Implementation and Impact Study of Imagine Math: 2023-2024

Submitted to

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EXHIBITS

EXECUTIVE SUMMARY

Imagine Learning partnered with RMC Research Corporation to conduct a study of the implementation and impact of Imagine Math during 2023/24. Imagine Math is a supplemental software program designed to provide personalized, adaptive instructional sequencing to accelerate mathematics achievement for students in grades K-8. The study examined student outcomes in two large districts: Indianapolis Public Schools (IPS) in Indiana and Northwest Independent School District (NISD) in Texas. Analyses compare the NWEA MAP Growth math scores of program participants to a matched comparison group of nonparticipants to estimate program impact, examine differences in impact by student subgroup, and examine how variations in student program usage relate to math performance.

Findings

While there were no statistically significant differences among Imagine Math participants and nonparticipants on math achievement outcomes, a significant positive impact of participation was found for students in grades 3, 4, and 5. Analyses of outcomes in IPS and NISD revealed no differences in spring 2024 achievement scores among Imagine Math participants and matched comparison students in each district. Analyses by grade level showed that Imagine Math had a statistically significant positive impact on students in grades 3, 4, and 5. There were no statistically significant differences for early elementary (grades 1 and 2) and middle school (grades 6, 7, and 8).

Student program usage was consistently and positively related to student math achievement. The implementation analysis revealed statistically significant and positive relationships between all measured usage variables (lessons completed, lessons passed, total program time, and meeting expectations for lessons completed and passed) and student MAP math scores.

Subgroup analyses suggest that the impact of Imagine Math on student achievement did not differ across student characteristics. Analytic models including interaction terms examining the moderating effects of gender, race/ethnicity, English learner status, and socioeconomic status found no statistically significant differences. In other words, impact of participation in Imagine Math was consistent across student groups.

The proportion of Imagine Math participants who met usage expectations was low and usage varied substantially by grade level. Imagine Math participants are expected to complete 30 or more lessons and to pass 30 or more lessons during an academic year. In the combined two-district sample in 2023/24, about 40% of Imagine Math participants met expectations for lessons completed and about 30% met expectations for lessons passed. The proportion of participants who met expectations was much lower in IPS where 18% met expectations for lessons completed and 9% met expectations for lessons passed. In NISD, elementary students exceeded expectations in terms of average lessons completed and passed while middle grade students had much lower average usage. For example, grade 4 students averaged 77 lessons completed and 56 lessons passed while students in grade 6 averaged 5 lessons completed and 3 lessons passed.

INTRODUCTION

Background

Imagine Math is a supplemental software program provided by Imagine Learning. It is designed to provide personalized, adaptive, and standards-based instruction for PreK-Geometry mathematics skills. The program operates with personalized instructional sequencing. Students are given an embedded computer-adaptive benchmark assessment to determine their proficiency level and generate a tailored learning trajectory. This trajectory is designed to provide continuous adjustments to meet students where they are, address foundational skills and scaffold students toward grade-level standards mastery. In the early grades (K-2), the platform immerses learners in engaging storybook contexts provided in both English and Spanish, intentionally building contextualized vocabulary and using game-based lessons to encourage student motivation. For students in grade 3 and higher, the curriculum emphasizes academic discourse and critical thinking skills, offering embedded opportunities for students to model and articulate mathematical reasoning. An interactive reward system is integrated into the upper grades to encourage student motivation.[1]

Prior studies have found positive impacts of participation in Imagine Math. A quasi-experimental study in five California districts conducted during 2017/18 examined outcomes for Imagine Math participants in grades 4 through 6. Relative to students in a matched comparison group, Imagine Math participants had higher scores on a standardized achievement test in two of three grade levels (Elliot, 2019)[2]. A quasi-experimental study conducted in a southeastern U.S. charter school network found significant positive relationships between Imagine Math participation during the 2020/21 school year and math achievement on the NWEA MAP Growth Math assessment across grades 1 through 8. Positive and significant relationships were also observed across various student subgroups, with regression models controlling for gender and racial/ethnic groups, including Asian, Black, Hispanic, and Multi-Ethnic students (Freeman et al., 2024[3]). A correlational study conducted in Idaho found significant positive relationships between Imagine Math participation during 2021/22 and math achievement on the state math achievement test. Positive and significant relationships between Imagine Math lessons passed and ISAT math score growth were consistent across various student subgroups, including special education students, English learners, students eligible for free or reduced-price lunch, and students in racial/ethnic groups (Imagine Learning, 2023[4]). Imagine Learning partnered with RMC Research Corporation (RMC) to conduct a quasi-experimental study of the impact of Imagine Math during the 2023/24 academic year in two large school districts. In addition to documenting impact on student outcomes, the study is

[1] https://www.imaginelearning.com/products/math/math/

[2] Elliot, S. (2019). *The effectiveness of Imagine Math for improving student math skills*. Retrieved from https://www.imaginelearning.com/wp-content/uploads/2022/11/ImagineMathEffectivenessStudyReport.pdf

[3] Freeman, K., Cartwright, M., & Berrett, D. (2024). *Impact evaluation of Imagine Math in a charter school network.* Retrieved from https://www.imaginelearning.com/wp-content/uploads/2023/07/Imagine-Math-Impact-Evaluation-in-Charter-School-Network.pdf

[4] Imagine Learning (2023). *The impact of Imagine Math® on ISAT performance: 2021–2022*. Retrieved from https://www.imaginelearning.com/wp-content/uploads/2023/06/MAT-ISAT-Performance-2021%E2%80%932022-Research-Brief.pdf?v=0824

designed to examine variation in outcomes among student subgroups, and how student program usage relates to student outcomes.

METHODOLOGY

This section presents study research questions and the Imagine Math logic model. Next, the study design, study setting, study data and samples, and analysis methods are described.

Research Questions

The following research questions related to program impact and implementation were addressed in this study.

Impact

1. How does achievement (NWEA MAP scores) for students who use the Imagine Math program compare to achievement of students who do not use the program?
2. Is Imagine Math differentially beneficial for students of varying characteristics (e.g., gender, race/ethnicity, socio-economic status, and English learner classification)?

Implementation

3. Are changes in achievement by students who use Imagine Math associated with variations in the way the program is used (e.g., number of lessons completed)?

Logic Model

Exhibit 1 presents the Imagine Math logic model. This representation focuses on aspects of the program's resources and implementation and of student program participation that are expected to affect math achievement. The model provides a framework to guide study questions and analyses.

Exhibit 1. Logic Model for Imagine Math

INPUTS Program Resources	ACTIVITIES Ensure Successful Implementation	OUTPUTS Evidence of Implementation and Participation	STUDENT OUTCOMES Evidence of Positive Change

Imagine Math
▶ Research-based, standards-aligned supplemental
▶ program to provide meaningful practice and promotes mastery of grade-level content
▶ Scaffolded support and informative feedback to make learning accessible for all students
▶ Embedded motivation system to engage learners and encourages perseverance
▶ Diagnostic Benchmark Tests for placement and ongoing formative assessments for progress monitoring
▶ Actionable reports that drive instruction for a whole class or individual students
▶ Flexible model for delivery
▶ Professional development, training, and support
District
▶ Access to Imagine Math instructional content via site license
▶ Technology: networked computers or mobile devices, headsets, and supporting hardware and software
▶ School and district infrastructure to support technology use
▶ Teacher buy-in and readiness to adopt technology
▶ School implementation plan
▶ School or district learning goals
	Student Activities
	▶ Spend at least 45 minutes (or 2–3 lessons) per week (PreK–Grade 2)
	▶ Spend 60–90 minutes (or 2–3 lessons) per week (Grade 3–High School)
	▶ Pass 30 lessons before the end of the school year
	▶ Engage in offline resources:
	  ▶ Printable worksheets
	  ▶ Printable worksheets; Application Tasks; Journaling Pages
	Teacher Activities
	▶ Implement blended learning model(s): whole-class instruction, computer lab, in-class rotation, intervention, extended learning (at-home, after school, summer school, etc.)
	▶ Use actionable data to monitor student progress and plan for differentiated instruction
		Implementation Metrics
		▶ Number of districts, schools, students, and teachers
		Progress Metrics
		▶ Number of lessons completed
		▶ Number of problems completed
		▶ Percent of tokens earned
		▶ Number of Math Helps used
		▶ Number of Live Help Sessions used
		Student Usage
		▶ Number of total students using or enrolled
		▶ Number of active students using Imagine Math at school and/or at home
		▶ Average student usage, percentage of goal
		Student Progress Lessons
		▶ Average weekly math time
		▶ Number of lessons completed
		▶ Number of lessons passed
		Student Progress Assessments
		▶ Number of assessments completed
		▶ Quantile measure
		▶ Student performance level, percentile rank, and instructional grade level
			Short-Term Outcomes
			▶ Students exhibit increased engagement as measured by usage of and progress through Imagine Math
			▶ Students increase mathematics proficiency as evidenced by their performance on Imagine Math assessments
			Long-Term Outcomes
			▶ Students increase mathematics proficiency on nationally normed or standardized assessments
			▶ Students increase academic achievement in other subject areas
			▶ Students develop motivation, self-efficacy, and self-confidence to learn mathematics
			▶ Teachers feel prepared to implement Imagine Math in their classrooms
			▶ Teachers build understanding of students' mathematical thinking

Note. Adapted from Imagine Math Logic Model.
https://www.imaginelearning.com/pdf-viewer/?file=https://www.imaginelearning.com/wp-content/uploads/2022/11/MAT-Logic-Model.pdf#zoom=auto&pagemode=none

Design

RMC used a quasi-experimental design (QED) to examine the impact of Imagine Math on math achievement during the 2023/24 academic year for students who used Imagine Math as a supplementary program relative to matched comparison students within the district who did not. In addition to documenting impact on student outcomes, the study also examined differences in outcomes by student characteristics, variations in student program usage, and how that variation relates to math achievement outcomes.

Intervention and Comparison Conditions. Students in the intervention condition were those identified as Imagine Math participants (defined as students who logged any time in the Imagine Math program during the 2023/24 academic year). The program was offered as a supplement to core math instruction. The comparison group included students who did not log time in Imagine Math during the school year. Study districts determined which students participated in Imagine Math.

Study Data

To address the research questions, the study used Imagine Math program data and district administrative data for the 2023/24 school year. In spring 2024, student program usage data were collected from Imagine Learning. Deidentified student-level and school-level data were provided by Indianapolis Public Schools (IPS) in Indiana and Northwest Independent School District (NISD) in Texas. Spring 2024 outcome data were used to estimate program impact, controlling for baseline data from fall 2023. Data sources are summarized in Exhibit 2.

Exhibit 2. Data Sources

Data Source	Data Elements
District Administrative Records	**Student characteristics**, including gender, grade, race/ethnicity, English learner (EL) status, economic disadvantage status, homeless status, foster status, at-risk or unaccompanied status[a], special education status, 504 plan status, gifted status. **Student performance data**, including baseline (fall 2023) scores on the NWEA Measures of Academic Progress (MAP) Growth Math, and outcome (spring 2024) scores on the NWEA MAP Growth Math.
Program Usage Data	Student time spent on online activities, lessons completed, and lessons passed.

[a]At-risk and unaccompanied status were considered one variable across districts as unaccompanied is a component of at-risk student factors. See: ERIC definition of "at-risk."

Samples

The initial sample comprised 21,137 students who had both baseline (fall 2023) and outcome (spring 2024) MAP data (Exhibit 3). This sample was drawn from IPS, contributing 9,669 students, and NISD, contributing 11,468 students. While students in grades 1 through 8 were represented, most students were in grades 3-8 (13-15% at each grade level). A clear distinction in student characteristics existed between the two districts. The IPS sample was predominantly economically disadvantaged (63%) and had a higher percentage of Black/African American and Hispanic/Latino students, while the NISD sample consisted of 51% White students and had fewer who were economically disadvantaged (26%). Five separate analytic samples were identified based on this initial sample, including impact analysis samples for each district (RQ1 and RQ2), and an implementation analysis sample for each district and across both districts (RQ3).

Exhibit 3. Pre-Matching Student Characteristics by District and Total Samples

		IPS (*n* = 9,669)		NISD (*n* = 11,468)		Total (*N* = 21,137)	
Variable	**Category**	***n***	**%**	***n***	**%**	***n***	**%**
Gender[a]	Male	5,090	52.6	5,800	50.6	10,890	51.5
	Female	4,577	47.3	5,668	49.4	10,245	48.5
Grade[a]	Grade 1	1,261	13.0	-	-	1,261	6.0
	Grade 2	1,312	13.6	-	-	1,312	6.2
	Grade 3	1,405	14.5	1,829	15.9	3,234	15.3
	Grade 4	1,369	14.2	1,911	16.7	3,280	15.5
	Grade 5	1,394	14.4	1,922	16.8	3,316	15.7
	Grade 6	1,029	10.6	2,038	17.8	3,067	14.5
	Grade 7	1,009	10.4	1,883	16.4	2,892	13.7
	Grade 8	882	9.1	1,884	16.4	2,766	13.1
Race[a]	American Indian or Alaska Native	-	-	61	0.5	69	0.3
	Asian	102	1.1	854	7.4	956	4.5
	Black/African American	3,200	33.1	1,382	12.1	4,582	21.7
	Hispanic/Latino	3,411	35.3	2,900	25.3	6,311	29.9
	Native Hawaiian or Pacific Islander	-	-	35	0.3	38	0.2
	White	2,305	23.8	5,837	50.9	8,142	38.5
	Multiple Races	639	6.6	399	3.5	1,038	4.9
Economic Disadvantage	Yes	6,045	62.5	2,993	26.1	9,038	42.8
Special Education	Yes	1,553	16.1	2,146	18.7	3,699	17.5
504 Plan	Yes	110	1.1	1,486	13.0	1,596	7.6
Gifted	Yes	1,776	18.4	2,016	17.6	3,792	17.9
Homeless	Yes	139	1.4	12	0.1	151	0.7
Foster	Yes	13	0.1	11	0.1	24	0.1
English Learner	Yes	2,870	29.7	720	6.3	3,590	17.0
At-Risk or Unaccompanied[a]	Yes	-	-	4,636	40.4	4,637	21.9

[a] Variable categories with $n < 10$ are suppressed, resulting in the sum of variable categories not equaling the total *N*.
Note. For binary yes/no demographic indicators, "no" comprises the remaining *n* and percent. No values were missing.

