

# **Supporting the Implementation of Math Recovery<sup>®</sup> Professional Development**

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

## **Analysis of Normative Data from NWEA Mathematics Measure of Academic Progress (MAP) Grades K-5, 2015-16**

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*Supporting the Implementation of Math Recovery<sup>®</sup> 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<sup>®</sup> (AVMR<sup>®</sup>) designed for K-5 teachers. The training consists of two AVMR<sup>®</sup> 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<sup>®</sup> assessment tools that help them recognize students' current mathematics understanding and build on their current ways of reasoning. Three cohorts of trainings were 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)

This report highlights findings from an analysis of fall 2015 (pre) and spring 2016 (post) nationally normed Measures of Academic Progress (MAP) student scores. MAP scores were obtained from the classes of 22 Cohort 1 and 2 teachers in three Priority Partner schools (Freemont Elementary, Nelson Elementary, and Valley View Elementary).

Science and Mathematics Program Improvement (SAMPI) at Western Michigan University serves as external evaluators for the project. Contact Dr. Kristin Everett (email: [kristin.everett@wmich.edu](mailto:kristin.everett@wmich.edu) or phone: 269-387-2417) or Dr. Robert Ruhf (email: [robert.ruhf@wmich.edu](mailto:robert.ruhf@wmich.edu) or phone: 269-387-5390) for more information about the evaluation.

## Methodology

Fall 2015 (pre) and spring 2016 (post) Measures of Academic Progress (MAP) data were obtained from the K-5 classrooms of 22 Cohort 1 and 2 teachers in three Priority Partner schools (Freemont Elementary: 11; Nelson Elementary: 7; and Valley View Elementary: 4). Data were available for 438 students (Freemont Elementary: 233; Nelson Elementary: 111; and Valley View Elementary: 94). The breakdown of teachers and students by grade level is shown in Tables 1 and 2.

**Table 1. Number of teachers**

Priority School	K	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	Total
Freemont Elementary	2	2	1	2	2	2	11
Nelson Elementary	1	2	1	2	1	--	7
Valley View Elementary	1	--	1	1	--	1	4
<b>Total</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>5</b>	<b>3</b>	<b>3</b>	<b>22</b>

**Table 2. Number of students with MAP data**

Priority School	K	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	Total
Freemont Elementary	38	37	18	47	51	42	233
Nelson Elementary	16	30	20	39	6	--	111
Valley View Elementary	19	--	23	26	--	26	94
<b>Total</b>	<b>73</b>	<b>67</b>	<b>61</b>	<b>112</b>	<b>57</b>	<b>68</b>	<b>438</b>

Student MAP testing results are reported in RIT (Rasch Unit) and percentile scores. A RIT score measures a student's level of achievement. Each grade level was analyzed separately. Appropriate statistical tests were performed to answer the following research questions:

- How do the fall 2015 (pre) and spring 2016 (post) scores compare to the national norm?
- What proportion of students were at or above the national norm?
- How does student growth compare to nationally normal growth?

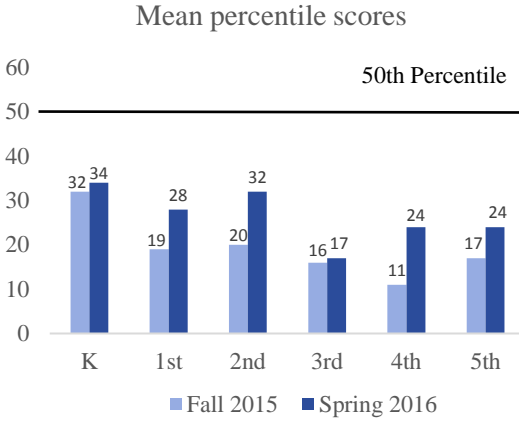
SAMPI can supply the details of the statistical tests upon request. Findings are summarized for each research question below.

