

NOVEMBER 27, 2006

INDIA
TODAY

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An **EXCLUSIVE SURVEY** of India's top schools exposes alarming gaps in student learning, with performance falling way below international levels

WHAT'S WRONG WITH OUR TEACHING?

INDIA TODAY

www.indiatoday.com

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Indians take great pride in their academic credentials. The Indian middle class parent's emphasis on education, above all else, is celebrated at home and well known all over the world. As the cut-offs for college admissions get higher every year, many among us may believe our children are actually getting smarter. Our best schools seem to exemplify the ideals of a good Indian education, with long hours, plenty of books and frequent testing being the norm.

In the light of a startling new study exclusively made available to INDIA TODAY, it is perhaps time to challenge these assumptions about how we teach our children. In one of the largest surveys of private school education ever undertaken in India, Wipro and Education Initiatives tested 32,000 schoolchildren from 142 schools across the five metros. The students were tested on Science, Maths and English, the aim being to test a student's genuine comprehension of a subject, not just the power of the memory.

Of the questions put to students, some judged their capacity to remember and others challenged their "adaptive thinking". This way, the study checked their understanding of a subject and their ability to apply that to life situations or to a query put slightly differently.

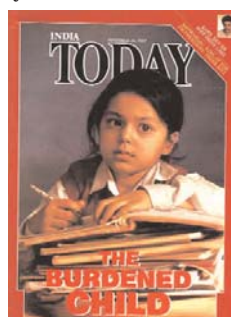
The findings from this study in a word are alarming. When questions taken from an international survey across schools in 43 countries, were put to Indian students of the same grade they scored below the international average. There was no connection between a school's facilities (extracurricular activities, computerisation) and the results turned in by their students. Even the most elite schools tended to lean towards rote learning as opposed to encouraging creativity.

The survey highlights many deep-rooted anomalies in our system of teaching. Rote learning is not harmful, but it provides incomplete education. In today's age, calculators do the multiplication and computers act as memory banks. What really count now are ideas and the application of knowledge to think out-of-the-box. Worryingly, for school boards, teachers and parents, India's best schools appear to be stuck in mechanical methods of imparting education.

By highlighting this survey on our cover, we want to provoke a debate about the standards of India's primary education and how it can be revamped. Instead of looking into the quality of our education and how to improve it, our vote-hungry politicians are obsessed only with reservation.

It is historically established that if a country has to graduate from being a developing country to a developed one, it must have total literacy and a high quality of education. As software czar Azim H. Premji whose education foundation jointly conducted the survey, says in his column: "If we want to transform India's destiny, we have to begin by changing what we teach and how we teach". I couldn't agree with him more.


(Aroon Purie)



Our Nov 1987 cover

AN EXCLUSIVE SURVEY

WHAT'S WRONG WITH OUR TEACHING?

■ By Raj Chengappa and Shruti Maheshwari

It may be sacrilegious to ask such a question given that averaging 90 per cent marks in board examinations is now passé. To ask that of India's top private schools is to prepare ground for certain excommunication. For, aren't these schools the thought leaders, the role models whose ideas and practices set the pace for others? Isn't poor quality the preserve of government-run schools? Isn't our standard of education, especially in English medium schools in major metros, among the best in the world and possibly the reason why India is fast emerging as a knowledge superpower?

Those who thought so, and most of us did, must get ready for an absolute shocker. The results of a major survey of students in 142 of India's top private schools spread across five metros made exclusively available to INDIA TODAY reveals a frightening gap in learning in key subjects. Worse, when their performance was compared to students in 43 other countries, Indian schools fared well below international levels. The survey, one of the largest

AT SCHOOL: Your child might be studying hard but not really learning

TOP SCHOOLS IN INDIA SHOW AN ALARMING GAP IN STUDENT LEARNING

INDIAN STUDENTS FARE POORLY IN COMPARISON TO INTERNATIONAL COUNTERPARTS

LEARNING IS ROTE-BASED AND DOES NOT FOCUS ON REAL KNOWLEDGE

THE SURVEY

The study was conducted jointly by Educational Initiatives (EI) and Wipro. EI is a research organisation that develops and conducts Assessment of scholastic Skills through Educational Testing (ASSET), a diagnostic test for students of classes III-X. Wipro, through its community initiative—*Wipro Applying Thought in Schools*—works for educational reforms in India. The study was conducted across 142 schools in five cities and tested learning and understanding of key concepts in English, Maths and Science of over 32,000 students in classes IV, VI and VIII.