Impact Analysis Sample

We conducted propensity score matching (PSM) to generate a matched comparison group of students within IPS and NISD. Given the different compositions of Imagine Math participants in IPS and NISD, matching and impact analyses were conducted separately by district. District administrative data were used to select a matched sample of comparison students with characteristics similar to intervention students at baseline in each district. The matching algorithm used a comprehensive set of baseline

covariates, including an exact grade match and baseline NWEA MAP Math scores, alongside demographic indicators such as gender, race/ethnicity (nonwhite), special education status, gifted status, 504 plan status, and socioeconomic indicators including homeless and foster status. In NISD, students' at-risk status was also included. To maximize the available analytic sample size, no caliper was specified during the matching process.

In some grade levels, the number of comparison students was fewer than the number of Imagine Math students. The matching ratios were adjusted by district and grade level to maximize the sample size, retaining as many Imagine Math and comparison students as possible while also maintaining balance in proportion of Imagine Math and comparison students. For NISD, in grades 6 through 8, a 1:1 ratio was employed, matching 1,346 treatment students to 1,346 control students. Similarly, in IPS for Grades 7 and 8, a 1:1 ratio was utilized to match 709 treatment students with 709 control students; in this instance, priority was given to retaining all available comparison students, resulting in 423 treatment students remaining unmatched. For IPS grades 1 through 6, a 2:1 ratio was applied, matching 2,846 treatment students to 1,423 comparison students. Again, the priority of keeping all available comparison students in these grades resulted in 3,417 treatment students remaining unmatched.

Exhibit 4 presents the post-matching study sample (N = 8,379) used to estimate the Imagine Math program effect on NWEA MAP Math scores for the impact analysis, including 68% from IPS and 32% from NISD. The matched sample included a slightly higher proportion of male students (52%) and students in Grades 1 through 8. While the IPS matched sample included students across Grades 1 through 8, the NISD matched sample focused solely on Grades 6 through 8, with the highest concentration of NISD students in Grade 6 (60%). The matched sample included a high proportion of Hispanic/Latino (35%), followed by Black/African American (29%). About half were economically disadvantaged (56%), 17% received Special Education services, and 14% were classified as Gifted.

Exhibit 4. Post-Matching Student Characteristics by District and Total Samples

		IPS (*n* = 5,687)		NISD (*n* = 2,692)		Total (*N* = 8,379)	
Variable	**Category**	***n***	**%**	***n***	**%**	***N***	**%**
Gender[a]	Male	2,979	52.4	1,358	50.4	4,337	51.8
	Female	2,706	47.6	1,334	49.6	4,040	48.2
Grade[a]	Grade 1	378	6.6	-	-	378	4.5
	Grade 2	522	9.2	-	-	522	6.2
	Grade 3	588	10.3	-	-	588	7.0
	Grade 4	996	17.5	-	-	996	11.9
	Grade 5	1,101	19.4	-	-	1,101	13.1
	Grade 6	684	12.0	1,612	59.9	2,296	27.4
	Grade 7	660	11.6	624	23.3	1,284	15.3
	Grade 8	758	13.3	456	16.9	1,214	14.5
Race[a]	American Indian or Alaska Native	-	-	23	0.9	25	0.3
	Asian	54	0.9	167	6.2	221	2.6
	Black/African American	2,014	35.4	421	15.6	2,435	29.1
	Hispanic/Latino	2,039	35.9	789	29.3	2,828	34.8
	Native Hawaiian or Pacific Islander	-	-	12	0.4	14	0.2
	White	1,204	21.2	1,195	44.4	2,399	28.6
	Multiple Races	371	6.5	84	3.2	456	5.4
Economic Disadvantage	Yes	3,766	66.2	935	34.7	4,701	56.1
Special Education	Yes	889	15.6	564	21.0	1,453	17.3
504 Plan	Yes	75	1.3	424	15.8	499	6.0
Gifted	Yes	884	15.5	269	10.0	1,153	13.8
Homeless[a]	Yes	69	1.2	-	-	74	0.9
English Learner	Yes	1,679	29.5	259	9.6	1,938	23.1
At-Risk or Unaccompanied[a]	Yes	-	-	1,550	57.6	1,550	18.5

[a] Variable categories with $n < 10$ are suppressed, resulting in the sum of variable categories not equaling the total *N*.
Note. for binary yes/no demographic indicators, "no" comprises the remaining *n* and percent. No values were missing. Foster was suppressed as the variable had fewer than 10 "yes" cases.

Exhibit 5 presents student characteristics for the post-matched sample for IPS, separated into the treatment (*n* = 3,555) and matched comparison (*n* = 2,132) groups. Student characteristics across groups were comparable within a few percentage points. For example, both groups have similar proportion of male students (53% treatment vs. 52% comparison), students identified as nonwhite (78% vs. 80%), and those identified as economically disadvantaged (67% vs. 65%), special education students (15% vs. 16%), and English learners (31% vs. 27%). There were slightly higher percentages of grade 7 and grade 8

students in the comparison group based on how the matched samples were createHd (i.e., 1:1 match for students in grades 1-6 and a 2:1 match for students in grades 7 and 8).

Exhibit 5. Post-Matching Student Characteristics for IPS Impact Sample by Treatment and Comparison Groups

		Treatment (*n* = 3,555)		Comparison (*n* = 2,132)	
Variable	**Category**	***n***	**%**	***n***	**%**
Gender[a]	Male	1,870	52.6	1,109	52.0
	Female	1,684	47.4	1,022	48.0
Grade[a]	Grade 1	252	7.1	126	5.9
	Grade 2	348	9.8	174	8.2
	Grade 3	392	11.0	196	9.2
	Grade 4	664	18.7	332	15.6
	Grade 5	734	20.6	367	17.2
	Grade 6	456	12.8	228	10.7
	Grade 7	330	9.3	330	15.5
	Grade 8	379	10.7	379	17.8
Nonwhite	Yes	2,788	78.4	1,695	79.5
Economic Disadvantage	Yes	2,372	66.7	1,394	65.4
Special Education	Yes	540	15.2	349	16.4
504 Plan	Yes	45	1.3	30	1.4
Gifted	Yes	572	16.1	312	14.6
Homeless	Yes	45	1.3	24	1.1
English Learner	Yes	1,104	31.1	575	27.0

[a] Variable categories with $n < 10$ are suppressed, resulting in the sum of variable categories not equaling the total *N*.
Note. for binary yes/no demographic indicators, "no" comprises the remaining *n* and percent. No values were missing. Foster was suppressed as the variable had fewer than 10 "yes" cases.

Exhibit 6 presents the student characteristics for post-matched sample for NISD, separated for treatment (*n* = 1,346) and matched comparison (*n* = 1,346) groups. Student characteristics across groups were comparable within a few percentage points, such as nonwhite status (56% treatment vs. 55% comparsion) and special education status (21% for both groups). There were slightlyer higher percentages of English learners in the treatment group (11%) than the comparison group (9%), while comparison group inlcuded more gifted students (9% treatment vs. 11% comparison). In both groups, there were more students in grade 6 (60%) than in grades 7 (23%) and grade 8 (17%).

Exhibit 6. Post-Matching Student Characteristics for NISD Impact Sample by Treatment and Comparison Groups

		Treatment (*n* = 1,346)		Comparison (*n* = 1,346)	
Variable	**Category**	***n***	**%**	***n***	**%**
Gender	Male	677	50.3	681	50.6
	Female	669	49.7	665	49.4
Grade	Grade 6	806	59.9	806	59.9
	Grade 7	312	23.2	312	23.2
	Grade 8	228	16.9	228	16.9
Nonwhite	Yes	751	55.8	746	55.4
Economic Disadvantage	Yes	488	36.3	447	33.2
Special Education	Yes	282	21.0	282	21.0
504 Plan	Yes	222	16.5	202	15.0
Gifted	Yes	119	8.8	150	11.1
English Learner	Yes	145	10.8	114	8.5
At risk or unaccompanied	Yes	806	59.9	744	55.3

Note. For binary yes/no demographic indicators, "no" comprises the remaining *n* and percent. No values were missing. Foster and Homeless were suppressed as the variables had fewer than 10 "yes" cases.

A large portion of the impact analysis treatment students showed low program usage, with 30% of IPS students and 49% of NISD students passing less than one Imagine Math lesson. Only 16% of IPS students and less than 6% of NISD students in the impact sample met the expectation of completing 30 or more Imagine Math lessons. Around 9% of IPS students and less than 2% of NISD students in the impact analysis sample met the goal of passing 30 or more lessons. Detailed program usage information for the treatment group in the impact analysis sample can be found in Exhibits C1-C6 in Appendix C.

Baseline Equivalence

The impact analysis sample, constructed using propensity score matching, was examined for baseline equivalence using fall 2023 NWEA MAP Math scores (Exhibit 7) and student characteristics (Exhibit 8). Baseline equivalence was demonstrated for impact analysis samples in IPS (g = 0.11) and NISD (g = 0.07) and student demographics in each district (Exhibit 9 and 10). These results support the use of subsequent regression analysis to reliably estimate the program's intervention effect, controlling for baseline measures.

Exhibit 7. NWEA MAP Math Baseline Equivalence Statistics: Impact Analysis Sample

Group	Students	Mean	*SD*	Mean Diff.	Effect Size (*g*)
IPS Imagine Math	3,555	182.64	26.18	2.94	0.11
IPS Comparison	2,132	185.58	26.10		
NISD Imagine Math	1,346	215.02	14.32	0.99	0.07
NISD Comparison	1,346	216.01	14.50		

Exhibit 8. Student Characteristics Baseline Equivalence Statistics: Impact Analysis Sample

Variable	Imagine Math (*n* = 4,901) % (*n*)	Comparison (*n* = 3,478) % (*n*)	Effect Size Cox's *d*
Gender (Female)	48.0 (2,353)	48.5 (1,687)	0.01
Economic Disadvantage	58.4 (2,860)	52.9 (1,841)	0.13
Non-white	72.6 (3,539)	70.2 (2,441)	0.07
Special Education	16.8 (822)	18.1 (631)	0.05
504 Plan	5.4 (267)	6.7 (232)	0.14
Gifted	14.1 (691)	13.3 (462)	0.04
Homeless	1.0 (47)	0.8 (27)	0.13
At-Risk or Unaccompanied	16.4 (806)	21.4 (744)	0.20

Note: Foster was suppressed as the variable had fewer than 10 "yes" cases.

Exhibit 9. Student Characteristics Baseline Equivalence Statistics: IPS Impact Analysis Sample

Variable	Imagine Math (*n* = 3,555) % (*n*)	Comparison (*n* = 2,132) % (*n*)	Effect Size Cox's *d*
Gender (Female)	47.4 (1,684)	48.0 (1,022)	0.01
Economic Disadvantage	65.4 (2,372)	66.7 (1,394)	0.04
Non-white	78.4 (2,788)	79.5 (1,695)	0.04
Special Education	15.2 (540)	16.4 (349)	0.05
504 Plan	1.3 (45)	1.4 (30)	0.05
Gifted	16.1 (572)	14.6 (312)	0.07
Homeless	1.3 (45)	1.1 (24)	0.10

Note: Foster and At-Risk/Unaccompanied were suppressed as the variables had fewer than 10 "yes" cases.

Exhibit 10. Student Characteristics Baseline Equivalence Statistics: NISD Impact Analysis Sample

Variable	Imagine Math (*n* = 1,346) % (*n*)	Comparison (*n* = 1,346) % (*n*)	Effect Size Cox's *d*
Gender (Female)	49.7 (669)	49.4 (665)	0.01
Economic Disadvantage	36.3 (488)	33.2 (447)	0.08
Non-white	55.8 (751)	55.4 (746)	0.01
Special Education	21.0 (282)	21.0 (282)	< 0.01
504 Plan	16.5 (222)	15.0 (202)	0.07
Gifted	8.8 (119)	11.1 (150)	0.16

Note: Foster, Homeless, and At-Risk/Unaccompanied were suppressed as the variables had fewer than 10 "yes" cases.

Implementation Analysis Samples

Exhibit 11 displays characteristics of three implementation analysis samples, which included Imagine Math participants in IPS (*n* = 7,490), Imagine Math participants in NISD (*n* = 7,167), and all participants combined from both districts (*n* = 14,657). Students who logged any time in the program according to data from Imagine Learning were considered participants and were included in these samples. Data for these students were used to estimate the relationship between Imagine Math program usage and student outcomes (research question 3). The implementation study samples revealed demographic and grade-level distinctions between the two participating districts. The IPS implementation sample (*n* = 7,490) consists primarily of students in the early and middle grades (grades 1-5), whereas the NISD sample (*n* = 7,167) is concentrated in both elementary (grades 3-5) and middle school grades (grades 6-8). Demographically, the IPS implementation sample is predominantly Black/African American (32%) and Hispanic/Latino (36%), while the NISD intervention students are primarily White (49%) and Hispanic/Latino (26%).

Exhibit 11. Student Characteristics: Implementation Analysis Samples

Variable	IPS Students (*n* = 7,490) % (*n*)	NISD Students (*n* = 7,167) % (*n*)	Total Students (*N* = 14,657) % (*n*)
Grade 1	15.2 (1,135)	-	7.7 (1,135)
Grade 2	15.1 (1,133)	-	7.7 (1,133)
Grade 3	16.1 (1,206)	25.5 (1,827)	20.7 (3,033)
Grade 4	13.8 (1,031)	26.6 (1,909)	20.1 (2,940)
Grade 5	13.6 (1,020)	26.8 (1,918)	20.1 (2,938)
Grade 6	10.6 (797)	11.4 (815)	11.0 (1,612)
Grade 7	9.0 (673)	4.5 (322)	6.8 (995)
Grade 8	6.5 (489)	5.2 (376)	5.9 (865)
Gender (Female)	47.2 (3,537)	48.8 (3,494)	48.0 (7,031)
American Indian or Alaska Native	-	0.4 (30)	0.3 (37)

Asian	1.2 (87)	7.2 (518)	4.1 (605)
Black/African American	31.8 (2,383)	12.8 (919)	22.5 (3,302)
Hispanic/Latino	35.5 (2,661)	25.9 (1,855)	30.8 (4,516)
Native Hawaiian or Pacific Islander	-	0.3 (22)	0.2 (25)
White	24.9 (1,863)	49.4 (3,544)	36.9 (5,407)
Multiple Races	6.5 (485)	3.9 (279)	5.2 (764)
SPED	16.0 (1,197)	22.4 (1,604)	19.1 (2,801)
504 Plan	1.1 (80)	10.9 (781)	5.9 (861)
Gifted	19.5 (1,461)	17.1 (1,224)	18.3 (2,685)
Homeless	1.5 (114)	0.1 (7)	0.8 (121)
At-Risk or Unaccompanied[a]	-	43.1 (3,090)	21.1 (3,091)
Foster	0.2 (12)	0.1 (10)	0.2 (22)

Note. Variable categories with $n < 10$ are suppressed, resulting in the sum of variable categories not equaling the total *N*. The implementation samples in this table include all Imagine Math participants.

