Impact Study Evaluation of the Rural Math Innovation Network (RMIN) i3 Development Project (U411C160023)

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Virginia Ed Strategies

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Table of Contents

List of Tables and Figures

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Abstract

The Rural Math Innovation Network (RMIN) is a 4-year project that launched in January 2017 after receiving a $2.9 million Investing in Innovation (i3) development grant from the U.S. Department of Education (ED) and matching funds from the private sector. Virginia Ed Strategies and rural local education agencies (LEAs) in Virginia are implementing a project using a networked improvement community (NIC) of Pre-Algebra and Algebra 1 teachers to incorporate social-emotional learning (SEL) factors of academic self-efficacy and growth mindset into lesson plans for teaching career readiness math competencies.

During Year 1, the project established Memos of Understanding with 18 school divisions in southwest and southside Virginia, which enabled math teachers within these divisions to submit applications to participate in the project. At the end of Year 1, December 2017, the project had a 38-member teacher cohort across 25 schools. By the end of Year 2 (January 1 – December 31, 2018), the cohort included 30 teachers (19 middle school teachers and 11 high school teachers) across 20 schools (12 middle schools and 8 high schools) within 16 participating divisions (several teachers dropped out of the project in Year 2 and a few teachers were added). During Year 3 (January 1 – December 31, 2019), several more teachers dropped out of the project, resulting in 26 teachers (17 middle school and 9 high school) across 18 schools within 15 participating divisions. Sixteen of the 26 teachers are located in the southside region, with the remaining 10 teachers located in the southwest region of Virginia.

One of the i3 requirements is to have an external evaluation conducted of the project; development grants must include both an implementation study and an impact study. To fulfill this requirement, Virginia Ed Strategies hired ICF to conduct an independent evaluation of the RMIN project throughout the 4-year period. The evaluation includes three components: a formative study to provide ongoing feedback about participants' reactions, learning, behaviors, and results; an implementation study focusing on how well the structural and programmatic aspects of the RMIN project are implemented, as well as facilitating or impeding factors; and an impact study to determine the extent to which the project impacts high-need students' math achievement. Previously in Year 2, the evaluation team recruited 10 comparison teachers across rural Virginia school divisions who were also teaching either Pre-Algebra or Algebra 1 (no school has both a participating and comparison teacher).

The purpose of this report is to summarize key findings from the impact study. The primary audience is the RMIN project staff at Virginia Ed Strategies; secondary audiences include ED and other interested stakeholders. Although the impact study was designed originally to include students from the 2018-19 and 2019-20 school years, the COVID-19 pandemic in spring 2020 led to school closings and no administration of the statewide Standards of Learning (SOL) math assessment. Therefore, the impact study is based solely on the one year of SOL data.

Findings are presented for the impact data and framed by the evaluation questions. Conclusions are presented below.

Impact on student achievement. The one-year program impact on students' SOL scores was estimated and the results did not find evidence that the RMIN program significantly improved students' SOL performance. The program impact from the Pre-Algebra sample was negative, but it was not statistically significant, and the effect size was small. The program impact from the Algebra I analysis was positive but not statistically significant, and the effect size was small.

Introduction

Established in 2009 under the American Recovery and Reinvestment Act, the Investing in Innovation (i3) fund promotes public and private investments in local education agencies (LEAs) and non-profit organizations to improve student achievement and attainment in low-income communities, and create an education sector supportive of the rapid development and adoption of effective solutions.[1] These competitive grants are awarded to school districts, nonprofit organizations working with districts, or a consortium of schools with a record of improving student achievement and attainment, and demonstrated public-private commitments.

RMIN Project Overview

The Rural Math Innovation Network (RMIN) is a 4-year project that launched in January 2017 after Virginia Ed Strategies received a $2.9 million i3 development grant from the U.S. Department of Education (ED) and matching funds from the private sector.[2] Virginia Ed Strategies and rural LEAs in Virginia are implementing a project using a networked improvement community (NIC) of Pre-Algebra and Algebra I teachers to incorporate social-emotional learning (SEL) factors of academic self-efficacy and growth mindset into lesson plans for teaching career-readiness math competencies. The RMIN objectives are:

1. To prepare all teachers in the NIC to innovate lesson plans with SEL strategies that address self-efficacy and growth mindset needs of students for learning mathematics required in STEM-H technician careers;

2. To provide supports for each teacher in the NIC to innovate 5 SEL math lessons and implement 10 SEL math lessons into instruction;

3. To establish technology capacity for NIC teachers to develop and implement SEL math lessons;

4. To achieve a student passage rate increase of 25% on the career-readiness math assessments: Virginia Pre-Algebra test, Virginia Algebra I test, Work Keys math test, and Virginia Community College math assessment; and

5. To broadly disseminate information that results in four schools as teacher innovation sites and a 125% increase in the NIC math teacher membership.

