USA District Like Mine (Low Student Need) Math Outcomes Analysis 2018/19

Grade Levels: 3, 4, 5
ST Math Program: Gen-5
Analysis Type: Z-score of math proficiency
Treatment-Years: 2018/19
Baseline-Year: 2012/13, 2013/14, 2014/15, 2015/16, 2016/17, or 2017/18
Subgroup: All

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Abstract

This analysis evaluates grades using ST Math with low student need in the USA in 2018/19. It identifies those grades with nominal or better implementation of the ST Math program, and matches them to randomly selected, similar math-performance comparison grades. The nominal ST Math users are an aggregation of 113 grades, consisting of grades 3, 4, and 5 at 69 schools, with an average baseline z-score of 0.74. Refer to Figures 2 and 3 for the math performance and demographic distributions. They were matched to 113 similar, randomly selected control grades at 104 schools that never used ST Math. Grade-wise growth in math proficiency was evaluated (i.e. growth in same grade, same school, from Baseline to 2018/19) on the mean z-scores of percent Proficient or Advanced (see Section 3.1). Grades 3, 4, and 5 aggregated showed an ST Math effect of 0.24 z-score points.

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1 Introduction

1.1 Background

This is a quasi-experimental analysis at the grade-mean level. Entire grades represent the units of analysis, and outcome measures are the multi-year changes in grade-mean z-score of Proficient or Advanced. The treatment grades used the ST Math program for 1, 2, 3, 4, 5, or 6 years, beginning in the 2013/14, 2014/15, 2015/16, 2016/17, 2017/18, or 2018/19 school year, respectively. The study hypothesis is treatment grades using ST Math will outperform similar matched control grades, using their "business as usual" conditions of instructional content and professional development. The control grades were selected to have similar demographic and math attributes (See Figures 2 and 3) to the treatment grades during the baseline year (2012/13, 2013/14, 2014/15, 2015/16, 2016/17, or 2017/18), and did not use ST Math in 2018/19. The treatment grades' selection pool was all schools using ST Math with low student need in grades 3, 4, and 5 in the USA. The control grades' pool was all schools not using ST Math in grades 3, 4, and 5 in the USA. This study method measures effectiveness of the ST Math program when nominally implemented.

1.2 Program Description

Spatial-Temporal Math (ST Math) is game-based, instructional software for K–12 students, created by the MIND Research Institute (MIND). The purpose of the program is to boost math comprehension through visual learning. The ST Math software games begin without language or symbol abstractions by posing math problems as purely visual puzzles. In this way, three objectives are accomplished: i) language proficiency prerequisites to engage with the program are minimal, ii) non-mathematical distractions (e.g. back-stories for word problems) are minimized or eliminated – thereby reducing load on working memory, and iii) the actual math in the problem can be represented clearly, simply, and unambiguously. Interactive, animated visual manipulatives provide informative feedback on student solutions. A score of 100 percent on a game level comprised of 4-12 puzzles is required for progression through the levels. Failure requires a re-play of the level, via a new quasi-random set of puzzles. In this way, progression is self-paced.

Besides the self-paced progress made by students in their one-to-one environment, the program is designed to be referenced by teachers during their regular math instruction. It is supplemental to core or basal math instruction and instructional materials. As the great majority of grade-level math standards are covered in the ST Math digital curriculum, completion of 100% of the entire ST Math curriculum (i.e. completing every Game) is required to cover all grade-level math standards. Teachers receive initial training, either face to face or through self-guided online instruction. The training covers account startup, as well as math learning and growth mindset goals, the pedagogical approach to learning in a visual experiential game, monitoring and intervention of the student 1:1 game play, and connecting of ST Math content to classroom content and pacing.

For students to achieve nominal progress through the program, there is a recommended time-on-task requirement of 90 minutes per week over about 30 weeks. Consistent application of 90 minutes per week throughout the school year is normally sufficient to result in a grade's average ST Math content coverage exceeding 50% by year-end. In this study, we include grades that have achieved 40% or more content coverage (Progress) by April 15th.

This is a passive study with no experimental setup or extraordinary communications to any schools. All schools in this study therefore received normal program implementation support through the year from MIND support managers. This support includes bundled startup services of approximately 2-4 hours of training either in-person or online, access to live webinars, regular online and push reports on

usage and progress, email/phone helpdesk, and proactive monitoring for gaps or issues by MIND support representatives.

MIND Research Institute initiated, funded, and exercised editorial control over this study.

2 Data Collection

Since this analysis uses grades as the unit of analysis, and states publish grade-mean state standardized test scores, the data for student math outcomes is collected from each state education agency's research files (retrieved from state websites). The treatment students use ST Math student accounts served by MIND. Student ST Math usage data is aggregated to grade-level means by MIND.

2.1 Treatment Grades Pool and Selection

The Treatment grades pool originated with all schools and grades using ST Math with low student need in the USA. From these schools, every grade that had used the ST Math program only for the year 2018/19 was identified. They comprise the Treatment grades pool for this evaluation of multi-year usage.

2.1.1 Enrollment Filter

Because the analysis uses grade-mean data, such as grade-mean scale scores or grade-mean proficiency level percentages, it is necessary that the program also be a grade-wide treatment, with the great majority of students in each grade receiving treatment. Otherwise, the grade-means reported by the state of 100% of *tested* students would not be valid measures of a smaller fraction of *treatment* students. MIND's site implementation requirement is that an entire grade, including all teachers and all classes within that grade, use the ST Math program. We validate how closely this is the case for each individual treatment grade by comparing the number of ST Math student accounts at a grade level to the reported enrollment at that grade level. We discard from the Treatment pool any grade with a ratio of ST Math student accounts to reported grade enrollment lower than 85%.

