Identifying Indicators, Approaches and Tools to Measure and Monitor the Quality of Education

by

Sandeep Srivastava

Abstract

Over the past six years we’ve been carrying a very successful action research project on developing a rather universal definition and measurement of quality education. We discovered that the five most universal indicators of quality education are:

a. Minimum dispersion between the top and bottom performance of classes in every scholastic subject,

b. Normal distribution of performance of classes in every ‘co-scholastic subject’,

c. Open and respectful student-teacher relationships, proud teachers, stress-free families/parents

d. Tuition-free homework/assignment submission and

e. Cumulative progress reporting.

It has emerged that the more effective approaches to quality education are:

a. Continuously motivated teachers

b. Student-centric teaching and learning materials, and

c. Enabling parents to perform

Among the various strategies and tools used for sustained measurement of quality the following were particularly helpful:

a. The extent of literary-level reading skills in any language of all students (or academic-level reading and writing skills in the academic language)

b. ‘Public knowledge of the lesson plans’

c. Level of pre-class preparation by students

d. The micro nature of assessment and reporting, micro-remedial efforts at home and school,

e. Professional commitment of teachers to the ‘last children’ and

The research presents a perfect showcase for deploying ‘camouflage proof’ quality interventions and effective monitoring tools.

Keywords: Quality of education, quality assessment system, quality indicators, reading skills, lesson plans, pre-class, slow learners, student centric
Introduction
Context of the study
While the entire world seems to be afflicted by the same fundamental enigma about education – what is (good) education – India seems to be overwhelmingly mired in debating the same. Expectedly, there cannot be any significant and sustainable change in educational outcomes when we all have convenient and conflicting definitions of the same.

‘Quality is in the eye of the beholder’ – every parent, principal, teacher, management, regulator (and even student) – the stakeholders has her own vision, priorities and ‘theory of education’; it is impossible to negotiate and implement win-win educational reforms.

According to ‘The Right to Education Act’ of 2009, free and compulsory education is provided as a fundamental right to children between the ages of 6 and 14 in India. As per the Annual Status of Education Report (ASER) 2014, 96.7% of all rural children between the ages of 6-14 were enrolled in school. While quantitatively India is inching closer to universal education, the quality of its education has been questioned particularly in its government run school system.

ASER 2014 report states that half of the Std V students enrolled in rural India could not read a Std II level text, or perform basic mathematical operations of Std II level. The children are going through schools with little learning, hence the need to measure and monitor quality of education.

A country that is among the world leader in the technology of the times – ICTs – finds itself in a state where the application of technology in schools is limited to ways which are not educationally sound at a fundamental level.

ICT in Schools is a component of the Rashtriya Madhyamik Shiksha Abhiyan (RMSA). It provides for computer aided education, establishment of smart schools, capacity enhancement of all teachers in ICT, development of e-content.

However, the current trend of adding more ‘screens’ in the lives of the children, supporting ‘smart class content’ that is more TV-like ‘broadcast by teachers’, high reliance on videos for learning inputs and increasing ‘gamification of learning content’ etc. has not been able to add quality to education being provided by schools. Schools have tenaciously deflected the real, disruptive applications of ICTs from transforming learning, and parents, school leaders and regulators have been indifferent to the effective use of ICTs.

Statement of problem
Identifying indicators, approaches and tools to measure and monitor the quality of education.

Objectives of the study
Moving away from re-researching the well articulated dimensions of quality in education, we wanted to develop bottom up, highly outcome oriented implementation-friendly and realistic approaches and indicators to measure and monitor quality in schools. Another
objective was to create a few cases of sustained quality improvement in a wide range of schools such that most schools can find a relatable role model for change towards quality transformation.

The scope of this study
It may be stated upfront that the study focuses on the larger Indian population and the universality of the definition and measurement of quality is limited to Indian school education system – in India and outside India (e.g., Indian schools in foreign lands). Of course, a good part of the study, findings and interpretations may find relevance, in varying degrees, to all educational systems across the world.

Review of literature
About 255 million children in India are in school between Classes I-XII. Getting children through the school is not enough. Ensuring that they are getting quality education is the challenge.

What is quality education is a complex and contested concept. Human capital theory, human rights angle along with the importance of inclusivity, relevance and democracy in education were some of the approaches used in defining quality of education (Penga et al. 2014). Each stakeholder in education has his own perspective of what is quality education.

Parents perceived a school to be quality education provider if the school was an English medium school and teachers taught ‘nicely’ and took ‘care’ of the children (Morrow and Wilson 2014). Learning outcome, academic performance and personality development were also considered by parents to be indicators of school quality” (Ashraf 2012).

