Edk12!

Testing the value proposition

The AGEM Team

May 12, 2012

Contents

1. What do we propose to do

Indian education is stuck in an 18th century factory model rut at a time when society at large is beginning to see the connection between education and prosperity. The federal government has responded by bringing in the right to education and has introduced controversial mechanisms to ensure public private partnership in implementing it.

Within this context we propose a mechanism that will recognize the key problems in terms of the outcomes of the current education system and provide solutions that are scalable, affordable, measurable and effective.

1.1. The principal problems

There are two principal problems as we see them:

1.1.1. Visible problem - The disconnect between education and the needs of employers/tertiary education

Expressed with elegant brevity by the CEO of one of India's largest employers which is also a training company, Manish Sabharwal says:

> MANISH SABHARWAL - TEAM LEASE
>
> As a staffing firm, TeamLease sadly doesn't hire 95% of the youngsters who come to it for a job. As a training firm, it estimates that 40% of these job-interview rejects need more than a year of "repair" or "preparation" to make them truly job-ready.

1.1.2. The invisible problem - In a world that is changing rapidly - is there a requirement to ensure that we are preparing our children for a future where the only constant will be change.

The issue is that in a country that is developing at 6 to 8 percent can we truly say that our children are not being prepared for change.

The evidence lies in the first problem. Our children are not being prepared for the present, let alone the future.

1.2. The principal solutions

We see this as requiring three principal measures and try to present the rationale for these measures in the following paragraphs.

1.2.1. Imparting meaningful education

Currently there is a vicious cycle created by the examination boards which have to provide mechanisms for consistent marking across the length and breadth of a very diverse country. This focuses the examination system and thereby the school system into discrete data/info relationships rather than grey area issues. In other words, there is always a clear "right" answer even if the rationale behind it is not known by the student and often by the teacher.

We need to move beyond these confines to create in children the capacity for inference i.e. the ability to apply information to new circumstances and through dealing with real world problems being to acquire what Damasio and Yang have termed "skilled intuition"

1.2.2. Inculcating decision making skills

While an infant has all decisions made for it, the adult is supposed to have competent decision making skills. This transition occurs infrequently in the home and more infrequently in the classroom. It is only in the playground, particularly in team games, where children get to make decisions, sometimes have conflicts which they usually resolve harmoniously, and get immediate feedback on the quality of the decision. We need to extend these characteristics at least into the classroom. We have to remember the famous phrase variously attributed to some individual in the British nobility that the battle of Waterloo was won on the playing fields of Harrow and Eton. The mention of classrooms is conspicuously absent. Hence the origin of the problem is not necessarily in the immediate past.

1.2.3. Inculcating participative decision processes

PIDM or participation in decision making has been shown to produce increments in performance in various industries. There are three specific illustrations. Firstly, in the figure below, one can see the relationship between the TIMMSS test and the prosperity in the country concerned. One can see that in the lower right quadrant you have a strange phenomenon that high income correlates with bottom line TIMMSS test scores. These are also countries that are not known for invoking the opinions of their citizens into government decisions.

Similarly, if one looks at the United Nations Human Development Index, the top three countries are Norway, Australia and the Netherlands. None of the 200 people who have sat through the presentation have been able to name any individual or great leader who could have carried these countries to the top of the UN HDI. On the contrary these countries are known for the equality of citizens, participative government, and a focus on education and laws against child abuse. India, leaders exuding from every pore stands at the far end of the spectrum with a position of 134 on the UN HDI.

2. What is the value proposition

Our value proposition is that we would dilute the following two problems.

2.1. the gap between school education and the needs of the workplace and tertiary education

We will endeavour to establish the validity of this problem in two ways. The Hirsch Index is a measure of how India performs against other countries. The World Bank statement is culled from a report which includes initiatives by the Govt. of India and by the World Bank.

