Volume 4, Issue 1
March 2007

Chiguru

Learning Network Newsletter

Dear Readers,

Greetings! We are pleased to bring you the first issue of Chiguru, the Learning Network Newsletter for the year 2007.

Inside this Issue

The *Viewpoint* section contains the summary of a study done to understand how well children are learning in the top schools of our country. Following this, we share a dialogue between Beena Choksi and Sridhar Rajagopalan on this study. Suma Vivekanandan shares her experiences of motivating students in her classroom to learn the basic number operations and skills. Arvind Gupta in his article "Toying Around" that urges us to rethink mainstream ideas of what we call 'toys'. And do not miss the inset flyer with details of the upcoming 5th Annual Learning Network Conference.

We thank all of you who contributed articles to this newsletter. We welcome your contributions to upcoming issues of Chiguru. We hope that the enthusiasm to share and learn continues!

Best Wishes,
The Newsletter Team
(Anita, Anju, Meenakshi)

5th Annual Conference

When
July 20-22, 2007

Where
Deenabandhu Trust,
Chamarajanagar

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Viewpoint

What's Wrong With Our Teaching?

Educational Initiatives (EI) and Wipro Applying Thought in Schools jointly conducted a national research study to understand how children are learning in the top schools of our country. The November 27th issue of India Today carries a cover story highlighting the main findings of the study. Below we share a summary of the report.

Mainstream public discourse on education assumes that poor quality is an issue largely confined to government schooling. But how well are students in our 'top' schools learning? To understand this, Educational Initiatives (EI) and Wipro Ltd. conducted a research study in the 5 metros – Mumbai, Kolkata, Chennai, Delhi and Bangalore.

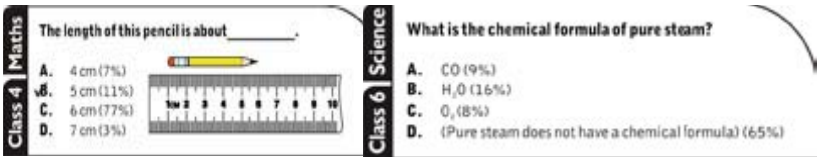
Students seem to be learning language less as something integral and useful to real life, and more as if it were merely a school subject being studied for a test to be passed.

Findings

Over 32,000 students of classes 4, 6 and 8 from 'top' English medium schools (as per public perception) participated in this study. An analysis of their performance suggests that students seem to rely on memory or learnt procedures to answer almost all questions, rather than trying to think through and solve the unfamiliar ones. It appears that many practical competencies, important in real life, are not being developed very well. Students' performance on questions based on measurement, estimation, problem solving, general observation and day- to-day language use is not very good. Many competencies - important in real life - do actually form a part of the school curriculum. But probably the way they are taught distances them from the real world - resulting in surprisingly low performances in questions testing these competencies.

Instead of acquiring concepts, students seem to be learning to handle a limited number of question types. So when they come across a question similar to one they have 'learnt', they 'jump' to the most

familiar answer they find! It is not unusual to find students, parents or even teachers sometimes referring to a question that is not in the textbook or from the class discussion as 'out of syllabus', even if the topic of the question is very much a part of the syllabus. Incidents of students memorizing essays or proofs of theorems are other manifestations of this thinking. Students are learning in 'compartments', i.e. they may be aware of two pieces of information, but often not know how they are related or how that relation works in a real life situation.



Some examples showing students faltering when questions are asked in even a slightly unfamiliar form. (Figures in brackets indicate the percentage of students who chose that option.)

Writing abilities of students

The analysis of a writing task (writing a paragraph, describing a picture/incident or writing a story) shows that although students' proficiency in English increases with class, even in class 8 about 80% of students are making mistakes in comprehension, grammar and syntax. It appears that in a large population of students language learning is mechanical, with students often failing to relate a writing task to its real life implications.

Some recommendations

Students must be encouraged to convey oral messages in short and simple sentences from the earliest classes. Day to day, real life situations should be used, and this should be extended to written messages gradually in higher classes. Students These could include advertisements, film posters,

> Students should be exposed to reading and understanding as many unseen passages as possible in the form of authentic material.

brochures, labels, interviews and reports from magazines and newspapers and factual passages. Regular reading of passages, short stories, magazines and the daily newspaper would familiarize students with contextual vocabulary, different sentence constructions and figurative expressions, conducive to creative writing.