VVOB a non-profit organisation defines quality education as “… one that provides all learners with capabilities they require to become economically productive, develop sustainable livelihoods, contribute to peaceful and democratic societies and enhance individual well-being… the end of the basic education cycle must include threshold levels of literacy and numeracy, basic scientific knowledge and life skills including awareness and prevention of disease. Capacity development to improve the quality of teachers and other education stakeholders is crucial throughout this process… Quality education puts the child in the centre and helps it to reach his or her full potential.”

“A good quality education arises from interactions between three overlapping environments, namely the policy, the school and the home/ community environments” (Tikly 2010). Grauwe and Naidoo (2004) views quality as a multi-dimensional concept composed of three interrelated dimensions, the quality of inputs available (human and material resources), the processes (management and teaching/learning processes) and the quality of output of outcomes (result). The UNICEF (2000) model of quality of education comprises five dimensions i.e. quality learners, quality learning environments, quality content, quality processes, and quality outcomes.

“An education indicator provides information about the health of the educational system. A statistics becomes an indicator when it is useful in a policy context.” (Kagaan and
These indicators help in monitoring changes, assessing impact, encouraging good practices and focusing on problem areas. (Kagaan and Smith 1985)

After having achieved near universal (97%) access to primary education, the Government in India is now focusing on delivering quality education for all. Some of the approaches for fostering quality education envisaged by Government include:

- Improvement of school infrastructure
- Increasing teacher availability
- Training of in-service teachers
- Teacher Qualification and Teacher Eligibility Test (TET)
- Strengthening academic support structures
- Curricular reforms
- Development of learning indicators
- Development of indicators for School performance assessment
- Continuous and comprehensive evaluation (CCE)
- Use of Information and Communication Technology (ICT) in schools
- National Repository of Open Educational Resources (NROER)
- Enhanced funding for quality improvement

Source: Education For All Towards: Quality with Equity Report (2014)

For all education quality improvement strategies and policies, evaluation of schools is essential. Most inspections and evaluations of schools are centered around administrative concurrence and control over teachers and or assessment results of individual students. School evaluation is mostly equated with teachers and/or student performance. (Grauwe and Naidoo 2004)

The EducationWorld is a seventeen years old India based education magazine which ranks all sorts of educational institutions including schools. The parameters they use for ranking schools include academic excellence, teacher welfare and development, faculty competence, academic reputation, co-curricular activities, sports education, among others.

However, when such ranking is limited to information, it has little impact on the performance of school. If School ranking or evaluation can also identify the strengths and weaknesses of the school, it would be an important step in improvement towards improvement of quality of education. (Grauwe and Naidoo 2004)

The same can be said about student assessment. Most schools announce and use the board examination results to attract new admissions. However, such announcements are information about scholastic achievements of few students in the school. These announcements do not reflect achievement of wider objectives of education. (Ashraf 2012)
Methodology
Research Setting:
Nine schools were studied over a period over four years. The study included schools from the two premier private school chains of the country and all are in the north and eastern India. Students of classes VI - X were part of the study.

The student performance data has been collected through online assessments, also though the data that came through offline assessments and in-class surveys. Teacher-related data has been collected through personal interviews, supervisor’s reports and questionnaires. Data from parents was collected through physical, in-seminar responses and questionnaires.

Research Design:
As expected, given the longitudinal and geographic expanse of this project, the research design did evolve over the period of study and variation in design had to be introduced for each of the school. The best way to record the research design would be to bifurcate the design elements into
(a) Those which did not significantly change till date
   1. Deconstructing teaching and learning to the level of concepts
   2. Micro-progress reports
   3. Continuous, formal and informal feedback from all stake holders.

(b) Those which changed to varying degrees over the year of research
   1. Cumulative progress reporting
   2. ‘Public lesson plans’
   3. Students – centered learning resources

The project interventions as were mostly digital – Website, Apps, OCR cards – but structure questionnaires, and interviews were also used. Total record collection by us and by teachers also added to the data prints. In-class survey of students and in – PTM (Parent Teacher meetings) of parents also added to the called data.

Result, discussion and recommendations
The need for universal definition of quality
The most common denominator about school education is the plurality of the definition about what is quality education; everyone has an air of authority on what is expected out of school, and hence, what is quality education. Our survey of a small sample of nine schools quite clearly attests the plurality across stakeholders.