CORBIS

MATHS

WHAT IS THE LENGTH OF THE PENCIL IN THE PICTURE?



- A 4 cm
- B 5 cm
- C 6 cm
- D 7 cm

CORRECT ANSWER IS OPTION 'B'

How they answered



Right answer Wrong answers

Observation

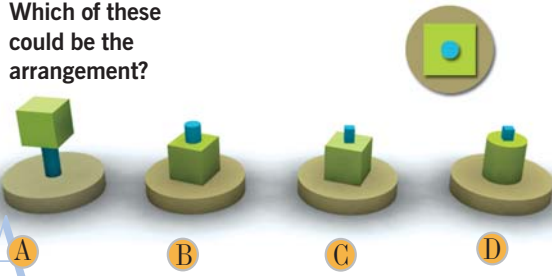
Class IV students know that readings have to be taken from the right side of the scale but not when the left end is not at zero. That this is not just an oversight is evident because the error is repeated in similar questions.

Graphics by ALANKAR

IDENTIFY THE CORRECT ARRANGEMENT

Three solids when arranged one on top of the other look like this from the top (see figure).

Which of these could be the arrangement?

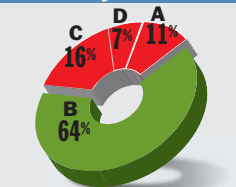


Right answer Wrong answers

CORRECT ANSWER IS OPTION 'B'

All questions © ASSET

How they answered



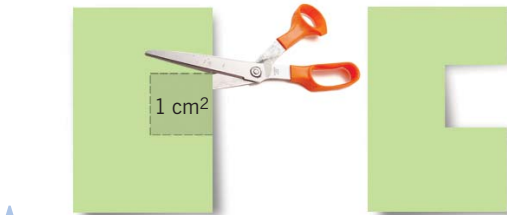
Observation

Class VI fared relatively well in a question needing visualisation even though this is not formally taught in schools.

Percentages in this graphic and others may not total 100 because of invalid or no responses

WHAT IS THE PERIMETER?

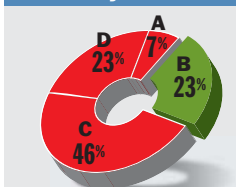
Nandita cut off a square of side 1 cm from a rectangular sheet as follows. What would be the change in perimeter as compared to the original paper?



- A It would remain the same
- B It would increase by 2 cm
- C It would decrease by 2 cm
- D It would decrease by 3 cm

CORRECT ANSWER IS OPTION 'B'

How they answered



Right answer Wrong answers

Observation

Class VIII students seemed to think that cutting something off will mean the perimeter will reduce.

STUDENTS FARE WELL IN ROTE QUESTIONS BUT TRIP UP ON THOSE NEEDING INTERPRETATION & ANALYSIS.



of its kind involving 32,000 students in Delhi, Mumbai, Bangalore, Chennai and Kolkata, was conducted jointly by Wipro Applying Thought in Schools (founded by Bangalore-based software giant Wipro) and Educational Initiatives (EI), a reputed educational research organisation headquartered in Ahmedabad. EI's Managing Director Sridhar Rajagopalan admits that when the study was conceived it was essentially to find out how well students were learning. They didn't expect to come

STUDY METHODS: The stress is on memorising and not understanding

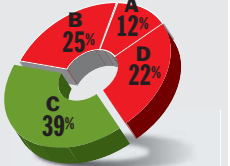
WHAT IS THE LIKELY WEIGHT OF A REGULAR TEASPOON?



