Systemic Intervention / Algebra Readiness
Richardson, Texas ● School Year 2006-7

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Introduction

In the school year 2006-2007, the MathForward program was in its second year at Richardson, TX Independent School District (RISD). RISD successfully managed their MathForward program. They scaled up the program to classes in 5 middle schools. They also extended the intervention from grades 7-8 to include pilot classes in grade 9 Algebra at two high schools. In all, 642 students were enrolled in the MathForward classes taught by 22 teachers at the junior high schools, along with 60 9th graders taught by five teachers at the high school sites.

Key Findings

- RISD successfully expanded its implementation to more schools and an additional grade. This suggests the scalability of the intervention.
- The successful self-sufficient management of MathForward by RISD, with positive results in the second year, suggests the sustainability of MathForward.
- RISD MathForward students gained on the TAKS, while the district as a whole declined slightly. This shows that MathForward students are showing movement toward closing the learning gap.
- In RISD, MathForward showed learning gains both for students who were in the quartiles above and below the TAKS proficiency level in the previous year. The gains probably were not due to chance. Thus, MathForward is not just a remedial program, but helps students in a broad range of achievement levels.
- In RISD, the subset of MathForward students who failed the TAKS in the previous year gained more on the TAKS than similar students district-wide. This result was not due to chance, and suggests the MathForward students are “closing the gap” in achievement.

- For RISD middle schools, researchers could make a year-to-year comparison of TAKS pass rate for students who failed in the previous year. This year the pass rate was 46% vs. 33% in 2006.
- In the RISD pilot of MathForward in the 9th Grade, pass rate for the subset of students who failed the TAKS in the previous year was 57% vs. 34% for a similar comparison group.

Summary

In the school year 2006-2007, the Richardson, TX Independent School District (RISD) managed of their MathForward program. They expanded the program to classes in 5 middle schools. They also extended the intervention from grades 7-8 to include pilot classes in grade 9 Algebra at two high schools. In all, 642 students were enrolled in the MathForward classes taught by 22 teachers at the junior high schools, along with 60 9th graders taught by five teachers at the high school sites.

Profile: Richardson ISD (RISD)

RISD is an ethnically and economically diverse school district serving a first-ring suburb of Dallas, TX. The demographic profile of junior high schools participating in MathForward is summarized in table 1 below.

Results

In 2007, RISD gave priority access to MathForward for the quartile of students who were just below proficiency on the TAKS in the previous year (here called Type 1 students), and the quartile of students who were just above proficiency in the previous year (called Type 2 students). In 2006, all students were below proficiency, and thus most comparable to Type 1. In 2007, MathForward classes included more Type 2 students and fewer Type 1 students, and the Type 1 students did not include those in the lowest quartile of 2006 TAKS scores. In order to do an "apples to apples" comparison of 2006 and 2007 MathForward performance, the researchers separately analyzed Type 1 and Type 2 students.

Learning Gains. Chart #2 below shows that the gains by the subset of students who failed the TAKS the previous year exceeded those of any comparison group (Type 1 students). The gains are largest relative to non-MathForward similar students district-wide (Control 3).

Chart #3 below examines students who passed the TAKS in the previous year (Type 2 students). It shows that MathForward students showed gains from 2006 to 2007, while all other comparison groups declined. Again, the district-wide comparison to similar non-MathForward students (Control 3) is the most meaningful.

Examining the two bar graphs together shows that MathForward is effective in raising TAKS scores of both types of students: those who failed the previous year TAKS, and those who passed the previous year TAKS. Thus, both low-achievement and higher-achievement students benefit from MathForward. It is not just beneficial for "remedial" students. Comparing relative gains shows that the lower-achieving Type 1 students gained more than the Type 2 students. This suggests that the lower achieving students are "catching up" or closing the achievement gap.

