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## The world of mathematics in the classroom

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### Abstract

In spite of teaching with innovative activities in mathematics classes, the appreciative value the subject has remained focused on recall and procedures. Apart from the teacher, student, subject and teaching techniques, so many facets are ascribed in educational settings. Valuing of these can facilitate to strengthen the world of mathematics in classroom culture. This paper tries to explore some of such issues of great magnitude in achieving success in the magical world of mathematics.

**Keywords:** Mathematics classes, recall and procedures, world of mathematics

### Introduction

Knowledge and understanding of the various levels can help to understand the world of mathematics and strengthen mathematics in school. Mathematics is a subject which deals with calculation of numbers and explanation by logical conclusion. The presence of abstract elements further strengthens the relationship of the concept of mathematics and lead to generalization. The beauty of mathematics is that the abstract system is also based on logic. But mathematics as a subject is considered as a less interesting subject.

From time to time, scholars have tried to understand the many reasons for negative attitude of the students through research and also have come up with many solutions. Scholars blame erratic study habits, lack of parental attention, poor math base, teacher's attitude towards teaching, and the classroom environment. If understood from the point of view of the students, the teaching approach and classroom strategies fail to make the mathematical concepts clear, as the focus of the teachers remains on the procedural skills. The desire for a correct answer leads to the memorization of formulas. In this content based teaching, the involvement of students is less with concepts and more with methods / procedure. To understand mathematics, it is very important to connect with it. Students will find the meaning of mathematics subjects only when they are able to connect the new and old mathematical experiences in a coherent way without any fear of failure. NCF (2005) has brought out necessity to bring a change in pedagogical strategies of Mathematics. It lays emphasis on presenting the subject interestingly, not as burdensome.

Collaborative and exploratory methods can create fun to make mathematics interactive NEP (2020) considers experience based learning to be meaningful and interesting and emphasizes using those approach strategies and methods in teaching mathematics that can easily communicate innovation to students.

### School Mathematics and Platonism

Most of the time, mathematical mindset is bound by parochialism. Mathematicians are unable to bring outside mathematics into the realm of school mathematics. The school curriculum portrays mathematics as pure mathematics only. This is a strange depiction of the abstract world or can be said to be the imaginary world of the Platonist system. For the need of positive beliefs, thoughts and influences towards mathematics in classroom teaching, it is important to know how the world of mathematics outside the school is. Plato's philosophy has been given an important place in the teaching-learning process of mathematics by western civilization. They consider mathematics as a non-ideological, culture-free and value-free subject, and therefore, mathematics is categorized as universal and generalized discipline (Ernest, 2016) <sup>[5]</sup>. Surprisingly, mathematics, as it is presented in books is without human sensibility.

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That is why it has become an uninteresting and boring subject for most of the school students. Mathematics as applied in the real world is completely different from Plato's Purity of Mind.

### **School Mathematics and Ethno-Mathematics**

The study of how mathematics is understood and used in different cultures/communities is termed as Ethno-Mathematics (D'Ambrosio, 2006) <sup>[4]</sup>. It has become clear by now that indigenous tribal communities also carry thinking in mathematics and have their own ways of applying mathematical concepts to facilitate their community work that are distinct from the frameworks of western mathematics. Moreira and David (2007) <sup>[11]</sup> have pointed out that there is no harmony between mathematicians (who work in the field of pure mathematics through abstract concepts) and school mathematics teachers. Seen through the prism of situated cognition, one can be acquainted in the same knowledge that he would be operating / using in his environment, the same thing applies in the realization of mathematical notions. Hence, this kind of deliberations can be the basis of classroom mathematics.

### **School Mathematics and Everyday Mathematics**

Mathematics outside school was considered as Real mathematics, but it still stayed away from the word problems printed in books and the formulas written on the blackboard. After a time, story problems in the name of daily life activities dominated in school text books. Such problems became dubious for most of the students of that age group as information of students' immediate interest or their own world was missing (Burkhardt, 1981) <sup>[2]</sup>. Also, the information furnished in the question was so limited that the students could be judged correctly only on arriving at the correct answer, which any student could arrive at by seeing mentioned numbers in the problem and/or applying operation without proper understanding. Ignoring the various aspects of the real situation, the textbook questions used to be prepared in a few lines with limited information, which is why the RME movement emphasized on mathematization (Treffers & Beishuizen, 1999) <sup>[14]</sup>.

According to Civil (2002) <sup>[3]</sup>, the difference between school mathematics and mathematicians' mathematics refers to the process where school mathematics focuses only on finding the correct answer and accordingly the progression of concepts proceeds. It comes under Behaviorism. On the other hand, mathematicians' mathematics in school context comes under the school of thought of Constructivism. The school curriculum also includes the concepts of mathematicians' mathematics. Here, the student's way of understanding mathematics is very similar to the working style of mathematicians. All methods of exploration, discussion, dialogue, observation, etc. are used, to find solutions through students' active participation.

There is another type of mathematics where mathematical conventions are used for everyday activities. In this type of process, tasks emerge from everyday activities and the solver has the power to control/modify the situation to some extent which enables him to get the final answer. Also, without going into an apprenticeship program, doers are not able to perform tasks independently in early stages. Here, processes may not get a very prominent position in valid mathematical procedures.

So, it is unfair to say that such routes will create mathematical understanding in the school students. Yet,

characteristics of mathematical processes outside of school can be used as a helping hand to overcome barriers to classroom mathematics that will later be useful in generalizing and abstracting mathematical conceptions.

### **School Mathematics and Social Justice**

The struggle the learners make to get 'good marks' in school mathematics is also worth consideration. It is not just a point arising from the pedagogical practices of the subject. Intellectual protection, gender equality, human rights, availability of educational resources to marginalized students etc. are configurations of conflicts existing in school scenario. The educational contexts of mathematics classroom cannot be devoid of regulating issues of social justice, political justice and cultural justice (Gutiérrez, 2008) <sup>[9]</sup>.

Any type of labeling and deficit thinking in the context of mathematics is an attack on the exquisiteness of discipline. The promoters of formal schooling have genuinely accepted that outside school information, community-generated experiences, to an extent, the norms and rules of society, are a great resource for mathematization in a larger perspective (Boaler, 1993) <sup>[1]</sup>. It not only enhances mathematical comprehension but also helps to analyze various issues from a different perspective that enables one to become a responsible citizen with impartiality which is essential for the commitment of social justice.

### **School Mathematics and Success**

Mathematics is perceived meaningful by the students only when they apply their mathematics knowledge and skills with exploratory methods in a context that is neither too imaginary, nor too narrow and nor too sanitized. Stem statements in questions can be helpful to engage students in many purposeful activities. Students' interests, experiences and beliefs should be matched according to their experiential world while designing mathematical tasks/activities. It should also be taken care that there is no bombardment of only one type of closed ended questions during teaching and also in assessing students' performances. Indeed, in open-ended tasks, the situation is explained in different ways under various conditions and the answer comes on the basis of the option chosen by the students. It is not necessary that there is only one fixed answer which the teacher can label as right or wrong. In this, great importance is also given to the logic and reasoning to which students are exposed (Sullivan, P. & Lillburn, 1997) <sup>[13]</sup>. For the success of mathematics, it is necessary that the interest of the students should be kept in mind, while designing purposeful activities for them so that their involvement in these activities can be ensured.

The 21<sup>st</sup> century is a huge storehouse of mathematical concepts and it is very important to promote equitable practices and reflective rituals to fill the insufficient understanding among students so that there is an accomplishment of learning skills, literacy skills along with life skills.

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