2.1.2 Content Coverage Filter

Furthermore, the outcomes measure is a summative year-end test, i.e. the standardized math assessment of that state. The math assessment thus covers all the math standards for that entire grade level. Meanwhile, the ST Math program curriculum (arranged into Learning Objectives) is also aligned to each state's math standards. To infer that the ST Math content is having a valid effect on student outcomes on the summative assessment, we discard any grade with grade-mean of ST Math Progress for its students lower than 40% by April.

Progress is a percentage, and is defined as Levels completed by the student, divided by the total number of Levels in the grade-level curriculum. Note that student achievement of at least 40% progress in ST Math is accomplished primarily by teacher assignment of computer session time to students. With sufficient time on task, students make progress. The program helps them self-pace through providing real-time informative feedback for each puzzle.

2.2 Control Grades Pool and Selection

The control grades are randomly selected from a control pool of schools in the USA. Though they are randomly selected, they are also matched to be similar to the Treatment grades' math attributes and demographics during the baseline Baseline year. The matched attributes include:

- grade-mean z-score of percent Proficient or Advanced
- percentage of students receiving free or reduced lunch at the school-level (using the demographic data from MDR).

The method of matching used is propensity score matching, via the "matchit" program in R, with "mahalanobis" as the distance measure.

3 Data Analysis

The set of all schools and grades using ST Math with low student need in the USA is evaluated for Enrollment percentage and Progress percentage parameters. A filtered Treatment set (TRT) of all ST Math grades with $\geq$ 85% Enrollment and $\geq$ 40% Progress is identified. State math assessment data is tabulated. A matching set of Control grades based on baseline year state math assessment is selected.

Changes in math performance, i.e. the difference in math performance of a grade from a baseline year to the final year, are evaluated and tabulated. Statistical tests of the significance of the difference in math performance changes between Treatment grades and Control grades are performed. Finally, a grade-by-grade disaggregation is performed.

3.1 Z-scores

In order to analyze across all states with different math assessments, a new z-score of that test's math proficiency is calculated. For each year being analyzed, by grade, a z-score takes the difference of the grade mean percent proficient and the mean of all percent proficient statewide for that year, and then divides it by the standard deviation of all percent proficient statewide for that year. Here is a fictional example to illustrate the calculation of a z-score for the 2015/16 exam:

School A, Grade 3, Percent Proficient: 70
Average across all schools statewide, Grade 3: 50
Standard deviation across all schools statewide, Grade 3: 20
Z-score=((School A, Grade 3, Percent Proficient)-(Average across all schools, Grade 3))/(Standard deviation across all schools, Grade 3)

$$\text{Z-score}=\frac{70-50}{20}=1$$

The z-score is calculated for every grade across all years being analyzed, using the full state data set of schools for the averages and standard deviations. The use of z-scores is a valid statistical method to normalize any dataset and to enable analysis across otherwise uncomparable exams. In this report, we only analyze z-scores.

3.2 Percentile Ranking

These newly calculated z-scores can then be converted into a percentile ranking. Each percentile ranking shows the grade's performance relative to the others in that year and grade. For example, for a specific grade 3, a percentile ranking of 50 shows that this grade 3 performed at the average of all third grades in the state for that testing year.

3.3 Final Treatment and Control

3.3.1 ST Math Grade-Aggregated Implementation ($\geq$ 85% Enrollment Grades Only)

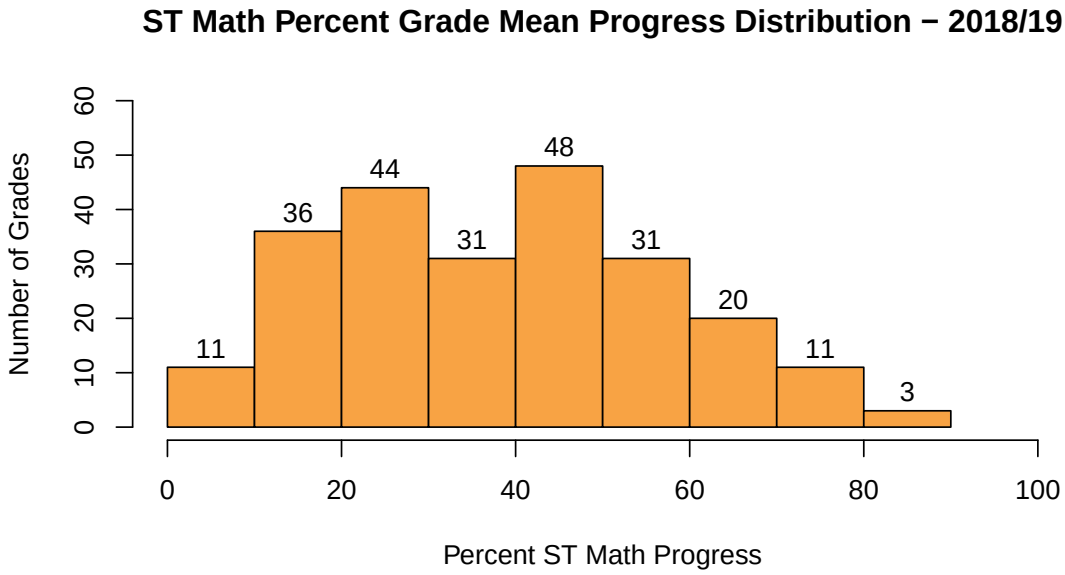

Figure 1: Histogram of ST Math Percent Progress for $\geq$ 85% Enrollment Grades 2018/19

For all ST Math grades with Enrollment $\geq$ 85%, Figure 1 shows the frequency distribution of grade-average Progress percentage through the program. Note that we will only be using grades with $\geq$ 40% Progress as the Treatment Group.