Further analysis using *Regression discontinuity* was performed to see if the result could be due only to chance. The results are shown in Graph 7, below. To do the analysis, the subset of MathForward students who failed the TAKS in 2006 (Type 1, Study) were compared to a similar district-wide group of non-MathForward students who did not fail the TAKS in the previous year (Type 2, Control 3). The gap between the two lines is not due to chance (is statistically significant). The gap shows that MathForward students who failed the TAKS in the previous year learned more than they would have without MathForward. The size of the effect is in 4 to 6.5 points of improvement on a 100 point scale.

Proficiency Rate Gains. Another metric which is meaningful to administrators is the percentage of students who showed proficiency on the state test at the end of the year (TAKS pass rate). We would expect most of the MathForward students who passed last year to pass this year, so it is more meaningful to examine only the subset of MathForward students who failed the TAKS in the previous year (Type 1 students). The last two charts show proficiency Rates for these students.

The first of the two final charts shows the results for middle school, and compares them to a similar district-wide group of non-MathForward students. The overall 46% state test pass rate (for students who did not pass the state test last year, or Type 1 students) represents an improvement when compared to the 33% pass rate reported last year, as well as a gain relative to the comparison group.

The last chart shows the proficiency rate for the Type 1 students in the high school program (a small pilot in 9th grade at two schools). The chart shows their proficiency rate, and compares it to a similar group of students who failed to pass the TAKS in the previous year. The chart shows that 57% of MathForward students who failed the TAKS in 2006, attained proficiency in 2007. By contrast, the comparison group had a 34% pass rate. This suggests that MathForward can be successfully extended from Pre-Algebra to Algebra.

References

The following full reports are available from Texas Instruments on request.

Winick, M. and Lewis, J. (2007) *TI-RISD MathForward Intervention 2007 Year End Report.* Redlands, CA: Winick & Lewis Research, LLC., August 15, 2007

Stroup, Walter, Pham, Vinh and Alexander, Celeste (2007) Richardson *MathForward Project Second Year Final Report: Math TAKS Results*. Austin, TX: The University of Texas at Austin

Table 1. RISD Economically disadvantaged and ethnic group percentages across junior high schools and between classes

		Economically Disadvantaged	Asian	African American	Hispanic	White	Total
		Percent	Percent	Percent	Percent	Percent	Count
Lake Highlands Junior High	Comparison Class	55%	2%	55%	25%	19%	183
	MathForward Class	64%	0%	53%	27%	19%	172
Richardson West Junior High	Comparison Class	58%	5%	21%	50%	22%	216
	MathForward Class	74%	0%	17%	63%	20%	109
Forest Meadow Junior High	Comparison Class	72%	3%	57%	30%	9%	268
	MathForward Class	60%	0%	56%	24%	20%	82
Westwood Junior High	Comparison Class	58%	3%	29%	46%	22%	180
	MathForward Class	60%	1%	31%	51%	17%	98
Liberty Junior High	Comparison Class	62%	15%	36%	27%	20%	273
	MathForward Class	64%	12%	52%	26%	10%	181

Chart 2. Mean TNCE change for different groups of Type 1 students between 2006 and 2007