The result of the surveys conducted among the principals, teachers, students, and parents, of the nine schools to find out what quality education means to them is as follows:
### Survey of School Principals

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Better human being</td>
<td>1</td>
</tr>
<tr>
<td>Good citizens</td>
<td>2</td>
</tr>
<tr>
<td>Good career</td>
<td>3</td>
</tr>
<tr>
<td>Good higher education</td>
<td>4</td>
</tr>
<tr>
<td>Happy children</td>
<td>5</td>
</tr>
</tbody>
</table>

### Survey of School Teachers

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Getting toppers</td>
<td>1</td>
</tr>
<tr>
<td>Completing syllabus</td>
<td>2</td>
</tr>
<tr>
<td>Good values and ethics</td>
<td>3</td>
</tr>
<tr>
<td>Improving average marks</td>
<td>4</td>
</tr>
<tr>
<td>Disciplined children</td>
<td>5</td>
</tr>
</tbody>
</table>
The ‘free-choice’ open-ended meaning of quality education as stated by the 6 principals are (a couple of statements are from outside the project schools):

a. Create an environment of education that allows children to understand ways of making their life meaningful, to contemplate on issues that matter, and to engage in constructive dialogues.

b. Create worthy citizens of the country with humane qualities by homogenizing the western knowledge while remaining anchored to the Indian cultural moorings.

c. Make education an innovative and enriching experience through unique blend of academic, sports and extra-curricular programmes delivered within student centric culture to enable the younger generation emerge as future leaders.
d. Enable a child to excel in his/her chosen field with the confidence to face the global challenge without forgetting social responsibilities. Perseverance, dedication & hard work to be the key attributes to be build.

e. We strive for the perfect all round development of the students

f. Our student shall endeavour to maintain and improve the quality of life- without damaging the planet for future generation

The need for universal measurement of quality
The popular proverbial saying about the blind men and the elephant quite literally represents the reason for the need for universal measurement of quality. Short of the universal measure of quality, any and everything could be justified in some way or the other as quality enough.

The result of collecting data from a hundred school advertisements for admission it was seen that schools boasted about the curriculum followed, the infrastructure, achievement of students, CCTVs, smart boards, transportation etc. It is also a common experience that no school leader is ever found short on glorifying their school for some or the other child who simply did better than the other.

In fact, it emerged that a school has to just outperform another school in some or other criteria to become a good school, and quality education provider in its neighbourhood. Schools claim excellence in similar domains with completely different processes, resources, teacher pool and student/parent pool.

Discovery of the foundational pillars of universal definition of quality
Based on our research, we recommend these five most universal indicators as tools for measure of monitoring quality education.

A. Minimum dispersion between the top and bottom performance of classes in every scholastic subject.
None of the schools we worked with could ever entertain the thought of 'advertising' the performance of the bottom quartile of the students in any class as a proof of quality of education.

For parents, and the society at large what matters is equity – ensuring all children mostly perform well in school and get a fair chance in professional pursuits.
From the perspective of the parents, the performance of the bottom of a class is the most re-assuring academic quality measure as it reflects the minimum guarantee level of all students in the school. The average is a complete non-statement on the lowest possible performance of students in a class/school. Of course, the performance of the topper(s) is essentially outlier and has little reflection on the expected performance of the rest of class.

The performance of each and every classroom in a school in scholastic subjects must reflect the following range:

Two ground rules for the interpretation of the above graphs:

1. The narrower the range/dispersion of the graph, the better the quality of education
2. Better quality education is about minimising the dispersion and then keep efforts on in moving the average performance up the absolute scale

More importantly, the introduction of this measure as the more appropriate one will bring about a visible change in language of the school leaders and teachers when thinking or talking about quality. The measure is simple but the downside is that it will show schools in very bad light if they have very high dispersion in performance.
B. **Normal distribution of performance of classes in every ‘co-scholastic subject’**

In the performance measurement in co-scholastic ‘subjects’/domains such as, dance, music, painting, design, games, sports, photography etc. by way of bell curves the difficulties that emerged were as following:

- **a.** It is difficult to narrow the performance dispersion in any of the co-scholastic domains – majority of the students had limited interest in each of the given domain
- **b.** Achieving high performance in co-scholastic domain needs personalized attention and effort by both the students as well as mentors/coaches. School timetables do not allow such leverages and not many children have interest enough to put through the rigor and discipline of these domains.
- **c.** Given the wide range of co-scholastic domains on offer at majority of the schools (on an average of 9, in the schools in our sample), it also becomes impossible for schools to offer high performance for all students in each of the offered domains.
- **d.** Surprisingly, at least in all the schools in our sample, finding quality teachers/mentors/coaches in co-scholastic domains is far difficult as compared to the quality teachers in scholastic domains (including math). Achieving high performance for a few is a tall order, let alone the entire student population.