A 25 milligram
B 75 milligram
C 20 gram
D 100 gram

CORRECT ANSWER IS OPTION 'C'

How they answered



Observation

Class VIII students show poor weights and measures competency which is so important in real life—something they would learn better if there was more emphasis on practical applications.



HEMANT CHAWLA

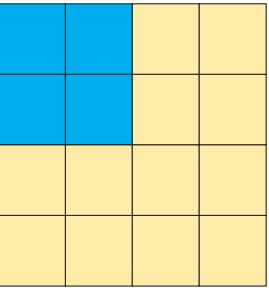
EARLY BURDEN: Students are forced to cover unrealistic syllabi

up with such disquieting results about the quality of education being imparted in India's top schools.

For the survey, the EI-Wipro team devised a series of tests to study whether the students in classes IV, VI and VIII understood key concepts in English, Mathematics and Science. Apart from multiple-choice questions that were devised to test their learning achievements, their writing competence was also put to test. A secondary study was conducted to gather insights into just how much students retain and develop their knowledge as they move to higher classes. To compare their learning abilities with those of children in other countries, questions were also taken from an international assessment study for which performance data of students from over 40 countries was available.

The analysis was geared to answer questions such as how well are students learning in these schools, how much time do students take to internalise a concept, how developed are their writing and expression competencies, is the performance of any city better or worse than others, do students of a particular board do better than those of other boards, how do they compare with international levels

WHAT FRACTION DOES THE SHADED PART REPRESENT?



A 1/4 **C** 4/13
B 1/16 **D** 4/12

CORRECT ANSWER IS OPTION 'A'

How they answered



Observation

Class IV students fare better if the question is more direct, (one out of four parts is shaded instead of four of the 16) showing an inability to handle unfamiliar questions.

WHAT IS 6789678967896789 DIVIDED BY 6789?



A 1111
B 10101
C 1000100010001
D 1000100010001000

CORRECT ANSWER IS OPTION 'C'

How they answered



Observation

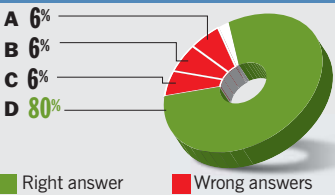
Despite learning division in class III, class VIII students trip up on this question which tests if the technique of division is properly understood.

LEARNING SEEMS TO BE TAKING PLACE IN WATERTIGHT COMPARTMENTS WITH LITTLE RELATION TO REAL LIFE.

CHOOSE THE SENTENCE WITH NO MISTAKES.

- A The taj mahal is is agra
 - B The Taj Mahal is in agra
 - C The Taj mahal is in agra
 - D The Taj Mahal is in Agra
- CORRECT ANSWER IS OPTION 'D'

How they answered



Observation

Grammar tends to be emphasized a lot in our system—one reason why 80 per cent students of class IV got this right.

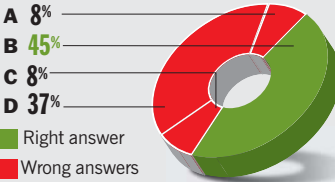
WHY, ACCORDING TO THE PASSAGE, IS PHARAOH TUTANKHAMEN FAMOUS?

“Tutankhamen’s tomb was forgotten until Howard Carter discovered it...(in) 1922...(The) treasures (in his tomb) made Tutankhamen perhaps the best known of the pharaohs...”



- A He died under tragic conditions
 - B His tomb had many valuables
 - C The walls of his tomb were thick
 - D The tomb was discovered in 1922
- CORRECT ANSWER IS OPTION 'B'

How they answered



Observation

None of the phrases in the question appear as they do in the passage—enough to confuse class VI students.