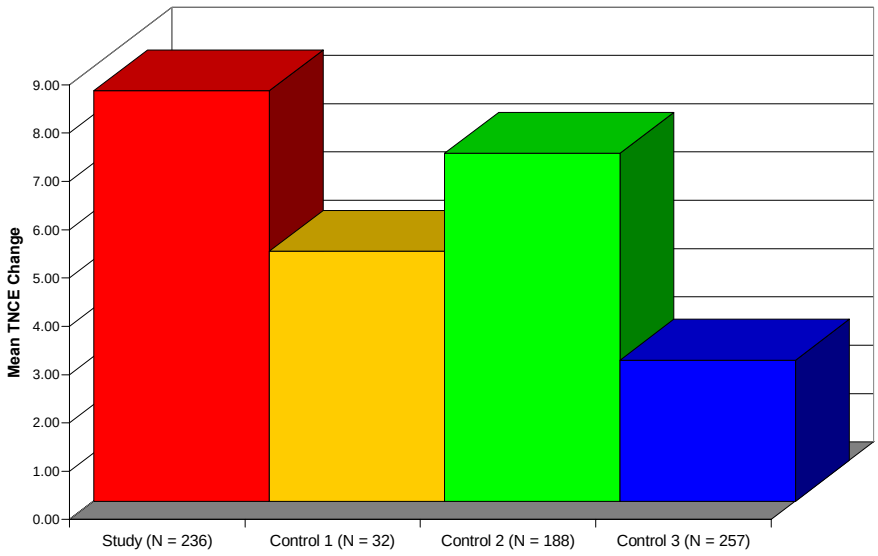
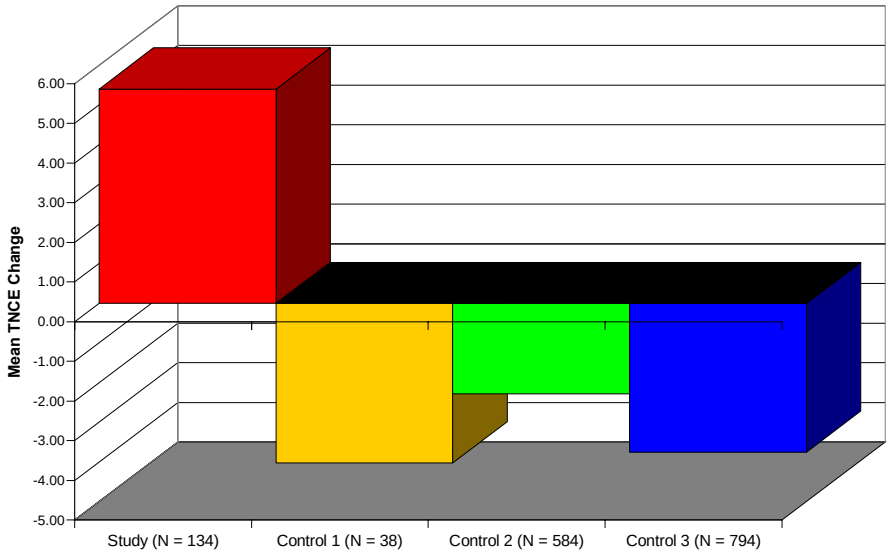
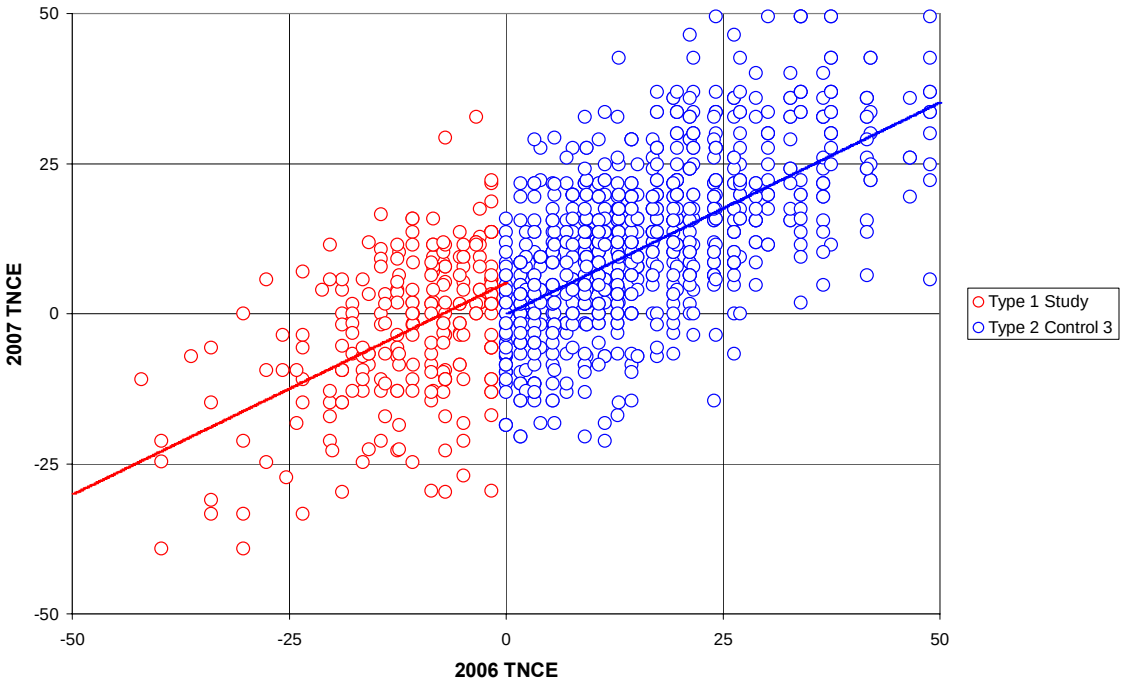