Analyses

Impact Analyses

To address **research question 1**, RMC used hierarchical linear models (HLMs) to estimate the impact of participation in the Imagine Math intervention on students' NWEA MAP math achievement. Impact analyses were conducted separately for IPS and NISD. Students' gender, grade level, race/ethnicity (nonwhite), special education status, EL status, economic disadvantage status, gifted status, 504 Plan status, foster status, and homeless status were included as covariates in the impact models. An additional measure of at-risk status was used in the impact analysis for NISD. At level-2 of the model, a random intercept for school was added to account for students being nested within different schools. The intraclass correlation coefficient (*ICC*) was calculated to assess the amount of variance that could be attributed to students' attendance at different schools. Fall scores served as baseline measures and spring scores served as outcome measures. The following general model was used:

Level 1: $Y_{ij} = \beta_{0j} + \beta_1 Baseline_{ij} + \beta_2 T_{ij} + \lambda_1 Stud\_Cov_{ij} + e_{ij}$

Level 2: $\beta_{0j} = \gamma_{00} + \mu_{0j}$

Where Y_{ij} represents the outcome variable (the spring score on the NWEA MAP assessment for student *i* in in school *j* after participation in Imagine Math), β_{0j} is the intercept for school *j*, β_1 is a parameter representing the association between the baseline achievement measure and the outcome, $Baseline_{ij}$ is each student's baseline achievement measure, T_{ij} is the intervention indicator variable (1 = intervention; 0 = comparison), β_2 is the coefficient representing the impact of Imagine Math on Y_{ij} (outcome variable), $Stud\_Cov1_{ij}$ is a vector of student covariates (gender, grade, nonwhite, English learner, special education, economic disadvantage, gifted, 504 plan, homeless, foster), λ_1 is a vector of

the corresponding parameters for the student covariates, e_{ij} represents the random error for student *i*'s outcome score from the predicted score based on the model. At Level 2, γ_{00} represents the overall grand mean (intercept) and μ_{0j} represents the random effect for school *j*. Our focus is on β_2, the Imagine Math intervention effect which is used to estimate the mean difference in scores between intervention participants and nonparticipants, adjusting for model covariates. The adjusted mean differences were used to calculate the effect size (Hedges' *g*). The full analytic model was examined first, followed by the final models which excluded trimmed covariates that did not reach statistical significance.

The final HLM examining the impact of Imagine Math included a random intercept to account for students' school, baseline (fall) NWEA MAP math scores, treatment status, gender, grade, race (nonwhite), special education status, socioeconomic status, gifted status, and homeless status. Covariates for students' 504 plan, EL status, and foster status were nonsignificant and trimmed from the final models in IPS and NISD.

To address **research question 2**, analyses that examined the extent to which program outcomes were moderated by factors such as gender, race/ethnicity, EL status, and socio-economic status, were conducted by including interaction terms between the characteristic and the intervention indicator. The models used the same structure and covariates as the final trimmed HLM in research question 1, with the addition of an interaction term for each relevant student characteristic (product of the intervention indicator and student characteristic measures). Regarding the models examining moderation by race/ethnicity, four models were conducted to examine differences in outcomes for Black, White, Hispanic, and Asian students. Groups were selected based on sufficient sample size. In each model examining differences by race/ethnicity, students from one group were compared to all remaining students in the sample (e.g., Hispanic vs. non-Hispanic).

Implementation Analyses

To address **research question 3**, student NWEA MAP scores were regressed on measures of Imagine Math student program usage in analyses that included only Imagine Math participants. The models used the same structure and covariates as the final trimmed HLM in research question 1, with the addition of a measure of Imagine Math usage. A covariate for students' at risk status was applied only to the implementation analyses conducted on the NISD sample. The measures of Imagine Math usage included: (1) total number of lessons completed, (2) a dichotomous indicator of whether students completed 30 or more lessons (annual program expectation), (3) total number of lessons passed, (4) a dichotomous indicator of whether students passed 30 or more lessons (annual program expectation), and (5) total hours of program usage. These analyses were conducted on a combined sample of Imagine Math participants from both districts, and separately for students from IPS and NISD. This yielded a total of fifteen models – each of the five measures of Imagine Math program usage were applied to the combined, IPS, and NISD samples.

FINDINGS

This section summarizes findings from data collected in 2023/24 including administrative data from the two participating districts and Imagine Math program data. First, findings related to the impact of Imagine Math on student outcomes and outcomes for student subgroups are presented, followed by information about Imagine Math student usage and its relationship to student outcomes.

Impact on Student Outcomes

Results for IPS revealed a small, positive treatment effect that neared, but did not reach statistical significance (p = 0.068; Exhibit 12). Imagine Math participants (n = 3,555) had an adjusted mean scale score that was 0.57 points higher than students in the comparison group (n = 2,132), with an effect size of 0.06. While the findings suggest a positive trend in math achievement for Imagine Math participants in IPS, the results are statistically nonsignificant. Detailed analysis output for the full analytic model is presented in Exhibit A1 and output for the final trimmed model is presented in Exhibit A2 in Appendix A.

Exhibit 12. Impact Analysis Results for Imagine Math in IPS

Group	Students	Schools	Unadjusted Scale Score Mean (*SD*)	*ICC*	Scale Score Adjusted Mean Diff(*SE*)	*p*-value	Effect Size (*g*)
Intervention	3,555	50	198.40 (25.04)	0.22	0.57 (0.31)	0.068	0.06
Comparison	2,132		199.54 (24.81)				

Note. The intraclass correlation coefficient (ICC) was computed based on the null model. Hedges' g was calculated using adjusted model means. M_{IM} = 198.39 (SE = 0.72), $M_{Comparison}$ = 197.82 (SE = 0.74).

Similarly, the impact analysis indicated that student participation in Imagine Math did not result in a statistically significant difference in achievement outcomes compared to the matched comparison group in NISD (p = 0.38). Exhibit 13 shows a very small adjusted mean difference of -0.31 scale score points for the treatment group (n = 1,346) relative to the comparison group (n = 1,346). This corresponded to an effect size of -0.04. Detailed analysis output is presented for the full analytic model in Exhibit A10 and the final trimmed model is presented in Exhibit A11 in Appendix A. These findings suggest that for the NISD sample, math achievement outcomes were similar between Imagine Math participants and matched nonparticipants.

Exhibit 13. Impact Analysis Results for Imagine Math in NISD

Group	Students	Schools	Unadjusted Scale Score Mean (*SD*)	*ICC*	Scale Score Adjusted Mean Diff(*SE*)	*p*-value	Effect Size (*g*)
Imagine Math (IM)	1,346	11	222.47 (16.79)	0.14	-0.31 (0.33)	0.38	-0.04
Comparison	1,346		223.91 (17.47)				

Note. The intraclass correlation coefficient (ICC) was computed based on the null model. Hedges' *g* was calculated using adjusted model means. M_{IM} = 219.06 (*SE* = 1.96), $M_{Comparison}$ = 219.37 (*SE* = 1.96).

Additional analyses were conducted to examine the impact of Imagine Math in particular grades. Students were categorized into three grade bands:

- Early elementary: grades 1 and 2;
- Upper elementary: grades 3, 4, and 5; and
- Middle school: grades 6, 7, and 8.

Exhibit 15 shows that Imagine Math had a statistically significant positive impact (p = 0.016) on upper elementary students. Intervention students had an adjusted mean scale score of 1.16 points higher than the matched comparison group, representing a small but significant effect size (g = 0.13). There were no statistically significant differences for early elementary and middle school students (Exhibits 14 and 16).

Exhibit 14. Impact Analysis Results for Imagine Math in IPS: Grades 1 and 2

Group	Students	Schools	Unadjusted Scale Score Mean (*SD*)	*ICC*	Scale Score Adjusted Mean Diff (*SE*)	*p*-value	Effect Size (*g*)
Intervention	600	39	168.05 (18.26)	0.17	0.55 (0.95)	0.56	0.06
Comparison	300		166.11 (18.00)				

Note. The intraclass correlation coefficient (ICC) was computed based on the null model. Hedges' *g* was calculated using adjusted model means. M_{ILL} = 166.27 (SE = 1.89), $M_{Comparison}$ = 165.73 (SE = 2.02).

Exhibit 15. Impact Analysis Results for Imagine Math in IPS: Grades 3 to 5

Group	Students	Schools	Unadjusted Scale Score Mean (*SD*)	*ICC*	Scale Score Adjusted Mean Diff (*SE*)	*p*-value	Effect Size(*g*)
Intervention	1,790	42	198.62 (20.19)	0.17	1.16 (0.48)	0.016*	0.13
Comparison	895		195.70 (19.47)				

Note. The intraclass correlation coefficient (ICC) was computed based on the null model. Hedges' *g* was calculated using adjusted model means. M_{ILL} = 197.72 (SE = 0.95), $M_{Comparison}$ = 196.56 (SE = 1.02).

Exhibit 16. Impact Analysis Results for Imagine Math in IPS: Grades 6 to 8

Group	Students	Schools	Unadjusted Scale Score Mean (*SD*)	*ICC*	Scale Score Adjusted Mean Diff (*SE*)	*p*-value	Effect Size (*g*)
Intervention	1,165	17	213.71 (20.18)	0.09	-0.05 (0.44)	0.91	0.005
Comparison	937		213.90 (18.89)				

Note. The intraclass correlation coefficient (ICC) was computed based on the null model. Hedges' *g* was calculated using adjusted model means. M_{ILL} = 211.96 (SE = 1.05), $M_{Comparison}$ = 212.01 (SE = 1.07).

To address research question 2, analyses examined the interaction effects to determine if Imagine Math was differentially beneficial for student subgroups in each district. Interaction terms were added to the final trimmed analytic model. The subgroup analysis for IPS indicated that Imagine Math did not have a statistically significant differential impact based on gender (p = 0.79), economic status (p = 0.42), EL status (p = 0.74), or race/ethnicity (Exhibit 17). Complete results from the IPS subgroup analyses are presented in Exhibits A3-A9 in Appendix A.

Exhibit 17. Subgroup Analysis by Treatment Interaction in IPS Impact Sample

Treatment Interaction	Group	*N* Students	Interaction Coefficient (*SE*)	*p*-value
Gender (Female)	Intervention	1,684	-0.14 (0.53)	0.79
	Comparison	1,022		
Economically Disadvantaged	Intervention	2,372	-0.46 (0.57)	0.42
	Comparison	1,394		
English Learner	Intervention	1,104	-0.20 (.60)	0.74
	Comparison	575		
White	Intervention	767	-0.36 (0.67)	0.59
	Comparison	437		
Black/African American	Intervention	1,220	0.76 (0.56)	0.17
	Comparison	794		
Hispanic	Intervention	1,305	-0.69 (0.56)	0.22
	Comparison	734		
Asian	Intervention	39	-1.66 (2.94)	0.57
	Comparison	15		

Note. The number of students from each subgroup in the treatment and comparison group is reported in the column labeled *N* Students. For all interactions by race/ethnicity, students from each group were compared to the remainder of the sample (e.g., white vs. nonwhite, Hispanic vs. non-Hispanic).

Similar to the IPS findings, subgroup analysis results for NISD showed no statistically significant differences by student subgroup (Exhibit 18). Imagine Math neither disproportionately benefited nor disadvantaged female students (p = 0.44), students classified as economically disadvantaged (p = 0.34),

English learner students (p = 0.66), or any specific racial/ethical group. Complete results from the NISD subgroup analyses are presented in Exhibits A12-A18 in Appendix A.

Exhibit 18. Subgroup Analysis by Treatment Interaction in NISD Impact Sample

Treatment Interaction	Group	*N* Students	Interaction Coefficient (*SE*)	*p*-value
Gender (Female)	Intervention	669	-0.48 (0.62)	0.44
	Comparison	665		
Economically Disadvantaged	Intervention	488	0.62 (0.66)	0.34
	Comparison	447		
English Learner	Intervention	145	0.47 (1.07)	0.66
	Comparison	114		
White	Intervention	595	-0.82 (0.53)	0.12
	Comparison	600		
Black/African American	Intervention	225	0.76 (0.86)	0.38
	Comparison	196		
Hispanic	Intervention	396	-0.82 (0.69)	0.23
	Comparison	393		
Asian	Intervention	73	-0.37 (1.30)	0.78
	Comparison	94		

Note. The number of students from each subgroup in the treatment and comparison group is reported in the column labeled, *N* Students. For all interactions by race/ethnicity, students from each group were compared to the remainder of the sample (e.g., white vs. nonwhite, Hispanic vs. non-Hispanic).

Implementation Analysis

Implementation analysis examined the extent to which changes in the math achievement of students who used Imagine Math were associated with variations in student program usage (lessons completed, lessons passed, total time in the program, and recommended program usage thresholds).

Differences in student program usage were observed for Imagine Math across districts. Exhibit 19 summarizes program usage for IPS students across grades 1 through 8, showing variation by grade level. Average usage for lessons completed, lessons passed, and total hours in the program generally declined as grade level increased. There was particularly high usage in grade 1, with students completing an average of 25.6 lessons, passing 13.1 lessons, and spending 11.5 total hours in the program. Grades 4 and 5 also demonstrated relatively high usage, averaging over 21 lessons completed and around over 8 hours in the program. Usage was lower in middle grades. For example, on average, grade 8 students completed only 9.5 lessons, passed 4.4 lessons, and spent 4.6 hours in the program.

Exhibit 19. Summary of Imagine Math Program Usage for IPS by Grade Level

Grades	Lessons Completed *M* (*SD*)	Lessons Passed *M* (*SD*)	Hours in Program *M* (*SD*)
Grade 1	25.6 (23.27)	13.1 (15.91)	11.5 (9.23)
Grade 2	12.4 (15.44)	7.7 (11.80)	7.1 (7.05)
Grade 3	11.2 (17.39)	7.0 (14.51)	7.0 (8.31)
Grade 4	21.6 (34.59)	13.6 (25.64)	8.4 (10.37)
Grade 5	21.6 (40.2)	13.2 (26.86)	8.3 (12.26)
Grade 6	13.3 (23.59)	7.2 (17.04)	5.6 (7.20)
Grade 7	16.7 (31.48)	9.6 (18.97)	6.5 (10.39)
Grade 8	9.5 (25.97)	4.4 (11.83)	4.6 (9.36)

NISD, on the other hand, showed a strong grade level pattern for Imagine Math student usage (Exhibit 20). Students in grades 3 through 5 exceeded recommended usage goals of 30 lessons completed. For example, grade 4 students averaged 76.8 lessons completed, 55.7 lessons passed, and 19.8 hours in the program. NISD students in grades 6 through 8 had very low program usage. For example, grade 6 students averaged only 5.1 lessons completed, 3.0 lessons passed, and 1.8 hours spent in the program.