2.1.1. The Hirsch Index

The Hirsch index is a function of the number of citations academic papers receive. India ranks 24th on the list (Country Rankings by Hirsch Index) in spite of having the world's second largest population.

2.1.2. The World Bank Report

> "there can be no major expansion or improvement of higher education in India without first improving and expanding the secondary level."

2.2. the gap between current educational outcomes and the needs of the future.

To address this, we provide an incisive statement from a World Bank Report

"Finally, India's gross enrollment rate (GER) at the secondary level of 40 percent is far inferior to the GERs of its global competitors in East Asia (average 70 percent) and Latin America (average 82 percent). Even countries such as Vietnam and Bangladesh, which have lower per capita incomes than India, have higher gross enrollment rates. The relative success of these countries suggests that India is underperforming at the secondary level, and has scope for significantly improving access and quality of secondary education given its current (and projected) GDP per capita. It also suggests that India needs to increase public investment in secondary education to remain globally competitive."

3. Testing the value proposition

We tested the value proposition by running seminars for school teachers and principals. Each individual in the group had our proprietary wireless keyboards and was able to respond to pre-prepared questions in our presentation as they were displayed.

There were two groups. Group 1 comprised 14 members of staff of an International School in Bangalore which included a male Principal, 11 female teachers, and two "others".

Group 2 comprised 32 members of a Society that runs a group of schools across the country with the highest reputation for academic success. Students are largely the children of scientists which may be a weighted factor in their success.

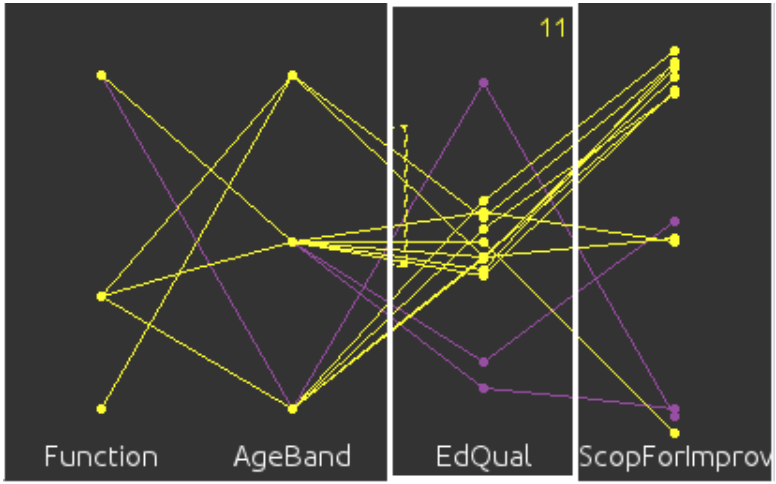
Identities of both entities are being witheld.

In this experiment, we were trying to assess the impact of a number of issues but in doing so we have to be mindful of Einstein's advice that the mindset that created the problem cannot be the mindset that will solve the problem. Historically, the Religious Institutions, Armed Forces and Education are three types of entities that have been averse to getting management expertise from outside the system. Hence, feedback

from within the system has to be absorbed with care for the mindset may be more influential than vested interest or the demands of inertia.

3.1. Perception of educational quality

The responses of those who felt education quality was very low or very high tended to predict low scope for improvement. The rest appeared to tend towards the prediction of a high scope for improvement. The parallel coordinates display shows this outcome. Educational Quality(EdQual) and Scope for Improvement of the educational system (ScopForImprov) are jittered to give a better idea of the relationships between EdQual and ScopForImprov.



3.2. Perception whether it is possible to effect change

This is also addressed above and indicates that the potential for improvement is seen better by those inside the classroom and correlates well with a belief that the system is less effective than it could be.

More specifically this issue was addressed with 32 principals of Group 2 who were given a seminar on the issue of Continuous and Comprehensive Evaluation. CCE represents a mechanism for more holistic evaluation thereby diluting the rationale for rote learning that dominates the current examination system and therefore influences the teaching of students. The pertinent questions put to them and their responses are indicated in Appendix 1.

