

## Students Receiving Instruction in a Spanish Immersion Classroom Exhibit Gains

This report provides findings from a first-year implementation of McGraw-Hill Education’s *Everyday Mathematics-4* (hereafter, EM4) program for a small group of fifth grade students attending a Spanish immersion school in the state of Michigan. The school is unique, offering Kindergarten through sixth graders instruction using an early-total, one-way Spanish Immersion model where students receive core academic content in Spanish. The Michigan State Department of Education website reports that during the 2016-2017 school year, this particular school served 554 students in the fifth and sixth grade.

The school was part of a larger school district serving nearly 10,000 students and containing 4 high schools, 6 middle schools, and 8 elementary schools. Initiated in the fall of the 2016-2017 school year, the study incorporates twenty-three fifth grade students attending one classroom in the Spanish immersion school. The sample is one of convenience, as the school implementing EM4 voluntarily adopted the program during the 2016-2017 school year and willingly provided data regarding student demographics and achievement scores.

### Research Design Measures

The site was one of convenience, and the study did not employ a comparison or a control group. The primary measure for the study included student results on the spring 2016 and 2017 administration of the mathematics section of the Michigan state-mandated achievement test, the Michigan Student Test of Educational Progress, or M-STEP. The M-STEP provides a scaled test score,

### About This Paper

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which is derived from student raw scores. Data provided by the school included selected student demographic variables, student composite, or ‘total’ score on the M-STEP, and student scores in each of the content areas: Concepts and Procedures; Problem Solving, Modeling and Data Analysis; and Communicating Reasoning.

The school also provided each student’s overall proficiency level (e.g., Not Proficient, Partially Proficient, Proficient, and Advanced) on the 2016 and 2017 administrations of the M-STEP. A student identified as Not Proficient requires a great deal of intervention and exhibits a minimal understanding and application of content. A student identified as Partially Proficient requires some support, but is exhibiting some understanding and application of content. A student identified as Proficient exhibits understanding and application of content within grade level standards. A student identified as Advanced exceeds the grade level standards for understanding and application of content.

## Study Participants

Table 1 provides a summary of demographic information for study participants. Overall, 23 students participated in the study and received instruction in EM4. Thirteen students were girls, and ten students were boys. The majority of students (74%) were Caucasian. One student was identified as receiving special education services, and one student was identified as receiving free/reduced lunch services. All students were native English speakers.

Table 1

*Student Demographics as a Percentage of the Sample*

Demographic	n	%
Grade		
5	23	100.0
Gender		
Female	13	56.5
Male	10	43.5
Ethnicity		
African American	1	4.3
Asian	1	4.3
Caucasian	17	73.9
Hispanic	2	8.7
Multiple Ethnicity	2	8.7
Special Education		
Yes	1	4.3
No	22	95.7
Free/Reduced Lunch		
Yes	1	4.3
No	22	95.7
ESL		
Yes	0	0.0
No	23	100.0

## Program Implementation

One teacher, reporting between three and five years of teaching experience, was responsible for implementing EM4 to this sample of students. Prior to implementing EM4, the teacher received professional development training by educational consultants from McGraw-Hill Education. About 50 minutes per day was allotted for EM4 instruction. The classroom was equipped with a digital projector, a document camera (e.g., Elmo), and a laptop computer. A partial set of Chromebooks were available for student use during the class period, with students taking turns.

## Results

Table 2 lists the mean scaled score and standard deviation for the Total score and content areas on the 2016 and the 2017 administration of the M-STEP in mathematics. For example, the mean Total scaled score was 1413 on the 2016 administration of the M-Step, and 1513 on the 2017 administration of the M-STEP, for an average gain of about 100 scaled score units. The difference between the 2016 and 2017 score was statistically significant,  $p < .000$ . Similarly, the difference between scores on the 2016 and 2017 administration of the M-STEP were statistically significant for all content areas.

Table 2  
*Student Performance (Scaled Scores) on the M-STEP in Mathematics*

Area	M-STEP 2016		M-STEP 2017	
	Mean	SD	Mean	SD
<i>Total</i>	1413.00	19.13	1513.52*	16.05
<i>Concepts and Procedures</i>	1414.17	20.56	1515.00*	17.73
<i>Problem Solving, Modeling</i>	1414.65	21.83	1512.09*	16.48
<i>Communicating Reasoning</i>	1405.52	29.35	1511.22*	19.26

*Note.* Statistical significance reflects difference between 2016 and 2017 scores.  
\* $p < .000$ .

