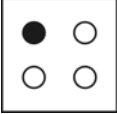
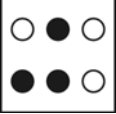
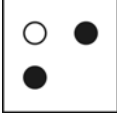
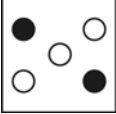



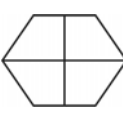
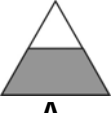

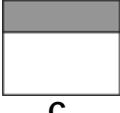
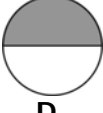


That is what Scale Anchoring provides, in an extremely scientific manner. The results clearly show which concepts or topics are understood only by students performing at higher levels and which topics are understood by other students also. Certain topics are said to 'anchor' at certain percentile levels of performance (25, 50, 75, 90 percentiles). Insights provided by the Scale Anchoring process can help us understand the way children learn and plan scientific remediation.

Benchmark information can be used in a variety of ways - 1. At the policy level, benchmarks help determine the areas of focus for teacher training (*for example, see Graph 4, Tamil Nadu although above national average, has 8.8% of students reaching advanced benchmark in class 4 maths showing the need for training to enable teachers handle concepts anchoring at advanced benchmarks*); 2. At the level of curriculum and pedagogy, benchmarks determine patterns in learning that are useful in refining textbooks and teaching learning materials (*for example, see Table 1 which shows patterns on how the same topic is acquired in different ability levels*); 3. At the school level, benchmarks enable the teacher to bring about classroom remediation. (*for*

example, based on Table 1, a teacher gets to know what are the gaps she should address for her students to reach advanced benchmark in the topic)

**Table 1:** Exploring Acquisition of a Concept at Different Levels of Student Ability

Class 4 Maths - Concept of a Fraction		
<p><b>Low Benchmark</b> (25<sup>th</sup> Percentile)</p>	<p>If a watermelon weighs 10 kg, how much will half the watermelon weigh?</p> <p>_____</p>	<p>Students understand fractional quantities such as half written in a word form <b>as one out of 2 parts</b> and apply them practically in their daily context.</p>
<p><b>Intermediate Benchmark</b> (50<sup>th</sup> Percentile)</p>	<p>In which figure are one-half of the dots black? Tick (✓) the answer.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>A.</p> </div> <div style="text-align: center;">  <p>B.</p> </div> <div style="text-align: center;">  <p>C.</p> </div> <div style="text-align: center;">  <p>D.</p> </div> </div>	<p>Students understand the concept of half <b>as a number divided by 2</b>, for example, in a group of same objects, they know that 3 out of 6 is half the number of that object.</p>
<p><b>High Benchmark</b> (75<sup>th</sup> Percentile)</p>	<p>Which figure is divided into four EQUAL parts? Tick (✓) the answer.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>A.</p> </div> <div style="text-align: center;">  <p>B.</p> </div> <div style="text-align: center;">  <p>C.</p> </div> <div style="text-align: center;">  <p>D.</p> </div> </div>	<p>Students understand parts of a whole and can visually <b>identify equal parts</b>.</p>
<p><b>Advanced Benchmark</b> (90<sup>th</sup> Percentile)</p>	<p>Which figure is <math>\frac{1}{2}</math> shaded? Tick (✓) the answer.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>A.</p> </div> <div style="text-align: center;">  <p>B.</p> </div> <div style="text-align: center;">  <p>C.</p> </div> <div style="text-align: center;">  <p>D.</p> </div> </div>	<p>Students understand half represented as a fraction and understand it as <b>one out of 2 equal parts</b> and are able to identify the correctly shaded figure based on this.</p>

### INSIGHTS FOR CURRICULUM AND PEDAGOGY THROUGH SCALE ANCHORING BENCHMARKS

#### RECOMMENDATIONS:

- Orienting policies to focus on learning outcomes:** While the Central Government initiated Sarva Shiksha Abhiyan (SSA) in 2002 and set the targets of universal primary education in 2007 and Universal Elementary Education (UEE) by 2010 respectively, it has not set itself a target based on quality of student learning outcomes. It is important that all policies are built with a focus on the learning outcomes, for, if students are not learning, then this defeats the purpose even if all other goals are met.
- Making Low Stakes Diagnostic Assessments – a regular feature of the state programs:** Assessments tend to work well when they are low-stake. Their purpose is to inform students, teachers, schools and even the larger society where schools stand. Without official pressure, the purpose of the assessment is two-fold: to provide support and information, and this itself leads to the creation of a positive peer and/or self pressure. The tests must be created by a body or organisation that is truly independent and is not in a way responsible for providing quality education. Low stakes assessments thus developed should be diagnostic and check for understanding and not simply rote or recall.
- Extensively use Benchmark data from the study to build reform:** A powerful goal of these assessments is to obtain a clear picture on where students and teachers stand with respect to peers in the