Exhibit 20. Summary of Imagine Math Program Usage for NISD by Grade Level

Grades	Lessons Completed *M* (*SD*)	Lessons Passed *M* (*SD*)	Hours in Program *M* (*SD*)
Grade 3	66.5 (60.58)	46.0 (42.35)	17.4 (10.43)
Grade 4	76.8 (69.26)	55.7 (50.01)	19.8 (12.18)
Grade 5	68.3 (62.25)	46.8 (42.54)	18.7 (11.39)
Grade 6	5.1 (13.86)	3.0 (7.60)	1.8 (3.95)
Grade 7	5.2 (13.98)	2.5 (6.77)	2.0 (4.44)
Grade 8	6.9 (12.80)	3.7 (6.65)	2.5 (4.22)

The proportions of students who met expectations for lessons completed and passed are presented for the combined sample and each district (Exhibit 21). For the combined two-district sample, about 40% of Imagine Math participants completed 30 or more lessons and about 30% passed 30 or more lessons. The proportion of participants who met expectations was much lower in IPS than NISD.

Exhibit 21. Proportion of Imagine Math Participants Who Met Expectations for Lessons Completed and Lessons Passed, by District

	IPS (*n* = 7,400) % (*n*)	NISD (*n* = 6,931) % (*n*)	Two-District Sample (*N* = 14,331) % (*n*)
30 or More Lessons Completed	17.5 (1,292)	67.5 (4,317)	39.1 (5,609)
30 or More Lessons Passed	8.9 (662)	55.5 (3,547)	29.4 (4,209)

In addition to the summary of student program usage for all students included in implementation analyses (i.e., "implementation analysis samples;" presented in Exhibit 21), program usage was examined separately for the Imagine Math participants included in impact analyses (i.e., the "impact analysis samples") for IPS and NISD. Analysis of IPS student program usage in the impact analysis sample reveals that students had lower average program usage than those in the implementation analysis sample. The average number of lessons completed was 17 for the implementation analysis sample compared to 16 for the impact analysis sample, and the average lessons passed followed a similar trend at 10 and 9 passed for the implementation and impact analysis samples, respectively. The proportion of students who met expectations of 30-lesson passed was low across both samples, with only about 9% of each group reaching this threshold. Further, the impact sample contained a higher proportion of students who passed less than one lesson (30%) compared to the implementation sample (23%). See Exhibits C1 and C3 in Appendix C for additional information.

Analysis of NISD student program usage in the impact analysis sample shows that students had substantially lower average program usage than those in the implementation analysis sample. This disparity could be explained by the fact that the impact analysis sample was restricted to middle school students in grades 6 through 8 while the implementation analysis sample also included elementary grades. The average number of lessons passed was 41 for the implementation analysis sample compared to 3 for the impact analysis sample, and the average lessons completed followed a similar trend at 58 and 6 passed for the implementation and impact analysis samples, respectively. The implementation analysis sample also included a higher proportion of students who passed (56%) or completed (68%) 30 or more lessons, compared to the impact analysis sample (6% completed 30 or more lessons and 2% passed 30 or more lessons). See Exhibits C2 and C3 in Appendix C for additional information.

Exhibit 22 shows statistically significant and positive relationships between all student usage measures and math achievement ($p < 0.001$). For additional lessons completed or passed, there was a corresponding increase in student math scores. Further, students who met the thresholds of completing or passing 30 or more lessons had significantly higher math achievement, with unstandardized beta coefficients[5] of 2.88 and 3.27, respectively, compared to those who passed or completed fewer than 30 lessons. Total time spent in the program was also significantly related to higher student math outcomes ($b = 0.12$). Predicted scores for students who did and did not meet expectations for the number of lessons completed and passed are presented in Exhibit 23. Complete results from the cross-district implementation analysis are presented in Exhibits B1-B5 in Appendix B.

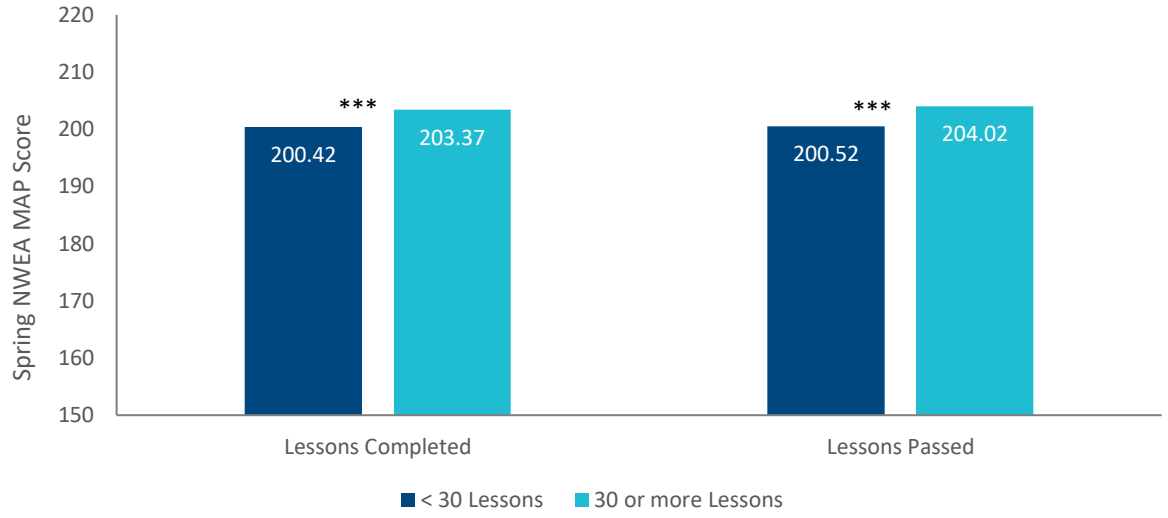
[5] An unstandardized beta coefficient represents the amount of change in a dependent variable for every one-unit change in an independent variable, assuming all other variables in the model stay the same.

Exhibit 22. Summary of Imagine Math Implementation Analyses – IPS and NISD Combined

Program Variable	Coefficient (*SE*)	*p*-value
Lessons Completed	0.02 (0.002)	<0.001***
30 or More Lessons Completed	2.88 (0.19)	<0.001***
Lessons Passed	0.04 (0.002)	<0.001***
30 or More Lessons Passed	3.27 (0.21)	<0.001***
Total Time in Program	0.12 (0.01)	<0.001***

Note. N = 14,331 students. Unstandardized beta coefficients are reported. Lessons completed, lessons passed, and total time in program were entered as continuous variables. Only treatment students with baseline and outcome data were included in these analyses. *$p < .05$, ** $p < .01$, ***$p < 0.001$.

Exhibit 23. Spring NWEA MAP Scores for Students Below and Above a 30-Lesson Imagine Math Threshold – IPS and NISD Combined



Note. Students' adjusted means from the analytic model are displayed. Significance testing was calculated between students below and above the 30-lesson threshold. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

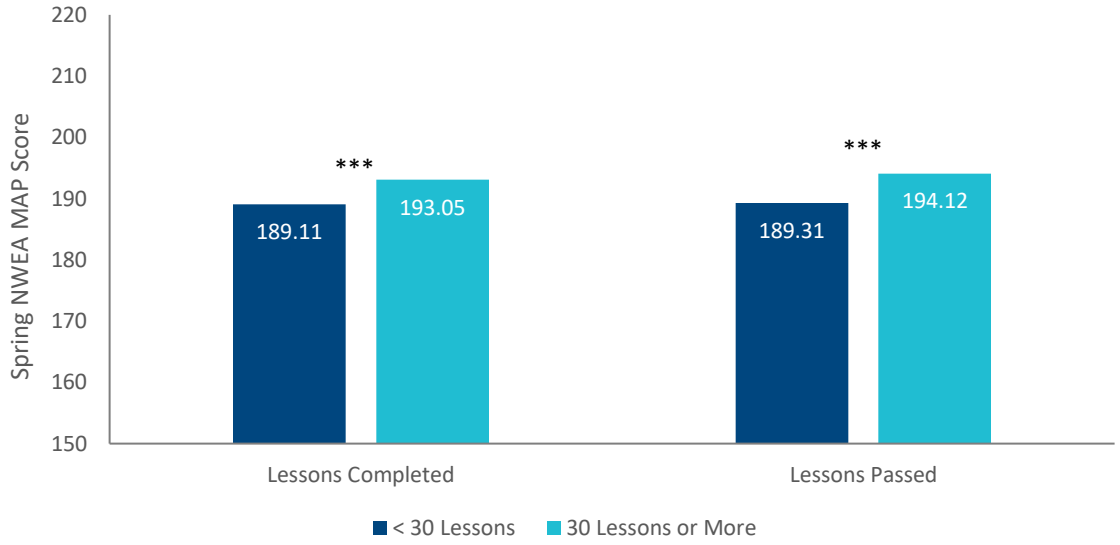
Implementation analysis for each district yielded similar findings. Exhibits 24 through 27 provide district-specific implementation analyses for IPS and NISD. In IPS, higher program usage was strongly correlated with academic performance (Exhibit 24). The positive impact of meeting program usage goals was particularly pronounced in this district; students who achieved the program usage goals of 30 or more lessons completed or passed saw significant math achievement gains, with coefficients of 3.95 and 4.82, respectively. Predicted scores for students who did and did not meet expectations for the number of lessons completed and passed are presented in Exhibit 25. Complete results from the IPS implementation analysis are presented in Exhibits B6-B10 in Appendix B.

Exhibit 24. Summary of Implementation Analyses for Imagine Math – IPS

Program Variable	Coefficient (*SE*)	*p*-value
Lessons Completed	0.06 (0.004)	<0.001***
30 or More Lessons Completed	3.95 (0.32)	<0.001***
Lessons Passed	0.10 (0.01)	<0.001***
30 or More Lessons Passed	4.82 (0.43)	<0.001***
Total Time in Program	0.17 (0.01)	<0.001***

Note. *N* = 7,400 students. Unstandardized beta coefficients are reported. Lessons completed, lessons passed, and total time in program were entered as continuous variables. Only treatment students with baseline and outcome data were included in these analyses. *p < .05, ** p < .01, ***p < 0.001.

Exhibit 25. Spring NWEA MAP Scores for Students Below and Above a 30-Lesson Imagine Math Threshold – IPS



Note. Students' adjusted means from the analytic model are displayed. Significance testing was calculated between students below and above the 30-lesson threshold. * p < 0.05, ** p < 0.01, *** p < 0.001.

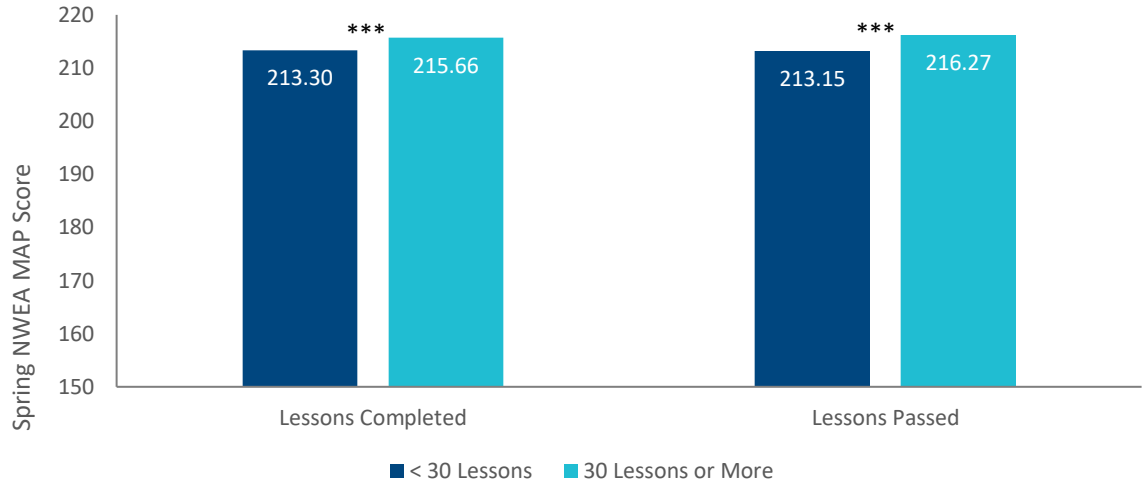
The implementation analysis for NISD also yielded statistically significant positive results for all usage measures (Exhibit 26). While the coefficients were slightly lower than those observed in IPS, students who completed at least 30 or lessons and passed at least 30 lessons had significantly higher achievement than students who did not meet these thresholds. Total program time (b = 0.09) and the number of lessons completed (b = 0.02) were both significant predictors of student achievement. Predicted scores for students who did and did not meet expectations for the number of lessons completed and passed are presented in Exhibit 27. Complete results from the NISD implementation analysis are presented in Exhibits B11-B15 in Appendix B.

Exhibit 26. Summary of Implementation Analyses for Imagine Math – NISD

Program Variable	Coefficient (*SE*)	*p*-value
Lessons Completed	0.02 (0.002)	<0.001***
30 or More Lessons Completed	2.37 (0.23)	<0.001***
Lessons Passed	0.03 (0.002)	<0.001***
30 or More Lessons Passed	3.11 (0.21)	<0.001***
Total Time in Program	0.09 (0.01)	<0.001***

Note. N = 6,931 students. Unstandardized beta coefficients are reported. Lessons completed, lessons passed, and total time in program were entered as continuous variables. Only treatment students with baseline and outcome data were included in these analyses. *p < .05, ** p < .01, ***p < 0.001.

Exhibit 27. Spring NWEA MAP Scores for Students Below and Above a 30-Lesson Imagine Math Threshold – NISD



Note. Students' adjusted means from the analytic model are displayed. Significance testing was calculated between students below and above the 30-lesson threshold. * p < 0.05, ** p < 0.01, *** p < 0.001.

CONCLUSIONS

In this section, conclusions from the data analysis are presented, followed by study limitations and considerations for interpretation.