Table 1 provides descriptive statistics of the Progress distribution. Table 2 shows the number of remaining treatment grades after applying enrollment and progress filters.

	Min.	Max.	Average	S.D.
ST Math % Progress	1.9	89.9	38.7	19.3

Table 1: Descriptive Statistics of ST Math Percent Progress for >= 85 percent Enrollment Grades

Grades with >= 85% Enrollment:	235
Grades with in addition >= 40% Progress:	113

Table 2: Number of ST Math Grades with >= 85 percent Enrollment and with >= 40 percent progress

3.3.2 Filtering Treatment and Controls

Table 3 shows the total number of grades in the Treatment pool, the number of grades that exceeded the 85% Enrollment figure, and also the 40% Progress filter. Other rows in the table indicate counts of numbers of students (2018/19 from state testing count) and counts of number of schools represented. The number of matched Control (CTRL) grades, students, and schools is also shown.

	Grade 3	Grade 4	Grade 5	Total
ST Math Using Grades	140	121	97	358
ST Math Using Schools	140	121	97	177
ST Math Students	11221	9275	8080	28576
ST Math Grades (Enroll >= 85%)	90	81	64	235
TRT Grades (Enroll >= 85% & Prog >= 40%)	48	39	26	113
TRT Schools (Enroll >= 85% & Prog >= 40%)	48	39	26	69
TRT Students (Enroll >= 85% & Prog >= 40%)	4155	3295	2549	9999
CTRL Grades	48	39	26	113
CTRL Schools	47	39	26	104
CTRL Students	3915	2687	2110	8712

Table 3: Treatment Pool Filtering and Controls: Counts of Grades, Schools, and Students

3.3.3 Match of Controls to Treatment

Figure 2 shows the density plots of the baseline z-score of percent students at state assessment Proficient or Advanced (left plot) and the percentage of students needing free or reduced lunch (right plot) for treatment grades overlayed on control grades, showing the closeness of the match obtained between Treatment and Control sets of grades in the baseline year.

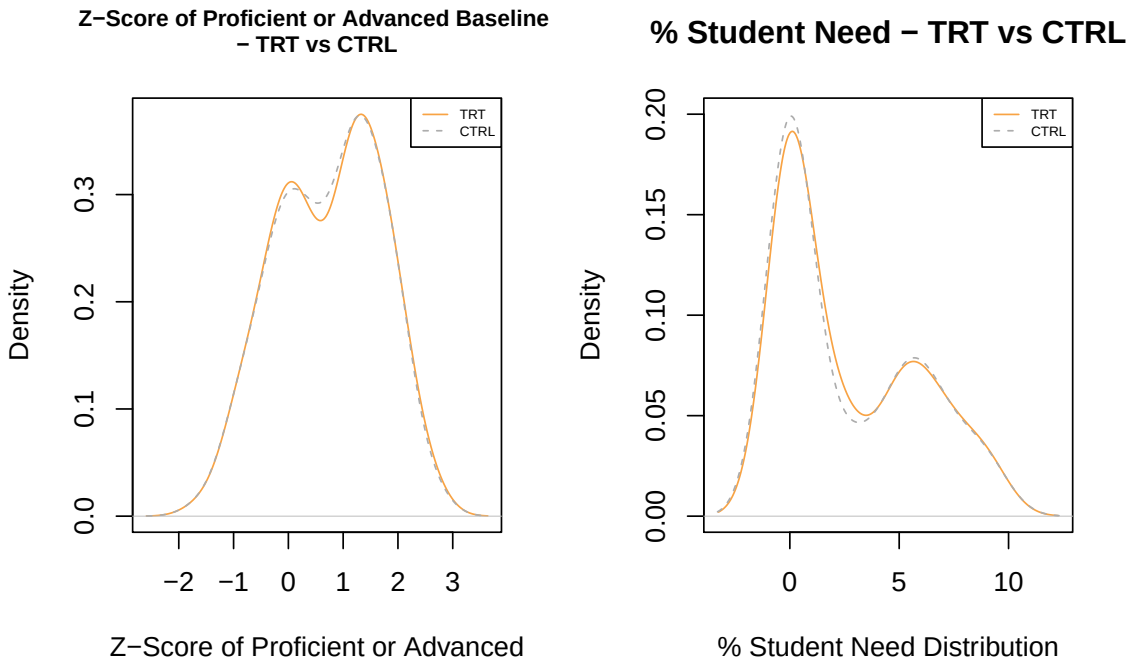

Figure 2: Baseline Year Density Plots Showing Math Scores and Percent Student Need Match between TRT and CTRL - Baseline

Table 4 shows the difference of the means of Treatment versus Control in the baseline year, with accompanying p-values, for mean z-score of percent Proficient or Advanced and for percent of students receiving free or reduced lunch. The large p-values show the differences between the Treatment and Control grades are not statistically significant.

	Mean(TRT)	SD(TRT)	Mean(CTRL)	SD(CTRL)	Estimate	P-Value	Effect Size
Z-Score of Proficient or Advanced - Baseline	0.74	0.96	0.73	0.95	0.01	0.97	0.01
Percent Free or Reduced Lunch	2.65	3.11	2.59	3.15	0.06	0.88	0.02

Table 4: Matching TRT and CTRL

3.4 Grade-Aggregated Analysis

Table 5 shows for both Treatment (TRT) and Control (CTRL) aggregation across grades of z-score distributions. The far right column also shows the average ST Math Progress for the TRT set.