The findings of these are that teachers are possibly overloaded already and there is a strong feeling that the introduction of CCE may greatly overload teachers.

However, it is in the context of student time that the consensus of opinion is most strongly expressed. This consensus indicates that there will not be enough student time to conduct this evaluation. The questions put by the audience of principals depicts a certain misalignment with the idea of CCE as a productive tool.

3.2.1. The role of the AGEM initiative

Our initiative is characterized by the following:

- each student is provided a feedback device
- all material is pre-prepared for a projected display in the classroom and contains embedded questions designed to yield specific indicators of performance every few minutes.
- the response of the class is analysed and displayed on the projector within seconds of all students having answered.
- all responses are archived for ongoing analysis

- students are provided regular reports on how they can improve their performance
- no homework is provided and no textbooks are needed.
- project work usually with real world data is intrinsic to this method.

The following photograph depicts a classroom with 65 students undertaking a class in mathematics at Grade 6 in a school for disadvantaged children. The feedback devices are visible on their laps. The room was too small for the number of students and large areas at the front and the back were taken up with heavy school bags.

4. The outcomes of a pilot study to test the value proposition

We asked for and received a set of students who were generally weak in mathematics as can be seen from the teacher estimate of student ability in maths in the figure below. We went through 5 topic plans with them of which the first was hopelessly optimistic and had been designed before we could give the children a pre-test. The remaining four assumed that little or no knowledge of mathematics and covered the following areas:

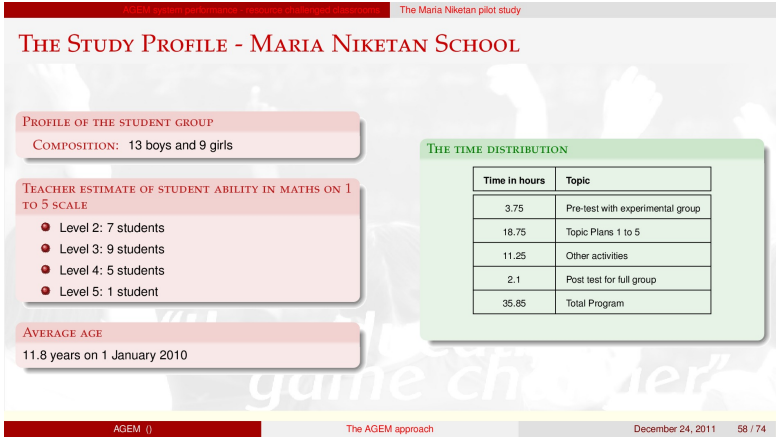
1. The concept of number

2. decimals
3. percentages
4. fractions

During the course of this effort we understood that the group of 22 was derived from a single class of about 75 students. Hence, a pre-test was not possible but all the children took the same post-test. This formed a basis for comparison.

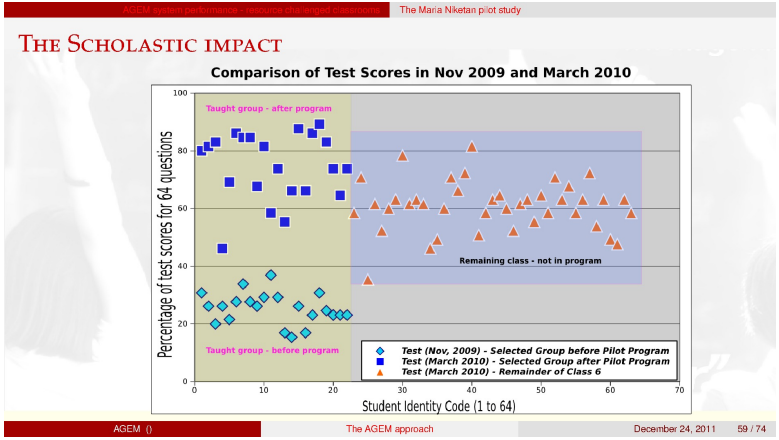
An alternative basis for comparison that was used was the change in performance between the end of term 1 i.e. before we commenced teaching and the end of term 2 when we had concluded teaching. Due to the unusually large difference between pre-test and post-test for our experimental group we decided to see if the changed motivation of children could have impacted not only mathematics but Science and English in the schools own examinations.

