THE FACTS ON EDUCATION

What is the Best Way for Students to Learn Math?

Starting from early childhood, we make sense of the objects and space we experience. Effective teaching builds on students' mathematical experiences, which differ among individuals and across contexts. High expectations for performance, initiative and independence support achievement. Even young children can reason mathematically.

People learn mathematics when they wrestle with problems, connect them with their prior mathematical knowledge, and develop coherent and relevant methods and explanations. Teachers can help students learn mathematics by engaging them in this way. Students understand procedures better if they have the opportunity to manipulate concrete materials to represent mathematical operations (e.g., using blocks to represent place value: a cube to represent one, a stick made of 10 ones, a square made of 10 sticks, etc.), and to talk about reasons for their procedures. Calculators and other technologies can be useful tools for exploration of patterns and relationships, but children still need to be able to perform calculations and understand them without reliance on the technologies.

Regular and effective feedback from teachers and peers supports students' mathematical learning when it focuses on noticing patterns, exploring predictions, and explaining reasoning. Students' errors are best viewed as opportunities to clarify incomplete understanding and can help teachers know what concepts need more exploration.

Mathematics curriculum should build topics onto each other. The sequence of these topics is more important than matching age-related stages. An overloaded curriculum can be a barrier to learning. Teachers need to be comfortable with mathematics and have conceptual understanding. Their teaching benefits from collaborative planning that focuses on the central ideas of mathematics.

Language skills are necessary for learning mathematics. Teaching should recognize that a students' first language may be one important resource in their mathematics learning. Children from disadvantaged backgrounds can benefit with intervention in the early years to connect mathematics to their experiences and thus increase their comfort with it.

Conceptual understanding (knowing why something works), fluency with calculations (comfort with basic mathematics facts and procedures), and problem solving work together in mathematical learning. However, no high quality research supports any kind of ideal ratio between such focuses; they are all necessary.

For online resources as well as the research references that inform this issue, please visit:
www.cea-ace.ca/facts-on-education

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UNB EST. 1785 UNIVERSITY OF NEW BRUNSWICK | Education Fredericton

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