American Mathematical Society
Committee on Education Meeting
October 27-29, 2011
Washington DC

Summary Report

The Committee discussed a number of issues related to mathematics education. The meeting was well attended, with over 50 participants, including 20 chairs and representatives of mathematical sciences department.

The Intel Math Program
Catherine Roberts (College of the Holy Cross) gave a presentation on the Intel Math Program, a professional development course for in-service K-8 teachers designed to strengthen their conceptual understanding of mathematics. She talked about how the program got started, what the course includes, how it is implemented and how it is funded.

Roberts described how the program is designed for each state and district and talked about the impact of the program and the costs involved. She also noted that the program is growing and expanding into other states.

Reforming Math Education: MfA and Others
Irwin Kra (SUNY Stony Brook) talked about the need for teachers skilled in mathematics in this country. Math for America (MfA) was founded to tackle this national problem and bring improved math teaching and learning into our public high schools.

The New York City program is MfA's flagship site and offers four programs: fellowship (started in 2004), master teacher fellowship (started in 2005), early career fellowship (started in 2010), and school leader fellowship (started in 2011). There are six other sites around the country offering various programs (Berkeley, Boston, Los Angeles, San Diego, Utah and Washington, DC). MfA is committed to providing professional enrichment for its fellows, developing leaders and creating a corps of highly-skilled mathematics teachers.

Kra also talked about MfA funding sources and highlighted program successes.

Professional Development and 'Textbook' School Mathematics
Hung Hsi-Wu (University of California at Berkeley) discussed the challenge of maintaining America's leadership in science and technology in the coming decades. He spoke to the need for knowledgeable math and science teachers in American classrooms and blames our universities for not providing our teachers with the mathematical knowledge they need to teach.

He explained what he calls "*textbook* school mathematics" (TSM) ... the need for teachers to teach from the textbook because their university education did not give them the tools and knowledge they need to teach more effectively. Helping teachers to replace their knowledge of TSM with a correct version of school mathematics must be a priority in their professional development.

Wu cited the 2001 CBMS publication, The Mathematical Education of Teachers (MET), as guidance to mathematics departments on how to educate future teachers. He also described the summer institutes for elementary and middle school teachers that he has been conducting each summer since 2000, the goal of which is to replace teachers' knowledge of TSM with a usable version of mathematics.

New Directions in STEM Education at NSF: Cross-Foundation Efforts and Possibilities

Joan Ferrini-Mundy (Directorate for Education and Human Resources, National Science Foundation) presented some background information on the Education and Human Resources Directorate (EHR) at the National Science Foundation and described how the directorate fits into the "One NSF" strategic plan instituted by the new NSF Director. Dual goals of this new plan are to improve science and engineering outcomes by engaging with STEM education and improving STEM education outcomes by engaging with science and engineering research.

Ferrini-Mundy also mentioned some recent NRC publications that prescribe a strong R&D core for the EHR Directorate and she described some successful cross-directorate partnerships. She said that EHR is repositioning itself to become a hub for programs in other directorates to facilitate more collaborative work between directorates that will further the "One NSF" vision.

She also mentioned some new programs at EHR and discussed how the directorate is addressing graduate education needs.

Panel for Discussion on Graduate Education

Zdzislaw Jackiewicz (Arizona State University), John McCarthy (Washington University in St. Louis) and Michael Thaddeus (Columbia University) each shared information on the graduate degree programs at their respective institutions. They talked about program history and structure, admissions and degree requirements, training and placements. These presentations were followed by a Q&A period where attendees inquired about advisors, teaching loads and qualifying exams, among other things.

The Vermont Mathematics Initiative: A Model for Improved Mathematics Instruction and Higher Student Achievement

Ken Gross (University of Vermont) discussed the Vermont Mathematics Initiative (VMI), which is committed to ensuring high quality mathematics instruction and high levels of student learning across the state of Vermont. The program consists of two phases: a Master's Degree component designed to train teachers and a District Implementation component which uses the phase one teachers to reach all K-8 teachers in the district.

Gross talked about the program's successes, formal evaluations and collaborations. To date, over 350 teachers have completed the VMI Master's Degree program or are currently enrolled. These teachers represent over 90% of the school districts in Vermont. He also reported that VMI is having an impact beyond Vermont, where the program is proving effective in other settings.

Common Core State Standards

Bill McCallum (University of Arizona) provided background information and an overview of the Common Core State Standards (CCSS) initiative. This effort is led by the National Governors Association Center for Best Practices (NGA Center) and the Council of Chief State School Officers (CCSSO). The standards describe what a student should know within their K-12 education careers so that they will graduate high school and succeed in college and in the workforce.

The standards provide no central clearing house on curriculum, each state and school district decide how to implement the standards on their own. As of October 2011, there are 44 states, plus Puerto Rico and the District of Columbia that have adopted the CCSS.

A Non-Mathematician's Perspective on the Math Prep Crisis

Jim Gates (University of Maryland, College Park) discussed the skills gap in the area of science, technology, engineering and mathematics (STEM). He presented statistical data showing America's place in math and science education and in the attainment of college degrees compared to other countries.

The data revealed that the U.S. workforce today is less educated than the generation before it for the first time in 100 years.

Gates also talked about the President's Council of Advisors on Science and Technology (PCAST), an advisory group of the nation's leading scientists and engineers which makes policy recommendations to the President in the areas of science, technology, and innovation. He discussed the STEM education report released by PCAST in September 2010 and its finding and recommendations in K-12 education. He also outlined a new PCAST report that will be finalized soon which examines the first two years of post- secondary education.

Gates also discussed the 'skills-pay gap' between the supply and demand for college educated workers and he talked about some STEM education initiatives designed to increase the number of people trained in STEM fields.

Discussion of K-12 Issues, Courses of Action and/or Recommendation

The committee discussed a number of issues related to K-12 education including whether the AMS should endorse the Common Core State Standards, including encouraging and facilitating AMS members involvement in implementation of the CCSS. A column in the *Notices* authored by the AMS President was suggested.

A webpage highlighting achievements in graduate education was also discussed, as was the idea of a prize that would recognize activities and/or programs that further mathematics education.

Graduate Student Chapters

Eric Friedlander (University of Southern California) presented a draft proposal on AMS Graduate Student Chapters. The proposal for these chapters will be considered by the Executive Committee and Board of Trustees in November 2011 and the Council in January 2012. The AMS would utilize the chapters to encourage graduate students to be involved in the organization and is considering funding the chapters at an amount of up to $1,000 annually.

The AMS Committee on Education decided to support the establishment of graduate student chapters.

Date of Next Meeting

The date of the next Committee on Education meeting will be October 18-20, 2012. The meeting will be held in Washington, DC.

Submitted by Anita Benjamin
American Mathematical Society
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