School factors affecting performance

Some background information - like the average class size, the number of hours of instruction per week, the number of working days per week and whether the school has laboratories for Math, science and language - was sought from each participating school. None of the factors like class size or school facilities seemed to be strongly and clearly correlated to the student performances in the tests..

The current focus on valuing high scores in the board exams or fancy facilities in our schools is unlikely to take us far, as far as real learning is concerned.

Comparative performance of the metros

It may be expected that the 'top' schools of the 5 metros will not show any major difference in their overall performance. After factors like infrastructure, socio-economic background of the students, and teacher profile are similar across schools. However, the performance of the cities fell into two categories, with Kolkata, Mumbai and Delhi clearly outperforming Bangalore and Chennai.

Next Steps

This study shows that even in the 'top' schools, a significant fraction of middle school students have not mastered primary school competencies. Improving the quality of learning in our schools will happen only if we choose to make that commitment to the next generation, by way of focusing on real learning.

The full text of this report is available at
http://www.ei-india.com/whats-wrong-with-our-teaching/

Sharing Corner

A dialogue on the report "What is Wrong with our teaching?"

We include below a dialogue between Beena Choksi of Homi Bhabha Center for Science Education (HBCSE) and Sridhar Rajagopalan of Education Initiative on some aspects of the report "What is wrong with our teaching?". Want to share your thoughts on this report? Do write to info@learningnet-india.org

Beena Choksi: The major findings of this study ("What is wrong with our teaching?" are troubling. School and college faculty and management, parents, curriculum developers, textbook writers, and corporate leaders as well, are familiar with the steady deterioration of education in private schools, especially over the last decade. All the same, this study may well have burst the bubble of those stakeholders of 'top' private schooling who have continued to reside in it (comfortably or otherwise). Below are comments on some sections of the study.

Rote learning is an outcome of 'rote teaching.'

Rote learning is an outcome of 'rote teaching.' So long as no demands are made on teachers by teacher educators to (learn to) think in multiple ways and encourage multiple ways of understanding in their classrooms, school students will display the ability to rote learn.

The recommendation that students be exposed to reading in the form of 'authentic material' is sound. However, including advertisements, film posters, and brochures in the category of 'authentic material' is startling. The recent fad of numerology, the "cleverness" of copy writing in the world of advertisements has resulted in a degeneration of authentic spelling and writing. The meaning of 'authentic' is more than 'real.' Film posters and advertisements do constitute the 'real world' for many of today's students. So does the use of mobile phones and its SMS culture. Yet, if the learning derived from them is likely to be limited and seriously flawed (with respect to language learning), then other authentic material which is also 'valid' must be sought.

Sridhar Rajagopalan: I would say both 'valid' authentic material (as well as posters and SMSs) constitute 'in-use' language and are important. Obviously this is not to underplay the importance of good literature or good writing - which should be covered also.

Beena Choksi: The correlation of factors such as library and computer facilities or class size to learning (performance) is commonly researched in the field of education. The finding that "none of the factors like class size or school facilities seemed to be strongly and clearly correlated to the student performances in the tests," was to be expected given the nature of data that was gathered by the study to assess the correlation.

- What proportion of assignments are designed to require students to use these facilities? - Are students guided in their use of them?
- Are the teachers adept at using these facilities from an educational point of view?
- Do students make use of the internet facility merely to copy and paste information from websites or are they taught how to search for multiple points of view on the same topic, critically assess the information on websites?

The Questionnaire for Schools indicates an effort to understand "if factors other than quality of classroom teaching affect student learning". This in itself is problematic from an educational point of view. To see these factors as apart from teaching and therefore measure them in static terms (classroom size, number of library books, access to internet) can lead to hasty, misguided conclusions. "Other factors" have meaning only in the context of teaching because the fundamental issue is whether and how opportunities afforded by them are utilized *purposefully* by teachers to enhance student learning.

Involving students in hands-on activities and providing meaningful feedback which are accepted as "best practices" in teaching, are easier to carry out if the class size is small(er)-provided of course the teacher is willing to take advantage of this feature. Similarly, how meaningfully the use of library

and computer facilities are structured and integrated into teaching practice will determine their influence on student performance. Perhaps future studies will take a more dynamic, complex and qualitative view of these variables in assessing their influence on student learning.