During Year 1, the project established Memos of Understanding with 18 school divisions in southwest and southside Virginia, which enabled math teachers within these divisions to submit applications to participate in the project. At the end of Year 1, December 2017, the project had a 38-member teacher cohort across 25 schools. By the end of Year 2 (January 1 – December 31, 2018), the cohort included 30 teachers (19 middle school teachers and 11 high school teachers) across 20 schools (12 middle schools and 8 high schools) within 16 participating divisions (several teachers dropped out of the project in Year 2 and a few teachers were added). During Year 3 (January 1 – December 31, 2019), several more teachers dropped out of the project, resulting in 26 teachers (17

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[1] See https://www2.ed.gov/programs/innovation/index.html
[2] See http://docs.wixstatic.com/ugd/19fc5e_55a5434194304978bcc6f1f88e4a80d8.pdf

middle school and 9 high school) across 18 schools within 15 participating divisions. Sixteen of the 26 teachers are located in the southside region, with the remaining 10 teachers located in the southwest region of Virginia.

RMIN Evaluation

One of the i3 requirements is to have an external evaluation of the project; development grants must include both an implementation study and an impact study. To fulfill this requirement, Virginia Ed Strategies hired ICF to conduct an independent evaluation of the RMIN project throughout the 4-year period. The evaluation includes three components: a formative study, an implementation study, and an impact study.

The formative study provides project staff with ongoing feedback as the teachers participate in the RMIN project. These findings can be used to make programmatic adjustments as needed to better meet participants' needs. The formative focus is on participants' reactions, learning, behaviors, and results. This study will be carried out all four years.

The implementation study investigates how well the structural and programmatic aspects of the RMIN project are being implemented, i.e., the fidelity of implementation. Fidelity focuses on adherence, dosage, quality of delivery, and participant responsiveness. This study was carried out in the first two years of the RMIN project.

The impact study determines the extent to which the project impacts high-need students' math achievement. This study employs a quasi-experimental design with comparison teachers so that the math achievement of students within treatment or comparison classrooms can be examined. This study began in Year 2, with the securement of comparison teachers so that student data could begin being collected. Although the impact study was designed originally to include students from the 2018-19 and 2019-20 school years, the COVID-19 pandemic in spring 2020 led to school closings and no administration of the Virginia statewide Standards of Learning (SOL) math assessment. Therefore, the impact study is based solely on the one year of SOL data.

The purpose of this report is to summarize key findings from the impact study. The primary audience is the RMIN project staff at Virginia Ed Strategies; secondary audiences include ED and other interested stakeholders.

Evaluation Design and Methodology

Evaluation Design

As noted earlier, ICF is conducting an external evaluation of the RMIN project that includes a formative study to provide ongoing feedback, an implementation study to investigate fidelity, and an impact study to determine the project impact on students' math achievement outcomes. The impact study design is described below.

This section focuses on the quasi-experimental study evaluating the RMIN program's impact on student mathematics achievement. As of January 2020, the ICF team has collected data to address evaluation questions for first-year students taught by participating and comparison teachers in Pre-Algebra and Algebra I courses.

This analysis focused on two of the four impact evaluation questions.[3]

1. What is the effect of the RMIN intervention on the math achievement of Pre-Algebra takers compared to the math achievement of Pre-Algebra takers in the business-as-usual condition at the end of Year 2?

2. What is the effect of the RMIN intervention on the math achievement of Algebra I takers compared to the math achievement of Algebra I takers in the business-as-usual condition at the end of Year 2?

Year 2 indicates that this was the second year of intervention for treatment (participating) teachers, which included student pretest (baseline) data from the 2017-18 school year and posttest data from the 2018-19 school year. This was the first cohort of students who were in the Pre-Algebra or Algebra I courses taught by treatment or comparison teachers during school year 2018-19.