The study of Imagine Math across IPS and NISD used a quasi-experimental design, employing propensity score matching to establish a matched comparison group in two districts. The primary impact analyses did not show statistically significant effects of Imagine Math participation on student math achievement during 2023/24. Analyses by grade level showed that Imagine Math had a statistically significant positive impact on students in grades 3, 4, and 5. There were no statistically significant differences for early elementary (grades 1 and 2) and middle school (grades 6, 7, and 8). Anaysis of Imagine Math impact across student subgroups also showed no significant differences suggesting that student characteristics (gender, race/ethnicity, EL status, or economic disadvantage) did not influence the relationship between Imagine Math participation and math achievement.

Analysis of the relationship between program implementation and outcomes revealed consistent and positive relationships between all measures of Imagine Math program usage and student math achievement. Across districts, the number of lessons completed, number of lessons passed, and total time in program were statistically significant predictors of improved math achievement. Students who met usage recommendations also had significantly higher average math achievement scores than those who did not. The relationship between student program usage and math achievement was more pronounced in IPS where a smaller proportion of students met implementation expectations.

Limitations and Considerations for Interpretation

As with all evaluation studies, this one has limitations that should be considered alongside interpretation of findings. First, the study was conducted during a single academic year in two school districts which limits the generalizabilty of findings to the broad range of settings in which Imagine Math is routinely implemented over time. Second, overall student program usage was low. Less than 20 percent of IPS students met expectations for lessons completed and fewer than 10 percent passed the expected number of lessons. On average, NISD students including in impact analyses completed only 6.0 lessons, passed 3.3 lessons, and spent just 2.2 hours in the program. Consequently, only 1.5% of these students met the recommended threshold of passing 30 or more lessons. Had implementation in study districts been better aligned with expectations, findings would likely have been more positive. Third, information about program implementation was limited to student usage data collected by Imagine Learning which has only basic information about how students engaged with the online program. The extent to which classroom teachers or others in study schools supported or encouraged student participation, for example, is not known and such factors may influence outcomes. Fourth, no information was available about how students were selected to participate in Imagine Math. The proportion of students who participated varied by grade level and district. Information about what led to this variation may have helped to explain outcomes. Lastly, there was no available information about programing in which comparison students may have participated. If nonparticipating students engaged in other math intervention programs or supports, this participation may have attenuated outcomes.

APPENDIX A

Full Model Information for Impact Analyses

Exhibit A1. Imagine Math Impact on MAP Math Scores: IPS Full Analytic Model

Covariate	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment	0.57	0.31	1.82	0.07	-0.04	1.19
Baseline	0.90	0.01	86.03	< 0.01	0.88	0.92
Gender	-1.07	0.26	-4.10	< 0.01	-1.57	-0.56
Grade 2	0.92	0.68	1.35	0.18	-0.41	2.26
Grade 3	1.58	0.71	2.22	0.03	0.18	2.97
Grade 4	0.41	0.74	0.56	0.58	-1.03	1.85
Grade 5	-0.02	0.81	-0.03	0.98	-1.60	1.56
Grade 6	-4.21	1.03	-4.10	< 0.01	-6.23	-2.20
Grade 7	-2.27	1.08	-2.10	0.04	-4.40	-0.15
Grade 8	-4.60	1.13	-4.06	< 0.01	-6.82	-2.38
Nonwhite	-2.07	0.37	-5.54	< 0.01	-2.80	-1.34
SPED	-2.84	0.38	-7.46	< 0.01	-3.58	-2.09
Gifted	3.66	0.41	8.82	< 0.01	2.84	4.47
Homeless	-3.46	1.17	-2.96	< 0.01	-5.76	-1.17
Foster	-4.21	6.78	-0.62	0.54	-17.50	9.08
504 Plan	1.00	1.13	0.89	0.38	-1.21	3.21
Economic Disadvantage	-0.71	0.30	-2.37	0.02	-1.29	-0.12
English Learner	0.15	0.32	0.47	0.64	-0.48	0.78
Intercept	37.54	1.68	22.35	< 0.01	34.25	40.84

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A2. Imagine Math Impact on MAP Math Scores: IPS Final Trimmed Model

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment	0.57	0.31	1.83	0.07	-0.04	1.19
Baseline	0.90	0.01	86.86	< 0.01	0.87	0.92
Gender	-1.08	0.26	-4.18	< 0.01	-1.59	-0.58
Grade 2	0.96	0.68	1.41	0.16	-0.38	2.29
Grade 3	1.61	0.71	2.27	0.02	0.22	3.00
Grade 4	0.47	0.73	0.64	0.52	-0.97	1.90
Grade 5	0.04	0.80	0.05	0.96	-1.53	1.61
Grade 6	-4.13	1.02	-4.04	< 0.01	-6.14	-2.12
Grade 7	-2.20	1.08	-2.03	0.04	-4.32	-0.08
Grade 8	-4.51	1.13	-4.01	< 0.01	-6.72	-2.31
Nonwhite	-2.05	0.37	-5.62	< 0.01	-2.77	-1.34
SPED	-2.89	0.38	-7.68	< 0.01	-3.62	-2.15
Gifted	3.65	0.41	8.86	< 0.01	2.84	4.46
Homeless	-3.52	1.17	-3.02	< 0.01	-5.80	-1.23
Economic Disadvantage	-0.72	0.30	-2.42	0.02	-1.30	-0.14
Intercept	37.72	1.66	22.77	< 0.01	34.47	40.97

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A3. Imagine Math Impact on MAP Math Scores: IPS Subgroup (Gender)

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment x Gender	-0.14	0.53	-0.26	0.80	-1.17	0.90
Treatment	0.64	0.40	1.59	0.11	-0.15	1.42
Baseline	0.90	0.01	86.85	< 0.01	0.87	0.92
Gender	-1.00	0.42	-2.37	0.02	-1.82	-0.17
Grade 2	0.96	0.68	1.40	0.16	-0.38	2.29
Grade 3	1.61	0.71	2.27	0.02	0.22	3.00
Grade 4	0.47	0.73	0.64	0.52	-0.97	1.90
Grade 5	0.04	0.80	0.05	0.96	-1.53	1.61
Grade 6	-4.13	1.02	-4.04	< 0.01	-6.14	-2.13
Grade 7	-2.20	1.08	-2.04	0.04	-4.32	-0.08
Grade 8	-4.52	1.13	-4.01	< 0.01	-6.73	-2.31
Nonwhite	-2.05	0.37	-5.63	< 0.01	-2.77	-1.34
SPED	-2.88	0.38	-7.66	< 0.01	-3.62	-2.15
Gifted	3.65	0.41	8.86	< 0.01	2.84	4.46
Homeless	-3.52	1.17	-3.02	< 0.01	-5.80	-1.24
Economic Disadvantage	-0.72	0.30	-2.42	0.02	-1.30	-0.14
Intercept	37.67	1.67	22.62	< 0.01	34.41	40.94

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A4. Imagine Math Impact on MAP Math Scores: IPS Subgroup (Economic Disadvantage)

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment x Economic Disadvantage	-0.46	0.57	-0.81	0.42	-1.58	0.65
Treatment	0.88	0.49	1.80	0.07	-0.08	1.84
Baseline	0.89	0.01	86.84	< 0.01	0.87	0.92
Gender	-1.09	0.26	-4.19	< 0.01	-1.59	-0.58
Grade 2	0.95	0.68	1.40	0.16	-0.38	2.29
Grade 3	1.62	0.71	2.28	0.02	0.23	3.01
Grade 4	0.48	0.73	0.65	0.52	-0.96	1.91
Grade 5	0.05	0.80	0.06	0.95	-1.52	1.62
Grade 6	-4.11	1.02	-4.01	< 0.01	-6.12	-2.10
Grade 7	-2.18	1.08	-2.02	0.04	-4.30	-0.06
Grade 8	-4.49	1.13	-3.99	< 0.01	-6.70	-2.28
Nonwhite	-2.05	0.37	-5.63	< 0.01	-2.77	-1.34
SPED	-2.89	0.38	-7.68	< 0.01	-3.63	-2.15
Gifted	3.65	0.41	8.86	< 0.01	2.84	4.46
Homeless	-3.51	1.17	-3.01	< 0.01	-5.79	-1.22
Economic Disadvantage	-0.44	0.46	-0.95	0.34	-1.34	0.46
Intercept	37.54	1.67	22.47	< 0.01	34.27	40.82

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A5. Imagine Math Impact on MAP Math Scores: IPS Subgroup (English Learner)

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment x English Learner	-0.20	0.60	-0.33	0.74	-1.37	0.97
Treatment	0.63	0.36	1.76	0.08	-0.07	1.33
Baseline	0.90	0.01	86.03	< 0.01	0.88	0.92
Gender	-1.08	0.26	-4.15	< 0.01	-1.59	-0.57
Grade 2	0.94	0.68	1.38	0.17	-0.40	2.27
Grade 3	1.59	0.71	2.24	0.03	0.20	2.98
Grade 4	0.44	0.74	0.59	0.55	-1.01	1.88
Grade 5	0.01	0.81	0.01	0.99	-1.57	1.59
Grade 6	-4.17	1.03	-4.06	< 0.01	-6.19	-2.16
Grade 7	-2.23	1.08	-2.06	0.04	-4.36	-0.10
Grade 8	-4.56	1.13	-4.03	< 0.01	-6.78	-2.34
Nonwhite	-2.08	0.37	-5.59	< 0.01	-2.82	-1.35
SPED	-2.86	0.38	-7.56	< 0.01	-3.61	-2.12
Gifted	3.67	0.41	8.86	< 0.01	2.86	4.48
Homeless	-3.47	1.17	-2.97	< 0.01	-5.77	-1.18
Economic Disadvantage	-0.71	0.30	-2.37	0.02	-1.29	-0.12
English Learner	0.26	0.49	0.54	0.59	-0.70	1.23
Intercept	37.57	1.68	22.34	< 0.01	34.27	40.87

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A6. Imagine Math Impact on MAP Math Scores: IPS Subgroup (Race/Ethnicity: Black/African American)

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment x Black/African American	0.76	0.56	1.36	0.17	-0.33	1.85
Treatment	0.31	0.37	0.83	0.41	-0.42	1.04
Baseline	0.90	0.01	90.08	< 0.01	0.88	0.92
Gender	-1.05	0.26	-4.04	< 0.01	-1.55	-0.54
Grade 2	0.83	0.68	1.23	0.22	-0.50	2.16
Grade 3	1.43	0.71	2.03	0.04	0.05	2.81
Grade 4	0.19	0.73	0.26	0.79	-1.23	1.61
Grade 5	-0.26	0.79	-0.33	0.74	-1.81	1.30
Grade 6	-4.52	1.01	-4.46	< 0.01	-6.51	-2.53
Grade 7	-2.51	1.07	-2.35	0.02	-4.61	-0.41
Grade 8	-4.96	1.11	-4.46	< 0.01	-7.14	-2.78
Black	-2.23	0.45	-4.99	< 0.01	-3.11	-1.35
SPED	-2.63	0.37	-7.04	< 0.01	-3.36	-1.90
Gifted	3.67	0.41	8.91	< 0.01	2.86	4.48
Homeless	-3.02	1.17	-2.59	0.01	-5.31	-0.73
Economic Disadvantage	-0.78	0.29	-2.64	0.01	-1.35	-0.20
Intercept	35.83	1.56	23.00	< 0.01	32.77	38.88

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A7. Imagine Math Impact on MAP Math Scores: IPS Subgroup (Race/Ethnicity: Hispanic)

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment x Hispanic	-0.69	0.56	-1.23	0.22	-1.79	0.41
Treatment	0.82	0.37	2.19	0.03	0.09	1.55
Baseline	0.91	0.01	90.94	< 0.01	0.89	0.93
Gender	-1.05	0.26	-4.03	< 0.01	-1.56	-0.54
Grade 2	0.67	0.68	0.98	0.33	-0.67	2.00
Grade 3	1.11	0.71	1.57	0.12	-0.28	2.50
Grade 4	-0.25	0.73	-0.34	0.74	-1.67	1.18
Grade 5	-0.80	0.79	-1.01	0.31	-2.36	0.76
Grade 6	-5.14	1.02	-5.04	< 0.01	-7.14	-3.14
Grade 7	-3.21	1.07	-2.99	< 0.01	-5.32	-1.10
Grade 8	-5.64	1.12	-5.04	< 0.01	-7.84	-3.45
Hispanic	0.74	0.46	1.61	0.11	-0.16	1.63
SPED	-2.63	0.38	-6.96	< 0.01	-3.36	-1.89
Gifted	3.48	0.41	8.45	< 0.01	2.68	4.29
Homeless	-3.45	1.17	-2.95	< 0.01	-5.75	-1.16
Economic Disadvantage	-1.10	0.29	-3.79	< 0.01	-1.67	-0.53
Intercept	33.82	1.57	21.57	< 0.01	30.75	36.90

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A8. Imagine Math Impact on MAP Math Scores: IPS Subgroup (Race/Ethnicity: White)

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment x White	-0.36	0.67	-0.54	0.59	-1.68	0.95
Treatment	0.65	0.34	1.89	0.06	-0.02	1.32
Baseline	0.90	0.01	86.85	< 0.01	0.87	0.92
Gender	-1.08	0.26	-4.17	< 0.01	-1.59	-0.57
Grade 2	0.96	0.68	1.41	0.16	-0.37	2.30
Grade 3	1.61	0.71	2.27	0.02	0.22	3.00
Grade 4	0.47	0.73	0.65	0.52	-0.96	1.91
Grade 5	0.05	0.80	0.06	0.96	-1.53	1.62
Grade 6	-4.12	1.03	-4.03	< 0.01	-6.13	-2.11
Grade 7	-2.19	1.08	-2.03	0.04	-4.31	-0.07
Grade 8	-4.51	1.13	-4.01	< 0.01	-6.72	-2.30
White	2.28	0.56	4.09	< 0.01	1.19	3.37
SPED	-2.89	0.38	-7.68	< 0.01	-3.62	-2.15
Gifted	3.65	0.41	8.85	< 0.01	2.84	4.46
Homeless	-3.53	1.17	-3.03	< 0.01	-5.81	-1.24
Economic Disadvantage	-0.72	0.30	-2.42	0.02	-1.30	-0.14
Intercept	35.61	1.56	22.83	< 0.01	32.55	38.67

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A9. Imagine Math Impact on MAP Math Scores: IPS Subgroup (Race/Ethnicity: Asian)