Table 2 highlights the mean and standard deviation Total scale score for EM4 users and mean and standard deviation Total scale scores at the school, district, and state level. One-way ANOVA with subsequent follow-up post hoc tests using Tukey HSD indicates that the mean difference in Total M-STEP scores between EM4 users and scores at the state level were statistically significant,  $p < .000$ . Although the mean of EM4 users was higher than the school and district means, the difference was not considered statistically significant.

Table 2

*Comparison of Student Performance by Group on the 2017 M-STEP in Mathematics*

Group	n	Mean	SD	Mean Difference (EM4 – Group)	Significant?	p
EM4	23	1513.52	16.05	--	--	--
School	288	1504.0	21.10	9.52	No	.290
District	764	1507.7	19.80	5.82	No	.604
State	106, 431	1487.8	25.0	25.72	Yes	.000

The percentage of students scoring at each level of proficiency on the 2016 and 2017 administration of the M-STEP is presented in Table 3. As shown in Table 3, about 39% of students scored in the Advanced range on the 2016 administration and before implementation of EM4, increasing to about 52% of students on the 2017 administration and after implementation of EM4. Roughly 34% of students scored in the Proficient range on the 2016 administration, and 17% of students scored in the Proficient range on the 2017 administration. The reason for the decline in the percentage of students scoring in the Proficient range is most likely that more students originally scoring in the Proficient range on the 2016 administration scored in the Advanced range on the 2017 administration. This is assumed, since the same number of students scored in the Partially Proficient range on the 2016 and 2017 administration and only one student scored in the Not Proficient range on the 2017 administration.

Table 3

*Student Proficiency Level on the M-STEP in Mathematics*

Proficiency Level	M-STEP 2016		M-STEP 2017	
	n	%	n	%
Advanced	9	39.1	12	52.2
Proficient	8	34.8	4	17.4
Partially Proficient	6	26.1	6	26.1
Not Proficient	0	0.0	1	4.3

Figure 1 shows the percentage of students scoring in the Advanced range on the 2017 administration of the M-STEP in mathematics, by group. Slightly over half of EM4 users scored in the Advanced range, followed by those at the district level (41%), school level (35%) and state (17%) level.

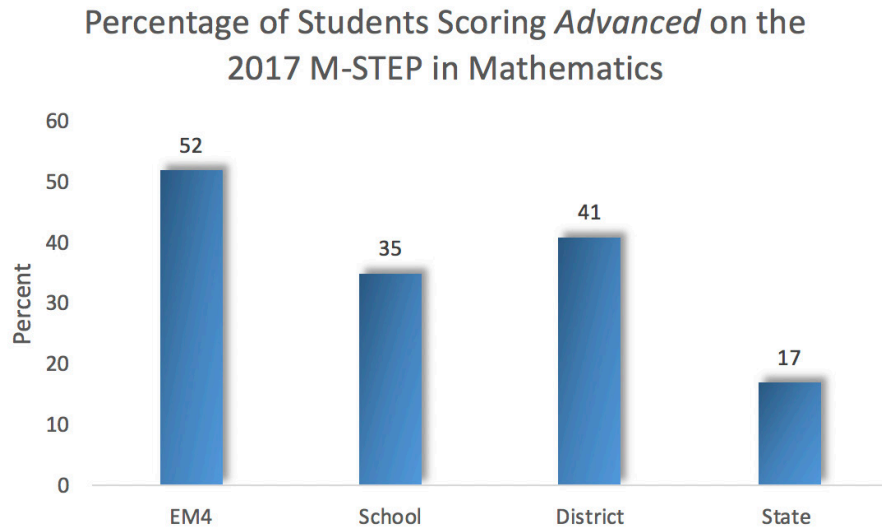
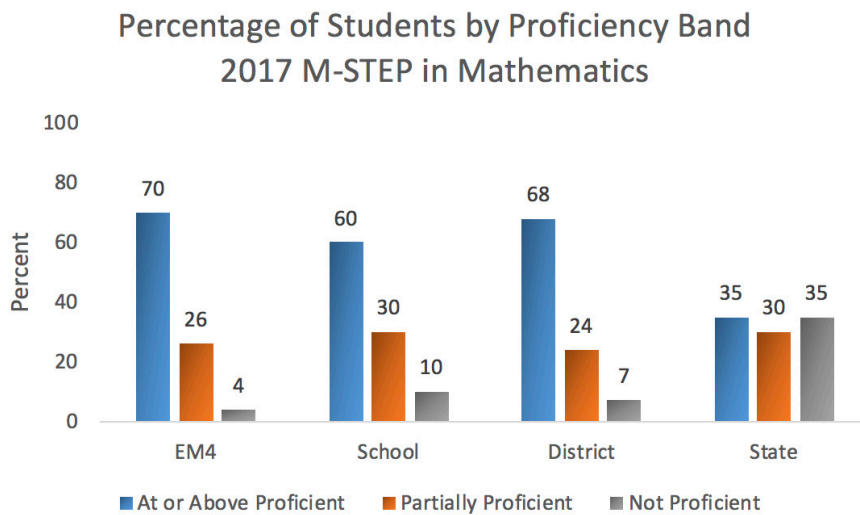


