

# **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 Video 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 training of a second cohort of teachers began in fall 2015. Training 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)

Teacher participants watched two short videos of teacher-student math activities as a pre-test on the first day of AVMR Course 1 and answered the following question after viewing each video: "What would you say and do to help the student develop understanding of the mathematics in this situation?" They watched the videos and answered the question again as a post-test on the last day of AVMR Course 2. A rubric was developed based on Math Recovery® principles to assess teachers' responses:

- 0 points – No, irrelevant, or nonsensical response; or vague/very general response
- 1 point – One or more specific inappropriate actions
- 2 points – One or more specific inappropriate and one or more appropriate actions
- 3 points – One specific appropriate action
- 4 points – Two or more specific appropriate actions

A consensus list of “appropriate” and “inappropriate” actions was created for each video in cooperation with the leadership team. Teachers could receive 4 points for each video for a total score of 8.

Pre-assessments were administered to 213 teacher participants; 205 participants completed the post-assessment. Of these, 189 data pairs were identified for further analysis (Cohort 1 = 90; Cohort 2 = 99). The data pairs were further subdivided by site for each of the two cohorts (Table 1)

**Table 1. Number of Matched Pre/Post Video Assessments**

Site	Cohort 1	Cohort 2
Calhoun	23	30
EUP	17	19
Mason	29	23
Muskegon	21	27
<b>Total</b>	<b>90</b>	<b>99</b>

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](mailto:kristin.everett@wmich.edu) or phone: 269-387-2417) or Dr. Mary Anne Sydlik (email: [maryanne.sydlik@wmich.edu](mailto: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...

- **...did not begin their AVMR training with the same ability to provide suggestions that help students develop their understanding of math.** The overall mean pre-test score was higher for Cohort 2 teachers (Cohort 1:  $\bar{x} = 29.3\%$ ,  $n = 90$ ; Cohort 2:  $\bar{x} = 35.9\%$ ,  $n = 99$ ). An independent samples t-test indicated that the difference was statistically significant ( $p$ -value  $< 0.0001$ ).
- **...made improvements in their ability to provide helpful suggestions to students.** A statistically significant pre-to-post change ( $p \leq 0.05$ ) was observed for all Cohort 2 sites and all Cohort 1 sites except EUP ( $p$ -value = 0.569).

**Table 1. Cohort 1 Teacher Pre/Post Video Analysis by Site**

Total possible score = 8	n	Pre-Test		Post-Test		p-value
		Score	%	Score	%	
<b>All Teachers</b>	<b>90</b>	<b>2.34</b>	<b>29.3%</b>	<b>4.40</b>	<b>55.0%</b>	<b>&lt; 0.001*</b>
Calhoun	23	2.13	26.6%	4.91	61.4%	< 0.001*
EUP	17	2.12	26.5%	2.88	36.0%	0.569
Mason	29	2.41	30.2%	5.17	64.7%	< 0.001*
Muskegon	21	2.67	33.3%	4.00	50.0%	< 0.001*

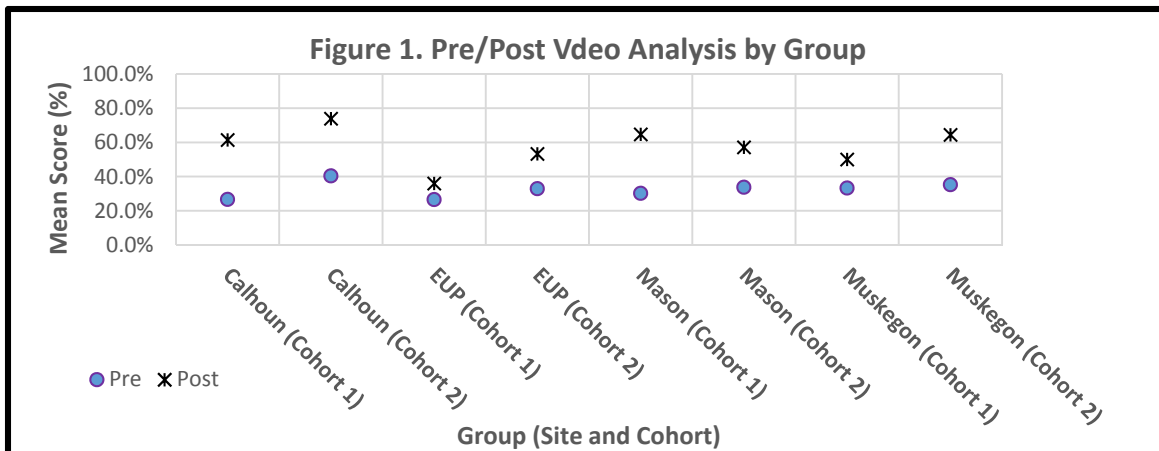
\* Statistically significant difference,  $p \leq 0.05$