Data and variables. The data from the first cohort of students were provided to the ICF team by the Virginia Department of Education (VDOE) at the end of December 2019. To address the evaluation questions, the analysis required the SOL test scores from one year prior to the intervention year (school year 2017-18) and the scores from the intervention year (school year 2018-19). To adjust for the influence of other student characteristics in the program impact analysis, demographic data were also obtained from the VDOE. The student variables provided were grade level, minority status (white or minority), English language learner status, and economic disadvantage status (based on free/reduced-price meal eligibility, TANF[4] recipient status, and Medicaid eligibility). Gender was not requested to address data security and privacy concerns.

Table 1 summarizes the number of cases per each raw dataset. The pretest data and the posttest data included, respectively, 2,784 cases and 2,598 cases with no missing values on analysis variables. After combining these datasets and keeping only Pre-algebra or Algebra I students in the sample, the data sample consisted of 2,255 students. When only Pre-Algebra courses were selected, the number of valid cases was 1,063. When Algebra I courses were selected, the number of cases was 1,192. As discussed below, these numbers were further reduced to address the data challenge of students taking different types of mathematics tests and students' grade levels.

Table 1. Number of Students in Raw SOL Databases

Databases	Number of Students
School year 2017-18 SOL pretest data (administered Spring 2018)	2,784
School year 2018-19 SOL posttest data (administered Spring 2019)	2,598
Combined data – cases with no missing values on any of the variables used in the analysis (keeping only students who were enrolled in either Pre-Algebra or Algebra I courses)	2,255
Number of students in Pre-Algebra courses in the combined dataset	1,063
Number of students in Algebra I courses in the combined dataset	1,192

[3] These were initially intended as the exploratory questions, with the third and fourth evaluation questions serving as the confirmatory questions, focusing on student data from project Year 3. Given the COVID-19 pandemic, SOL data for school year 2019-20 were unavailable.
[4] Temporary Assistance for Needy Families (TANF)

In constructing the analysis sample from the raw databases (Pre-Algebra dataset, n=1,063; Algebra I dataset, n=1,192), there were some challenges and limitations. The first consideration was that students took tests in different mathematical areas (Mathematics 7, 8, Algebra I, and Algebra II). The decision was made to focus on Pre-Algebra students who took Mathematics 7 test as pretest and Mathematics 8 test as posttest and on Algebra I students who took Mathematics 8 test as pretest and Algebra I test as posttest. The chosen posttest test types are consistent with the research interest (Pre-Algebra and Algebra I instruction and student achievement) and the chosen pretest maximized the resulting sample sizes and optimized statistical power. The other consideration was the grade levels of students. The decision was made to focus on only eighth graders for the Pre-Algebra analysis and only ninth graders for the Algebra I analysis, which again maximized possible sample sizes and provided more balance between the treatment and comparison group sample sizes. See Appendix A for more discussion of these data decisions.

As a result of these decisions, the number of teachers and students included in these final datasets were smaller than the original raw datasets. The Pre-Algebra sample consisted of students taught by ten treatment teachers from eight schools and two comparison teachers from two schools. The Algebra I analysis sample consisted of students taught by nine treatment teachers from six schools and six comparison teachers from six schools. Table 2 describes the final analytic samples.

Table 2. Final Analytic Samples

PRE-ALGEBRA SAMPLE (eighth graders only)					
Treatment Group		**Comparison Group**		**Combined**	
Schools	8	Schools	2	Schools	10
Teachers	10	Teachers	2	Teachers	12
Students	432	Students	80	Students	512
ALGEBRA I SAMPLE (ninth graders only)					
Treatment Group		**Comparison Group**		**Combined**	
Schools	6	Schools	6	Schools	12
Teachers	9	Teachers	6	Teachers	15
Students	327	Students	193	Students	520

Note: Pre-Algebra students in the sample (all eighth graders) took Mathematics 7 and Mathematics 8 SOL tests, respectively, for pretest and posttest. Algebra students in the sample (all ninth graders) took Mathematics 8 SOL test and Algebra I SOL test, respectively, for pretest and posttest.

The second data challenge was the fact that there were fewer comparison teachers than treatment teachers, resulting in less student data for comparison classrooms. This particularly imposed a constraint for the Pre-Algebra analysis sample as not many comparison teachers taught Pre-Algebra courses. As explained in Appendix A, this became a factor in how the two analysis samples were defined.