As a result, it became obvious that the quality measurement in co-scholastic has to follow a more natural endowment of resources and inherent interests/skills of children. A normal distribution of performance in co-scholastic domains by the end of the middle school is a reflection of quality.

The performance of each and every classroom in a school in co-scholastic subjects must reflect the following range:

![Normal distribution of performance](image)

C. **Open and respectful student-teacher relationships, proud teachers, stress-free families/parents**

The critical importance of student-teacher relationship in effective classroom transaction is well established. We wanted to explore and evaluate the effect of relationships between the key stakeholders in driving quality of education in a school.

Honestly, we must admit that we could not figure out the definitive cause and effect relation between –
a. ‘open and respectful student-teacher relationships, proud teachers, stress-free families/parents’ in the school and
b. the quality of education delivered by the school.

To us, it looks like a two-way relationship – there seems to be a kind of virtuous cycle. This co-habitation is very powerful and helps build the motivation and morale of teachers. Of course, it all start with the school leadership investing time and energy in training teachers and extensively communicating with all stakeholders about fostering, role modeling, trust and good relationship with students and parents would lead to better quality of education.

Of course, our main focus was to find ways to more universally define the following three measures of the people side of education:

   a. open and respectful student-teacher relationships  
   b. proud teachers  
   c. stress-free families/parents

The five common denominators that defined open and respectful student-teacher relationships and affect education quality were as following:

   a. Teachers’ respect for the talented and bottom quartile of the students in each of her class  
   b. Privacy quotient of the teachers, as judged by the students (it refers to the confidentiality maintained by the teachers on what the individual students confide in them)  
   c. The amount of lateral communication among students in each classroom transaction (no benchmarks could be found to work best, but the more the better)  
   d. Fairness quotient of the teachers, as judged by the students  
   e. No paid-for tutoring support for any of the students taught in school (a very special condition found in sub-continental schools)

The five common denominators that defined proud teachers (‘proud to be a teacher’) and affect education quality were as following:

   a. Make more students really passionate about the subjects they teach  
   b. A role model adult for the students they teach  
   c. Well informed of what is going on among the students in every class they teach  
   d. Mostly a distinguished ‘style’ of teaching  
   e. Limited absence at work

The five common denominators that defined ‘stress-free families/parents’ and affect education quality were as following:

   a. Healthy students  
   b. Fewer Incidences and extent of bullying by the students – counting victims as well as bullies  
   c. Better longitudinal trend in performance of the student in school  
   d. The definitiveness in educational routines at the homes of the students
e. Investments in purchasing books (by the families)

All the three people contexts of education are fairly sustainably definable, across cultures.

d. **Tuition-free homework/assignment submission**
This is a special Indian scenario – the Indian form of ‘tutor support’ is unique as tuition is a substitute for poor quality teaching at school. In India, tuition is almost a necessary evil for two reasons:

a. as mentioned, it is repeat edition of classroom teaching because classroom teaching is often substandard in most subjects
b. it is a compulsion in most homes, to submit ‘all correct’ answers to the assignments given out in schools as homework

Our study was focused on the ways and means to reduce the need for tuition to ensure correct-answer submission of homework assignments; the need for tuition to compensate for poor teaching quality at school is anyway the much bigger agenda for research and change.

We specifically worked on doing away with the need for tuition for homework because it was identified to be serious challenge to quality delivery for the following top five reasons, reported by the teachers:

a. Students came back to classrooms with almost no independent academic activity at home
b. Lack of parental involvement with academic activities and performance of their children; children too do not connect educational involvement as a parental task/duty
c. Parents become too dependent on the progress reporting by the schools and the tutors; however, both are gross-reporting and thereby misleading
d. A couple of years of tuition for homework completion puts the children on the path to dependence and little ability to think and self-help in academics
e. Students steadily become gapped out in classrooms and their gap keeps mounting by the day; pertinently, the quality of completion of homework assignment is teachers best continuous assessment tool of every student and once it gets vitiated by tutoring support teaching becomes significantly distant from the student’s actual prior knowledge to transact content of any kind