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment x Asian	-1.66	2.94	-0.57	0.57	-7.42	4.09
Treatment	0.59	0.32	1.86	0.06	-0.03	1.21
Baseline	0.91	0.01	91.37	< 0.01	0.89	0.93
Gender	-1.05	0.26	-4.04	< 0.01	-1.56	-0.54
Grade 2	0.72	0.68	1.06	0.29	-0.61	2.06
Grade 3	1.15	0.71	1.63	0.10	-0.23	2.54
Grade 4	-0.17	0.73	-0.24	0.81	-1.59	1.25
Grade 5	-0.73	0.79	-0.92	0.36	-2.28	0.82
Grade 6	-5.06	1.02	-4.97	< 0.01	-7.05	-3.06
Grade 7	-3.16	1.07	-2.94	< 0.01	-5.26	-1.05
Grade 8	-5.56	1.12	-4.98	< 0.01	-7.75	-3.37
Asian	1.78	2.49	0.71	0.48	-3.11	6.67
SPED	-2.67	0.38	-7.11	< 0.01	-3.40	-1.93
Gifted	3.47	0.41	8.42	< 0.01	2.66	4.28
Homeless	-3.55	1.17	-3.04	< 0.01	-5.84	-1.26
Economic Disadvantage	-1.10	0.29	-3.80	< 0.01	-1.67	-0.53
Intercept	34.22	1.54	22.19	< 0.01	31.20	37.24

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A10. Imagine Math Impact on MAP Math Scores: NISD Full Analytic Model

Covariate	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment	-0.32	0.33	-0.97	0.34	-0.96	0.33
Baseline	0.83	0.02	51.87	< 0.01	0.80	0.86
Gender	-0.59	0.32	-1.85	0.06	-1.21	0.03
Grade 7	-3.97	1.23	-3.24	0.01	-6.70	-1.24
Grade 8	-3.92	1.25	-3.15	0.01	-6.68	-1.17
Nonwhite	-0.37	0.34	-1.09	0.28	-1.05	0.30
SPED	-4.11	0.48	-8.57	< 0.01	-5.05	-3.17
At-Risk or Unaccompanied	-3.37	0.43	-7.92	< 0.01	-4.20	-2.53
Gifted	2.88	0.58	4.97	< 0.01	1.75	4.02
Homeless	-6.10	3.63	-1.68	0.09	-13.22	1.02
Foster	2.74	4.69	0.59	0.56	-6.46	11.94
504 Plan	0.26	0.46	0.58	0.57	-0.64	1.16
Economic Disadvantage	-0.56	0.36	-1.54	0.12	-1.27	0.15
English Learner	-0.67	0.57	-1.16	0.25	-1.79	0.46
Intercept	50.14	3.66	13.69	< 0.01	42.96	57.32

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A11. Imagine Math Impact on MAP Math Scores: NISD Final Trimmed Model

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment	-0.31	0.33	-0.96	0.34	-0.96	0.33
Baseline	0.83	0.02	52.04	< 0.01	0.79	0.86
Gender	-0.59	0.32	-1.87	0.06	-1.21	0.03
Grade 7	-3.96	1.23	-3.22	0.01	-6.70	-1.22
Grade 8	-3.90	1.25	-3.13	0.01	-6.66	-1.14
Nonwhite	-0.49	0.33	-1.48	0.14	-1.14	0.16
SPED	-4.14	0.46	-8.99	< 0.01	-5.04	-3.23
At-Risk or Unaccompanied	-3.42	0.42	-8.23	< 0.01	-4.24	-2.61
Gifted	2.88	0.58	4.97	< 0.01	1.74	4.02
Homeless	-6.12	3.63	-1.69	0.09	-13.24	1.00
Economic Disadvantage	-0.61	0.36	-1.71	0.09	-1.31	0.09
Intercept	50.32	3.64	13.83	< 0.01	43.19	57.46

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A12. Imagine Math Impact on MAP Math Scores: NISD Subgroup (Gender)

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment x Gender	-0.48	0.62	-0.77	0.44	-1.71	0.74
Treatment	-0.07	0.45	-0.17	0.87	-0.96	0.81
Baseline	0.83	0.02	52.03	< 0.01	0.79	0.86
Gender	-0.35	0.44	-0.78	0.44	-1.22	0.52
Grade 7	-3.95	1.23	-3.22	0.01	-6.69	-1.22
Grade 8	-3.89	1.25	-3.12	0.01	-6.65	-1.13
Nonwhite	-0.50	0.33	-1.49	0.14	-1.15	0.16
SPED	-4.13	0.46	-8.99	< 0.01	-5.04	-3.23
At-Risk or Unaccompanied	-3.42	0.42	-8.22	< 0.01	-4.24	-2.60
Gifted	2.89	0.58	4.99	< 0.01	1.76	4.03
Homeless	-6.10	3.63	-1.68	0.09	-13.22	1.02
Economic Disadvantage	-0.61	0.36	-1.69	0.09	-1.31	0.10
Intercept	50.21	3.64	13.79	< 0.01	43.06	57.35

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A13. Imagine Math Impact on MAP Math Scores: NISD Subgroup (Economic Disadvantage)

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment x Economic Disadvantage	0.62	0.66	0.95	0.35	-0.67	1.92
Treatment	-0.54	0.40	-1.33	0.18	-1.33	0.25
Baseline	0.83	0.02	52.04	< 0.01	0.80	0.86
Gender	-0.59	0.32	-1.89	0.06	-1.21	0.02
Grade 7	-3.95	1.23	-3.21	0.01	-6.70	-1.20
Grade 8	-3.90	1.25	-3.12	0.01	-6.67	-1.13
Nonwhite	-0.48	0.33	-1.43	0.15	-1.13	0.18
SPED	-4.14	0.46	-8.99	< 0.01	-5.04	-3.23
At-Risk or Unaccompanied	-3.42	0.42	-8.23	< 0.01	-4.24	-2.61
Gifted	2.87	0.58	4.95	< 0.01	1.73	4.00
Homeless	-6.07	3.63	-1.67	0.10	-13.19	1.05
Economic Disadvantage	-0.93	0.49	-1.89	0.06	-1.89	0.04
Intercept	50.33	3.64	13.83	< 0.01	43.19	57.46

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A14. Imagine Math Impact on MAP Math Scores: NISD Subgroup (English Learner)

Covariate	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment x English Learner	0.47	1.07	0.44	0.66	-1.62	2.57
Treatment	-0.35	0.34	-1.02	0.31	-1.03	0.32
Baseline	0.83	0.02	52.02	< 0.01	0.79	0.86
Gender	-0.60	0.32	-1.91	0.06	-1.22	0.02
Grade 7	-3.96	1.23	-3.22	0.01	-6.70	-1.22
Grade 8	-3.90	1.25	-3.12	0.01	-6.66	-1.14
Nonwhite	-0.42	0.34	-1.24	0.21	-1.08	0.24
SPED	-4.17	0.46	-9.05	< 0.01	-5.08	-3.27
At Risk or Unaccompanied	-3.34	0.42	-7.89	< 0.01	-4.16	-2.51
Gifted	2.88	0.58	4.96	< 0.01	1.74	4.01
Homeless	-6.17	3.63	-1.70	0.09	-13.29	0.95
Economic Disadvantage	-0.55	0.36	-1.53	0.13	-1.26	0.16
English Learner	-0.94	0.82	-1.15	0.25	-2.55	0.67
Intercept	50.35	3.64	13.83	< 0.01	43.21	57.49

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A15. Imagine Math Impact on MAP Math Scores: NISD Subgroup (Race/Ethnicity: Black/African American)

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment x Black/African American	0.76	0.86	0.88	0.38	-0.94	2.45
Treatment	-0.43	0.36	-1.20	0.23	-1.12	0.27
Baseline	0.83	0.02	51.90	< 0.01	0.79	0.86
Gender	-0.59	0.32	-1.86	0.06	-1.20	0.03
Grade 7	-3.95	1.24	-3.20	0.01	-6.71	-1.19
Grade 8	-3.89	1.26	-3.10	0.01	-6.67	-1.11
Black	-0.63	0.64	-1.00	0.32	-1.88	0.61
SPED	-4.10	0.46	-8.92	< 0.01	-5.00	-3.20
At-Risk or Unaccompanied	-3.49	0.41	-8.42	< 0.01	-4.30	-2.67
Gifted	2.88	0.58	4.97	< 0.01	1.74	4.02
Homeless	-6.22	3.63	-1.71	0.09	-13.34	0.90
Economic Disadvantage	-0.70	0.36	-1.96	0.05	-1.40	0.00
Intercept	50.19	3.65	13.77	< 0.01	43.04	57.34

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A16. Imagine Math Impact on MAP Math Scores: NISD Subgroup (Race/Ethnicity: Hispanic)

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment x Hispanic	-0.82	0.69	-1.19	0.23	-2.17	0.53
Treatment	-0.08	0.39	-0.21	0.84	-0.84	0.68
Baseline	0.83	0.02	52.00	< 0.01	0.79	0.86
Gender	-0.61	0.32	-1.94	0.05	-1.23	0.01
Grade 7	-3.99	1.23	-3.24	0.01	-6.73	-1.25
Grade 8	-3.92	1.25	-3.14	0.01	-6.69	-1.16
Hispanic	-0.16	0.49	-0.33	0.75	-1.13	0.81
SPED	-4.15	0.46	-9.02	< 0.01	-5.05	-3.25
At-Risk or Unaccompanied	-3.41	0.42	-8.19	< 0.01	-4.22	-2.59
Gifted	2.88	0.58	4.97	< 0.01	1.74	4.02
Homeless	-6.16	3.63	-1.70	0.09	-13.27	0.96
Economic Disadvantage	-0.70	0.35	-2.00	0.05	-1.39	-0.01
Intercept	50.26	3.64	13.82	< 0.01	43.12	57.39

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A17. Imagine Math Impact on MAP Math Scores: NISD Subgroup (Race/Ethnicity: White)

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment x White	-0.82	0.53	-1.53	0.13	-1.87	0.23
Treatment	-0.08	0.36	-0.22	0.83	-0.79	0.63
Baseline	0.83	0.02	52.00	< 0.01	0.79	0.86
Gender	-0.61	0.32	-1.92	0.05	-1.22	0.01
Grade 7	-3.98	1.23	-3.24	0.01	-6.72	-1.24
Grade 8	-3.91	1.25	-3.13	0.01	-6.68	-1.15
White	0.27	0.36	0.74	0.46	-0.44	0.98
SPED	-4.16	0.46	-9.04	< 0.01	-5.06	-3.25
At-Risk or Unaccompanied	-3.39	0.42	-8.13	< 0.01	-4.21	-2.57
Gifted	2.88	0.58	4.97	< 0.01	1.74	4.01
Homeless	-6.13	3.63	-1.69	0.09	-13.24	0.99
Economic Disadvantage	-0.65	0.36	-1.82	0.07	-1.36	0.05
Intercept	50.07	3.64	13.77	< 0.01	42.94	57.20

Note. All models included a random intercept to account for students being nested in schools.

Exhibit A18. Imagine Math Impact on MAP Math Scores: NISD Subgroup (Race/Ethnicity: Asian)

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Treatment x Asian	-0.37	1.30	-0.28	0.78	-2.93	2.19
Treatment	-0.29	0.34	-0.86	0.39	-0.95	0.37
Baseline	0.82	0.02	50.97	< 0.01	0.79	0.85
Gender	-0.63	0.32	-2.01	0.04	-1.25	-0.02
Grade 7	-3.95	1.22	-3.24	0.01	-6.67	-1.23
Grade 8	-3.86	1.24	-3.11	0.01	-6.60	-1.12
Asian	2.09	0.88	2.37	0.02	0.36	3.81
SPED	-4.11	0.46	-8.95	< 0.01	-5.01	-3.21
At-Risk or Unaccompanied	-3.57	0.41	-8.62	< 0.01	-4.39	-2.76
Gifted	2.87	0.58	4.95	< 0.01	1.73	4.00
Homeless	-6.18	3.63	-1.71	0.09	-13.29	0.93
Economic Disadvantage	-0.76	0.35	-2.16	0.03	-1.45	-0.07
Intercept	51.51	3.67	14.03	< 0.01	44.31	58.71

Note. All models included a random intercept to account for students being nested in schools.

APPENDIX B

Full Model Information for Implementation Analyses

Exhibit B1. Relationship of Imagine Math Lessons Completed to MAP Math Scores: Cross-District

Covariate	Coef.	*SE*	*t*	*p*-value	95% Confidence Intervals	
Lessons Completed	0.02	0.00	12.12	< 0.01	0.02	0.02
Baseline	0.85	0.01	136.42	< 0.01	0.83	0.86
Gender	-1.02	0.15	-7.01	< 0.01	-1.30	-0.73
Grade 1	12.30	3.52	3.50	< 0.01	5.41	19.19
Grade 2	13.81	3.52	3.93	< 0.01	6.91	20.71
Grade 3	14.06	3.52	3.99	< 0.01	7.16	20.97
Grade 4	14.32	3.53	4.06	< 0.01	7.41	21.23
Grade 5	14.17	3.53	4.01	< 0.01	7.24	21.09
Grade 6	15.00	3.55	4.23	< 0.01	8.04	21.95
Grade 7	17.48	3.57	4.89	< 0.01	10.48	24.48
Grade 8	14.99	3.58	4.18	< 0.01	7.96	22.01
Nonwhite	-1.01	0.17	-5.94	< 0.01	-1.34	-0.67
SPED	-3.09	0.20	-15.40	< 0.01	-3.48	-2.70
Gifted	2.98	0.22	13.67	< 0.01	2.56	3.41
Homeless	-2.12	0.79	-2.68	0.01	-3.68	-0.57
Economic Disadvantage	-0.82	0.17	-4.87	< 0.01	-1.14	-0.49
Intercept	30.31	3.64	8.33	< 0.01	23.18	37.44

Note. All models included a random intercept to account for students being nested in schools.

Exhibit B2. Relationship of Imagine Math Lessons Passed to MAP Math Scores: Cross-District

Covariate	Coef.	*SE*	*t*	*p*-value	95% Confidence Intervals	
Lessons Passed	0.04	0.00	15.97	< 0.01	0.04	0.05
Baseline	0.83	0.01	132.65	< 0.01	0.82	0.85
Gender	-1.00	0.15	-6.91	< 0.01	-1.28	-0.72
Grade 1	12.40	3.50	3.54	< 0.01	5.53	19.26
Grade 2	14.08	3.51	4.02	< 0.01	7.21	20.96
Grade 3	14.49	3.51	4.13	< 0.01	7.61	21.37
Grade 4	14.79	3.51	4.21	< 0.01	7.91	21.68
Grade 5	14.89	3.52	4.23	< 0.01	7.99	21.79
Grade 6	16.16	3.54	4.57	< 0.01	9.23	23.09
Grade 7	18.66	3.56	5.24	< 0.01	11.68	25.64
Grade 8	16.29	3.57	4.56	< 0.01	9.29	23.29
Nonwhite	-1.01	0.17	-5.97	< 0.01	-1.34	-0.68
SPED	-2.98	0.20	-14.90	< 0.01	-3.38	-2.59
Gifted	2.75	0.22	12.60	< 0.01	2.32	3.18
Homeless	-2.17	0.79	-2.75	0.01	-3.72	-0.62
Economic Disadvantage	-0.79	0.17	-4.71	< 0.01	-1.11	-0.46
Intercept	31.77	3.63	8.76	< 0.01	24.66	38.88

Note. All models included a random intercept to account for students being nested in schools.