	# Grades	# Schools	# Students	Z-Score	Percentile	ST Math Per Comp.
TRT.Baseline	113	69	9507	0.74	69.95	–
TRT.18.19	113	69	9506	0.93	75.56	55.34
TRT.Delta	–	–	–	0.20	5.61	–
CTRL.Baseline	113	104	8834	0.73	69.93	–
CTRL.18.19	113	104	8712	0.69	69.20	–
CTRL.Delta	–	–	–	-0.04	-0.73	–

Table 5: All Grades Together Growth

Figure 3 shows the changes in mean z-scores of percent Proficient or Advanced for the grade-aggregated Treatment and Control sets.

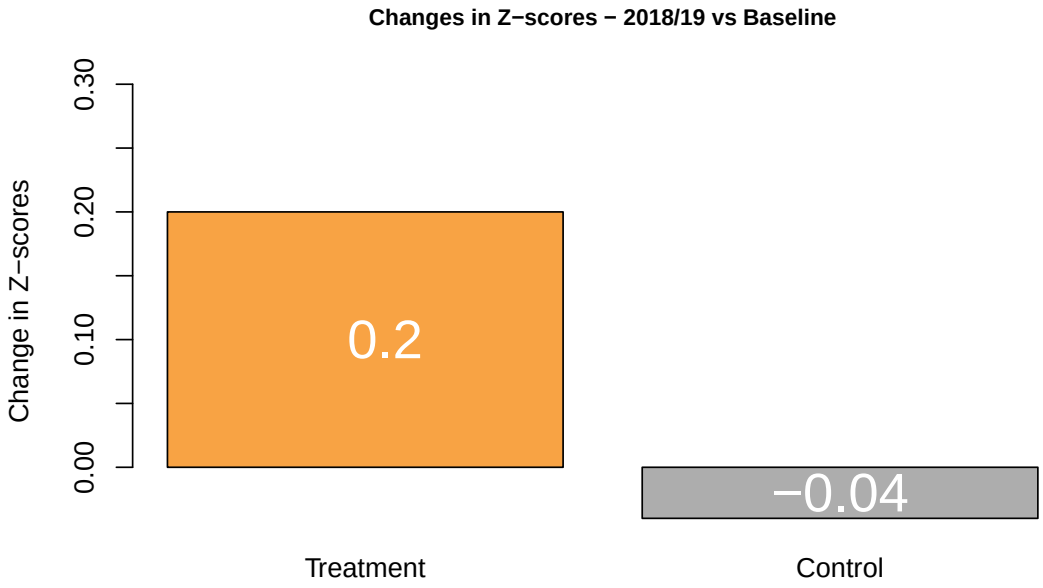

Figure 3: Changes in z-scores (See Section 3.1) for Grade-Aggregated TRT and CTRL datasets between Baseline and 2018/19

Further, Table 6 shows the statistics for the *differences* in changes between TRT and CTRL (Treatment - Control) for these same z-score changes as in the above figure. [1]

	Estimate	P-Value	Int.Low	Int.High
Z-Score	0.24	0.00*	0.09	0.40

Table 6: Statistics for the Differential Changes in Math Scores Growth (TRT - CTRL)

Finally, Figure 4 shows the changes in mean percentile ranking between TRT and CTRL.

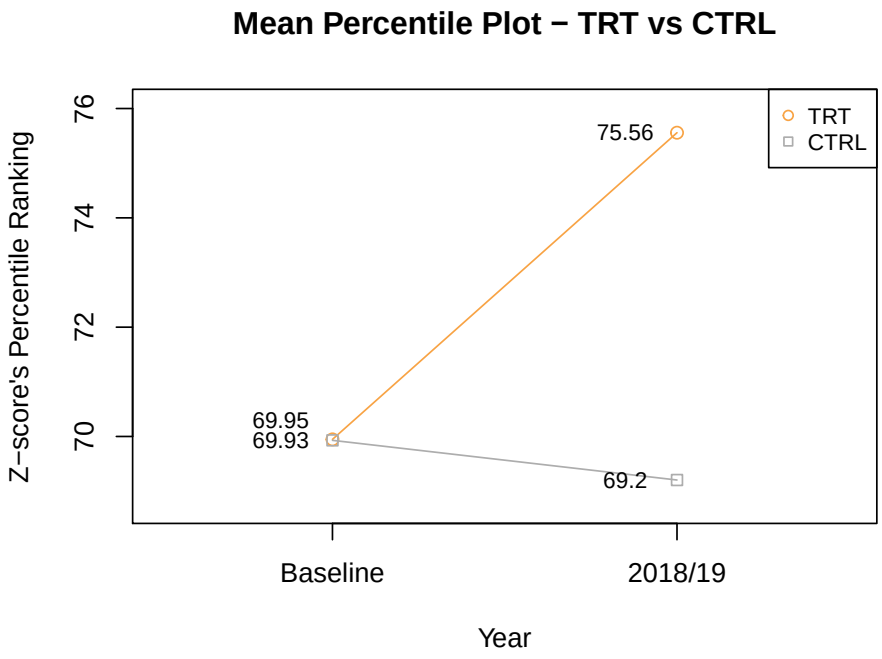

Figure 4: Changes in Percentile Ranking for TRT and CTRL Datasets between Baseline and 2018/19

[1] * statistically significant p<0.05

3.5 Grade-Level Analysis

3.5.1 Grade Level Result Tables

The following tables (Table 7, 8, and 9) present a disaggregation of results by grade level. The far right column in each table also shows the average ST Math Progress for the TRT set.

