

## **Milwaukee Mathematics Partnership Helping Shape Up Math Education** *(Appeared in UW-Milwaukee, School of Education Annual Report 2005-2006)*

The Milwaukee Mathematics Partnership (MMP) is multiplying the power of teachers to make mathematics add up for students. The partnership, funded through a \$20 million National Science Foundation grant, focuses on helping teachers improve students' mathematics achievement in Milwaukee Public Schools. In addition, the partnership, which includes UWM, Milwaukee Public Schools and the Milwaukee Area Technical College, is looking at ways to help students make important transitions between high school and college mathematics. And, the MMP is also involved in helping the district make system-wide changes in the mathematics curriculum.

The Milwaukee Mathematics Partnership, formed in 2002 when the NSF grant was awarded, grew out of a collaborative effort to improve the quality of education in Milwaukee through the Milwaukee Partnership Academy.

“Even though we consider it only one project, there are about twelve projects included in the work of the partnership,” says DeAnn Huinker, director of the Center for Mathematics and Science Education Research (CMESR) and principal investigator for the grant.

Helping teachers develop better ways to teach mathematical concepts is one key MMP focus. Instead of focusing simply on computation, current and aspiring teachers are learning a comprehensive approach. In addition to learning computation skills, students learn mathematical reasoning and problem solving and are able to apply mathematical principles and understand problems.

The NSF funding provides workshops for experienced teachers to help them learn more about mathematics themselves and develop their skills in sharing mathematics knowledge with students. These workshops are held at MPS as well as at UWM. Last year, the content theme was algebraic understanding and reasoning, says Huinker. This year, teachers are working on geometry and measurement concepts. In addition, a number of UWM courses are being offered for MPS teachers this spring that focus on topics from fraction concepts to mathematical communication and reasoning. The courses have also expanded to include kindergarten and special education teachers.

In addition to workshops for experienced teachers, the NSF project helps fund mathematics teacher leaders and mathematics specialists. The teacher leaders are experienced teachers who serve on school learning teams and help focus the school on improving mathematics teaching and learning. Four Teachers-in-Residence at UWM are focused on mathematics, helping lead workshops and develop mathematics courses for prospective teachers.

The MMP's approach to mathematics education is also affecting how UWM and MATC are educating aspiring teachers.

Multidisciplinary teams which include mathematics educators, mathematicians and experienced classroom teachers are working together to redesign existing courses and develop new courses. The goal is to increase teachers' knowledge of mathematics content and also help them develop the tools and techniques they need to share those concepts with students.

Four new courses have already been developed for the mathematics minor in the Middle Childhood through Early Adolescence (MCEA) Program. The members of the design team work collaboratively to determine course content, based on national and Wisconsin standards, says Huinker. Team members also teach the courses collaboratively, exposing students to the different perspectives of faculty from the School of Education, faculty from Letters and Science, and teachers from MPS.

All the newly developed courses try to find a balanced approach. "Right now we're contributing to a countrywide debate," says Huinker. "If you're going to be a middle school or elementary school teacher, should you just take the same math courses if you're going to be an engineer? "Based on national reports and recommendations, the UWM Mathematical Sciences Department and School of Education decided that what teachers need to know is indeed different from what prospective engineers need to know."

### **Transition**

Helping students make the transition from high school to college is another crucial focus of the MMP.

In the past, many MPS graduates had to take remedial classes when they started college. Now, MPS, MATC and UWM are working together to bridge the gap. For example, 10<sup>th</sup>, 11<sup>th</sup> and 12<sup>th</sup> grade students in MPS can now take a test to assess their mathematical readiness. "We wanted to find out how they scored and what areas they needed to work on to be ready for college mathematics," says Huinker.

Eric Key, professor of mathematics, is working with the MMP on a bridge program that helps students prepare for placement tests and make the transition between high school and college. As part of this effort, Key and David Ruszkiewicz, MATC mathematics faculty, have developed practice problem booklets for MPS students. These booklets also help teachers see what the expectations are and how their students are doing on those topics. The bridge program also provides students with one-on-one tutoring and online monitoring.

UWM is helping incoming freshman who do well on the ACT, but not on mathematics placement tests. Out of 220 students who retested after the review, 70% had a higher placement test score.

The MMP is also making it easier for students who start at MATC to make the move to UWM by redesigning courses at MATC to make them more consistent with UWM

courses, assuring not only that credits transfer, but that students are better prepared for more advanced courses.

### **Making assessments work**

UWM mathematics education faculty, mathematics faculty, MATC and MPS are also collaborating on pilot projects to help teachers better use information from mathematics assessments aimed at finding out how well students are doing in meeting mathematics learning targets. Many teachers, says Huinker, need help in transforming this information into “descriptive feedback,” information that makes it clear to students where their weaknesses are and what they need to do to improve as well as reinforcing their strengths.

### **Changing the system**

In addition to increasing the number of mathematics specialists in schools and adding math teacher leaders to school learning teams, the MMP is involved in other changes to the way mathematics is taught. For example, MMP members and MMP-trained teachers were involved in the selection of new mathematics textbooks and programs for their schools next year. The MMP is also working collaboratively with school redesign teams to provide additional mathematics support at district high schools that have been turned into smaller schools under one roof.

Although research and data collection are continuing, Hanssen Consulting, LLC, the NSF project’s external evaluator, reported in November that results look promising, according to Huinker. “We are making a difference in teachers’ learning.” The “bonding” that is resulting from mathematics teacher leaders on learning teams is an extra benefit. “Schools that are cemented around mathematics improvement are building stronger school communities.”