The five key strategies on how home-works can be assigned are proposed as follows:

a. Assessment of homework assigned can focus on quantity of homework done, rather than the quality (a student can get all the answers wrong but not get any reprimand for it)
b. The homework content can be changed in a way that the need for tutoring support is completely avoidable; continuous communication with parents on the changed content of homework and need to avoid tutoring
c. One of the best ways to change the content of homework is to assign reading tasks as homework - flipped class reading materials
d. Homework assignment submission to be checked for student’s known ability to achieve the level of correctness in homework and softly penalise those who get their homework assignment completed with tutoring support; teachers start to use quality of homework assignment submission as the most instant feedback on the teaching effectiveness of any topic/content.

e. However, homework not to be avoided, homework is to be routinely assigned

E. Cumulative progress reporting
This steadily emerged as a game changer in defining quality of education in a very simple manner – its application by a school is one certain foundation of quality in the school’s delivery of education. Longitudinally cumulating every student’s progress across subjects is critical to ensuring quality; it is the only way to effectively personalise educational context for quality.

Interestingly, cumulative progress reporting has been found to be as powerfully useful for talented students as it obviously is for the ‘slow learners’; for instance, only a cumulative progress reporting can inform all interested in a talented child about a concept or two which may have been mastered by the child in any of the previous class(es).

A sample of the cumulative progress report’s content and format used in many of the schools looks like as under:

A sample of cumulative progress report for Math for Class X

![Cumulative progress report screenshot]

It may be obvious that cumulative progress reporting is not really possible without extensive digitalisation of a school’s processes, resources and data. It is also very apparent that duly harnessed technology application by itself enhances quality in every domain of our living, and education is no exception.

Thus, appropriate use of technology and using it to personalise education of every student through the creation of extensive ‘accumulation and manipulation’ of data points about the developmental milestones achieved by the students – enhances both formative as well as summative assessment.

To sum, the following together constitute a comprehensive, yet universal, definition of quality in school education:

a. minimum dispersion between the top and bottom performance of classes in every scholastic subject,
b. normal distribution of performance of classes in every ‘co-scholastic subject’,
c. open and respectful student-teacher relationships, proud teachers, stress-free families/parents
d. tuition-free homework/assignment submission and
e. the effective use of cumulative progress reporting (and extensive digitalization of school’s processes, resources and data)

Institutional approaches to achieve a universally applicable definition of quality

For a more effective approach to a universally acknowledged quality education, a combination of the following three broad strategies is required:

1. **Continuously motivated teachers**
   At the end of the day, there is only one-way street of continuous motivation – the intrinsic, self-motivation. A proud teacher with open and respectful relationships with students is the most complete avatar of a motivated teacher.

2. **Student-centric teaching and learning materials**
   This is how progressive teachers have described the current, in use, curricular books:
   a. Made for teachers (to handhold them in teaching by filling up the gaps in content connections)
   b. More like coffee table books – too many pictures (nice, colourful, lovely and informative book)
   c. Books not meant to be read but seen (math and science lessons do not have stories).
   d. ‘Out of life’ activities – most of the activities cannot be performed in classrooms and at homes; most of the activities are decades old
   e. ‘(Prescribed) Textbooks’ are not books – the content, style and presentation of ‘textbooks’ is very typical, irrespective of authors

   Indeed, the textbooks need a total re-design and re-write! This has been one of the most visible and impactful part of the project.

3. **Enabling parents to perform**
   Parenting matters! However, all the schools in our study tend to limit interactions with parents in subtle and explicit ways; for example, interaction with parents is kept limited PTMs and exceptional situations.

   However, in many parts of the country and in majority of the schools reported in this study, there is hardly an appreciation that there is even a need to make homes (the 18 hours of the day) effectively complement and supplement the education at school. Some of the schools treat ‘parents as undesirable influence’ on their children.
In the schools we worked with, the following five interventions proved useful in integrating parents to contribute in their children’s education (in order of the frequency of use of these interventions):

a. Micro-progress reports of their children’s assessments – this enables parents to better utilize the tutoring support
b. Actionable, micro-remedial inputs – ‘readable, self-explanatory’ concept conversations for children and parents
c. Special classes for parents on the critical concepts in math and science (till class VIII) – optionally available on holidays/weekends
d. Special and continuous workshops for parents on careers and the changing paradigms of living – personal, social, and professional
e. Special sessions and counselling to the parents on issues such as gender role changes, legal changes, positive discrimination in terms of ‘active feminization of the society’, cyber bullying, proper use of cyber resources

Among the various strategies and tools recommended for sustained measurement of quality:

1. **The extent of literary-level reading skills in any language** of all students (or academic-level reading and writing skills in the academic language)

The annul ASER report (2014) have brought out that the primary cause of children lagging behind is the low levels of language competence (in any language).