	# Grades	# Schools	# Students	Z-Score	Percentile	ST Math Per Prog.
TRT.Baseline	48	48	4068	0.75	70.85	–
TRT.18.19	48	48	3999	0.88	74.83	53.72
TRT.Delta	–	–	–	0.13	3.98	–
CTRL.Baseline	48	47	4093	0.77	71.77	–
CTRL.18.19	48	47	3915	0.71	70.29	–
CTRL.Delta	–	–	–	-0.07	-1.48	–

Table 7: Grade 3 - Yearly Math Performance and Counts for TRT and CTRL Datasets

	# Grades	# Schools	# Students	Z-Score	Percentile	ST Math Per Prog.
TRT.Baseline	39	39	3201	0.69	68.95	–
TRT.18.19	39	39	3173	0.93	74.28	56.79
TRT.Delta	–	–	–	0.24	5.33	–
CTRL.Baseline	39	39	2636	0.67	68.28	–
CTRL.18.19	39	39	2687	0.64	67.74	–
CTRL.Delta	–	–	–	-0.03	-0.54	–

Table 8: Grade 4 - Yearly Math Performance and Counts for TRT and CTRL Datasets

	# Grades	# Schools	# Students	Z-Score	Percentile	ST Math Per Prog.
TRT.Baseline	26	26	2238	0.78	69.77	–
TRT.18.19	26	26	2334	1.04	78.81	56.15
TRT.Delta	–	–	–	0.26	9.04	–
CTRL.Baseline	26	26	2105	0.75	69.00	–
CTRL.18.19	26	26	2110	0.73	69.38	–
CTRL.Delta	–	–	–	-0.02	0.38	–

Table 9: Grade 5 - Yearly Math Performance and Counts for TRT and CTRL Datasets

3.5.2 Grade-Level Analysis of Changes in Z-scores of Proficient or Advanced

Figure 5 shows the changes in the grade-mean z-scores of students for the TRT and CTRL datasets, disaggregated by grade:

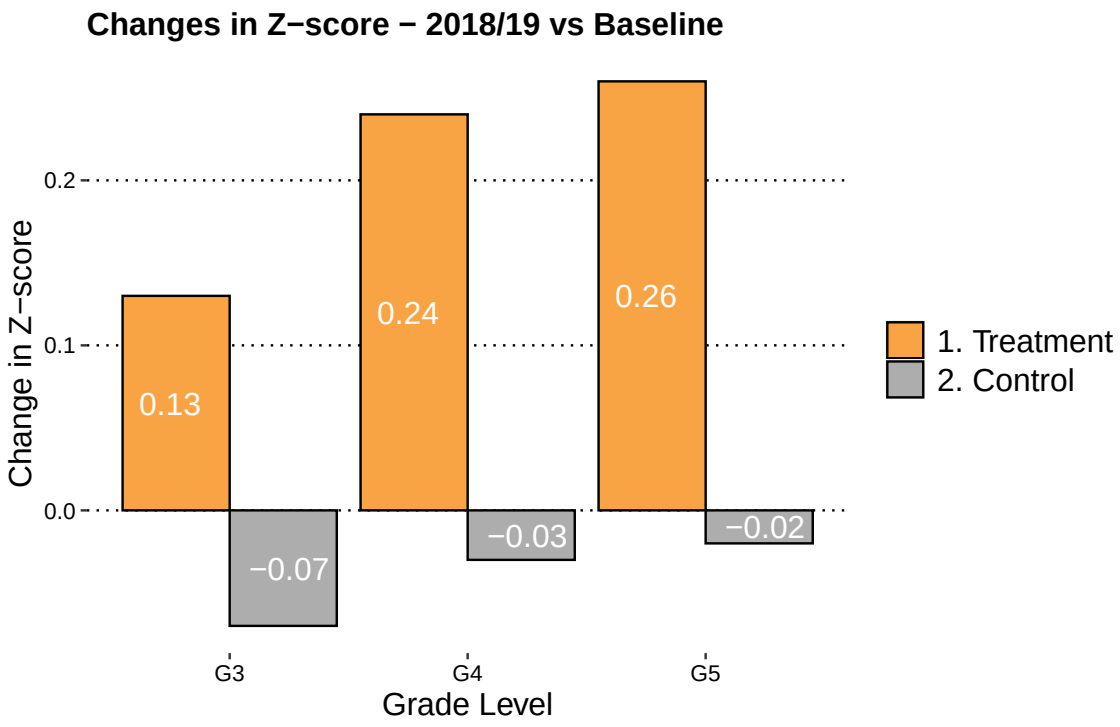

Figure 5: Changes in Grade-Mean Z-score (See Section 3.1) for TRT and CTRL Datasets between Baseline and 2018/19

Table 10 shows the statistics for the differences between TRT and CTRL (Treatment - Control) for these same z-score changes as shown in Figure 5.

	Estimate	P-Value	Int.Low	Int.High
Grade 3	0.20	0.05*	0.00	0.40
Grade 4	0.27	0.07	-0.02	0.56
Grade 5	0.28	0.13	-0.08	0.64

Table 10: Statistics for the Differential Changes in Z-scores (See Section 3.1) Growth, (TRT - CTRL)

4 Effect Size

The following table shows the effect sizes for z-score of Proficient or Advanced.