Baseline equivalence of analysis samples. To evaluate the program effectiveness, comparison teachers were recruited from the same or similar school districts and the ICF team employed the Propensity Score Matching (PSM) analysis. The PSM analysis compared treatment students and comparison students based on prior-to-the intervention characteristics, keeping only matched pairs of treatment and comparison students in the analysis sample. This study used pretest SOL scores as the baseline variable used in the PSM analysis. The scores used for this analysis were z-scores (standardized with a sample mean of 0 and standard deviation of 1).

Even without PSM, as shown in Table 3, the analysis samples established baseline equivalence in pretest SOL scores. The standardized pretest group difference was -.21 and 0.19, respectively, for the Pre-Algebra sample and the Algebra I sample. Per What Works Clearinghouse (WWC) guidelines, these values were within the acceptable range. WWC requires that the covariate whose group differences were greater than 0.05 and smaller than 0.25 be included in the final statistical model. Pretest SOL scores were used as a covariate in the statistical model. Because the samples already pass the WWC guideline for baseline equivalence, the ICF team decided to use the original sample without relying on the PSM analysis.

Table 3. Baseline Equivalence Analysis of Pretest SOL Test Scores

	N	Raw Mean	Raw SD	Standard-ized Mean	Standard-ized SD	Standardized Difference (Hedge's g)	WWC Test Result
Pre-Algebra (all eighth graders; n=512)							
Treatment students	432	389	51	-0.03	1.01	-0.21	Baseline equivalence established
Comparison students	80	400	48	0.18	0.95		
Algebra I (all ninth graders; n=520)							
Treatment students	327	423	39	0.07	0.98	0.19	Baseline equivalence established
Comparison students	193	415	42	-0.12	1.03		

Note: The absolute values of estimated standardized effects were greater than 0.05 but smaller than 0.25; the two analysis samples establish baseline equivalence with a requirement that pretest scores must be included in the statistical model (per WWC guideline).

Statistical analysis. The goal of the hierarchical linear model (HLM) analysis is to estimate the impact of RMIN intervention on student SOL test scores. The statistical model used posttest SOL test scores as the outcome and controls for pretest SOL test scores, as well as other student predictors: racial majority-minority status (white vs. non-whites), English language learner status, and economic disadvantage status (based on free/reduced-price meal eligibility, TANF recipient status, and Medicaid eligibility). Grade levels were not used because the Pre-Algebra sample included only eighth graders and the Algebra I sample included only ninth graders. The program effect was estimated as the coefficient of the group status (1 if treatment, 0 if comparison) and the standardized effect size was presented to facilitate interpretation. The standardized program effect was derived by running the statistical model using the z-score version of posttest SOL scores (z-score used the sample mean and sample standard deviation (SD); not the state mean or state SD).

To address the clustering issue inherent in education data (students are nested within clusters and thus errors are not independently distributed), the model estimated the intercepts (i.e., teacher effects) as random effects. The rational for treating teachers as the nesting unit comes from the fact that RMIN recruited individual teachers for program participation and the study was designed as a teacher-level study. Preparatory analysis suggested that using the school level as the nesting unit in the model does not substantially change the analysis result.

The following equation summarizes the model described above.

$$Posttest_{ij} = \beta_{00} + \beta_{10} * pretest_{ij}$$
$$+ \beta_{20} * treatment_{j} + \ldots + r_{ij} + u_{j}$$

where

- Posttest represents posttest SOL scores
- Pretest represents the pretest SOL scores
- Postscripts *i* and *j*, respectively represent student and teacher
- βs are parameters to be estimated and r and u are error terms
- The three ellipses (i.e., "…") indicate that the model will include multiple predictors (white student, English language learner, and economic disadvantage status) and corresponding parameters
- Treatment represents the group status (1 if treatment group; 0 if comparison group)

Findings

The following section provides findings for the impact study, framed by the evaluation questions. This summary is based on data from student math achievement scores.

Impact Evaluation Findings

The following section provides a summary of findings for the exploratory questions for the impact study. Data sources include statewide math assessment scores (Standards of Learning, or SOL) for students in treatment and comparison teacher Pre-Algebra or Algebra I classrooms during the 2018-19 school year.