## Summary of Findings

*Overall results suggest that Math Recovery® training impacted the students of teacher participants in the Priority schools.* While average spring 2016 (post) scores were below the norm, the pre-to-post growth was statistically significant and exceeded the projected growth for all grade levels. Statistically significant pre-to-post growth also was observed in the proportion of 1<sup>st</sup> and 5<sup>th</sup> grade students who were at or above the national norm.

**Question 1: How do the fall 2015 (pre) and spring 2016 (post) scores compare to the national norm?**

The average fall 2015 (pre) percentile scores were below the norm (50<sup>th</sup> Percentile) for all grade levels. The average percentile scores again were below the norm in spring 2016 (post) for all grade levels but were closer to the norm than fall (pre) scores (Table 2). The pre-to-post growth was statistically significant for all grade levels. The largest change was in 4<sup>th</sup> grade, a change of 13 percentile points, from the 11<sup>th</sup> to 24<sup>th</sup> percentile. The smallest change was in the 3<sup>rd</sup> grade, a change of 1 percentile point, from the 16<sup>th</sup> to the 17<sup>th</sup> percentile.



**Table 2. Mean percentile scores**

*For each grade level, the norm is located at the 50<sup>th</sup> percentile (50%)*

Grade	n	Mean Percentile Score		
		Fall 2015	Spring 2016	Mean Change
<b>K</b>	73	32	34	+ 2*
<b>1<sup>st</sup></b>	67	19	28	+ 9*
<b>2<sup>nd</sup></b>	71	20	32	+ 12*
<b>3<sup>rd</sup></b>	112	16	17	+ 1*
<b>4<sup>th</sup></b>	57	11	24	+ 13*
<b>5<sup>th</sup></b>	68	17	24	+ 7*

\* The mean change is statistically significant at  $\alpha = 0.05$ .

**Question 2: What proportion of students were at or above the national norm?**

- The proportion of students who were at or above the norm (50<sup>th</sup> percentile) in the fall (pre) ranged from 19% (4<sup>th</sup> Grade) to 39% (1<sup>st</sup> Grade). The proportion increased significantly in spring (post) for two grades (1<sup>st</sup> and 5<sup>th</sup>), with both grades at or near 50% (Table 3).
- No statistically significant change was detected for the other grades.

**Table 3. Proportion of students at or above the norm**

Grade	n	Proportion of Students at or above the Norm		
		Fall 2015	Spring 2016	Mean Change
<b>K</b>	73	32%	38%	+ 6%
<b>1<sup>st</sup></b>	67	39%	54%	+ 15%*
<b>2<sup>nd</sup></b>	71	31%	38%	+ 7%
<b>3<sup>rd</sup></b>	112	21%	20%	- 1%
<b>4<sup>th</sup></b>	57	19%	26%	+ 7%
<b>5<sup>th</sup></b>	68	32%	46%	+ 14%*

\* The mean change is statistically significant at  $\alpha = 0.05$ .

### Question 3: How does student growth compare to nationally normed growth?

- Observed student growth compared well with the normed growth. Note especially the growth for 4<sup>th</sup> grade (Table 4).
- More than half of the students' pre-to-post growth in RIT scores met or exceeded the projected (normed) growth, ranging from 65% of the students (Kindergarten) to 92% of the students (4<sup>th</sup> Grade). Growth is clearly above the norm.

**Table 4. Observed growth compared with normed growth**

Grade	n	Average Projected (Normed) Pre-to-Post RIT Score Growth	Average Observed Pre-to Post RIT Score Growth	Proportion of Students who Met or Exceeded Projected (Normed) Growth
<b>K</b>	73	20	21	65%
<b>1<sup>st</sup></b>	67	20	24	85%
<b>2<sup>nd</sup></b>	71	17	18	80%
<b>3<sup>rd</sup></b>	112	14	15	67%
<b>4<sup>th</sup></b>	57	12	19	92%
<b>5<sup>th</sup></b>	68	10	12	78%