Much of private schooling in recent times has become less of a social and educational enterprise and more of a business management venture, spurred by profits and thought about in terms of cost-benefit. If class size is reported to have no influence on student performance, large classes may be justified as a means to improve the cost-benefit ratio. If library and computer facilities are reported to have no influence on student performance, no additional effort may be invested in using them consistently and creatively. Reporting a lack of correlation between class size or school facilities and student performance derived from limited data could lead to conclusions and decisions by school administrators/managers/trustees which are impulsive and ill-considered.

The quality of teaching, the nature of engagement and the richness of the learning environment matter most

Sridhar Rajagopalan: I guess it is a double edged-sword. What the questionnaire analysis says (broadly) is that 'presence of libraries and computers alone does not lead to real learning'. I am not sure if the suggestion to have more complex questions that ask things like "are children actually using internet resources effectively or are they simply copying" is an easy exercise that will yield correct answers. But I do appreciate that if we can establish scientifically what we both are saying - that the quality of the teaching, nature of the engagement and the richness of the learning environment matter most - it would be very good. At this point, I am not so sure that large classrooms (at least upto 40 students) are bad or that small classrooms are the way to go, especially in a country with a large population like India's.

Beena Choksi: Factors such as 'socio-economic background of the students,' 'infrastructure,' 'teacher profile' which were the variables taken into account may be 'common' to the study, but seem to have been equated and confused with being 'similar'. The probability of similarity in a non probability sample is likely to be low.

The reason for the "surprise" at schools in Kolkata, Mumbai and Delhi clearly outperforming those in Bangalore and Chennai is not clear. Is the surprise based more on some hidden assumption of the researchers about which cities are likely to have an edge over others? Or, is there any prior research which has pointed to some pattern in the performance outcomes across metros?

Sridhar Rajagopalan: There is no prior reason to believe that this trend would show. For example, the Chennai region scores higher than most other regions in CBSE results. Hence the initial surprise.

Beena Choksi: Poor student performance as revealed by the study is symptomatic of a deeper malaise. We must enter classrooms-both in schools and teacher training institutes-to understand how teacher-student transactions unfold. Educational researchers must enter into partnerships with teachers and students, with curriculum developers and school management, to become a part of a sustained effort to change the way students learn and the way teachers teach.

Learning Spotlight — Manavik

Manavik, a center for Research and Innovations in Science, Education, and Health is located in the central hills of Orissa. It has been working with school teachers, parents and children for past 30 years and consists of several resource persons from schools/colleges, research & research institutes, NGOs, medicals, educational institutions, health workers and social activists.

Manavik activities include organising training programmes for teachers, students, parents on issues related to science, education, health and vacation science/mathematics programmes for students, publishing and disseminating resource materials on education. *Manavik* has published more than 120 books/booklets on education/ science including several educational classics It is closely associated with several national and state level educational initiatives.

Manavik has organized Environment Education Camps for teachers, NGOs and children regularly in almost all states/UTs in collaboration with Department of Science & Technology, Govt. of India and State Education Departments. It collects and disseminates the best of resource materials from different parts of the country for the benefit of local educators. Manavik believes that access and exposure to ideas through print and audio-visual media, workshops/seminars/camps/ exposure visits/activity camps etc. is significant to bring about quality improvement in education. *Manavik* is unique in that it has been able to self-sustain all these activities with very little assistance from national of international agencies.

For more information visit http://www.learningnet-india.org
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Sharing Corner

Motivating Students in a Math Classroom

Suma Vivekanandan from Atul Vidyalaya shares her experiences of motivating students in her classroom to learn the basic number operations and skills. She can be contacted by writing to atul_vidya@yahoo.com

Mathematics is a concept-laden subject. It has many skills which need to be mastered, one of the important ones being the four basic operations and related algorithms for the above. For practicing these skills, teachers give a number of problems as "drills". Many of these problem sets are stand-alone and decontextualised. Students usually get bored doing these drills and there isn't much learning.

In the primary school at Atul Vidyalaya we try to make these drills interesting by taking examples from Number Theory that are accessible to primary students and also have built-in surprises. In this article, I share some of these problems and the reactions of the students.