Figure 2 shows the percentage of students considered At or Above Proficient, Partially Proficient, and Not Proficient, by group, on the 2017 administration of the M-STEP. The At or Above Proficient category reflects those in the Advanced and Proficient range, combined. Roughly 70% of EM4 users were considered At or Above Proficient, while 60% of students at the school level were within this category. About 68% of students district-wide scored At or Above Proficient and about 35% of students, state-wide were in this category.



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## Survey Results

### Professional Development

The teacher received professional development less than one year before implementing EM4, and reported feeling ‘Very Satisfied’ with the training. There were no suggestions for future topics in regard to professional development.

### Overall Perception

Prior to implementing EM4, the teacher reported knowing ‘Quite a Bit’ about the program and had a ‘Somewhat Favorable’ impression. After implementing EM4, the teacher reported a ‘Very Favorable’ perception of the program and indicated she ‘Definitely Would’ use EM4 again.

### Teacher and Student Perception

When asked what, specifically, was liked about the program, the teacher responded, “It is very simple for students to understand”. There were no comments regarding teacher dislikes.

Students appeared to like “the different methods being taught”, but felt that, “there are not enough practice problems”. When asked to provide final feedback, the teacher reported simply, “I love the program!”.

### Usage

The teacher was additionally asked to indicate the degree to which specific components of EM4 were utilized. The following components were considered as indispensable and utilized on a ‘daily’ basis: Assessment Handbook; Student Math Journals; Teacher Lesson Guides; Online Teacher Center; Home Links Student Book; and Wall Charts and Posters. The teacher reported, ‘Never’ using the Manipulative Kits, Student Reference Book, Skills Link Student Book, or Classroom Game Kits, largely because the teacher, “didn’t have” these resources. Components utilized, “Once or Twice per Week” included the Math Masters, Activity Cards, and Skills Link Student Guide. The Online Student Center was accessed less than once per week.

## Summary

This report provides findings from a first-year implementation of EM4, for a small group of twenty-three students attending a Spanish immersion school in the state of Michigan. The site is unique, in that instruction is provided solely in Spanish. It should be noted that the sample size is quite small and a lack of comparison group limits interpretation of these findings. Expanding the sample size, incorporating a control group, and extending this study for an addition year would be helpful in further determining the effects of EM4.

Results indicate that students made significant gains from the 2016 administration to the 2017 administration of the M-STEP, in all content areas. The difference in 2017 M-STEP scores between EM4 users and students at the school, district, and state level was statistically significant for students at the state level. Although EM4 users scored higher, overall than other fifth grade students at the school and district level, the difference was not statistically significant. Further,

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EM4 students appeared to reach a greater level of proficiency on the 2017 administration of the EM4, with roughly 52% of students performing at an Advanced level, and 70% of students performing At or Above Proficient. Teacher perception of the program was quite favorable; the respondent indicated that she ‘definitely would use the program’ and that it was simple for students to understand. Those components utilized on a daily basis included the Assessment Handbook; Student Math Journals; Teacher Lesson Guides; Online Teacher Center; Home Links Student Book; and Wall Charts and Posters. The teacher reported not possessing several components of the program, including the Manipulative Kits, Student Reference Book, Skills Link Student Book, or Classroom Game Kits.

### **About *Everyday Mathematics***

*Everyday Mathematics* is developed by educators at the University of Chicago School Mathematics Project (UCSMP). This group is dedicated to helping children learn mathematics using a research-based approach. *Everyday Mathematics* is the most research-grounded and field-tested elementary mathematics program available today.

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