

Changing the Game: Working Together to Improve Mathematics Learning

Center for Research in Mathematics and Science Education, Michigan State University

William H. Schmidt, University Distinguished Professor

Presented March 24, 2009 at American Educational Research Association and the Coalition for National Science Funding
15th Annual Exhibition, "The Path to Innovation: Scientific Discovery and Learning," Capitol Hill

The need for reform in mathematics and science education is clear: students in the US demonstrate mediocre performance on international assessments such as TIMSS and PISA compared with our economic peers and competitors. From such studies, three areas have been identified as possible foci for leveraging reform: curriculum, the substance of schooling; teachers, the knowledge, expertise, and resources deployed in classrooms; and parents, representing the broader cultural context of schooling.

In PROM/SE (Promoting Rigorous Outcomes in Mathematics and Science Education), a MSP funded by the NSF involving over 50 districts in two states, the main focus has been on creating and implementing a coherent curriculum, a curriculum that focuses on a meaningfully small number of topics each year and builds across the grades and instantiates important and rigorous disciplinary concepts each year. Professional development activity with teachers, curriculum specialists, district and building administrators has focused on building capacity for understanding the principles of coherence and aiding educators to use their own district materials to craft district-wide coherent curriculum within and across grade levels. Results of a randomized study indicated that this effort has made a difference. In districts that received extensive training in capacity building related to coherence, larger gains in student achievement were found than in other districts. In fact, gains were only seen in the specific curricular areas that had been the foci of PROM/SE professional development activities.

Teacher knowledge of subject matter and pedagogy is assumed to be an important prerequisite for fostering sound student learning and achievement in schools. Mathematics Teaching in the 21st Century (MT21), a small, six country study focused on how middle school mathematics teachers are prepared, found that every teacher preparation program included coursework in mathematics, the teaching of mathematics, and in general aspects of the teaching profession such as classroom management, learning theory, and human development. The extent to which these various aspects were emphasized, however, differed greatly.

Finally, the cultural context of schooling was investigated through a survey of parents in PROM/SE districts. The goals and desires of all parents for their children's education were remarkably similar. However, the extent to which parents expressed confidence that they could affect decisions about their children's schooling differed. Parents differed in their understanding of the importance of students' access to rigorous mathematics and how this can limit future learning opportunities and career choice. This poster session outlines our research in these three areas as we seek to leverage knowledge to affect reform of the k-16 mathematics and science education system.

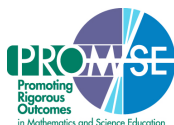
Contact: William H. Schmidt, Center for Research on Mathematics and Science Education, Michigan State University, 238 Erickson Hall, East Lansing, MI 48824-1034, Telephone: (517) 353-7755

MSU Center for Research on Mathematics and Science Education Related Projects:

Promoting Rigorous Outcomes in Mathematics and Science Education
<http://www.promse.msu.edu>, NSF Cooperative Agreement No. EHR-0314866

Mathematics Counts & Science Matters
<http://www.promse.msu.edu/mcsm>

Mathematics Teaching in the 21st Century (MT21)
<http://www.educ.msu.edu/MT21>, NSF Grant No. 0231886



Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the authors and do not necessarily reflect the views of the National Science Foundation.