state, peers in the rest of the country and peers internationally. These are not just numbers, but detailed statements of strengths and weaknesses which can lead to specific action points.

### What are Learning Outcomes?

Learning outcomes are statements of what a learner is expected to know, understand and be able to demonstrate after completion of learning. They are essentially student centred or learner centred. They seek to describe the student's learning progress in terms of the knowledge acquired, the comprehension of that knowledge, the capacity to apply it, the capacity to analyse, synthesise and evaluate. Learning outcomes guide the selection and coordination of appropriate content, learning activities, and assessment strategies that promote the overall learning process. Quality of student learning can be monitored against the expected performance for these learning outcomes.

### **An example of a Learning Outcome in Reading: Students' listen to or read the various types of texts for information, comprehension, and literary appreciation.**

In Classes K-4, *students should know and be able to do the following:*

- Listening to /and reading a variety of Indian and non-Indian literary (class-appropriate fiction, folktales, fables, funny stories, rhymes, plays, diaries, etc.) and non-literary text (simple informational text, text books of other subjects, picture books, simple descriptive/ narrative text, children's encyclopaedia, instructions from science experiments, factual recounts (news stories), lists, etc. - From 'Learning Standards' by Educational Initiatives

### **How do you check for the quality of attainment in this learning outcome?**

These are described in the 4 performance levels – Basic, Partially Proficient, Proficient, Advanced.

#### **e.g. Proficient Level**

At this level, students are encouraged to go beyond the text; however, they are still required to show understanding of the ideas in the text. Students may be encouraged to explain, generalize, or connect ideas. Items may involve abstract theme identification, inference across an entire passage, or students' application of prior knowledge. Items may also involve more superficial connections between texts. Some examples for 'Proficient Level' performance are:

- Explain or recognize how the author's purpose affects the interpretation of a reading selection.
- Analyze and describe the characteristics of various types of literature

- 4. Student Progress Tracking System:** We have reached a stage in our development where accuracy of available data alone can make a significant difference to our development. This brings to the fore the need for computer-based systems like Student Progress Tracking System in helping to achieving universal primary education nationally. Student Progress Tracking System is a computerised system with unique student identification and aids in tracking student learning / progress on both scholastic and non scholastic domains. Such a system will allow drilling down of information to the level of the individual student and teacher and enable targeting the remediation.
- 5. Large Scale Awareness campaign to redefine attitudes towards learning - a movement *against rote learning and for Learning with Understanding:*** Rote learning can deceptively look like learning and be mistaken for it. A consensus needs to be gradually built that *rote learning is not learning at all.*
- 6. Widely disseminating the findings of this report among teachers and others:** We recommend that each state make a systemic and detailed plan to disseminate this report, giving every teacher an opportunity to see it, understand and even question and discuss it. The purpose of all this is two-fold: 1. initiate the rote versus learning with understanding debate in the country; and 2. get teachers to start thinking about 'what are children learning and not learning' rather than just focussing on 'what are we teaching or what to teach'.
- 7. Providing effective teacher support based on the feedback from the assessment:** Targeted capacity building in teachers is often enabled by detailed diagnostic assessments such as the SLS, which reveal absolute performance and trends showing weaknesses in groups of students, schools and sometimes even a region or in the entire state. The background factor analysis in the study reveals that teachers with an academic degree were ineffective in achieving higher scores for their students in language and maths while teachers with teacher training qualification were effective in achieving higher scores for their students in maths. This is an indication for reviewing the teacher recruitment and training system.

The future steps would involve dissemination of the findings at the national and state level to enable policy and educational reform.



# Student Learning Study

Google

[www.google.org](http://www.google.org)



**Educational Initiatives Pvt. Ltd.**  
[www.ei-india.com](http://www.ei-india.com)