In India the largest national board prescribes teaching of the language of academics – English – at ‘functional level’ (communicative level)! As a result, there is little or no time, attention and stress on reading literature in English; expectedly, the language deficit for academic transactions in English widens with each passing year and it is mirrored in the increasing percentage of children who report poorer grades/confidence/passion for academics and 47.4% children dropout between Class I-X (Educational Statistics at a Glance 2014).

To top it all, there is no environment for reading at home. Therefore, it’s recommended that -

a. In homes where parents can be motivated to read in the mother tongue (if they cannot read texts in English), they can help children develop reading competence in the mother tongue. Later the acquired reading skills can be used to achieve reading competence in English to transact all subjects in academics in English
b. In home where parents can read in English, reading competence can be developed in English language and children can steadily be made comfortable with transacting all subjects in academics in English
2. ‘Public knowledge of the lesson plans’
The key findings regarding the content of teacher-student communication were as follows:

<table>
<thead>
<tr>
<th>Common Communication</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication to all in a class for sharing homework, projects</td>
<td>39%</td>
</tr>
<tr>
<td>Communication to all in a section of class for sharing homework, projects</td>
<td>15%</td>
</tr>
<tr>
<td>Communication to all in a class for administrative reasons</td>
<td>28%</td>
</tr>
<tr>
<td>Communication to all in a section of class for administrative</td>
<td>12%</td>
</tr>
<tr>
<td>Communication to a few students/parents as a group</td>
<td>8%</td>
</tr>
<tr>
<td>Communication to a particular student/parent</td>
<td>6%</td>
</tr>
<tr>
<td>Other reasons (e.g., responding to queries from individual parents)</td>
<td>3%</td>
</tr>
</tbody>
</table>

The following pertinent evidences emerged:

a. Communication is overwhelmingly top down
b. Communication is teacher-centric, e.g., fulfils teachers’ need to communicate

None of the schools studied shared the lesson plans with the students; lesson plans are taken to be school/teacher secret. Students simply carried the subject-wise books to school every day with no clue about the plan of teaching/learning in the day.

In six schools we introduced communication of weekly lesson plans with the students (the topic and the content) and the results were as follows:

<table>
<thead>
<tr>
<th>Student reactions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students who simply loved the change</td>
<td>64%</td>
</tr>
<tr>
<td>Students who were neutral to the change</td>
<td>9%</td>
</tr>
<tr>
<td>Students who did not like the change</td>
<td>27%</td>
</tr>
</tbody>
</table>
The teachers are mostly struggling with the change for reasons beyond their agreement with the change. However, the reasons cited by teachers for liking the change are as under:

<table>
<thead>
<tr>
<th>Teachers reactions</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do not need to give extra inputs on topics</td>
<td>26%</td>
</tr>
<tr>
<td>Reading habit of children has improved</td>
<td>25%</td>
</tr>
<tr>
<td>Parents are liking the change</td>
<td>17%</td>
</tr>
<tr>
<td>Lateral conversations among children has improve</td>
<td>19%</td>
</tr>
<tr>
<td>Other reasons</td>
<td>5%</td>
</tr>
</tbody>
</table>

It is recommend that schools should ensure that the lesson plans for every subject, teacher, and period, be shared with students at least a week in advance. This also follows the cardinal rules of communication – share the agenda of meeting prior to the meetings. For adults, such a sharing is not only desirable but also critical for effective communication and a result-focused meeting.

The data in the next recommendation will substantiate that the public knowledge of the content and schedule of lesson plans have salutary impact on the motivation, effort and performance of children.

3. **Level of pre-class preparation by students**

The study of children’s reactions on the impact of the knowledge of the lesson plans well ahead of the teaching in class is summarised as under:
While the sharing of the lesson plans to all the students, in all classes/subjects, is the necessary beginning, a lot more must be done to ensure that children are better equipped for being taught and are learning.

