Mathematics Learning and Teaching: a student's perspective

Tasnuva Ansari
Department of Computing, Communications Technology & Mathematics
London Metropolitan University

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Concepts of mathematics

Learning of mathematics starts from when we begin to learn how to count. Then we use mathematics in our everyday lives, sometimes without even realizing. In these situations, what we needed to learn - the 'basic numerical concepts' - was nothing but a way of expressing ourselves (in a language), in order to communicate with and relate to others.

A widely used contemporary dictionary defines mathematics as:

> *"The science of numbers and their operations, interrelations, combinations, generalizations, and abstractions and of space configurations and their structure, measurement, transformations, and generalizations."*

Mathematics is a science related to life that has been used and valued by people ever since the emergence of civilization or even before then, in many known and unknown ways. Paul Ernest (cited in Bramall and White, 2000) suggests that,

> *"We understand our lives through the conceptual meshes of the clock, calendar, working timetables, travel planning and timetables, finances and currencies, insurance, pensions, tax, measurements of weight, length, area and volume, graphical and geometric representations, etc."*

Mathematical skills develop as we grow and get involved in more and more activities, for example: measuring flour while making cakes or maybe rushing to 'the sale' calculating (in our heads) how much money could be saved. What we need in these occasions is mostly common sense, a practical approach towards obtaining a solution and some prior experience.

Everyday mathematics does not require the *brains* of an academic mathematician. Sometimes it is surprising how people even with barely any formal education can deal with calculations so quickly. From my own experience, I have seen people in Bangladesh without any academic background, dealing with calculations fairly quickly without any formal education, and there is the famous study of Brazilian street children.

Learning and teaching mathematics

So, what does learning maths actually require? In my view, a national curriculum set for schools is required that bears in mind the social context and relevance to the current issues of an increasingly mathematised society. Basic mathematical skills should be taught to pupils in schools, because as a minimal mathematical capability is essential. I also think a different approach towards

teaching mathematics is necessary, involving the embedding of practical constructs alongside the academic theoretical ones. In this way, we can relate maths to our everyday life, conceptualize the meanings of the theories and understand its importance.

However, it differs from student to student as to what they actually need to learn mathematics, as different people learn in many different ways and are influenced by different experiences. For some it is easier to visualize the mathematical fact without being practically involved, while others may find it really difficult. So, it may be beneficial to consider an individualistic approach in teaching, where different teaching methods can be applied for different groups of people.

In order to talk about the teaching and learning activities in mathematics, it is vitally important to know about, what is relevant and appropriate in today's world. In a recent paper, Noss (1997:17-18), states that, '[t]he massive computerization of systems will, to a greater or lesser degree, herald new kinds of craft and expertise.' He points out:

> 'It will mean that the distinction between domain specific knowledge of mathematical facts and generalizable skills will become increasingly obsolete. And, for our teaching of numeracy it will involve constructing new educational cultures in which individuals have the means to make sense of models, and the means to express them algebraically, geometrically and computationally. New cultures of work are redefining the boundaries of what needs to be understood as a whole, rather than as isolated skills.'

Mathematics is no more a mere subject of approximation or hypotheses for mathematicians. It is now a requirement for the everyday life of all sorts of people. Thus it is important to ensure that all the activities of teaching and learning mathematics involve relevance to the real or practical world. Different types of activities and different teaching methods should be applied for a proper understanding of the subject. For example, Alejandre (1998) notes that:

> 'My belief in the importance of teaching lessons using more than one method of presentation has been reinforced. Here are methods I have found to be valuable:
> **activities** - kinesthetic, manipulative, cooperative
> **technology** - the Web, software or graphing calculators
> **revisiting and formalizing** the mathematics "

Alejandre explains how she engages students in both individual studies and then group studies along with different types of approaches towards the same topic. She suggests that, once the first presentation of an activity is completed, a different way of presenting the same topic can be undertaken.

From my own experience as a student, I think it is a very good idea in today's context to teach the same topic in more than one ways. For example, while studying cubes, students after being bored by being theoretically taught, seemed to be quite interested when they got the cubes in their hands and they were even more enthusiastic when a computer was used to show a little animation or the movement of the three dimensional cubes. I think all these activities - theoretical, practical and technological - help students learn maths. Not only that, sometimes relaxed teaching approaches like numerical games can also make them view the topic with interest and learn among themselves. They can share experiences and learn different skills from each other. So, arrangements should be made to enhance communication between fellow students and encourage group activities, peer tutoring along with individual learning and teaching sessions. To conclude, I believe that in today's world appreciating the utility of a mathematical concept by applying it in a purposeful context is an extremely powerful way of learning mathematics.

References

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Biographical note

Tasnuva Ansari completed his secondary education in Bangladesh and is currently a final-year undergraduate studying Computing and Mathematics at London Metropolitan University. He hopes to pursue a career based on research in Discrete Maths and Maths education in general.