



The power of rigorous teacher tests

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By Sandra Stotsky

Most elementary teachers seem to require intensive, expensive, and continuous professional development in mathematics. Even if current federal and state initiatives to train experienced teachers are successful, their costs are staggering. Other countries sensibly focus on "frontloading" (imparting subject-matter knowledge to teachers before they are licensed and enter the classroom) rather than "backloading" (trying to patch teachers' knowledge after they've started their career). It's reasonable to think that our elementary teachers' understanding of mathematics might be increased more effectively and efficiently via regular or specially designed mathematics courses they take before, rather than after, they begin teaching.

In December 2006, the Massachusetts Board of Education seized this tiger's tail and voted to create a demanding 40-item math test that all elementary and special education teachers must pass in order to earn a license. The new Massachusetts test will be the first in the country to seriously assess the mathematics knowledge of prospective elementary (and special ed) teachers. Designed primarily to assess the conceptual foundations of what the state's mathematics standards now expect them to teach, the prospective teachers' test will be based on the reasonable assumption that candidates who take it should be expected to demonstrate, without the use of a calculator, a deep understanding of the mathematics concepts that underpin what they will teach their students, who in turn must master them without the use of a calculator. The Board wants the test to have strong ripple effects through the state's institutions of higher education. So it is also proposing stronger math requirements for elementary licensure programs as well as detailed guidelines for the content of the mathematics courses for aspiring teachers, courses that it expects to be taught by mathematicians.

Why is the Massachusetts Board of Education making it harder to get an elementary teaching license and expecting education schools to ensure that its teacher candidates have taken more demanding (and probably more) mathematics courses? Both common sense and research tell us that pupils of math teachers who know their subject learn more math than students of teachers who don't. In a February 2001 report for the U.S. Department of Education summarizing teacher preparation research, Michigan State University scholars noted that studies show "a positive connection between teachers' preparation in their subject matter and their performance and impact in the classroom." In one study of 2,829 students and their high school math teachers, from 1994, David Monk found that the number of undergraduate courses in a teacher's background--up to about five--had a positive impact on pupil performance.

The Board also knows that many elementary teachers struggle with mathematics, and fears that they are passing on their limited math mastery to their students. Although Bay State students' average scores are the highest in the nation on NAEP's grade 4 and grade 8 mathematics tests, their scores on the state's own mathematics tests have not risen for several years, and not enough students achieve at the two highest performance levels.

Other states should follow suit. Most teacher licensure tests are pitched at the high school level in terms of overall difficulty, and their cut scores are set so low that a passing score often means no more

than middle school achievement. We would expect more from high school students who wanted to become teachers, never mind college graduates.

All states should ensure that newly licensed elementary teachers begin their careers competent to teach arithmetic effectively--and then need only authentic professional development, not endless remediation.

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