

**Michigan Middle School
Mathematics Reform Project (M³RP)**

Summary of Evaluation Findings

from Year 01 and 02 (July 1, 1999-June 30, 2001)

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Introduction. This document is a summary of findings from the on-going evaluation of M³RP. It is based on data collected during the first two years of the project. More detailed reports are available from the M³RP office.

What is M³RP? M³RP is a four-year collaborative effort designed to assist Michigan school districts in aligning their middle school mathematics curriculum and instruction with the Michigan Curriculum Framework and other professional recommendations. Each participating district has a District Leadership Team (DLT) that is assisted by the project in facilitating middle school mathematics improvement in their districts. There are two or more Teacher Leaders (TLs) for each district, who receive extensive professional development to deepen their understanding of mathematics content and pedagogy, as well as how to provide professional development for colleagues at their home schools.

Professional development for DLTs and TLs is conducted at 7 regional sites, facilitated by 2 Regional Directors (experienced mathematics educators) in each region. These Regional Directors work with the 10-15 districts in their regions to develop and implement strategies to improve their mathematics programs. Programs that parallel those conducted at the regional sites are conducted at the district level by DLT members (including TLs) to prepare local middle school teachers and other educational stakeholders in the community.

Who is being served? The original goal of M³RP was to recruit 75 school districts in 5 regions. At the end of year 02:

- 90 participating districts (15 more than the goal) in 7 regions
- 147 middle schools, approximately 20% of all Michigan public schools serving middle school students
- 80,000+ students being served, approximately 21% of all Michigan middle school students in public schools
- 8 urban districts, 9 small city districts, 20 suburban, and 52 rural (this includes the second and third largest school districts in Michigan)

How many educators are involved?

- 197 Teacher Leaders
- 294 District Leadership Team Members--administrators, high school/elem. teachers, parent/community members (not including TLs)
- 923 middle schools teachers (non-TLs or DLT members)

How much professional development (PD) has been provided?

- 4 DLT sessions were conducted, 6 hours each. There are 421 DLT members across all regions. Attendance: Session #1 = 91%, #2 = 90%, #3 = 77%, #4 = 80%. Across all four sessions a total of 9,366 hours of PD was received.
- 2 TL Summer Institutes were conducted, 2 weeks each (60 hours). Attendance: Year 01 = 97%, Year 02 = 90%. Across the two institutes a total of 22,140 hours of professional development was received.
- 4 TL school year training sessions were conducted on 3 Saturdays and 1 Friday, 6 hours each. Attendance: Session #1 = 87%, #2 = 83%, #3 = 77%, #4 = 80%. Across the four sessions a total of 3,858 hours of PD was received.
- Participating districts developed plans for providing professional development for their other middle school teachers, with a goal of providing 32 hours per year. That programming got underway in Year 02. Final data are currently being compiled. Preliminary data show about 670 teachers have received 13,000 hours of professional development.

Who are the Teacher Leaders? From a survey of TLs, a profile based on selected indicators follows:

- Average years teaching = 9, Range = 1-33
- Average years as middle school teacher = 9, Range = 0-27
- Average years as middle school math teacher = 5, Range = 0-28
- % certified at elementary level = 61%; at secondary = 46%
- % with mathematics major in college = 42%
- % with mathematics minor in college = 45%

What improvements in teaching practices have been reported by Teacher Leaders?

Surveys of TLs were conducted in Year 01 and 02. An analysis comparing responses from one year to the next show the following:

- ✓ Teachers report making greater use of the following, important elements of a standards-based investigative mathematics program.
 - Arranging seating in their classrooms to facilitate student discussion
 - Using open-ended questions in their discourse with students
 - Requiring students to explain their reasoning when giving an answer
 - Encouraging students to communicate mathematically in their discourse
- ✓ Teachers also report they are engaging students more in the following activities, all consistent with standards-based investigative mathematics programming.
 - Working in cooperative groups
 - Making formal presentations to the class about their work
 - Working on solving real-world problems
 - Engaging in hands-on mathematics activities
 - Following specific instructions in an activity
 - Designing or implementing their own investigations
- ✓ Teachers report doing less of the following in their classrooms:
 - Introducing content through formal presentations (lectures)
 - Having students work individually (independently) on problems

What do lessons look like in classrooms of Teacher Leaders? Evaluators observed lessons in the classrooms of 120 Teacher Leaders during the 2000-01 school year using a standardized protocol. A brief summary of findings follows. A more detailed report is available.