Tables 4 and 5 summarize the result of the program impact analysis, respectively, for Pre-Algebra and Algebra I students. As mentioned in the method section, HLM was used to analyze the data. The treatment coefficient, which corresponds to the program impact, was adjusted for race (minority vs. white), students' English language learner status, and economic disadvantage status (defined earlier). Descriptive statistics for the samples used for analysis can be found in Appendix B (Table B1 and B2 were, respectively, for the Pre-Algebra analysis and the Algebra I analysis).

The results from the Pre-Algebra and Algebra I analyses both show that the program impact was small. The standardized effect for the Pre-Algebra analysis was -0.17 and the effect for the Algebra I analysis was 0.07. The negative effect for the Pre-Algebra, however, was not statistically significant and the effect size was relatively small. WWC considers an effect size greater than 0.25 as "substantively important." The positive effect from the Algebra I analysis is consistent with the program expectation. The effect size, however, was also small and not statistically significant.

Table 4. Pre-Algebra: Summary of Program Impact HLM Analysis: Adjusted Posttest SOL Test Average Scores by Group Status (n=512)

	Estimate	Standard Error	P-value	Stat. test	Standardized Program Impact
Intercept	436.65	8.99	<.0001	***	
Treatment	-7.90	9.20	0.41	ns	-0.17
Pretest (z-score)	35.16	1.39	<.0001	***	
White student	-2.00	3.19	0.53	ns	
English language learner	13.05	11.11	0.24	ns	
Economic disadvantage	-12.96	3.19	<.0001	***	

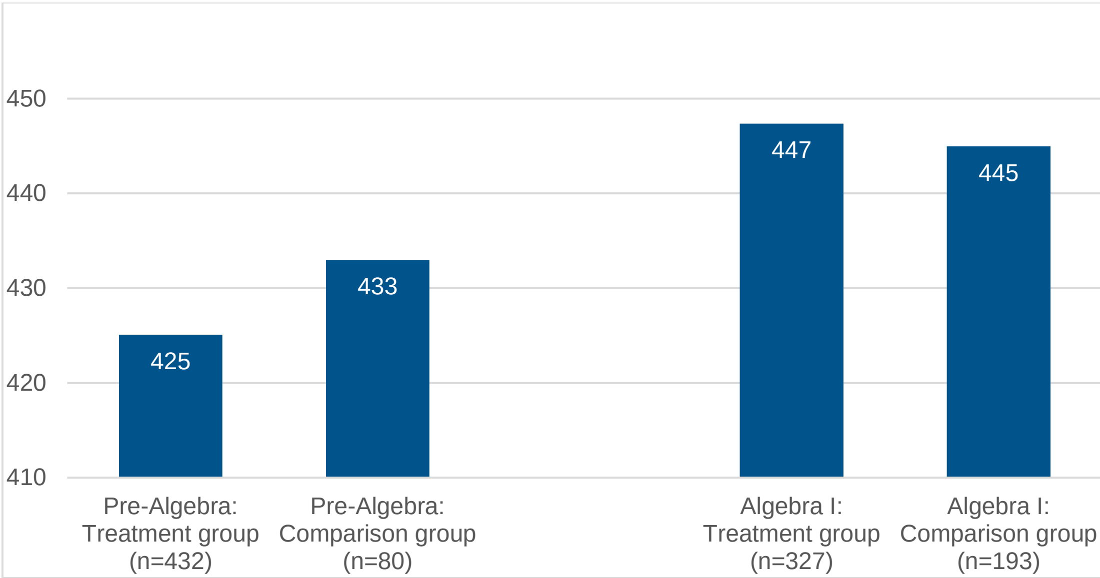
Note: Significance test: ns if p >=10 ~ if $p<0.10$, * if $p< 0.05$; ** if $p< 0.01$, *** $p< 0.001$. See Appendix B, Table B1 for descriptive statistics of the sample used for this analysis. See Table B3 for unadjusted descriptive statistics of posttest scores.

Table 5. Algebra I: Summary of Program Impact HLM Analysis: Adjusted Posttest SOL Test Average Scores by Group Status (n=520)

	Estimate	Standard Error	P-value	Stat. test	Standardized Program Impact
Intercept	430.90	9.26	<.0001	***	
Treatment	2.40	11.61	0.84	ns	0.07
Pretest (z-score)	18.02	1.35	<.0001	***	
White student	-4.45	2.93	0.13	ns	
English language learner	8.36	8.19	0.31	ns	
Economic disadvantage	0.44	3.49	0.90	ns	

Note: Significance test: ns if p >=10 ~ if $p<0.10$, * if $p< 0.05$; ** if $p< 0.01$, *** $p< 0.001$. See Appendix B, Table B2 for descriptive statistics of the sample used for this analysis. See Table B3 for unadjusted descriptive statistics of posttest scores.