4.1. Profile of students



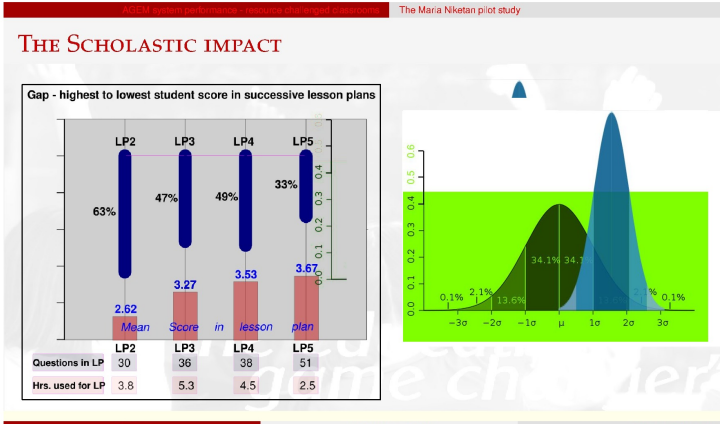
We can see here that the total teaching time for the 5 topic plans was 18.75 hours out of a total class time of less than 36 hours.

4.2. Performance in AGEM tests



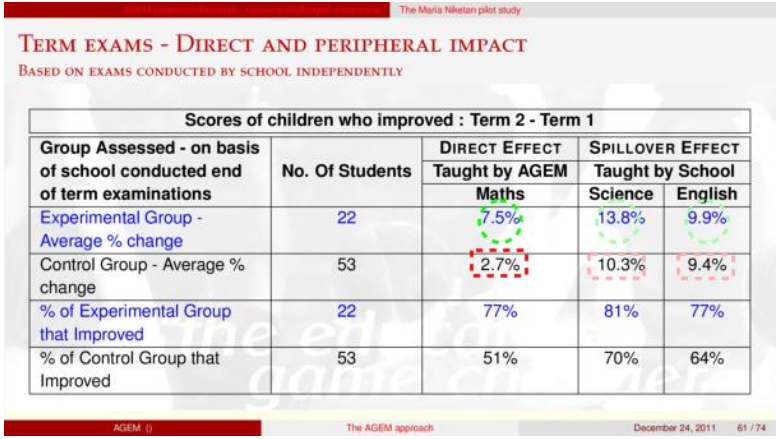
From this we observe that the taught group generally averaged less than 25% in the pre-test. As Prof. Hans Rosling of the Karolinska Institute has observed, this does not mean the children did not know, but implies they knew the wrong thing. However the change in performance was surprising

4.3. Performance of the group per topic plan



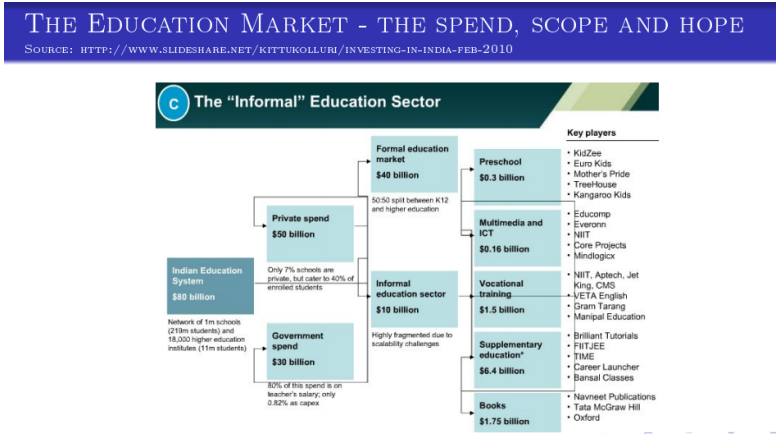
The results show an improvement by the class in mean score with the topic plan but they also show a compression in performance of the class as a whole. In statistical terms this could be understood as a decrease in the variance as well as an increase in the mean score.

