

Supporting the Implementation of Math Recovery[®] Professional Development

**A Michigan Mathematics and Science Partnership (MSP) Grant
The Muskegon Area ISD Regional Mathematics and Science Center**

Pre/Post Teacher Content Assessment

**Prepared by the External Evaluation Team
Science and Mathematics Program Improvement (SAMPI)
Western Michigan University**

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Supporting the Implementation of Math Recovery[®] Professional Development is a project funded by the Michigan Mathematics and Science Partnership competitive grants program of the Michigan Department of Education. The purpose of the project is to implement a 40-hour training called Add+VantageMR[®] (AVMR) designed for K-5 teachers. The training consists of two AVMR courses designed to provide a detailed understanding of how children develop understanding of early numeracy (Course 1) and number domains of place value and multiplication and division (Course 2). K-5 teachers also are trained to administer AVMR assessment tools that help them recognize students' current mathematics understanding and build on their current ways of reasoning. The training of the first cohort of teachers began in spring/summer 2015 and was implemented by the Muskegon Area ISD Regional Mathematics and Science Center (Muskegon) and the following partners:

- Calhoun Intermediate School District (Calhoun)
- Eastern Upper Peninsula Mathematics and Science Center (EUP)
- Mason-Lake Oceana Mathematics and Science Center (Mason)

The training of the second cohort of teachers began in fall 2015 and was implemented by the same four partners. A pre/post content test was administered to all teacher participants. The following document reports the outcome of this testing.

The test was developed cooperatively between the evaluation team and the project leaders and was reviewed by mathematics education professionals before being administered. The test contained 12 items representing math concepts and strategies teachers were exposed to during Math Recovery[®] training. Some items had several parts, bringing to the total possible score to 25 points. Data were subject to paired sample t-tests for each of the four sites and for each of the two cohorts.

Pre-assessments were administered to 214 teacher participants; 206 participants completed the post-assessment. Of these, 198 data pairs were identified for further analysis (Cohort 1 = 92; Cohort 2 = 106). The data pairs were further subdivided by site for each of the two cohorts (Table 1)

Table 1. Number of Matched Pre/Post Tests

Site	Cohort 1	Cohort 2
Calhoun	24	30
EUP	17	24
Mason	29	23
Muskegon	22	29
Total	92	106

The external evaluation is being conducted by Science and Mathematics Program Improvement (SAMPI), Western Michigan University (WMU). Contact Dr. Kristin Everett (email: kristin.everett@wmich.edu or phone: 269-387-2417) or Dr. Mary Anne Sydlik (email: maryanne.sydlik@wmich.edu or phone: 269-387-3791) for more information about the evaluation.

Summary of Results

The following comments are intended as feedback for the *Supporting the Implementation of Math Recovery® Professional Development* project team as they reflect on accomplishments and plan for future efforts.

Tables 1 and 2 show that teachers in both cohorts...

- **...began their AVMR training with a comparable level of content knowledge.** Overall mean pre-test scores were similar for both cohorts (Cohort 1: $\bar{x} = 70.0\%$, $n = 92$; Cohort 2: $\bar{x} = 71.2\%$, $n = 106$). An independent samples t-test indicated that the difference was not statistically significant ($p = 0.596$).
- **...made improvements in their content knowledge.** A statistically significant pre-to-post change ($p \leq 0.05$) was observed for all Cohort 2 sites and all Cohort 1 sites except Muskegon, which was on the cusp of significance ($p\text{-value} = 0.056$).

Table 1. Cohort 1 Teacher Pre/Post Test Analysis by Site ¹

Total possible score = 25	n	Pre-Test		Post-Test		p-value
		Score	%	Score	%	
All Teachers	92	17.5	70.0%	19.8	79.0%	0.001*
Calhoun	24	17.8	71.3%	19.0	76.2%	0.021*
EUP	17	17.1	68.5%	19.5	78.1%	0.023*
Mason	29	17.1	68.4%	20.9	83.6%	< 0.001*
Muskegon	22	17.7	70.9%	19.1	76.5%	0.056