LANGUAGE IS BEING LEARNT LESS AS SOMETHING INTRINSICALLY GRAMMATICAL AND USEFUL AND MORE AS A SUBJECT FOR A TEST.

WHAT’S AMISS IN ENGLISH

Common errors that occur in student writing across classes IV, VI and VIII

	SPELLING	GRAMMAR AND PUNCTUATION
4 th	carring for carrying gowing for going sum for some	say the aunty, said you, asked that, he said his mother is been carrying, has went Ignoring capitalisation of proper nouns Errors in sentence formation and punctuation
6 th	minites for minutes carring for carrying	said you, not in the home Improper use of capitals and apostrophe and erroneous sentence formation has went, is been carrying, was come, calls to our house
8 th	carring for carrying recieve for receive aunti/anti for aunty meat for meet greatful for grateful	asked to me, rang of the phone, the Dipti Aunty Ignoring capitalisation of proper nouns and unnecessary speech marks in written text if you going to be delayed

and are there any differences in the performance of boys and girls.

The results do present a dismal picture of student learning in the country’s premier schools. The highlights:

- Students appear to be learning mechanically rather than truly understanding the concepts.
- They performed exceedingly well only where the answers could be mugged up from textbooks showing a disproportionate and unhealthy bias towards rote learning.
- Their performance on questions testing comprehension or applications was far below acceptable levels.
- The students slotted learning into artificial compartments and their ability to apply what they learnt to real life situations—essential for competence building—was extremely poor.
- The survey showed that while

learning did improve as the students progressed from class IV to VIII, many of them caught up with class III and IV concepts only when they reached class VI. It’s a warning that our learning process is unsatisfactory.

- Worryingly, when international comparisons were done, class IV students in Indian schools performed far below average in Mathematics and Science when compared to their counterparts in 43 other countries.
- Surprisingly, when comparisons were made across Indian cities, Delhi, Mumbai and Kolkata outperformed Bangalore and Chennai. The reason may relate to differences in the respective state curriculums.
- Interestingly, those schools affiliated to the ICSE Board outperformed the CBSE Board which in turn outperformed the state boards. It indicated that ICSE was more adaptive to current needs.
- Class size or school facilities such as computers and libraries made no substantial difference to a school’s performance indicating that what matters most is the way children are being taught to learn.
- In a somewhat controversial finding, boys outperformed girls in Maths. The hypothesis for this finding is not genetics as a former Harvard president once conjectured and got into serious trouble for doing so. But apparently because of societal pressure that compels parents to force their male children to excel in Mathematics.

The survey strikes at the core of what’s increasingly going wrong with the approach to education—the focus on high value scores in board exams rather than concentrating on imparting real learning. While the results of the study are yet to be made public, experts reacted differently when told about some of the key findings. Arun Kapur, director of Delhi’s Vasant Valley School, believes that the survey finally gives statistical validity to the reality that had been staring schools in the face for a while. Says Kapur, “It’s been clear that instead of focusing on inputs we need to be looking more closely at outcomes. That we need to reduce the importance we give to the role of textbooks and shift the emphasis to application in real life. The survey gives us a vehicle to do that.”

Educationists do acknowledge that

METHODOLOGY

How The Survey Was Done

To understand how well children are learning in the top schools of our country, a national level research study was jointly conducted by Educational Initiatives (EI) and Wipro Applying Thought in Schools. Over 32,000 students from 142 leading schools of five metros—Mumbai, Kolkata, Chennai, Delhi and Bangalore participated in the tests conducted between February and April 2006.

To identify 200 leading schools, a sample survey was conducted of 200-230 persons in each metro from various categories like students, teachers and professionals. The selected schools were then asked to randomly identify two sections each of classes IV, VI and VIII to participate in the test. Schools were requested not to break classes or to select students for the study to prevent skews such as getting just toppers to take the test.

Special test papers were designed with multiple-choice questions of known difficulty levels from past ASSET papers. A 'secondary study' was designed to understand student learning across classes.