We enabled the following layers of activities/tasks in two schools studied by us:

i. Enabling parents to communicate (with just a click on mobile) to teachers if their children prepared every concept before teaching in school
ii. Online pre-class brief assessment on the level of understanding of the pre-class reading content in lesson plans
iii. Online post-class assessments at three levels, immediately after the classroom teaching – immediate feedback to teachers before they move on to the next concept
iv. Online pre-class and post-class assessments at three levels – prior knowledge, information on current concept, applications of current concepts
v. Live reports to teachers on reading at home, pre- and post-class assessments

The impact of the above, as measured in two schools over two academic sessions is summarised as under (as average over three subjects – the subject that reported the highest performance is also mentioned):

Better teaching (as reported by teachers) 69% Social science
Better learning (as reported by students) 53% Science
Better grades (as per comparative report cards) 46% Science

Obviously, there is significant gain, but some more distance to go.
Teachers reported the following challenges to improving gains from pre-class preparation inputs/supports to children (in the order of the level of challenge posed):

a. Lack of involvement of the majority of parents
b. Lack of reading skills among the majority of children
c. Lack of time in the school time table as well as at home to live up to the new demands
d. Lack of effective support from the school leadership
e. Demands of change on teachers

Thus, the benefits of prepared students can be reaped to a much higher level if the above five challenges are specifically addressed.

4. The micro nature of assessment and reporting, micro-remedial efforts at home and school

In six schools in this study, micro-assessments, micro-progress report was introduced along with it micro-remedial inputs were given to the teachers for remedial in school and to parents so that they who could support their children themselves use tutors for the required support.

The following formats of assessments, reports and remedial were used:

Formative Assessment report for Class VIII Math
And remedial requirement for each key-concept in the chapter

![Graph showing Formative Assessment report for Class VIII Math](image-url)

<table>
<thead>
<tr>
<th>Code</th>
<th>Concept Name</th>
<th>VIII - A</th>
<th>VIII - B</th>
<th>VIII - C</th>
<th>VIII - D</th>
<th>VIII - E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>RN</td>
<td>TS</td>
<td>RN</td>
<td>TS</td>
<td>RN</td>
</tr>
<tr>
<td>KC 1</td>
<td>Percentages</td>
<td>12</td>
<td>32</td>
<td>9</td>
<td>28</td>
<td>17</td>
</tr>
<tr>
<td>KC 2</td>
<td>Profit and Loss</td>
<td>14</td>
<td>29</td>
<td>6</td>
<td>20</td>
<td>9</td>
</tr>
<tr>
<td>KC 3</td>
<td>Discount</td>
<td>5</td>
<td>32</td>
<td>7</td>
<td>32</td>
<td>8</td>
</tr>
<tr>
<td>KC 4</td>
<td>Sales tax/Value Added Tax</td>
<td>18</td>
<td>31</td>
<td>22</td>
<td>21</td>
<td>25</td>
</tr>
<tr>
<td>KC 5</td>
<td>Compound Interest</td>
<td>14</td>
<td>32</td>
<td>32</td>
<td>27</td>
<td>17</td>
</tr>
</tbody>
</table>

| RN  | Remedial Needed       |          |          |          |          |          |          |
| TS  | Total Student         |          |          |          |          |          |          |

Comparing Quantities (Level 1)  Qualifying Criteria : 90%
# Performance Based Report of Students in Class VIII, Section A

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Student Name</th>
<th>Frequency and tally marks</th>
<th>Pictograph</th>
<th>Bar Graphs</th>
<th>Histogram</th>
<th>Pie charts</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>L1</td>
<td>L2</td>
<td>L1</td>
<td>L2</td>
<td>L1</td>
<td>L2</td>
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<tr>
<td>1</td>
<td>AMAN</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>2</td>
<td>ANUP</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>17</td>
<td>JANVI</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>18</td>
<td>KARAN</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>X</td>
<td>✓</td>
</tr>
<tr>
<td>19</td>
<td>KHUSHI</td>
<td>?</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
</tr>
<tr>
<td>22</td>
<td>NISHIKA</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>24</td>
<td>PRANJAL</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
</tr>
<tr>
<td>25</td>
<td>RAGHAV</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>27</td>
<td>ROHAN</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>29</td>
<td>SHREYA</td>
<td>X</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>30</td>
<td>SHREYAS</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>X</td>
<td>X</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Qualified Student / Total Student Attempted**: 8/29, 4/30, 8/30, 11/30, 26/30, 17/30, 21/29, 18/29, 27/30, 9/30, 8/29, 22/29
## Section Remedial Report