	Z-Score of Proficient or Advanced Effect Size
Grade 3	0.23
Grade 4	0.27
Grade 5	0.27
All Grades	0.26

Table 11: Cohen's d Effect Size

5 Findings Summary

USA grades 3, 4, and 5 using ST Math with low student need for the year 2018/19 averaged 33% ST Math Progress. 136/358 grades (38%) averaged covering more than 40% of ST Math content. Statistically significant differences were found in this analysis for both grade-aggregated and individual grade levels. Looking at Table 6, a statistically significant differences was found for grade-aggregated z-score, with an estimate of 0.24 points favorable for the ST Math treatment set. Furthermore, referring to table 10, grade 3 ST math treatment set outperformed their matched controls for z-scores with a statistically significant difference of 0.2.

6 Confounders

Despite best efforts in minimizing confounders to the results of this analysis, there still remain a few input variables that could be significant in affecting differences of state test score outcomes between the Treatment and Control sets. One issue is the lack of randomization of grades chosen to receive the ST Math treatment. Instead of randomized selection, Treatment grades are self-selected. Self-selection can be an indication of districts or schools with a focus on math, an appetite for change, and with a spotlight on math training. Furthermore, not all grades using the ST Math program are chosen for analysis. Each grade must pass two specific filters to be considered for the Treatment set: the first being an enrollment filter of at least 85% of students in each grade using the program, and the second being a progress filter of at least 40% of the program completed on average by students in that grade. These filters might indicate relatively high-functioning schools with a team of relatively effective teachers in that grade, thus resulting in better instruction overall. A mitigation of this possible confounder is our selection of treatment groups on the grade level, rather than the teacher level, so there is no cherry picking of teachers: the full range of teachers in each grade is included. Moreover, the specific teachers may often be the same in the baseline year as in the current year, so the Treatment growth is not due to teacher differences. Finally, a possible confounder lies in the "business as usual" conditions at the matched control grades chosen for each analysis. It's unknown whether these control grades used other programs that could affect the comparison of the two sets of grades.

7 Lists of Schools

7.1 Treatment Schools

The following tables list the treatment schools and grades (after 85% enrollment and 40% progress filtering) used in the analysis.

PID	IID	State	District	School Name	GRADE
41080	IRE0RS	AZ	Roosevelt Elementary District	Irene Lopez School	3
4033774	TOP6O3	AZ	Topock Elementary District	Topock Elementary School	3
3008764	LAC73K	CA	Encinitas Union Elementary	La Costa Heights Elementary	3
4278493	OLI73K	CA	Encinitas Union Elementary	Olivenhain Pioneer Elementary	4
4915794	ELC73K	CA	Encinitas Union Elementary	El Camino Creek Elementary	3
96827	RAL75C	CA	Huntington Beach City Elementary	Ralph E. Hawes Elementary	5, 3, 4
1397624	SAM75C	CA	Huntington Beach City Elementary	S. A. Moffett Elementary	4, 3
98667	VIS758	CA	Irvine Unified	Vista Verde	5
4875950	PLA758	CA	Irvine Unified	Plaza Vista	3
2223313	MIL7DS	CA	Latrobe	Miller's Hill	4
71982	NAP708	CA	Long Beach Unified	Naples Elementary	4
49678	HIL0RW	CA	Oakland Unified	Hillcrest Elementary	3
1824990	JER73X	CA	San Diego Unified	Jerabek Elementary	5, 4, 3
4428844	DIN73X	CA	San Diego Unified	Dingeman Elementary	3
5102536	SCR73X	CA	San Diego Unified	Scripps Elementary	3
82345	ANZ6ZE	CA	Torrance Unified	Anza Elementary	4, 3, 5
250944	PLE42G	IA	Pleasant Valley CSD	Pleasant View Elementary School	3, 4, 5
11709904	HOP42G	IA	Pleasant Valley CSD	Hopewell Elementary	5, 4, 3
273568	WIL0S5	IL	River Forest SD 90	Willard Elem School	4
418031	THA0RT	MA	Attleboro	Peter Thacher Elementary School	3, 4
1415472	HIL07I	MA	Attleboro	Hill-Roberts Elementary School	3, 4
440216	JOH0RX	MA	Boston	Eliot Elementary	3, 4
441167	PHI0RT	MA	Boston	Phineas Bates	3
4814566	BOS0RS	MA	Boston Collegiate Charter (District)	Boston Collegiate Charter School	5
428713	FOX050	MA	Burlington	Fox Hill	3
425151	MOU0RU	MA	East Longmeadow	Mountain View	3
4284193	GOL053	MA	Haverhill	Golden Hill	3, 4
430613	BAR0RV	MA	Lowell	Bartlett Community Partnership	4
430730	JGP055	MA	Lowell	Pyne Arts	4, 3, 5
438940	HEN0RS	MA	Middleborough	Henry B. Burkland Elementary School	4, 3, 5
438952	MAR0RX	MA	Middleborough	Mary K. Goode Elementary School	5, 3, 4
1398537	RES0RS	MA	Millbury	Raymond E. Shaw Elementary	5, 4
423191	KIT0RS	MA	North Andover	Kittredge	4, 3, 5
423220	THO0RT	MA	North Andover	Thomson	4
4362484	ANN0RS	MA	North Andover	Annie L Sargent School	5, 3, 4
441818	WHE0RS	MA	Revere	A. C. Whelan Elementary School	3
441820	LIN0RV	MA	Revere	Abraham Lincoln	4, 3
441870	JAM0RS	MA	Revere	Garfield Elementary School	3, 4
441923	HIL0RX	MA	Revere	Staff Sargent James J. Hill Elementary School	5
441935	PAU0RS	MA	Revere	Paul Revere	3, 4, 5
2044624	BEA0RU	MA	Revere	Beachmont Veterans Memorial School	5, 4
420046	HAR0RZ	MA	Taunton	H H Galligan	4, 3
447173	WHI0RS	MA	Uxbridge	Whitin Intermediate	4, 5
436899	FIS05S	MA	Walpole	Fisher	3
426478	JOH0RY	MA	West Springfield	John R Fausey	3, 4
426313	ABN0RS	MA	Westfield	Abner Gibbs	4
448086	UNI0RU	MA	Worcester	Union Hill School	3, 5
1828623	ARR4K6	MT	Billings Elem	Arrowhead School	3
2045197	BOW097	NH	Bow	Bow Elementary School	4
2110807	THO0OG	NJ	Bethlehem Twp	Thomas B. Conley Elementary School	3
683236	LOG0MG	NJ	Logan Twp	Logan Township Elementary School	3
691790	CLA0LG	NJ	Manalapan-Englishtown Reg	Clark Mills School	5, 4
713312	HJG6WG	NV	Storey	Hugh Gallagher Elementary School	5
736584	CAN0RV	NY	JERICHO UNION FREE SCHOOL DISTRICT	CANTIAGUE ELEMENTARY SCHOOL	5
736596	GEO0RT	NY	JERICHO UNION FREE SCHOOL DISTRICT	GEORGE A JACKSON SCHOOL	5, 4, 3