✓ **Planning and organization** of most lessons were consistent with state and national standards for good lesson design. Strong design elements included providing for substantive student-student interactions, substantive teacher-student interactions, making investigative tasks essential elements of the lesson, and organizing so lessons addressed student learning styles/developmental levels. Weak areas included inadequate time for students and/or the teacher to reflect on the lesson and its content and inadequate time for lesson wrap-up and closure.

✓ **Adequate supplies and equipment** were available for 96% of lesson observed.

✓ **Room arrangement** in 53% of the lessons maximized student-student interactions; in the other lessons it was more difficult for students to work together.

✓ A strong element of **lesson implementation** was the high teacher confidence in conducting the mathematics lesson. Areas of implementation that need more attention include:

- More probing and substantive interactions between students and the teacher
- Adjusting the pace of the lesson to better meet needs of the students
- Increase the effectiveness of interactions between students in small groups, pairs, and in whole group sessions

✓ The **content** of 65% of the mathematics lessons observed was important and worthwhile and consistent with the Michigan Curriculum Framework. In 65% of the lessons, teachers show a strong understanding of the mathematics content of the lesson.

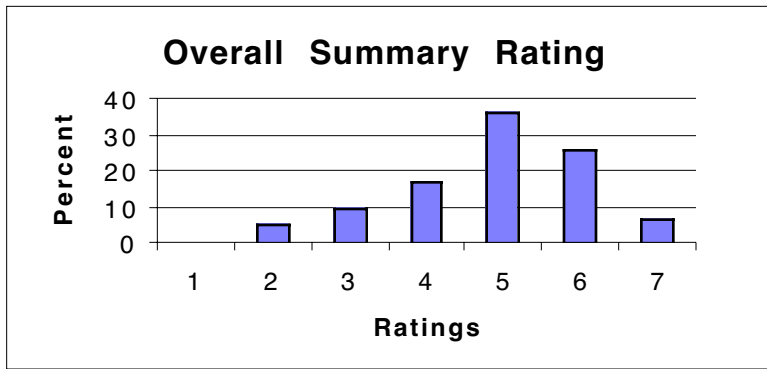
An area of weakness related to content of a lesson relates to making connections, a core teaching and learning standard. Among about half of the lessons, strong connections were made between the ideas of the lesson being observed and previous and/or future lessons in the overall unit. In about one-third of the lessons, strong applications of mathematics concepts were made to real-world situations. In less than one-fourth of lessons were strong connections made between the content of the lesson and other areas of mathematics and other subjects. Although not every lesson must include major connections, according to teaching and learning standards, this should be an important element of most lessons.

✓ **Classroom culture** is concerned with the classroom climate, the level of engagement of students in activities and tasks, and the nature of the working relationships among students and between students and the teacher. More emphasis could be placed on achieving the following:

- Encouraging and valuing the active participation of all students in the class
- Greater recognition and valuing of student ideas, questions, and contributions to a lesson
- Creating a classroom climate that encourages all students to generate ideas, questions, and propositions
- Developing more collaborative working relationships among students

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✓ All lessons observed received an overall rating on a 7 point scale, with 1 = low rating and 7 = high rating. The graph below shows results. It suggests that, in general, a high proportion of Teacher Leader lessons are consistent with state and national teaching and learning standards.



What mathematics curricula are being used by participating districts? 37% of districts are using one of the NSF-funded reform mathematics programs.

NSF-Funded Reform Math Program	No. Schools Using the Program at End of Year 02	Additional Schools Beginning to Use in Year 03
Connected Math	14	4
Math Themes	5	3
MathScape	4	2
Math Themes (6th) and MathScape (7-8th)	1	0
TOTAL	24	9

What barriers and issues have principals identified as affecting their mathematics improvement efforts? The table below shows barriers identified and percent of principals who identified that issue. Data is from interviews with principals.

Not enough time to implement change	34%
Inadequate financial resources	17%
Resistant/reluctant teachers	13.5%
Convincing community, etc. OK to change	6.5%
Inadequate parent support/understanding	5%
Change happening too fast	4%
Inadequate technology	2.5%

What do project operations look like? The management team continues to provide direction for the project, meeting regularly to plan and problem-solve. The fourteen Regional Directors implement DLT and TL sessions at the regional level and meet 3 times each year for planning and training in preparation for upcoming activities. An Advisory Board made up of representatives of the collaborating organizations meets twice each year. The workload for everyone involved continues to be heavy. Facilitating the improvement efforts of a statewide project of 90 school districts is a major challenge. The efforts of the core team are to be commended.