Non-traditional mathematics curriculum results in higher standardized test scores, study finds

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For many years, studies have shown that American students score significantly lower than students worldwide in mathematics achievement, ranking 25th among 34 countries. Now, researchers from the University of Missouri have found high school students in the United States achieve higher scores on a standardized mathematics test if they study from a curriculum known as integrated mathematics.

James Tarr, a professor in the MU College of Education, and Doug Grouws, a professor emeritus from MU, studied more than 3,000 high school students around the country to determine whether there is a difference in achievement when students study from an integrated mathematics program or a more traditional curriculum. Integrated mathematics is a curriculum that combines several mathematic topics, such as algebra, geometry and statistics, into single courses. Many countries that currently perform higher than the U.S. in mathematics achievement use a more integrated curriculum. Traditional U.S. mathematics curricula typically organize the content into year-long courses, so that a 9th grade student may take Algebra I, followed by Geometry, followed by Algebra II before a pre-Calculus course.

Tarr and Grouws found that students who studied from an integrated mathematics program scored significantly higher on standardized tests administered to all participating students, after controlling for many teacher and student attributes. Tarr says these findings may challenge

some long-standing views on mathematics education in the U.S.

"Many educators in America have strong views that a more traditional approach to math education is the best way to educate high school students," Tarr said. "Results of our study simply do not support such impassioned views, especially when discussing high-achieving students. We found students with higher prior achievement scores benefitted more from the integrated mathematics program than students who studied from the traditional curriculum."

Tarr and Grouws' papers, which were recently published in the *Journal for Research in Mathematics Education*, come from a three-year study measuring educational outcomes for students studying from different types of mathematics curricula. Tarr says improving American mathematics education is vital for the future of the country.

"Many countries that the U.S. competes with economically are outpacing us in many fields, particularly in mathematics and science," Tarr said. "It is crucial that we re-evaluate our school mathematics curricula and how it is implemented if we hope to remain competitive on a global stage."

Provided by University of Missouri-Columbia