Table 12: Treatment Schools (TRT Dataset)

PID	IID	State	District	School Name	GRADE
4447826	ROB0RS	NY	JERICHO UNION FREE SCHOOL DISTRICT	ROBERT SEAMAN ELEMENTARY SCHOOL	3, 5, 4
738611	ROB0RT	NY	SYOSSET CENTRAL SCHOOL DISTRICT	ROBBINS LANE ELEMENTARY SCHOOL	3
738673	VIL0RU	NY	SYOSSET CENTRAL SCHOOL DISTRICT	VILLAGE ELEMENTARY SCHOOL	4
790463	WES3EM	OH	Bay Village City	Westerly Elementary School	3
4450196	ALU3BJ	OH	Olentangy Local	Alum Creek Elementary School	3
4803036	SCI3BM	OH	Olentangy Local	Scioto Ridge Elementary School	3
5275236	IND3BM	OH	Olentangy Local	Indian Springs Elementary	3
5275248	WAL3BI	OH	Olentangy Local	Walnut Creek Elementary	3
11512749	FRE3BJ	OH	Olentangy Local	Freedom Trail Elementary	4, 3, 5
802535	EVE3BO	OH	Worthington City	Evening Street Elementary School	3
4918320	WES6HC	UT	Alpine District	Westfield School	4
2855942	CRE6IQ	UT	Carbon District	Creekview School	5, 4
1068990	MER1RM	VA	Albemarle County	Meriwether Lewis Elementary	4
3393129	VIR1RM	VA	Albemarle County	Virginia L. Murray Elementary	3, 5

Table 13: Treatment Schools (TRT Dataset)

7.2 Control Schools

The following tables list the control schools and grades (matched control grades to treatment grades) used in the analysis.

PID	State	District	School Name	GRADE
12162787	AZ	Fit Kids, Inc. dba Champion Schools	Champion Chandler	3
4943325	AZ	Scottsdale Unified District	Copper Ridge School	3
129890	CA	Bonny Doon Union Elementary	Bonny Doon Elementary	5
2104793	CA	Carlsbad Unified	Kelly Elementary	4
4364365	CA	Castro Valley Unified	Jensen Ranch Elementary	4
126032	CA	Cupertino Union	West Valley Elementary	3
4918875	CA	Dublin Unified	James Dougherty Elementary	3
89109	CA	Larkspur-Corte Madera	Neil Cummins Elementary	3, 5
126642	CA	Los Altos Elementary	Almond Elementary	3
75158	CA	Los Angeles Unified	Wonderland Avenue Elementary	4, 5
122311	CA	Menlo Park City Elementary	Laurel Elementary	4
128030	CA	Palo Alto Unified	Palo Verde Elementary	4
4912948	CA	Pleasanton Unified	Phoebe Apperson Hearst Elementary	3
122854	CA	San Carlos Elementary	Arundel Elementary	3
122880	CA	San Carlos Elementary	Heather Elementary	4
55433	CA	San Ramon Valley Unified	Montair Elementary	5
10913413	CA	San Ramon Valley Unified	Live Oak Elementary	3, 3
4287963	CA	Solana Beach Elementary	Carmel Creek Elementary	3
11849463	CA	The Heights Charter	The Heights Charter	4
4946092	CA	Tustin Unified	Ladera Elementary	3
11817903	IA	Ankeny CSD	Prairie Trail Elementary	3
11928291	IA	Gilbert CSD	Gilbert Intermediate School	4
241838	IA	Iowa City CSD	Lincoln Elementary School	3
4286232	IA	Waukee CSD	Eason Elementary	4
10011168	IA	Waukee CSD	Walnut Hills Elementary	5
11553884	IA	Waukee CSD	Shuler Elementary	5
267569	IL	Barrington CUSD 220	Hough Street Elem School	4
2044466	MA	Acton-Boxborough	Blanchard Memorial School	4, 5
11742803	MA	Alma del Mar Charter School (District)	Alma del Mar Charter School	5
3389269	MA	Belchertown	Swift River Elementary	3
2044765	MA	Blackstone-Millville	A F Maloney	5
3397917	MA	Braintree	Hollis	4
11227994	MA	Cambridge	John M Tobin	4, 5
416899	MA	Central Berkshire	Craneville	3
418237	MA	Dighton-Rehoboth	Dighton Middle School	5
2046244	MA	Dighton-Rehoboth	Dighton Elementary	3
11821215	MA	Dudley Street Neighborhood Charter School (District)	Dudley Street Neighborhood Charter School	3
10905260	MA	Everett	Webster School	3, 4
416538	MA	Falmouth	Morse Pond School	5
11435517	MA	Fitchburg	McKay Arts Academy	3
3389805	MA	Grafton	Millbury Street Elementary School	4
10012928	MA	Holyoke Community Charter (District)	Holyoke Community Charter School	4
10911702	MA	Leominster	Frances Drake School	3
422599	MA	Lynn	Sewell-Anderson	4
1846508	MA	Lynn	Washington Elementary School	3
2044234	MA	Manchester Essex Regional	Essex Elementary	3
438861	MA	Marshfield	South River	3
422915	MA	Methuen	Marsh Grammar School	4
417776	MA	Mount Greylock	Williamstown Elementary	3
2044090	MA	Mount Greylock	Lanesborough Elementary	5
419102	MA	New Bedford	Abraham Lincoln	5
1413515	MA	New Bedford	Casimir Pulaski	4, 5
1531301	MA	New Salem-Wendell	Swift River	4
432075	MA	Newton	Peirce	3
417283	MA	North Adams	Greylock	5

