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Curriculum for excellence in mathematics

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Abstract
This paper traces the excellence in mathematics and its significance for education in the daily lives of the Indian people, from way back early times to the existing scenario. A brief introduction about mathematics is presented with various information on the share and value. It also enlighten us about how mathematics has become an integral part in various processes; how strongly and widely it has created an impact on the demand of creating new knowledge about how to engage children and young people in new activities, new ideas and new kinds of learning. This means that teachers, working together in schools, will need to explore, experiment, and exchange ideas about how to make *Curriculum for Excellence* work for them.

Keywords: Curriculum, mathematics, significance, education

Introduction

Introduction of mathematical learning experience

There's no denying that education is constantly changing, but what's truly astonishing is the difference that can be seen just in the past generation. Parents today hardly recognize the classrooms in which their children are learning – whatever happened to using a good old-fashioned pencil? OK, maybe that's an exaggeration, but more is changing in math classrooms than the tools that are used. The expectations that 21st century students face are completely transforming the approach that's being taken in classrooms across World, especially the United States wants to make sure its students are ready to compete on a global level, and teachers are stepping up to the plate.

1. Higher academic standards

While there have been multiple movements in education over the past hundred years to change academic requirements, the most recent push, which has taken the form of the Common Core State Standards, asks students to meet benchmarks at younger ages and to develop a deeper understanding of what they are learning. The idea is that the higher academic standards will ensure students are adequately prepared for college and the careers of the 21st century.

2. Emphasis on the "why" and the "how"

While many of us spent our time in math classrooms memorizing formula after formula, today, just as much emphasis is put on the "why" as the "how." Students are expected to not only study and master specific math skills, but also to understand the concepts behind them. Today's math classrooms are flipping the old adage "a mile wide and an inch deep" on its head.

3. Digital math games

Today's students are what is known as "digital natives," which means they grew up surrounded by technology and expect that it be incorporated in all aspects of their lives. While students of the 1970s were excited about the TI-30, kids today can fluently use computers by kindergarten. Teachers are turning to digital math games and adaptive learning systems to engage students and make math fun.

4. College on the horizon

College wasn't always the end goal for K-12 education, but today nearly 70 percent of high school graduates attend college. That's a large chunk of students, and math education has shifted to make sure that kids are building the foundational skills they'll need to be successful during their post-secondary education. In fact, one of the central missions of the CCSS is to prepare students for college.

5. Technology takes center stage

Technology used to be something of a novelty in American classrooms – what child of the 90s doesn't remember making the trek to the computer lab filled with rows of beige-colored Mackintosh Classics? Today, technology takes center stage in classrooms – students use graphing calculators to solve complex equations and work through adaptive learning programs to master new concepts.

6. Real-world applications

Math has made the shift from an abstract concept filled with formulas and theorems to a concrete example of skills that can be applied in the real world. Educators now make a point of showing students how what they're learning can be used outside of school. Math is no longer a list of things to memorize and then promptly forget after you've taken the test – it's a tool to be used beyond K-12 education.

7. Allow students to explore

One of the most notable changes in math education has been a shift in views as to how students learn. It used to be that children were asked to repeat math concepts until their responses were automatic – remember the endless pages of multiplication tables? Now students are encouraged to explore ideas and experiment with different avenues of inquiry. Learning is dynamic, rather than static.

8. Cross-curriculum application
In the past, math curricula was turned in upon itself – mathematics was applied to the math classroom, and nowhere else. Today there is a major emphasis on cross-curricular application of mathematics. Students are encouraged to use what they've learned in the math classroom as tools to guide their way of thinking in other areas, like science.

9. Link between researchers and educators
Researchers and educators are making a much greater effort to work together and shape math education in a way that will truly prepare students to use these skills outside of the classroom. Teachers are no longer merely consumers of research, they are encouraged to collaborate with researchers to produce data that can help improve education.

10. Changing perceptions of math
Research has shown that how children view their math capabilities can have effect on their success level in future. Kids' willingness to take higher-level math (which is increasingly important when pursuing 21st century jobs) is connected to the emotional view they have of themselves as learners. Teachers are working to transform math from a scary subject into something that is approachable and useful for students so they can develop the confidence they need to be successful.

Characteristics of effective teaching in mathematics
In order to secure effective teaching of mathematics teacher should consider:

1. What are the key aspects of the development and progression of mathematical skills and concepts?
2. What are the key building blocks in mathematical learning and where to go back to if a child is struggling to go forward?
3. How can they continue to maintain and develop their mathematical knowledge and teaching methods?
4. How can they sustain high levels of expectations of learners' effort and engagement, progress and achievement, and thus motivate learners to do even better?

1.2 Essential knowledge for teaching mathematics
1. Knowledge and understanding of number, the number system and its operations.
Having a well-developed sense of number allows an individual to manipulate numbers, comprehend the connections between operations, decipher written 'problems' and tackle calculations that have a number of steps.
2. Well-developed skills in calculating mentally
Developing a good range of flexible strategies for calculating mentally enhances learners' progress and achievement in mathematics.
3. Understand and using inverse processes to simplify a problem.
For many learners, calculating 32 ÷ 4 can be daunting, but is much simplified on appreciating the relationship between 32 ÷ 4 and 8 x 4.
4. Skills in estimating appropriate quantities
Teachers need to develop in their students not just the skill of estimating, but also the ability to decide how accurate an answer needs to be, for a given context.

In order that those involved in the teaching of mathematics have the knowledge they need
Teachers should consider
What specific topics present particular difficulties for students, and how can they find time to work with other practitioners to identify, and solve, common problems?

Continuous professional development (CPD)

1. The CPD built on what teachers knew and could do already, with an emphasis on individual learning
2. Teachers were encouraged and guided in supporting each other
3. There was some external input, in terms of both theory and practice, for example by sharing experiences from other schools and teachers, or from research studies
4. There was a shift in the "ownership" of the reform from those providing the external stimulus to the teachers themselves.

In order to maximise the potential benefits to be gained from effective external contacts, partnerships and support
Teachers should consider
How to best utilise available external contacts, partners and support to help make learning more relevant and engaging, and to enable learners to make connections to the real world by applying their mathematical learning.

School leaders should consider
How best to facilitate and sustain such external links and partnerships so that they will flourish and impact positively on learning.

Policymakers should consider
In what ways they can best promote and further develop opportunities for effective partnerships working e.g. through local and national clubs, events and competitions.

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