

Doing Away with the Fear of Maths

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Mathematics often scares children and many adults too. All children have to learn mathematics till class X, however, by the time they come to class III-IV, they drift away from it. The same children, who in classes I and II were eager to understand and made an effort to engage with maths, start falling behind. And as they move up to higher classes, they start panicking at the name of mathematics. The policy documents in India have been highlighting this issue and the most recent, National Curriculum Framework for School Education (NCF-SE) 2023 also states that there are two major aspects that cause fear of maths: (i) the nature of the subject and how it is taught and assessed; and (ii) how it is perceived in society. (NCF-SE 2023, p. 271)

In this article, we will first briefly talk about the processes and practices that create this fear of maths. Then, we shall discuss how it can be transacted in class so that all children develop an interest in and understanding of maths. This is based on the work that I am doing with classes II, III and IV.

How maths is taught

The initial classes (even up to class IV) do not focus on anything other than counting and the four arithmetic operations. Stepwise solutions of questions are written on the blackboard and then each step is explained. After this, children have to copy the solution from the board. Another task is learning arithmetic facts, definitions and algorithms by heart. Children try to memorise these but as they progress, the load of the 'seemingly meaningless definitions and processes' and fully remembering them and applying them correctly at the appropriate place keeps increasing. As the size of numbers that children have to deal with increases, children find it impossible to comprehend this size and it becomes difficult for them to use algorithms, shortcuts and tricks to get correct answers. Since they have no idea what number they should get as the answer, every number seems equally correct (or wrong) to them. This increases the fear, anxiety and sense of

helplessness associated with maths.

The obvious question, then is, can there be some processes and practices that make children not only learn concepts of mathematics but also enjoy learning them? NCF-SE 2023 states, 'The Mathematics Education curriculum not just aims for capacities in foundational numeracy, mathematical thinking, and problem-solving in students, but also intends to nurture joy, wonder, and curiosity and the ability to see patterns and appreciate the elegance and aesthetics of mathematical concepts and ideas, while at the same time eliminating the fear of Mathematics that is widely prevalent today.' (NCF-SE, 2023, p. 37)

There is no reason to be afraid of maths

It is often said that the behaviour of the teacher, and a natural atmosphere in the classroom, help make children feel comfortable. And if the teachers themselves do not see maths as terrifying, then children will have no reason to feel petrified by it. This is similar to the fact that if you are scared of lizards, your children are likely to be afraid of them as well.

My experience has been that generally at the beginning of class I and II, children do not fear maths. If I give them the opportunity, they try to engage and make efforts to understand concepts. Therefore, processes that make maths interesting for children must be initiated in these initial classes. The effort should be to provide challenges of an appropriate level and opportunity for them to attempt to find the answers, however much time and number of trials it takes, and to not provide them solutions as an easy route to learning.

In my interaction of teaching-learning of mathematics with children of classes II, III and IV, I have observed that there is not enough work done with children on reading texts while doing maths. Children look at the numbers, signs and symbols

and the order of questions in the given exercise and make a guess as to whether they need to add or perform some other operation. On their own, they cannot read instructions, verbal problems, examples and other texts given in the book. And as they move up to the higher classes this task of reading and comprehending keeps getting more difficult. Gradually, they keep moving further away from maths. It is therefore important that they learn to read mathematics from the beginning. They should read instructions, and if they cannot understand, there should be a conversation about that in the classroom. They should read word problems on their own and make new word problems themselves (verbally first and then in writing) to become familiar with mathematics and mathematical thinking. For example, problems, like a basket has 10 mangoes and 5 more are added to it, how many mangoes are there in the basket; if one table has 4 legs then how many legs would 4 tables have? Both these can be seen as questions of addition, but their nature is different.

Learning to read helps children in many ways. For one, it develops in them a self-confidence with respect to learning. Secondly, while reading, children start comprehending the difference between different types of questions, which means that they also start understanding concepts of mathematics a little better. I have been working with the current class II for about one and a half months. We read short instructions and word problems, and each child makes an effort to understand them. Sometimes, a few children need a little more help in reading and I have to work with them individually. Sometimes, their friends help them with reading and sometimes, they write the questions on the board and read with each other's help. But now all the children have started to read. When I tell them that we now have to read and help them in the process, they start realising that reading is essential and that it is something they can do.