A special design called 'rotated test papers' was used for the purpose of the study. There were two sets of papers for each class with some common questions. This means each student, in a way, wrote only half the test. This was done to allow a larger range of competencies to be tested without making the test too long.

Some of the questions in the test were from an international test known as 'Trends in International Maths and Science Study' (TIMSS). For these questions, the performance of students from 43 countries from around the world was known. This was used

to benchmark learning in our top schools with international levels.

The tests were coordinated by EI's city coordinators for the project. During the tests, adjacent students received different papers. The second section of every class got the secondary study paper (which was common for all the classes). A written task was included in every test paper.

A panel of experts comprising principals, educationists, subject specialists and assessment experts from various parts of the country guided the entire project. Wipro's Anand Swaminathan says, "Their inputs were sought on the overall design of the study as well as the design of the test papers, though not on the actual choice of questions."

Regarding the caveats for the study, Anar Shukla, Project Manager, EI, says, "This study is not an attempt to rank or identify top schools or boards, rather it is an attempt to understand overall patterns in student learning in the leading schools of our metros. No conclusion can or should be drawn based on this study's findings about individual schools, as the sampling was not designed for that, but rather for obtaining an overall picture about the leading English-medium schools of different cities."

STEP BY STEP

- 1 IDENTIFICATION OF TOP SCHOOLS:** To gauge this, around 200 people were surveyed in each metro.
- 2 THE NUMBERS:** 32,000 students of classes IV, VI and VIII were surveyed from 142 schools.
- 3 SUBJECTS:** Tests were conducted in three subjects—Maths, Science and English.
- 4 TESTS:** Students of the selected schools took the tests between February and April 2006.
- 5 VERIFICATION:** Results were discussed with experts and their views obtained.

CLASS VIII STUDENTS CONSISTENTLY FILTERED EVEN ON CONCEPTS THEY HAD LEARNT IN JUNIOR SCHOOL.



SCIENCE

WHAT IS THE CHEMICAL FORMULA OF PURE STEAM?

- A CO
B H₂O
C O₂
D Pure steam does not have a chemical formula

CORRECT ANSWER IS OPTION 'B'

How they answered

A 4%
B 37%
C 6%
D 51%

Right answer Wrong answers

Observation

Class VIII students fail to make a two-step reasoning: that water is H₂O and it evaporates to form steam.

emphasis on rote and procedural learning is good to some extent as it builds in students the necessary rigour and hardwork to achieve results. Shyama Chona, principal of Delhi Public School in R.K. Puram, says: "Memory plays a very important role in learning and we Indians by culture are very good at learning by heart. And this is not learning without understanding, otherwise how would they remember all the concepts for years. So learning by rote is not bad at all. The problem with our education system is that it is too bulky and the students are made to learn too much, too fast. It's clear we need immediate and rapid reforms."

MATH LABS: Concepts are internalised only when practised

Other experts though believe that the disproportionate emphasis on rote learning is clearly proving to be counterproductive. Dr K. Subramanian a professor at the Homi Bhabha Centre for Science Education in Mumbai, who was part of the expert panel which analysed the survey results, says: "It's clear from the survey that our top schools have very unsatisfactory learning. That children are not using their minds and there is something that is putting their thinking and analytical abilities off. The exclusive focus on high marks actually produces

this kind of learning and responses and affects the students all the way down to what the teacher chooses to stress on in class. Ultimately the goal of education is not to cover the syllabus but to uncover knowledge and that is yet to happen."

So then what is the way out of the morass? Experts offer a wide spectrum of solutions from drastically altering the curriculum to changing the examination system. The consensus is that there needs to be a shift from facts to skill. Students need to develop skills to learn how to learn rather than simply having to memorise larger and larger syllabi. They believe that in the coming

THE EARTH'S ROTATION ON ITS AXIS IS THE REASON FOR...