Table 14: Matched Control Schools (CTRL Dataset)

PID	State	District	School Name	GRADE
1171200	MA	Northampton	Leeds	4
2044674	MA	Northborough	Fannie E Proctor	3
1413539	MA	Peabody	William A Welch Sr	4
2044325	MA	Pioneer Valley	Northfield Elementary	3
11464453	MA	Pioneer Valley Chinese Immersion Charter (District)	Pioneer Valley Chinese Immersion Charter School	3, 4
1168291	MA	Pittsfield	Allendale	3, 5
1822277	MA	Plymouth	West Elementary	3
2044557	MA	Plymouth	Cold Spring	3
3266875	MA	Sandwich	Oak Ridge	5
1415525	MA	Somerville	Winter Hill Community	4
10975435	MA	Somerville	Albert F. Argenziano School at Lincoln Park	4
1524578	MA	Springfield	German Gerena Community School	3
2046309	MA	Sunderland	Sunderland Elementary	4
423945	MA	Swampscott	Stanley	4
2042793	MA	Wachusett	Leroy E.Mayo	4
436978	MA	Wellesley	Schofield	3
1828013	MA	Westport	Westport Elementary	4
3394549	MA	Worcester	City View	4
603705	MT	Montana City Elem	Montana City School	3
664670	NH	Brentwood	Swasey Central School	4
673683	NJ	Cherry Hill Twp	A. Russell Knight Elementary School	4
679390	NJ	Nutley Town	Yantacaw School	3
11832525	NJ	Union City	Colin Powell Elementary School	3
697524	NJ	Wayne Twp	Pines Lake Elementary School	5
10974833	NV	Achievement	Rainbow Dreams Academy	5
735827	NY	GARDEN CITY UNION FREE SCHOOL DISTRICT	STRATFORD AVENUE SCHOOL	3
737203	NY	MANHASSET UNION FREE SCHOOL DISTRICT	MUNSEY PARK ELEMENTARY SCHOOL	3
11561336	NY	NEW YORK CITY GEOGRAPHIC DISTRICT # 2	EAST SIDE ELEMENTRAY SCHOOL-PS 267	4
11561192	NY	NEW YORK CITY GEOGRAPHIC DISTRICT # 9	SUCCESS ACADEMY CHARTER SCHOOL-BRONX 2	4
737722	NY	NORTH SHORE CENTRAL SCHOOL DISTRICT	GLENWOOD LANDING ELEMENTARY SCHOOL	5
738087	NY	PLAINVIEW-OLD BETHPAGE CENTRAL SCHOOL DISTRICT	OLD BETHPAGE SCHOOL	4
738439	NY	ROSLYN UNION FREE SCHOOL DISTRICT	HARBOR HILL SCHOOL	5
781709	NY	RYE CITY SCHOOL DISTRICT	MILTON SCHOOL	3
739005	NY	WANTAGH UNION FREE SCHOOL DISTRICT	FOREST LAKE SCHOOL	5
11927572	OH	Beavercreek City	Trebein Elementary School	3
791027	OH	Chagrin Falls Exempted Village	Gurney Elementary School	3
806567	OH	Forest Hills Local	Wilson Elementary School	3
797552	OH	Franklin Monroe Local	Franklin Monroe Elementary School	4
3047461	OH	Gahanna-Jefferson City	High Point Elementary School	3
825551	OH	Oakwood City	Harman Elementary School	3
825575	OH	Oakwood City	Smith Elementary School	3
794653	OH	Solon City	Dorothy E Lewis Elementary School	3
11016549	OH	Stambaugh Charter Academy	Stambaugh Charter Academy	5
10756617	UT	American Preparatory Academy	American Preparatory Academy - Salem	4
11735317	UT	American Preparatory Academy	American Preparatory Academy - Accelerated School	5
5345283	UT	Ranches Academy	Ranches Academy	4
1826443	VA	Fairfax County	Sunrise Valley Elementary	4
3250412	VA	Henrico County	Gayton Elementary	5
10909058	VA	Loudoun County	Arcola Elementary	3

Table 15: Matched Control Schools (CTRL Dataset)