Science and Mathematics Misconceptions Management (SaM³) is a statewide collaborative effort between the Michigan Mathematics and Science Centers Network and the Michigan Department of Education to provide middle and high school science and mathematics teachers with professional development opportunities.

The research questions include: 1) What are some barriers to teaching and learning mathematics and science? 2) What are the similarities and differences of barriers to teaching and learning mathematics and science in different parts of Michigan?

Answers to these questions will 1) inform stakeholders about the barriers to implementing mathematics and science educational improvement programming, 2) show changes to educational environment and standards effects teachers and students, 3) provide information to project directors and staff designing professional development.

**Introduction**

Teacher participants were asked the following question on the pre-survey: What are the major issues or concerns for you related to the teaching and learning of mathematics at your grade level? The top seven responses from mathematics and science are shown in the figures below.

**Methods**

- Teacher surveys collected at the beginning of the 2011 and 2012 Summer Institutes.
- 28 mathematics and 31 science teachers completed the survey in 2011 (Cohort 1), and 38 mathematics and 32 science teachers completed the survey in 2012 (Cohort 2).
- Cohort 1 participants were primarily from urban areas in southern and eastern Michigan. Cohort 2 participants were primarily from rural areas in the Upper Peninsula and northwestern Michigan (see Figure 3, right).
- The survey was paper/pencil and prepared by a team of evaluators at Science and Mathematics Program Improvement (SAMPI), Western Michigan University.
- Data were entered into an Access® database.
- Survey contained a question on barriers to teaching and learning mathematics and science which has been used here for analysis.
- In this qualitative study, data were analyzed by categorizing the open-ended question of barriers.

**Results**

The top barriers for mathematics teachers were heavily student related: Lack of prior knowledge and Lack of motivation/effort/interest. In addition, Parental support/involvement and Addressing misconceptions were also high concerns. The top barriers for science teachers were Lack of resources, Lack of prior knowledge of students, Time, Content/Standards/Curriculum, and Addressing misconceptions.

**Conclusions**

Several barriers to teaching and learning mathematics and science were reported for urban and rural Michigan teachers. Future professional development could utilize this information to help address barriers of student prior knowledge, student lack of motivation, and lack of resources.

Professional development for teachers in these areas could potentially help increase student achievement, graduation rates, matriculation to college, etc.

Contact Info: Crystal Stein, Research Assistant, SAMPI—Western Michigan University, crystal.stein@wmich.edu, 269-387-2422