It is said that reading and writing proceed concurrently. And because they can read, they read the given questions carefully. And they also make their own questions when asked to do so. And slowly, they do it even when they are not asked to do it. Mostly their sentences are similar in construction to those in the worksheet or the textbook, but it has new numbers and some new words. Now, they often ask, 'Shall we make our own questions?' This shows that they enjoy this task.

It is important that whichever the class, children are given tasks that they can engage with. In class III, there was this question: Make different sums to get a total of 3500. Even after explaining the question to the children in their own language and giving examples, many children could not understand it. But when they were given the task of making different sums to get the total to 20, and a couple of examples were discussed with them, they understood and made many new questions. Here, I would like to underline a few other important points that can be helpful for a teacher.

Some good practices

Firstly, while doing maths with children we must use a language that children are comfortable in. The second thing is to remember that a special feature of maths is its patterns. Let's go back to the previous question where students were asked to make different sums to get a total of 3500. If children are not able to engage with some ideas when presented with large numbers, then the same concept can be worked on by using smaller numbers. The third is about the nature of the exercise. In this task, on the one hand, children were working with concepts of addition, subtraction, and small-large numbers, and on the other, they were also learning to look at numbers in relation to other numbers. Then, such questions can have many answers – all of them correct. The fourth is about the range of possibilities for it. Many questions of this type can be made, each with many answers, and as children make questions, they find more and more can be made, and then it becomes a game for them, which they try to play for as long as they can.

The maths classroom has to be such that children can talk about the given questions and how they have understood and gone about solving them, irrespective of whether they have done it correctly or not. Many times, when they are asked: how did you do this question? Then while thinking about the process they followed, they themselves realise where they have made a mistake and how it has to be corrected. For example, in class III, one response to the question, 'Write a number that has one at the unit's place and two in the ten's place,' was written as 12. When I asked the child to read again, the child corrected it immediately.

Similarly, many words like ascending and descending, units and tens, and preceding and succeeding numbers are concepts that children will be able to comprehend more easily if there are conversations about them in the classroom.

For example, the word *ascending* was explained by class III children in various ways – some said increasing order, some said like 1 to 10, some said from lesser to greater, and so on. In addition, we discussed questions like why one number comes before or after another. Such conversations help children comprehend the concepts and make their own definitions. Creating something yourself gives one enormous pleasure and self-confidence.

The belief that mathematics is learnt in a linear manner and in a definite time frame also leads to a sense of fear. If the children have to learn to think and appreciate abstraction, then we have to spend as much time on each concept as is necessary for the children to grasp it. And then the teacher must come back to the same concept after a few days. 'Teaching' a concept hurriedly and believing that 'once taught or completed' it is over, only to complete the syllabus, accomplishes very little. In fact, if children are still struggling to understand a concept and the next one is introduced, and this continues, many children are completely left out of the process. It is therefore necessary to give children ample time to engage with, understand, and do mathematics. For example, if working with the number line, then it is not correct to assume that just making a number line from 0 to 10 and from 0 to 100 and showing some numbers on these is enough for students to understand the concept. Understanding a number line means children are able to place different numbers on it on their own.

They should be able to see how big or small a number is when compared to another number and therefore, where it should be placed on the line. It is also very important for them to realise that the concept of a number line is linked to lesser and greater numbers and operations of addition and subtraction and is not an isolated concept.

Often concepts are taught in a linear way - one by one - as if they have no relationship with other concepts. Concepts in mathematics are interrelated and the understanding of each becomes better when it is understood as part of a whole in the mind of the learner. But while teaching, this is forgotten. So, all concepts – counting, numbers, numerals, addition, subtraction, place value, and writing in ascending or descending order - are there in the mind, but each is separate and has no connections. This is what makes seeing, comprehending, creating and playing with patterns so difficult. Therefore, it is necessary that children are asked such questions or given such tasks in which they have to make an effort to use the understanding they already have of concepts.

One important purpose of mathematics is that children learn to 'mathematise' and think logically. More often than not, children are not exposed sufficiently to maths and therefore find it uninteresting and dull. Making patterns, exploring and discovering, attempting one question in multiple ways, and making questions of maths are all part of mathematising, which should be enjoyed by all children.



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