Exhibit B3. Relationship of Imagine Math Total Time in Program to MAP Math Scores: Cross-District

Covariate	Coef.	*SE*	*t*	*p*-value	95% Confidence Intervals	
Total Time	0.12	0.01	15.46	< 0.01	0.10	0.13
Baseline	0.85	0.01	137.55	< 0.01	0.83	0.86
Gender	-1.22	0.15	-8.44	< 0.01	-1.50	-0.94
Grade 1	11.98	3.51	3.42	< 0.01	5.11	18.85
Grade 2	13.74	3.51	3.92	< 0.01	6.87	20.62
Grade 3	13.95	3.51	3.97	< 0.01	7.07	20.83
Grade 4	14.28	3.52	4.06	< 0.01	7.39	21.17
Grade 5	14.09	3.52	4.00	< 0.01	7.19	21.00
Grade 6	15.58	3.54	4.41	< 0.01	8.65	22.51
Grade 7	18.02	3.56	5.06	< 0.01	11.04	25.00
Grade 8	15.53	3.57	4.35	< 0.01	8.53	22.53
Nonwhite	-1.06	0.17	-6.30	< 0.01	-1.40	-0.73
SPED	-3.07	0.20	-15.35	< 0.01	-3.46	-2.68
Gifted	3.13	0.22	14.36	< 0.01	2.70	3.55
Homeless	-2.09	0.79	-2.65	0.01	-3.64	-0.54
Economic Disadvantage	-0.79	0.17	-4.72	< 0.01	-1.12	-0.46
Intercept	29.62	3.63	8.17	< 0.01	22.51	36.72

Note. All models included a random intercept to account for students being nested in schools.

Exhibit B4. Relationship of Imagine Math Lessons Completed (30 or more) to MAP Math Scores: Cross-District

Covariate	Coef.	*SE*	*t*	*p*-value	95% Confidence Intervals	
Lessons Completed (30 or more)	2.95	0.20	15.09	< 0.01	2.57	3.33
Baseline	0.84	0.01	136.01	< 0.01	0.83	0.86
Gender	-1.06	0.15	-7.30	< 0.01	-1.34	-0.77
Grade 1	11.95	3.51	3.41	< 0.01	5.08	18.83
Grade 2	13.96	3.51	3.98	< 0.01	7.09	20.84
Grade 3	14.25	3.51	4.06	< 0.01	7.37	21.14
Grade 4	14.34	3.52	4.08	< 0.01	7.45	21.23
Grade 5	14.23	3.52	4.04	< 0.01	7.32	21.13
Grade 6	15.85	3.54	4.48	< 0.01	8.92	22.79
Grade 7	18.33	3.56	5.14	< 0.01	11.34	25.31
Grade 8	15.88	3.57	4.44	< 0.01	8.88	22.88
Nonwhite	-0.96	0.17	-5.67	< 0.01	-1.29	-0.63
SPED	-3.06	0.20	-15.27	< 0.01	-3.45	-2.66
Gifted	2.98	0.22	13.67	< 0.01	2.55	3.40
Homeless	-2.09	0.79	-2.64	0.01	-3.64	-0.54
Economic Disadvantage	-0.77	0.17	-4.59	< 0.01	-1.10	-0.44
Intercept	30.19	3.63	8.32	< 0.01	23.08	37.30

Note. All models included a random intercept to account for students being nested in schools.

Exhibit B5. Relationship of Imagine Math Lessons Passed (30 or more) to MAP Math Scores: Cross-District

Covariate	Coef.	*SE*	*t*	*p*-value	95% Confidence Intervals	
Lessons Passed (30 or more)	3.50	0.21	16.51	< 0.01	3.08	3.91
Baseline	0.84	0.01	133.54	< 0.01	0.82	0.85
Gender	-1.03	0.14	-7.12	< 0.01	-1.31	-0.75
Grade 1	12.17	3.50	3.48	< 0.01	5.30	19.03
Grade 2	13.86	3.50	3.96	< 0.01	6.99	20.73
Grade 3	14.25	3.51	4.06	< 0.01	7.38	21.13
Grade 4	14.44	3.51	4.11	< 0.01	7.56	21.32
Grade 5	14.47	3.52	4.11	< 0.01	7.57	21.36
Grade 6	16.10	3.53	4.56	< 0.01	9.17	23.02
Grade 7	18.58	3.56	5.22	< 0.01	11.61	25.55
Grade 8	16.18	3.57	4.54	< 0.01	9.19	23.18
Nonwhite	-0.97	0.17	-5.75	< 0.01	-1.30	-0.64
SPED	-2.96	0.20	-14.77	< 0.01	-3.35	-2.56
Gifted	2.85	0.22	13.08	< 0.01	2.42	3.27
Homeless	-2.15	0.79	-2.73	0.01	-3.70	-0.61
Economic Disadvantage	-0.76	0.17	-4.56	< 0.01	-1.09	-0.43
Intercept	31.65	3.62	8.73	< 0.01	24.54	38.75

Note. All models included a random intercept to account for students being nested in schools.

Exhibit B6. Relationship of Imagine Math Lessons Completed to MAP Math Scores: IPS

Covariate	Coef.	*SE*	*t*	*p*-value	95% Confidence Intervals	
Lessons Completed	0.06	0.00	12.47	< 0.01	0.05	0.06
Baseline	0.85	0.01	94.74	< 0.01	0.83	0.87
Gender	-1.20	0.23	-5.31	< 0.01	-1.65	-0.76
Grade 1	11.72	3.94	2.98	< 0.01	4.00	19.44
Grade 2	13.64	3.95	3.46	< 0.01	5.90	21.37
Grade 3	13.89	3.95	3.51	< 0.01	6.14	21.64
Grade 4	14.01	3.96	3.54	< 0.01	6.24	21.78
Grade 5	14.14	3.98	3.56	< 0.01	6.35	21.94
Grade 6	9.58	4.04	2.37	0.02	1.67	17.49
Grade 7	13.25	4.05	3.27	< 0.01	5.31	21.20
Grade 8	9.85	4.08	2.42	0.02	1.86	17.84
Nonwhite	-1.91	0.31	-6.27	< 0.01	-2.51	-1.32
SPED	-3.21	0.33	-9.82	< 0.01	-3.84	-2.57
Gifted	3.31	0.34	9.66	< 0.01	2.64	3.98
Homeless	-2.15	0.92	-2.34	0.02	-3.94	-0.35
Economic Disadvantage	-0.67	0.26	-2.63	0.01	-1.17	-0.17
Intercept	32.21	4.14	7.78	< 0.01	24.10	40.32

Note: All models included a random intercept to account for students being nested in schools.

Exhibit B7. Relationship of Imagine Math Lessons Passed to MAP Math Scores: IPS

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Lessons Passed	0.10	0.01	14.95	< 0.01	0.09	0.11
Baseline	0.83	0.01	91.50	< 0.01	0.81	0.85
Gender	-1.19	0.23	-5.29	< 0.01	-1.64	-0.75
Grade 1	11.75	3.92	3.00	< 0.01	4.06	19.43
Grade 2	13.77	3.93	3.51	< 0.01	6.08	21.47
Grade 3	14.26	3.93	3.62	< 0.01	6.54	21.97
Grade 4	14.51	3.95	3.68	< 0.01	6.77	22.24
Grade 5	14.83	3.96	3.75	< 0.01	7.07	22.59
Grade 6	10.58	4.02	2.63	0.01	2.70	18.46
Grade 7	14.22	4.04	3.52	< 0.01	6.31	22.14
Grade 8	11.13	4.06	2.74	0.01	3.17	19.09
Nonwhite	-1.76	0.30	-5.78	< 0.01	-2.36	-1.16
SPED	-3.17	0.33	-9.77	< 0.01	-3.81	-2.54
Gifted	3.11	0.34	9.11	< 0.01	2.44	3.78
Homeless	-2.16	0.91	-2.37	0.02	-3.95	-0.37
Economic Disadvantage	-0.62	0.25	-2.43	0.02	-1.11	-0.12
Intercept	34.41	4.13	8.34	< 0.01	26.32	42.50

Note. All models included a random intercept to account for students being nested in schools.

Exhibit B8. Relationship of Imagine Math Total Time in Program to MAP Math Scores: IPS

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Total Time	0.17	0.01	13.00	< 0.01	0.14	0.19
Baseline	0.85	0.01	96.08	< 0.01	0.84	0.87
Gender	-1.36	0.23	-6.01	< 0.01	-1.81	-0.92
Grade 1	11.60	3.94	2.95	< 0.01	3.89	19.32
Grade 2	13.45	3.94	3.41	< 0.01	5.72	21.17
Grade 3	13.57	3.95	3.44	< 0.01	5.83	21.31
Grade 4	13.99	3.96	3.53	< 0.01	6.23	21.76
Grade 5	14.07	3.97	3.54	< 0.01	6.28	21.86
Grade 6	9.40	4.03	2.33	0.02	1.50	17.31
Grade 7	13.09	4.05	3.23	< 0.01	5.15	21.02
Grade 8	9.54	4.07	2.34	0.02	1.56	17.52
Nonwhite	-1.99	0.31	-6.53	< 0.01	-2.59	-1.39
SPED	-3.14	0.33	-9.63	< 0.01	-3.78	-2.50
Gifted	3.31	0.34	9.67	< 0.01	2.64	3.98
Homeless	-2.15	0.92	-2.34	0.02	-3.94	-0.35
Economic Disadvantage	-0.70	0.26	-2.74	0.01	-1.20	-0.20
Intercept	31.21	4.13	7.55	< 0.01	23.11	39.32

Note. All models included a random intercept to account for students being nested in schools.

Exhibit B9. Relationship of Imagine Math Lessons Completed (30 or more) to MAP Math Scores: IPS

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Lessons Completed (30 or more)	3.95	0.32	12.27	< 0.01	3.32	4.58
Baseline	0.85	0.01	95.33	< 0.01	0.83	0.87
Gender	-1.23	0.23	-5.42	< 0.01	-1.67	-0.79
Grade 1	11.55	3.94	2.93	< 0.01	3.83	19.28
Grade 2	13.63	3.95	3.46	< 0.01	5.90	21.37
Grade 3	13.87	3.95	3.51	< 0.01	6.12	21.62
Grade 4	13.88	3.96	3.50	< 0.01	6.10	21.65
Grade 5	14.06	3.98	3.53	< 0.01	6.26	21.86
Grade 6	9.40	4.04	2.33	0.02	1.48	17.31
Grade 7	13.11	4.05	3.23	< 0.01	5.16	21.05
Grade 8	9.57	4.08	2.35	0.02	1.57	17.56
Nonwhite	-1.90	0.31	-6.23	< 0.01	-2.50	-1.30
SPED	-3.09	0.33	-9.47	< 0.01	-3.73	-2.45
Gifted	3.37	0.34	9.82	< 0.01	2.69	4.04
Homeless	-2.17	0.92	-2.36	0.02	-3.96	-0.37
Economic Disadvantage	-0.70	0.26	-2.75	0.01	-1.20	-0.20
Intercept	32.07	4.14	7.75	< 0.01	23.95	40.18

Note. All models included a random intercept to account for students being nested in schools.

Exhibit B10. Relationship of Imagine Math Lessons Passed (30 or more) to MAP Math Scores: IPS

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Lessons Passed (30 or more)	4.82	0.43	11.25	< 0.01	3.98	5.66
Baseline	0.85	0.01	94.31	< 0.01	0.83	0.87
Gender	-1.25	0.23	-5.48	< 0.01	-1.69	-0.80
Grade 1	11.68	3.95	2.96	< 0.01	3.95	19.42
Grade 2	13.22	3.95	3.35	< 0.01	5.47	20.97
Grade 3	13.49	3.96	3.41	< 0.01	5.73	21.25
Grade 4	13.60	3.97	3.43	< 0.01	5.81	21.38
Grade 5	13.78	3.98	3.46	< 0.01	5.97	21.59
Grade 6	9.11	4.05	2.25	0.02	1.18	17.04
Grade 7	12.83	4.06	3.16	< 0.01	4.87	20.79
Grade 8	9.25	4.08	2.27	0.02	1.25	17.26
Nonwhite	-1.82	0.31	-5.95	< 0.01	-2.42	-1.22
SPED	-3.09	0.33	-9.46	< 0.01	-3.73	-2.45
Gifted	3.23	0.34	9.40	< 0.01	2.56	3.90
Homeless	-2.18	0.92	-2.38	0.02	-3.98	-0.38
Economic Disadvantage	-0.70	0.26	-2.73	0.01	-1.20	-0.20
Intercept	33.04	4.15	7.96	< 0.01	24.90	41.17

Note. All models included a random intercept to account for students being nested in schools.

Exhibit B11. Relationship of Imagine Math Lessons Completed to MAP Math Scores: NISD

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Lessons Completed	0.02	0.00	9.65	< 0.01	0.01	0.02
Baseline	0.77	0.01	81.78	< 0.01	0.75	0.79
Gender	-0.91	0.17	-5.30	< 0.01	-1.25	-0.57
Grade 4	-0.36	0.61	-0.59	0.56	-1.62	0.89
Grade 5	0.17	0.63	0.26	0.79	-1.13	1.46
Grade 6	2.31	0.69	3.36	< 0.01	0.92	3.70
Grade 7	-1.62	0.92	-1.77	0.08	-3.46	0.23
Grade 8	-1.81	0.95	-1.91	0.06	-3.70	0.09
Nonwhite	0.01	0.18	0.03	0.98	-0.35	0.36
SPED	-2.69	0.24	-11.28	< 0.01	-3.16	-2.22
At-Risk or Unaccompanied	-3.99	0.23	-17.69	< 0.01	-4.43	-3.55
Gifted	2.49	0.26	9.49	< 0.01	1.97	3.00
Homeless	-1.22	2.66	-0.46	0.65	-6.44	4.00
Economic Disadvantage	-0.63	0.21	-3.08	< 0.01	-1.03	-0.23
Intercept	59.94	1.87	32.09	< 0.01	56.28	63.60

Note. All models included a random intercept to account for students being nested in schools.

