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MSU study finds that U.S. middle school math teachers are ill-prepared

WASHINGTON, D.C. — Middle school math teachers in the United States are not as well prepared to teach this subject compared to teachers in five other countries, something that could negatively affect the U.S. as it continues to compete on an international scale.

The findings of this new Michigan State University study, Mathematics Teaching in the 21st Century (MT21), were presented today at a press conference at the National Press Club.

“Our future teachers are getting weak training mathematically and are just not prepared to teach the demanding mathematics curriculum we need for middle schools if we hope to compete internationally,” said William Schmidt, MSU Distinguished Professor of counseling, educational psychology and special education, who directed the study.

MT21 studied how well a sample of universities and teacher-training institutions prepare middle school math teachers in the U.S., South Korea, Taiwan, Germany, Bulgaria and Mexico. Specifically, 2,627 future teachers were surveyed about their preparation, knowledge and beliefs in this area.

“It is important for us as a nation to understand that teacher preparation programs are critical, not only for future teachers, but also for the children they will be teaching,” Schmidt said.

The length of teacher preparation requirements varied from four to seven years among the countries, according to the study, which was funded by the National Science Foundation.

“The real issue is the courses they take and the experiences they have while in their programs,” Schmidt said. “It’s not just the amount of formal mathematics training they get. It also involves training in the practical aspects of teaching middle school math and of teaching in general.”

Compared to the other countries, the U.S. future teachers ranked from the middle to the bottom on MT21 measures of math knowledge.

“What’s most disturbing is that one of the areas in which U.S. future teachers tend to do the worst is algebra, and algebra is the heart of middle school math,” Schmidt said. “When future teachers in the study were asked about opportunities to learn about the practical aspects of teaching mathematics, again we ranked mediocre at best.”

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“The MT21 study extends the international perspective from students to teachers and provides us with new approaches for how to conduct such a study and valuable comparisons about the outcomes of teacher education programs across the participating nations,” said Wand Ward, NSF deputy assistant director.

The MT21 findings support previous international research, including the Third International Mathematics and Science Study, also conducted by MSU, showing low U.S. achievement in math compared to other countries at seventh and eighth grades. Another TIMSS finding indicated that one of the major factors related to this low performance was a U.S. middle school curriculum that was unfocused, lacking coherence and not demanding.

“We must address this,” he said. “We can make our mathematics curriculum more demanding, instead of a mile wide and an inch deep, but we also need teachers that are well prepared to teach it to all children.”

Other MT21 findings include:

- The best area for future teachers in the U.S. was statistics knowledge, where they performed near the international average.
- Taiwanese and South Korean future teachers typically covered about 80 percent or more of advanced math topics in their training, while those in Mexico and the U.S. covered less than 50 percent.
- In the practical aspect of teaching, the extent of coverage for U.S. future teachers was also substantially less than that provided by Taiwan and South Korea.
- Future U.S. middle school math teachers in the study are trained in three kinds of programs: secondary programs, elementary programs and those that directly prepare middle school teachers.
- Those that prepare as secondary teachers have a stronger math preparation. Those that prepare as elementary teachers have stronger teaching skills preparation. Those that prepare as middle school teachers seem to have the worst preparation in both of these programs.

Meanwhile, a new study has just begun – Teacher Education and Development Study in Mathematics – which expands the research to include 19 countries and will look at the preparation of elementary and middle school teachers.

“The Boeing Company is pleased to join with the Carnegie Corp of N.Y., the Bill & Melinda Gates Foundation and the GE Foundation to support the U.S. participation in TEDS-M,” said Rick Stephens, senior vice president of human resources and administration for Boeing. “This investment in improving teacher preparation will help ensure that our future work force is inspired to use math and science skills to pursue interesting and challenging careers such as those in the aerospace industry.”

The full MT21 report is available at http://usteds.msu.edu/related_research.asp

Listen to a podcast with Schmidt at www.spartanpodcast.com

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