My Thoughts on Math Position Paper

By sumit | May 5, 2016

As I am going through the National Focus Group’s Position Paper on Teaching of Mathematics, here is an attempt to share my understanding and change in my perception about teaching and learning mathematics.

This Paper discusses the aims of mathematics education, a brief history of our journey in mathematics education, problem in teaching and learning of mathematics, some recommendations for enriching mathematics learning and teaching in school education.

Key points of the document

- Mathematics education should focus on both aims of enriching child’s inner resource and in developing life skills.
- Due to regular technology revolution making mathematics’ curriculum is a dynamic process.
- Curriculum should not disappoints a talented minority as well as should encourage the non-participating majority at the same time.
- If any subject is playing significant role in alienating children and causing them to stop attending school, it is mathematics. The largest number of Board Exam failures also happen in mathematics.
- There are many reasons for fear of mathematics among children, central among them is cumulative nature of mathematics.
- At primary level: mathematics pedagogy rarely resonates with the findings of children’s psychology. At secondary level: inability to link formal mathematics with experimental learning.

My understanding

The Position Paper addresses the problem faced in mathematics teaching and learning. The Paper deals with very finer aspect of learner’s dilemma, teacher’s inadequate preparation and many other social challenges which deprive students from a proper chance to do useful mathematics and acquire many important life skill.

In my view, the main problem with mathematics is its cumulative nature, which is strongest in mathematics than any subject at school level. Means one should have some command on previous chapters to understand next chapter. Abstract nature of mathematics makes it more difficulty for both, learner find it difficult to grab, visualize and search concrete example and the teacher faces difficulties in connecting it with the context based real examples.
Mathematics is a core component of education practice in India from the ancient India to the modern India. Arithmetic and geometry were important part of education and very well related with its use in daily life. Geometry were taught because it was required for the construction of sacrificial altars and ‘havan kunds’ of various shape and size. Arithmetic were taught for acquiring numerical skill.

[A more authoritative BBC video clip on the Story of Math where Prof Marcus du Sautoy discusses Indian contribution can be found here]

I think children need concrete examples and the connection between the logical functioning of their everyday lives to that of mathematical thinking.

Many children who find it difficult to get familiar with symbols, notations and abstract nature of mathematics at early stage of their learning process develop the fear of doing mathematics.

So it is a challenge for us to explain mathematics with concrete examples and without much abstraction especially at primary level to develop interest and then making them familiar with various notations and abstract nature of mathematics at a proper stage. If a theme can be introduced with better motivation at later stage then we should postpone till that stage.

I was teaching mathematics at almost every level of education. I always tried to explain the concepts with more examples, by making connection with previous concept and with a hope of developing a thinking in student’s mind of “why this?”. I was not giving the same priority to above mentioned technique especially at primary level. I had never asked myself or thought such questions regarding some concepts of primary level. But after reading the mathematics Position Paper and visiting schools, I have encountered many such question and developed a perception that this technique is also quite important and essential more so at a primary level, as they are forming first impressions on maths.
Here are some thoughts to ponder:

- Why positive integers are also natural numbers?
- Representation of fraction as number on number line is more important than their operation at primary level.
- Setting up of equation should get as much coverage as solving it.

We can encounter many 'irrelevant' questions in this process but each question can give us many new things to learn.

If I talk about secondary level then I had always thought that at this stage, the students begin to perceive the structure of mathematics, so theorems are important for them to just understand the related concept. I never felt that these theorems can be used to develop argumentation skills and in justifying previously learnt concepts. Similarly algebraic symbol should be introduced with the aim that if they pursue maths at higher level, before that they have some idea about the abstract nature of mathematics.

I feel we should introduce every concept at every level with keeping in mind both the aims. Curiosity, interest and talent in mathematics can be identified at very early stage of student's life. So enriching their talent totally depends on the environment provided for mathematics at primary level and for the kids with special need and for those who lost interest in mathematics, something new is required is to be done from the teacher's side so that they find purpose in picking basic mathematical concepts.