4.4. Performance in school end of term examinations



These results show an enhancement in the school end of term examinations which were in consonance with the school syllabus rather than what we had taught. The enhanced performance in maths continued for Science and English thereby possibly leading to the possibility of an increase in motivation and/or inference.

5. Market Size



6. Conclusions

This pilot was based on the three solutions posed at the beginning of this article. The results of the pilot seem to give prima facie evidence of the impact of these solutions on student performance.

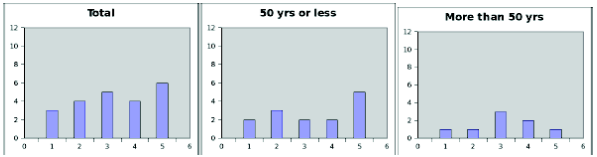
A. Responses of Principals and Administrative Heads

Question 1: Are teachers already overloaded?

Please indicate on a score of 1 to 5 where:

- 1 means "Definitely not"
- 5 means "Absolutely yes"

Question 1 Response Histograms



Responses = 22 Responses = 14 Responses = 8

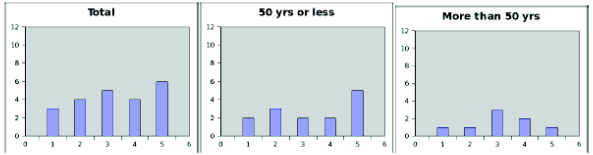
Result: There is a weak consensus that teachers are already overloaded. This perception is stronger among those who are 50 years of age or less.

Q2: Will teachers be greatly overloaded by CCE?

Please indicate on a score of 1 to 5 where:

- 1 means "Definitely not"
- 5 means "Absolutely yes"

Question 2 Response Histograms



Responses = 27 Responses = 17 Responses = 10

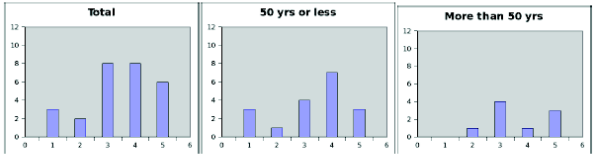
Result: The perception of respondents appears to indicate that the strong perception is that teachers will be greatly overloaded by CCE and this is manifest more in those who are 50 years of age or less.

Q3: Will teachers be able to acquire the skills to conduct the evaluation?

Please indicate on a score of 1 to 5 where:

- 1 means "Definitely not"
- 5 means "Absolutely yes"

Question 3 Response Histograms



Responses = 27 Responses = 18 Responses = 9

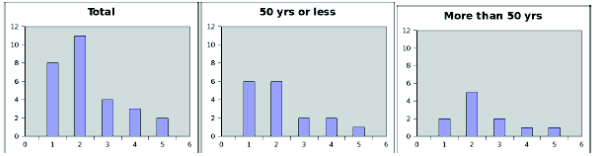
Result: The overall feeling is that teachers will be able to acquire the skills to conduct the evaluation but those who are 50 years or less have a wider spread of opinion on this issue.

Q4: Is there enough student time to allow this to be done properly?

Please indicate on a score of 1 to 5 where:

- 1 means "Definitely not"
- 5 means "Absolutely yes"

Question 4 Response Histograms



Responses = 28 Responses = 17 Responses = 11

Result: There seems to be a clear perception that there will not be enough student time for this work to be done properly. This perception is more acutely reflected in those less than 50 years of age.