* Statistically significant difference, $p \leq 0.05$

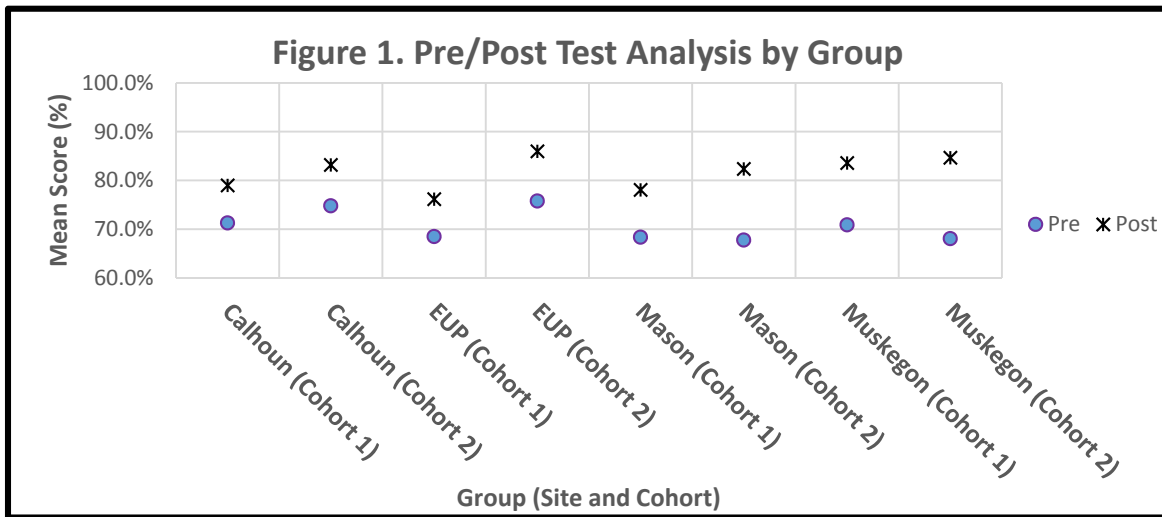
Table 2. Cohort 2 Teacher Pre/Post Test Analysis by Site

Total possible score = 25	n	Pre-Test		Post-Test		p-value
		Score	%	Score	%	
All Teachers	106	17.9	71.2%	21.0	84.0%	< 0.001*
Calhoun	30	18.7	74.8%	20.8	83.2%	0.001*
EUP	24	19.0	75.8%	21.5	86.0%	< 0.001*
Mason	23	17.0	67.8%	20.6	82.4%	< 0.001*
Muskegon	29	17.0	68.1%	21.2	84.7%	< 0.001*

* Statistically significant difference, $p \leq 0.05$

¹ Data reported in Table 1 are different from a preliminary analysis performed in October 2015. Five (5) Cohort 1 teachers were added to the analysis. Data for these teachers were received late and were not included in the October 2015 analysis.

The mean pre and post scores are shown graphically in Figure 1.



Cohort 2 teachers demonstrated the strongest growth in content knowledge. Overall mean post-test scores were highest among Cohort 2 participants (Cohort 1 \bar{x} = 79.0%, n = 92; Cohort 2: \bar{x} = 84.0%, n = 106). An independent samples t-test found the difference to be statistically significant (p = 0.019).

Table 3 shows statistics for each site when Cohorts 1 and 2 data are combined.

Table 3. Teacher Pre/Post Test Analysis (All Teachers)

Total possible score = 25	n	Pre-Test		Post-Test		p-value
		Score	%	Score	%	
All Teachers	198	17.7	70.8%	20.4	81.7%	< 0.001*
All Calhoun	54	18.3	73.3%	20.0	80.1%	< 0.001*
All EUP	41	18.2	72.8%	20.7	82.7%	< 0.001*
All Mason	52	17.0	68.1%	20.8	83.1%	< 0.001*
All Muskegon	51	17.3	69.3%	20.3	81.8%	< 0.001*

* Statistically significant difference, $p \leq 0.05$

Analysis of pre/post assessments provide evidence that the AVMR training impacted the content knowledge of teacher participants at all sites. The greatest growth was observed among Cohort 2 teachers, perhaps because of an improved presentation of the AVMR material. Facilitators likely learned from their Cohort 1 experiences and were better able to address the needs of Cohort 2 teachers, resulting in a greater impact on teachers' content knowledge. Project staff should be encouraged by these finding and are encouraged to continue in their efforts.