Figure 1 expresses the same information graphically. To reiterate the findings, the Pre-Algebra analysis shows the comparison group performed better than the treatment students; however, the difference between the treatment and the comparison group was small (standardized effect of -0.17) and not statistically significant. For the Algebra I analysis, the treatment group performed slightly better than the comparison group; however, again the group difference was small and not statistically significant (standardized effect of 0.07).



Note: The average score for the comparison group was fixed at the unadjusted means of the comparison group (Pre-Algebra 432.97; Algebra I 444.98).

Figure 1. Average Posttest SOL scores (Adjusted for Covariates)

Conclusions

Conclusions pertaining to the impact study are presented below. These conclusions are derived from analysis of available data sources.

Impact on Student Achievement

The one-year program impact on students' SOL scores was estimated and the results did not find evidence that the RMIN program significantly improved students' SOL performance. The program impact from the Pre-Algebra sample was negative, but it was not statistically significant and the effect size was small (standardized effect size, -0.17). The program impact from the Algebra I analysis was positive but not statistically significant, and the effect size was small (standardized effect size, 0.07). The result involving the first cohort of students does not negate the expectation that RMIN improved student performance. The samples included a small number of comparison teachers' students and thus this might have posed an estimation challenge. The fact that students often took different types of SOL tests and that the analysis focused on the exact pretest-posttest type combination further reduced the number of cases.

Appendix A: Data Definition of the Program Impact SOL Analysis Samples

This section describes how the program impact analysis samples were defined. Table A1 summarizes what SOL test students in the sample took for pretest and posttest. The largest number of students (n=513) took Mathematics 7 as pretest and Mathematics 8 as posttest. Other combinations of pretest and posttest shown in other columns were not only smaller in number of students, but data were more unbalanced by group status. For example, the number of students who took Mathematics 6 as pretest and Mathematics 7 as posttest was 268; however, all 268 students were treatment students. Other columns exhibit the same problem of how all or almost all students were treatment students. Including these unbalanced datasets would likely bias the program impact. Therefore, the Pre-Algebra sample included only those who took Mathematics 7 as pretest and Mathematics 8 as posttest.

Table A1. The Type of SOL Test Pre-Algebra Students Took for Pretest and Posttest by Group Status

Pretest SOL Test Type	Posttest SOL Test Type	Treatment Group	Comparison Group	Total	Notes
Math 6	Math 7	268	0	268	
Math 6	Math 8	274	0	274	
Math 7	Algebra I	1	0	1	
Math 7	**Math 8**	**433**	**80**	**513**	**Largest sample**
Math 8	Math 8	6	1	7	
	Total	982	81	1,063	

We took a closer look at the sample consisting of those who took Mathematics 7 for pretest and Mathematics 8 for posttest. As shown in Table A2, almost all students (except for one) in the sample were eighth graders. The analysis sample thus excluded the single seventh grader and included only eighth graders. The final sample size, therefore, was 512.

Table A2. Grade Levels of Students who Took Math 7 and Math 8 SOL Tests

Group Status	Seventh Graders Excluded from the Sample	Eighth Graders Included in the Sample
Comparison Group	0	80
Treatment Group	1	432
Total	1	512

Table A3 shows what Algebra I students took for pretest and posttest and the results were again separated by group status. The largest number of students took Mathematics 8 as pretest and Algebra I as posttest. Another combination, Mathematics 7 as pretest and Algebra I as posttest, had a relatively larger number of students than the rest of the combinations which barely had any cases.