**Class Section:** VIII - A  
**Subject:** Maths  
**Chapter 'Data Handling' and Key Concepts Attempted Through Assessments  
**Formative Assessment**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Concepts</th>
<th>Level - 1</th>
<th>Level - 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Students who need remedial</td>
<td>Students who need remedial</td>
</tr>
<tr>
<td>1</td>
<td>Frequency and tally marks</td>
<td>AARUSHI, ROHAN, SHREYA</td>
<td>ROHAN</td>
</tr>
<tr>
<td>2</td>
<td>Pictograph</td>
<td>NISHIKA, ROHAN</td>
<td>KARAN, ROHAN, SHREYAS</td>
</tr>
<tr>
<td>3</td>
<td>Bar Graphs</td>
<td>AARUSHI, AYUSH, JANVI, KARAN, KHUSHI, NISHIKA, RAGHAV, ROHAN, SHREYAS</td>
<td>ARSHYA, AYUSH, JANVI, NISHIKA, PRANJAL, ROHAN, SHREYA</td>
</tr>
<tr>
<td>4</td>
<td>Histogram</td>
<td>AYUSH, JANVI, KARAN, NISHIKA, ROHAN, SHREYAS</td>
<td>JANVI, NISHIKA, RAGHAV, ROHAN, SHREYAS</td>
</tr>
<tr>
<td>5</td>
<td>Pie charts</td>
<td>AARUSHI, ARSHYA, AYUSH, JANVI, KARAN, KHUSHI, NISHIKA, PRANJAL, RAGHAV, ROHAN, SHREYAS</td>
<td>JANVI, KARAN, ROHAN</td>
</tr>
<tr>
<td>6</td>
<td>Probability</td>
<td>AARUSHI, AYUSH, JANVI, KARAN, NISHIKA, RAGHAV, ROHAN, SHREYAS</td>
<td>AARUSHI, ARSHYA, AYUSH, KHUSHI, NISHIKA, RAGHAV, ROHAN, SHREYAS</td>
</tr>
</tbody>
</table>

## Student Performance Report

**Garie Matimbe**  
**Class VIII - A**  
**Qualifying Criteria:** 90% per concept  
**Chapter 'Data Handling' and Key Concepts Attempted Through Assessments  
**Formative Assessment**

<table>
<thead>
<tr>
<th>S.N</th>
<th>Concept</th>
<th>Level - 1</th>
<th>Level - 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Score (Right question/Total question) (Attempted by you on the basis of)</td>
<td>Wrong Answer (Total of you wrong response)</td>
</tr>
<tr>
<td>1</td>
<td>Frequency and tally marks</td>
<td>2 / 2</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Pictograph</td>
<td>2 / 2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>Bar Graphs</td>
<td>1 / 2</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Histogram</td>
<td>0 / 2</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>Pie charts</td>
<td>0 / 2</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Probability</td>
<td>2 / 2</td>
<td>0</td>
</tr>
</tbody>
</table>
Hopefully, the formats are self-explanatory and need no elaboration.

The above reports were the most common changes introduced in six schools in the study. These changes faced the least resistance by teachers and students/parents. It was therefore considered to be most impactful by the school leaders. This is one of the most impactful application of technology in schools.

5. Professional commitment of teachers to the lower quartile students with respect to performance of students of every classroom

In none of the nine schools studied, teachers seemed to be accountable for the presence of ‘slow learners’ in their classrooms. None of the schools measured their ‘performance’ in terms of the performance of the bottom quartile of the.

Schools could not be convinced to ‘officially’ show the performance of the bottom quartile of students (along with the top quartile and average performance levels). Three schools have however, started to internally take special cognizance of the lowest quartile of performance. These three schools reported the following changes in their schools’ processes and resources to help the lower quartile performers (in order of importance/attention given by the schools):

a. Fine-tuning the school’s remedial input contents and processes
b. More focus on improving the academic language competence of such students
c. More and consistent communication and support to the parents of such children
d. Informal acknowledgement of the role of school and teachers in the poor achievement levels of such children
A renewed appreciation, focus and educationally-powerful innovations for the bottom quartile performers is critical and can be achieved as mentioned above.

**Conclusion**

1. A universal definition of quality of K-12 education is a pre-requisite for measuring quality

**Bibliography**


Bureau of planning, monitoring & statistics (2014). Educational statistics at a glance. MHRD, GOI

National University of Educational Planning and Administration (2014) Education for all: Towards quality with equity report. MHRD GOI Pages 84-89


Author

Sandeep Srivastava is a (global) author, technologist, educator, social entrepreneur and (a new-age) political activist. Educated at the best of institutions at home (India) and abroad (JU, IIT D, INSEAD) and worked with best of corporates at home and abroad (Modi-Olivetti, Citibank), he turned a tech-led, self-funded social change agent in 2001.

He is the first Indian and among the first few in the world to author on Internet in the pre-dotcom bust in 2000! (Pearson/FT/UK). Over years he has authored curricular books for math, science, social science for classes III – XII – over 150 volumes – a unique feat in school education.

www.sandeepsrivastava.online