Usually mathematics problems are expected to have only one correct solution.

Students enjoy doing these problems as many of them have surprises at the end, which delight them and give them a sense of accomplishment. Many of these problems are open-ended and have more than one correct answer. Usually mathematics problems are expected to have only one correct solution. The moment a student in a class gets the answer and the teacher recognizes it, other students lose interest in working out the solution. Having many correct solutions was a win-win situation and did not create any competitively pressurized situations.

I was amazed at the enthusiasm of the students in doing the problems. Students who normally were reluctant to do more than 5 problems did 20 to 30 variations of the original problem with delight.

Many of them found the standard notebook page size inadequate and hence took larger sheets of paper or chart paper and made innovative and creative written presentations of their explorations. Students were also unconsciously mastering basic skills in computation, algorithms and problem-solving.

I give below 3 such problems. I invite readers to explore and find out the surprises for themselves.

Odds & Evens

Take any number. If it is even, then divide it by 2. If it is odd, then multiply it by 3 and add 1. Repeat the process endlessly. For example 6 -> 3 -> 10 -> 5 -> 16 -> 8 -> ……..…… The surprise is that whatever number that you start with, it always ends in **one particular number**. I understand that there is no mathematical proof for this result. Students of a class can take any number from 1 to 100 and explore. The entire process can be captured graphically as a river with many tributaries joining it at different points as the river ultimately reaches the sea.

1234

Use numbers 1, 2, 3 & 4 in the same sequence along with any acceptable mathematical operator and get all numbers from 1 to 100.
I had asked each student to come up with at least 10 solutions. Many came out with 20 to 30 solutions. One of my students came out with 150 different answers. Some of the solutions are given below.

1 + 2 + 3 + 4 = 10
12÷3 + 4 = 8
12-3-4 = 5
12 + 34 = 46
123 + 4 =127
12 + 3 - 4=11

They also came out with unexpected solutions like
L.C.M of 12 and 34 = 204
12^{th} multiple of 34 = 408

This problem can be done at any level in school up to class 12 with

students using more and more sophisticated operators like square root, log, factorial(!) etc.

At initial stages students can write down all the solutions they get sequentially and find solutions for missing numbers. At the second stage they can try to get multiple solutions for a particular number; say 47. I personally have seen about 30 solutions for 1; i.e. 30 different ways of getting the answer 1 using 1,2,3 & 4.

Describing Number Sequences

Take any 2 digit number, say 24. Write below it a number which describes the number above, as explained below. 24 consists of two digits 2 & 4. The quantity of 2 is one and the quantity of 4 is one.

So the number which describes 24 is written as 1214 (one of 2 and one of 4). The described numbers are written in ascending order .i.e. description of 2 is written before that of 4.

Repeat the process. i.e. describe 12 14.

It consists of 1, 2 & 4.

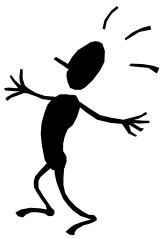
The quantity of 1 is two, that of 2 is one and that of 4 is 1.

So the number which describes 1214 is written as 21 12 14.

Repeat the process.

211214 is described by 31 22 14

312214 is described by 21 22 13 14



Any one who continues the process will meet a surprise in about 8 to 12 steps.

Readers are welcome to share their solution by sending it to :

Suma Vivekanandan, Primary Mathematics Teacher
Atul Vidyalaya, Atul, Gujarat 396020,
Email: Atul_vidya@yahoo.com

Article

Toying Around

This article, written by Arvind Gupta, appeared in Times of India on December 23, 2006. Arvind Gupta works at the Children's Science Centre in Pune. He can be contacted at arvindguptatoys@hotmail.com

A parent bought an expensive toy and after removing it from its gleaming box gave it to the child with a warning, 'Handle it carefully, don't break it'. The toy had rounded corners so the child could not even feel its edges. She couldn't hammer it on the ground as it was made of plastic. It had no smell or taste. Within three minutes flat the child had left the neatly rounded plastic toy in the corner, and was merrily playing with its box. She knew that she would not be scolded for throwing the box on the floor. From her own viewpoint the little girl had made an intelligent assessment of the toy. Today, children are inundated with expensive toys. Parents seem to be in a hurry to buy the latest toys with flashing lights and sounds.