A the different seasons
B longer days in summer
C eclipses
D day and night

CORRECT ANSWER IS OPTION 'D'

How they answered

A	17%
B	8%
C	7%
D	66%

Right answer Wrong answers

Observation

Class IV students fare well in this typically 'textbookish' question showing ease in handling rote problems—this is seen in other such questions as well across all grades and in all cities.



UNIFORM PROBLEM:
The focus is on getting high scores

HEMANT CHAWLA

WHAT WILL HAPPEN IF A SOLID HAVING THE SAME DENSITY AS THE LIQUID IS PLACED IN IT?



A It will sink
B It will float
C It will stay in any position within the liquid
D A solid cannot have the same density as a liquid

CORRECT ANSWER IS OPTION 'C'

Who got it right?

A	8%
B	17%
C	28%
D	44%

Right answer Wrong answers

Observation

This unfamiliar question requires an understanding of density and cannot be answered by rote.

A FISH BREATHES THROUGH ITS GILLS WHEREAS WHALES BREATHE THROUGH THEIR...



A lungs
B air holes
C skin
D mouth

CORRECT ANSWER IS OPTION 'A'

How they answered

A	36%
B	40%
C	11%
D	10%

Right answer Wrong answers

Observation

Even though class VI students know that whales are mammals and that mammals breathe through lungs, the majority do not make the connection.

HOW CAN YOU MAKE THE TORCH WORK?

Srihari has a torch with him and two new batteries. However, the torch requires three batteries to work. Is there anyway he can make the torch glow?



A Place a nail lightly in between
B Place nothing in between, just the two batteries
C Place a piece of cloth tightly in between
D None of these will work

CORRECT ANSWER IS OPTION 'A'

How they answered

A	52%
B	7%
C	4%
D	35%

Right answer Wrong answers

Observation

Class VIII students know that nails conduct electricity but fail to apply that knowledge here.

CLASS VI INDIAN STUDENTS IN SOME TESTS WERE OUTDONE BY INTERNATIONAL STUDENTS OF CLASS IV.

years, it would be more important for students to learn how to rapidly adapt to different job tasks and to constantly think out-of-the-box.

Given that there would be a host of new careers requiring specialised skills, it's important that the base—which is school education—be flexible and innovative to help students meet these challenges. Professor H.S. Srivastava, a former dean of NCERT, says, "What we need is to develop a system that encourages students to gain multiple abilities to help them combat the rapid changes in today's world."

Others call for a fundamental overhaul of the system. Fr T.V.

INTERNATIONAL SCORECARD

Trends in International Maths and Science Study (TIMSS) scores reveal that Indian students are not up to the mark.

Maths Score



International 63%
Indian 50%

Science Score



International 64%
Indian 48%

Comparative performance of students in Indian metros vis-a-vis the international average in class IV

Kunnankal, former CBSE chief and a member of NCERT's Steering Committee for Curriculum Reforms, says: "The problem is that our teachers are of the 'chalk and talk' type. But we have to make learning much more interactive at all levels right from kindergarten onwards. The laboratory approach in Mathematics, Languages and Science works far better than the text book method."

Rajagopalan agrees with Kunnankal's approach and adds: "What is also needed is for board exams to shift from rote questions to those that test understanding and make the process of correction more stringent. These would have a cascading effect, eventually leading to teachers focusing more on learning with understanding rather than by rote." He also emphasises the need for regular external assessments to gauge the health of the system and also to

constantly benchmark it to the best in the world.

All this is easier said than done. Perhaps we should learn from geniuses such as Albert Einstein who once said: "I never teach my pupils; I only attempt to provide the conditions in which they can learn." With Chinese President Hu Jintao arriving in Delhi from November 20 it may be more politically appropriate to quote Confucius who once said:

"What I hear, I forget.
What I see, I remember.
What I do, I understand."

We would like you to respond to the article by sending your comments to teaching@intoday.com or writing in to our mailing address. We plan to feature the best ideas from our readers on the subject in our future issues. For full text of the survey visit www.indiatoday.com