Exhibit B12. Relationship of Imagine Math Lessons Passed to MAP Math Scores: NISD

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Lessons Passed	0.03	0.00	13.17	< 0.01	0.03	0.04
Baseline	0.76	0.01	79.76	< 0.01	0.74	0.77
Gender	-0.90	0.17	-5.26	< 0.01	-1.23	-0.56
Grade 4	-0.32	0.58	-0.55	0.59	-1.52	0.88
Grade 5	0.50	0.61	0.82	0.42	-0.74	1.75
Grade 6	3.02	0.67	4.53	< 0.01	1.68	4.37
Grade 7	-0.88	0.89	-0.99	0.33	-2.67	0.91
Grade 8	-1.13	0.92	-1.23	0.22	-2.97	0.71
Nonwhite	-0.05	0.18	-0.26	0.79	-0.40	0.30
SPED	-2.61	0.24	-11.01	< 0.01	-3.08	-2.15
At-Risk or Unaccompanied	-3.87	0.22	-17.27	< 0.01	-4.31	-3.43
Gifted	2.23	0.26	8.54	< 0.01	1.72	2.74
Homeless	-1.45	2.65	-0.55	0.59	-6.64	3.75
Economic Disadvantage	-0.63	0.20	-3.11	< 0.01	-1.03	-0.23
Intercept	62.15	1.87	33.27	< 0.01	58.49	65.81

Note. All models included a random intercept to account for students being nested in schools.

Exhibit B13. Relationship of Imagine Math Total Time in Program to MAP Math Scores: NISD

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Total Time	0.09	0.01	10.38	< 0.01	0.07	0.11
Baseline	0.77	0.01	82.79	< 0.01	0.76	0.79
Gender	-1.14	0.17	-6.68	< 0.01	-1.48	-0.81
Grade 4	-0.48	0.61	-0.78	0.45	-1.74	0.78
Grade 5	-0.02	0.64	-0.04	0.97	-1.32	1.28
Grade 6	2.69	0.70	3.87	< 0.01	1.29	4.09
Grade 7	-1.26	0.92	-1.37	0.18	-3.12	0.60
Grade 8	-1.50	0.95	-1.58	0.12	-3.41	0.41
Nonwhite	-0.05	0.18	-0.29	0.78	-0.40	0.30
SPED	-2.60	0.24	-10.91	< 0.01	-3.07	-2.14
At-Risk or Unaccompanied	-3.97	0.23	-17.61	< 0.01	-4.41	-3.52
Gifted	2.69	0.26	10.25	< 0.01	2.18	3.21
Homeless	-1.30	2.66	-0.49	0.63	-6.51	3.92
Economic Disadvantage	-0.60	0.20	-2.95	< 0.01	-1.00	-0.20
Intercept	58.47	1.87	31.34	< 0.01	54.82	62.13

Note. All models included a random intercept to account for students being nested in schools.

Exhibit B14. Relationship of Imagine Math Lessons Completed (30 or more) to MAP Math Scores: NISD

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Lessons Completed (30 or more)	2.37	0.23	10.46	< 0.01	1.92	2.81
Baseline	0.77	0.01	82.19	< 0.01	0.75	0.79
Gender	-0.97	0.17	-5.64	< 0.01	-1.30	-0.63
Grade 4	-0.41	0.62	-0.66	0.51	-1.69	0.87
Grade 5	0.11	0.65	0.16	0.87	-1.21	1.43
Grade 6	2.99	0.71	4.22	< 0.01	1.56	4.42
Grade 7	-1.03	0.94	-1.09	0.28	-2.91	0.86
Grade 8	-1.27	0.97	-1.32	0.19	-3.21	0.66
Nonwhite	0.03	0.18	0.15	0.88	-0.33	0.38
SPED	-2.63	0.24	-11.02	< 0.01	-3.09	-2.16
At-Risk or Unaccompanied	-3.88	0.23	-17.20	< 0.01	-4.32	-3.44
Gifted	2.46	0.26	9.41	< 0.01	1.95	2.98
Homeless	-0.87	2.66	-0.33	0.74	-6.09	4.34
Economic Disadvantage	-0.59	0.20	-2.87	< 0.01	-0.99	-0.19
Intercept	58.92	1.87	31.59	< 0.01	55.26	62.57

Note. All models included a random intercept to account for students being nested in schools.

Exhibit B15. Relationship of Imagine Math Lessons Passed (30 or more) to MAP Math Scores: NISD

Covariates	Coef.	*SE*	*t*	*p*-value	95% Confidence Interval	
Lessons Passed (30 or more)	3.12	0.22	14.47	< 0.01	2.69	3.54
Baseline	0.76	0.01	80.63	< 0.01	0.74	0.78
Gender	-0.91	0.17	-5.34	< 0.01	-1.24	-0.58
Grade 4	-0.36	0.56	-0.64	0.53	-1.52	0.80
Grade 5	0.39	0.59	0.66	0.51	-0.81	1.59
Grade 6	3.47	0.65	5.32	< 0.01	2.16	4.79
Grade 7	-0.52	0.87	-0.60	0.55	-2.26	1.22
Grade 8	-0.71	0.90	-0.79	0.43	-2.51	1.09
Nonwhite	-0.05	0.18	-0.25	0.80	-0.39	0.30
SPED	-2.53	0.24	-10.69	< 0.01	-3.00	-2.07
At-Risk or Unaccompanied	-3.68	0.23	-16.39	< 0.01	-4.12	-3.24
Gifted	2.38	0.26	9.15	< 0.01	1.87	2.89
Homeless	-1.19	2.64	-0.45	0.65	-6.37	3.99
Economic Disadvantage	-0.61	0.20	-3.03	< 0.01	-1.01	-0.22
Intercept	61.18	1.85	33.01	< 0.01	57.55	64.82

Note. All models included a random intercept to account for students being nested in schools.

APPENDIX C

Additional Information about Program Usage

Exhibit C1. Summary of Imagine Math Program Usage for IPS Implementation and Impact Analysis Samples by Grade Level

Grades	Implementation Analysis Sample (*n* = 7,400)			Impact Analysis Sample (*n* = 3,555)		
	Lessons Completed *M* (*SD*)	Lessons Passed *M* (*SD*)	Hours in Program *M* (*SD*)	Lessons Completed *M* (*SD*)	Lessons Passed *M* (*SD*)	Hours in Program *M* (*SD*)
All Grades	17.2 (27.95)	10.0 (19.16)	7.8 (9.59)	16.3 (29.04)	9.4 (19.27)	7.2 (9.76)
Grade 1	25.6 (23.27)	13.1 (15.91)	11.5 (9.23)	23.0 (22.5)	11.4 (15.33)	10.6 (9.18)
Grade 2	12.4 (15.44)	7.7 (11.80)	7.1 (7.05)	11.5 (13.51)	7.4 (9.73)	6.5 (6.28)
Grade 3	11.20 (17.39)	7.0 (14.51)	7.0 (8.31)	10.1 (16.56)	6.5 (13.9)	6.4 (8.15)
Grade 4	21.6 (34.59)	13.6 (25.64)	8.4 (10.37)	21.2 (33.26)	12.4 (22.5)	8.3 (10.05)
Grade 5	21.6 (40.2)	13.2 (26.86)	8.3 (12.26)	21.0 (38.84)	12.4 (24.86)	8.4 (12.46)
Grade 6	13.3 (23.59)	7.2 (17.04)	5.6 (7.20)	13.0 (25.03)	6.8 (18.7)	5.5 (7.45)
Grade 7	16.7 (31.48)	9.6 (18.97)	6.5 (10.39)	17.0 (31.1)	10.0 (18.91)	6.7 (10.15)
Grade 8	9.5 (25.97)	4.4 (11.83)	4.6 (9.36)	8.5 (20.68)	4.5 (12.16)	4.4 (8.63)

Note. Implementation samples listed in this table include only students who were included in the implementation analyses (i.e., students with baseline and outcome assessment data).

Exhibit C2. Summary of Imagine Math Program Usage for NISD Implementation and Impact Analysis Samples by Grade Level

Grades	Implementation Analysis Sample (*n* = 6,931)			Impact Analysis Sample (*n* = 1,346)		
	Lessons Completed *M* (*SD*)	Lessons Passed *M* (*SD*)	Hours in Program *M* (*SD*)	Lessons Completed *M* (*SD*)	Lessons Passed *M* (*SD*)	Hours in Program *M* (*SD*)
All Grades	58.2 (63.65)	40.7 (44.88)	15.5 (12.30)	6.0 (14.35)	3.30 (7.56)	2.19 (4.34)
Grade 3	66.5 (60.58)	46.0 (42.35)	17.4 (10.43)	--	--	--
Grade 4	76.8 (69.26)	55.7 (50.01)	19.8 (12.18)	--	--	--
Grade 5	68.3 (62.25)	46.8 (42.54)	18.7 (11.39)	--	--	--
Grade 6	5.1 (13.86)	3.0 (7.60)	1.8 (3.95)	5.1 (13.93)	3.0 (7.64)	1.8 (3.97)
Grade 7	5.2 (13.98)	2.5 (6.77)	2.0 (4.44)	5.3 (14.18)	2.6 (6.87)	2.1 (4.50)
Grade 8	6.9 (12.80)	3.7 (6.65)	2.5 (4.22)	10.1 (15.38)	5.1 (7.93)	3.8 (5.00)

Note. Implementation samples described in this table include only students who were included in the implementation analyses (i.e., students with baseline and outcome assessment data). The impact sample for NISD included students in grades 6-8 only.

Exhibit C3. Proportion of Imagine Math Participants who Met Expectations for Lessons Completed and Lessons Passed, by District, for Implementation and Impact Analysis Samples

	Implementation Analysis Samples			Impact Analysis Samples	
	IPS (*n* = 7,400) % (*n*)	NISD (*n* = 6,931) % (*n*)	Two-District Sample (*N* = 14,331) % (*n*)	IPS (*n* = 3,555) % (*n*)	NISD (*n* = 1,346) % (*n*)
30 or More Lessons Completed	17.5 (1,292)	67.5 (4,317)	39.1 (5,609)	16.4 (584)	5.5 (74)
30 or More Lessons Passed	8.9 (662)	55.5 (3,547)	29.4 (4,209)	9.1 (323)	1.5 (20)

Note. Implementation samples described in this table include only students who were included in the implementation analyses (i.e., students with baseline and outcome assessment data).

Exhibit C4. Summary of Number of Imagine Math Lessons Completed, by District, for Implementation and Impact Analysis Samples

	Implementation Analysis Samples			Impact Analysis Samples	
	IPS (*n* = 7,400)	NISD (*n* = 6,931)	Two-District Sample (*N* = 14,331)	IPS (*n* = 3,555)	NISD (*n* = 1,346)
Number of Lessons Completed	**% (*n*)**	**% (*n*)**	**% (*n*)**	**% (*n*)**	**% (*n*)**
Less than 1 lesson	18.7 (1,387)	8.4 (583)	13.7 (1,970)	25.5 (908)	41.7 (561)
1-10	40.1 (2,970)	12.2 (847)	26.6 (3,817)	37.7 (1,341)	43.4 (584)
11-20	15.2 (1,126)	9.4 (652)	12.4 (1,778)	13.4 (475)	6.9 (93)
21-30	9.0 (666)	8.6 (597)	8.8 (1,263)	7.4 (262)	2.8 (38)
31-40	4.9 (359)	9.1 (629)	6.9 (988)	4 (141)	2.5 (33)
41 or more	12.1 (893)	52.3 (3,623)	31.5 (4,516)	12 (428)	2.7 (37)

Note. Implementation samples described in this table include only students who were included in the implementation analyses (i.e., students with baseline and outcome assessment data).

Exhibit C5. Summary of Number of Imagine Math Lessons Passed, by District, for Implementation and Impact Analysis Samples

	Implementation Analysis Samples			Impact Analysis Samples	
	IPS (*n* = 7,400)	NISD (*n* = 6,931)	Two-District Sample (*N* = 14,331)	IPS (*n* = 3,555)	NISD (*n* = 1,346)
Number of Lessons Passed	**% (*n*)**	**% (*n*)**	**% (*n*)**	**% (*n*)**	**% (*n*)**
Less than 1 lesson	22.6 (1,670)	10.1 (698)	16.5 (2,368)	30.3 (1,078)	48.5 (653)
1-10	52.6 (3,890)	17.3 (1,201)	35.5 (5,091)	46.6 (1,657)	43.2 (581)
11-20	10.9 (810)	11.9 (827)	11.4 (1,637)	9.8 (349)	5.1 (69)
21-30	5.3 (393)	11.6 (802)	8.3 (1,195)	4.4 (158)	1.9 (26)
31-40	3.1 (228)	11.1 (768)	6.9 (996)	3 (107)	0.8 (11)
41 or more	5.5 (410)	38 (2,635)	21.2 (3,045)	5.8 (206)	NA

Note. Implementation samples described in this table include only students who were included in the implementation analyses (i.e., students with baseline and outcome assessment data). NA indicates <10 students in a cell.

Exhibit C6. Summary of Total Hours of Imagine Math Use, by District, for Implementation and Impact Analysis Samples

	Implementation Analysis Samples			Impact Analysis Samples	
	IPS (*n* = 7,400)	NISD (*n* = 6,931)	Two-District Sample (*N* = 14,331)	IPS (*n* = 3,555)	NISD (*n* = 1,346)
Total Hours in Program	**% (*n*)**	**% (*n*)**	**% (*n*)**	**% (*n*)**	**% (*n*)**
Less than 1 hour	25.6 (1,897)	13 (904)	19.5 (2,801)	30.9 (1,097)	64.9 (873)
1-10	49 (3,630)	27.4 (1,902)	38.6 (5,532)	46.4 (1,649)	30.2 (406)
11-20	15.8 (1,172)	31.5 (2,182)	23.4 (3,354)	13.4 (475)	4.2 (57)
21-30	6.2 (462)	17.6 (1,217)	11.7 (1,679)	6 (214)	NA
31-40	2.1 (153)	7.1 (492)	4.5 (645)	2.1 (75)	NA
41 or more	1.2 (86)	3.4 (234)	2.2 (320)	1.3 (45)	NA

Note. Implementation samples described in this table include only students who were included in the implementation analyses (i.e., students with baseline and outcome assessment data). NA indicates <10 students in a cell.

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