The decision was made to focus only on the Mathematics 8 and Algebra I sample to make interpretation clear and to parallel the Pre-Algebra decision noted above.[5]

Table A3. The Type of SOL Test Algebra I Students Took for Pretest and Posttest by Group Status

Pretest SOL Test Type	Posttest SOL Test Type	Treatment Group	Comparison Group	Total	Notes
Algebra I	Algebra I	16	16	32	
Geometry	Algebra I	5	1	6	
Geometry	Algebra II	1	0	1	
Geometry	Geometry	0	1	1	
Math 6	Algebra I	2	0	2	
Math 7	Algebra I	212	86	298	
Math 7	Math 8	7	0	7	
Math 8	**Algebra I**	**635**	**210**	**845**	**Largest sample**
	Total	878	314	1,192	

The decision of including only ninth graders stemmed from the following. Table A4 shows how the number of Algebra I students vary by group status and grade levels. The ninth grade subsample includes relatively large number of students both in the treatment and comparison groups. The data are unbalanced for seventh graders (0 comparison students; 12 treatment students) and eighth graders (17 comparison students and 296 treatment students). This could bias the result of program impact estimation and thus we decided to focus on ninth graders for the Algebra analysis.

Table A4. Grade Levels of Students Who Took Math 8 and Algebra I SOL Tests

	Seventh Graders Excluded from the Sample	Eighth Graders Excluded from the Sample	Ninth Graders Included in the Sample
Comparison Group	0	17	193
Treatment Group	12	296	327
Total	12	313	520

[5] An alternative approach was to combine the two groups and standardize the pretest test scores using the Virginia state average score and standard deviation reported per each test type; however, this relies on the assumption that the Math 7 SOL test and the Math 8 SOL test were comparable if standardized (meaning, for example, students with the average Math 7 score and students with the average Math 8 test score have the same level of math competency). The decision was made to not employ this alternative approach since state statistics were not available at the time of this report.

Appendix B: Descriptive Statistics Tables for the Program Impact SOL Analysis

Table B1. Descriptive Statistics for the Sample Used for Pre-Algebra HLM Analysis (eighth graders)

	N	Mean	SD	Min	Max
Treatment	512	0.84	0.36	0.00	1.00
SOL Math 8 score (Posttest)	512	426.33	46.15	223.00	600.00
SOL Math 8, z-score	512	0.00	1.00	-4.41	3.76
SOL Math 7 score (Pretest)	512	391.01	50.88	206.00	600.00
SOL Math 7, z-score	512	0.00	1.00	-3.64	4.11
White student	512	0.72	0.45	0.00	1.00
English language learner	512	0.01	0.11	0.00	1.00
Economic disadvantage	512	0.19	0.40	0.00	1.00

Table B2. Descriptive Statistics for the Sample Used for Algebra I HLM Analysis (ninth graders)

	N	Mean	SD	Min	Max
Treatment	520	0.63	0.48	0.00	1.00
SOL Algebra I score (Posttest)	520	433.25	35.29	337.00	569.00
SOL Algebra I, z-score	520	0.00	1.00	-2.73	3.85
SOL Math 8 score (Pretest)	520	420.04	40.42	288.00	538.00
SOL Math 8, z-score	520	0.00	1.00	-3.27	2.92
White student	520	0.67	0.47	0.00	1.00
English language learner	520	0.02	0.15	0.00	1.00
Economic disadvantage	520	0.16	0.37	0.00	1.00

Table B3. Descriptive Statistics of Posttest SOL Test Scores Used for the Final HLM Analyses

<table>
<tr><th></th><th>N</th><th>Raw Mean</th><th>Raw SD</th><th>Standard-ized Mean</th><th>Standard-ized SD</th><th>Standardized Difference (Hedge's g)</th><th>Statistical Significance</th></tr>
<tr><td colspan="8">Pre-Algebra (all eighth graders; n=512)</td></tr>
<tr><td>Treatment students</td><td>432</td><td>423</td><td>44</td><td>-0.07</td><td>0.95</td><td rowspan="2">-0.48</td><td rowspan="2">Statistically significant at p=.001.</td></tr>
<tr><td>Comparison students</td><td>80</td><td>445</td><td>53</td><td>0.40</td><td>1.15</td></tr>
<tr><td colspan="8">Algebra I (all ninth graders; n=520)</td></tr>
<tr><td>Treatment students</td><td>327</td><td>433</td><td>36</td><td>0.00</td><td>1.03</td><td rowspan="2">0.00</td><td rowspan="2">Not significant</td></tr>
<tr><td>Comparison students</td><td>193</td><td>433</td><td>34</td><td>-0.00</td><td>0.95</td></tr>
</table>

Note: The results are based on simple descriptive statistics. While the Pre-Algebra result is statistically significant, the multilevel multivariate statistical model found the adjusted average difference to be not statistically significant (see Table 4).