

RAND NEW STUDY

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Making Sure No Child Is Left Behind: Improving Proficiency in Mathematics

In the No Child Left Behind Act and other state policy initiatives, federal and state policymakers have set out a formidable challenge: While the educational system has always produced some mathematically proficient individuals, now *every* student must be mathematically competent.

Meeting this challenge seems daunting. Over the past decade and a half, many public and private efforts have been advanced to improve math proficiency, including the development of standards and the creation of programs to attract and retrain more effective mathematics teachers. However, these efforts—and others like them—have met with limited success, in part because they have been supported by only a limited and uneven base of research and research-based development. There has never been a long-range programmatic effort to fund research and development in mathematics education, nor has funding been organized to focus on knowledge that would be usable in practice.

A new RAND study proposes a long-term and strategic program of research and development in mathematics education. The program would develop knowledge, materials, and programs to help educators raise the level of mathematical proficiency and eliminate differences in the levels of mathematical proficiency among students of different social, cultural, and ethnic groups.

The study argues that the production of knowledge about mathematics teaching and learning, and the improvement based on such knowledge, depend on a coordinated cycle of research, development, implementation in practice, and evaluation, leading in turn to new research and new development.

This RAND study maps out a long-term agenda of programmatic research, design, and development and recommends that given the limited resources that will be available for mathematical research and development in the future, policymakers focus on three specific domains:

1. Development of the mathematical knowledge teachers need to effectively teach students from diverse backgrounds.
2. Teaching and learning required for mathematical thinking and problem solving, because educators can develop more effective mathematics instruction by better understanding the practices of successful learners and users of mathematics.
3. Teaching and learning algebra from kindergarten through the 12th grade (K-12), because algebra is central to proficiency in mathematics.

The report also suggests a management structure for effectively guiding the program.