**Table 2. Cohort 2 Teacher Pre/Post Video Analysis by Site**

Total possible score = 8	n	Pre-Test		Post-Test		p-value
		Score	%	Score	%	
<b>All Teachers</b>	<b>99</b>	<b>2.88</b>	<b>36.0%</b>	<b>5.07</b>	<b>63.4%</b>	<b>&lt; 0.001*</b>
Calhoun	30	3.23	40.4%	5.90	73.8%	< 0.001*
EUP	19	2.63	32.9%	4.26	53.3%	0.001*
Mason	23	2.70	33.7%	4.57	57.1%	0.002*
Muskegon	27	2.81	35.2%	5.15	64.4%	< 0.001*

\* Statistically significant difference,  $p \leq 0.05$

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



**Cohort 2 teachers demonstrated greater post-program ability to provide helpful suggestions to students.** Overall mean post-test scores were highest among Cohort 2 participants (Cohort 1  $\bar{x} = 55.0\%$ ,  $n = 90$ ; Cohort 2:  $\bar{x} = 63.4\%$ ,  $n = 99$ ). An independent samples t-test found the difference to be statistically significant ( $p$ -value = 0.004).

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

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

Total possible score = 8	n	Pre-Test		Post-Test		p-value
		Score	%	Score	%	
<b>All Teachers</b>	<b>189</b>	<b>2.62</b>	<b>32.8%</b>	<b>4.75</b>	<b>59.4%</b>	<b>&lt; 0.001*</b>
All Calhoun	53	2.75	34.4%	5.47	68.4%	< 0.001*
All EUP	36	2.39	29.9%	3.61	45.1%	< 0.001*
All Mason	52	2.54	31.7%	4.90	61.3%	< 0.001*
All Muskegon	48	2.75	34.4%	4.65	58.1%	< 0.001*

\* Statistically significant difference,  $p \leq 0.05$

*Analysis of pre/post video assessments provide evidence that the AVMR training impacted the ability of teachers to provide suggestions that help students develop their understanding of math. Cohort 2 teachers demonstrated the strongest post-program ability, perhaps because their initial pre-program ability was stronger (as indicated by the pre-assessment scores). The facilitators should be commended for their efforts to provide a similar presentation of AVMR training across the four sites, efforts that appear to have resulted in a significant impact on participating teachers.*

### Summary of Results by Video

#### Video 1: Katie

**Table 4. Cohort 1 Teacher Pre/Post Katie Video Analysis by Site**

Total possible score = 4	n	Pre-Test		Post-Test		p-value
		Score	%	Score	%	
<b>All Teachers</b>	<b>90</b>	<b>1.29</b>	<b>32.3%</b>	<b>2.47</b>	<b>61.8%</b>	<b>&lt; 0.001*</b>
Calhoun	23	1.17	29.3%	2.61	65.3%	< 0.001*
EUP	17	1.12	28.0%	2.00	50.0%	0.005*
Mason	29	1.24	31.0%	2.72	68.0%	< 0.001*
Muskegon	21	1.62	40.5%	2.33	58.3%	0.012*

\* Statistically significant difference,  $p \leq 0.05$

**Table 5. Cohort 2 Teacher Pre/Post Katie Video Analysis by Site**

Total possible score = 4	n	Pre-Test		Post-Test		p-value
		Score	%	Score	%	
<b>All Teachers</b>	<b>99</b>	<b>1.77</b>	<b>44.3%</b>	<b>2.62</b>	<b>65.5%</b>	<b>&lt; 0.001*</b>
Calhoun	30	2.03	50.8%	3.17	79.3%	< 0.001*
EUP	19	1.58	39.5%	2.00	50.0%	0.134
Mason	23	1.70	42.5%	2.39	59.8%	0.050*
Muskegon	27	1.67	41.8%	2.63	65.8%	0.004*

\* Statistically significant difference,  $p \leq 0.05$

#### Video 2: Melissa

**Table 6. Cohort 1 Teacher Pre/Post Melissa Video Analysis by Site**

Total possible score = 4	n	Pre-Test		Post-Test		p-value
		Score	%	Score	%	
<b>All Teachers</b>	<b>90</b>	<b>1.06</b>	<b>26.5%</b>	<b>1.93</b>	<b>48.3%</b>	<b>&lt; 0.001*</b>
Calhoun	23	0.96	24.0%	2.30	57.5%	< 0.001*
EUP	17	1.00	25.0%	0.88	22.0%	0.707
Mason	29	1.17	29.3%	2.45	61.3%	< 0.001*
Muskegon	21	1.05	26.3%	1.67	41.8%	0.002*

\* Statistically significant difference,  $p \leq 0.05$

**Table 7. Cohort 2 Teacher Pre/Post Melissa Video Analysis by Site**

Total possible score = 4	n	Pre-Test		Post-Test		p-value
		Score	%	Score	%	
<b>All Teachers</b>	<b>99</b>	<b>1.11</b>	<b>27.8%</b>	<b>2.45</b>	<b>61.3%</b>	<b>&lt; 0.001*</b>
Calhoun	30	1.20	30.0%	2.73	68.3%	< 0.001*
EUP	19	1.05	26.3%	2.26	56.5%	0.001*
Mason	23	1.00	25.0%	2.17	54.3%	0.001*
Muskegon	27	1.15	28.8%	2.52	63.0%	< 0.001*

\* Statistically significant difference,  $p \leq 0.05$