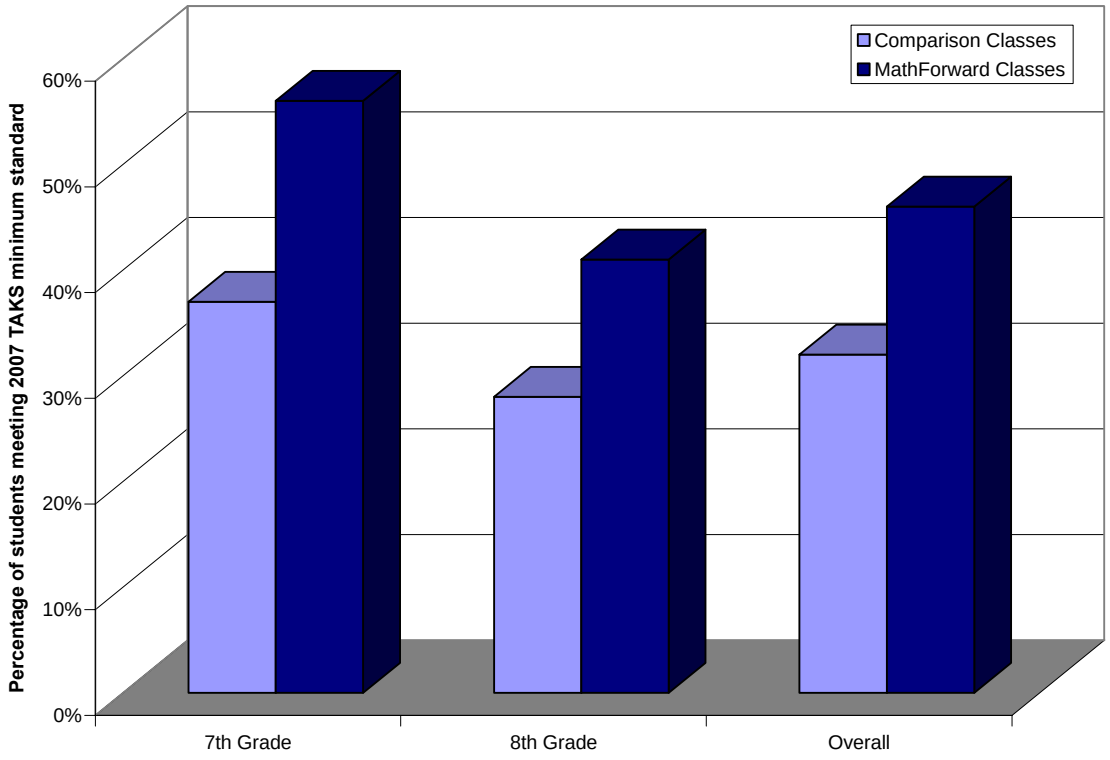
Chart 3. Mean TNCE change for different groups of Type 2 students between 2006 and 2007



Graph 7. Regression Discontinuity for 2007 Study and Control 3 groups



Percentage of RISD Students who failed to meet 2006 TAKS Minimum Standard who met 2007 TAKS Minimum Standard: MathForward versus Comparison Classes



Percentage of RISD High School Students who failed to meet TAKS Minimum Standard in 2006 who met 2007 TAKS Minimum Standard: MathForward versus Comparison Classes