Pedagogic learning is now associated with gloss and gleam. Children play with such toys for a while and then they throw them away. Instant gratification, instant forgetfulness seems to be the norm. Children need large chunks of time to play and mess around with things they like. This is how they construct their own knowledge patterns. According to Rabindranath Tagore, the best toys are those which are innately incomplete and which a child completes with her participation.

As a child, my daughter was gifted many expensive toys. But she was happiest playing with spoons and pots in the kitchen. Whenever we broke a coconut to make chutney we would preserve all the pieces of the hardwood in the washed plastic milk bag. In her spare time she really enjoyed putting the pieces together to make a wooden ball. This was akin to a three-dimensional jigsaw.

Children are eternal explorers. In their free moments they are experimenting and improvising. They are always making and inventing things out of odd bits and trinkets.

They learn a great deal from ordinary, organic things found around the house, and without being taught. The main thing about scrap is that children can use it freely without adult admonishment.

Traditionally children in India made their own toys - sometimes with the help of adults, often by themselves. Old pieces of leftover cloth were recycled into dolls and puppets. Empty matchboxes were favourites for making dressing tables and houses. Crown caps made lovely gears. Old newspapers were wonderful for making caps one could wear. And one made several kinds of whistles using leaves and scraps of paper. Over a hundred such handmade, self-made toys have been documented by Sudarshan Khanna, a professor at National Institute of Design, in his fascinating book, The Joy of Making Indian Toys.

Children require many experiences with different materials and situations before they start making sense of the world.

In today's context these toys can only be described as minimalist and eco-friendly. Since everything mattered nothing was ever destroyed, only reincarnated. These toys are a salute to the genius of Indian children. Much before the onslaught of the Barbies and Skullman - sexist and violent toys, children made their own toys and had loads of fun. They used local materials, often throwaway discards which didn't cost any money. Even poor children could enjoy them. Traditional toys evolved over centuries. Someone tried a simple design. Others added to it, and still other generations refined it to perfection. So the aesthetics, simplicity, utility, cost-effectiveness of a vernacular toy is a product of years, maybe centuries of R&D effort. And it is left behind in the public domain for subsequent generations to enjoy - magnanimity in an era of constipated patent regimes.

'The best thing a child can do with a toy is to break it', might sound like an anarchistic slogan. But there is great deal of truth in it. Every curious child would want to rip open a toy to peep into its 'tummy'. Good toy designs invite children to pull them apart and put them back

again. The Mecanno is a classic example. Children with fertile imaginations make far more things with the generic pieces of the Mecanno than are listed in the manual. Children learn best with familiar things.

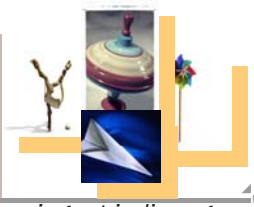
In 1907, Yakub Perelman, father of Russian popular science, published a book Fun with Physics, in which he used roubles and kopeks as weights. Coins are minted and therefore have standard weights. Coins are also accessible to the poorest children. A century later none of our puritanical science textbooks start on 'weights' with coins. What is the weight of an ordinary matchstick? Many science graduates wouldn't have a clue to this simple question.

Our feel for things and phenomena are very crude. Our estimates of length, area, volume, weight and time are often off the mark. These concepts are merely 'covered' in the course curriculum and remain empty words. Before children can understand a thing they need experience: Seeing, hearing, touching, arranging, taking things apart, and putting them together. They need to experiment with real things.

The biggest crisis of Indian design is that educated people do not wish to dirty their hands. And there are no good schools for children of artisans. Burettes, pipettes, test tubes and fancy glassware often threaten children. Fortunately, in most schools they are kept locked in the cupboards with a grime of dust covering them. The need of the day is to do more with less.

The great pioneers of science did their work with simple equipment. It is possible to follow in their footsteps. After all, the child's mind is the most precious piece of equipment involved.

Want ideas for simple, fun toys that you and your children can make and break? Visit http://www.arvindguptatoys.com/toys.html



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About the Learning Network

The learning network is a network of groups exploring various approaches to holistic learning . It is a resource for educators, parents and organizations seeking meaningful approaches to education.

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