

Impact Evaluation of Imagine Math[®] in a Charter School Network

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Introduction

Proficiency in early mathematics plays an important role in students' future academic success and career opportunities (Claessens & Engel, 2013; National Research Council, 2012; Shanley et al., 2017). Imagine Math by Imagine Learning offers a digital supplemental mathematics learning solution designed to support Pre-Kindergarten through Geometry students of all backgrounds. The program provides adaptive and developmentally-appropriate instruction that focuses on building students' conceptual understanding of mathematics. To supplement and enhance digital lessons, on-demand instruction by live, certified teachers is available to deliver scaffolded instruction and ensure that students receive timely assistance as needed.

This study aimed to evaluate the efficacy of Imagine Math by addressing the research question: how does participation in Imagine Math impact student achievement in mathematics? To accomplish this, Imagine Learning partnered with a large, southeastern charter school network which implemented Imagine Math across multiple schools with the intent to improve student math performance. Reported study results demonstrate how this program impacted students' NWEA MAP Growth Math performance by comparing the performance of Imagine Math students to a highly similar group of students who did not use Imagine Math.

Methods

POPULATION

Imagine Learning partnered with a charter school network in the southeastern region of the United States to evaluate how Imagine Math had impacted the success of its students. During the 2020–2021 school year, Imagine Math was made available to students in Kindergarten through Grade 8 across 16 schools in Florida and North Carolina. In these schools, Imagine Math was used at teachers' discretion. In many cases, it was used in the classroom or at home if a teacher deemed it valuable to support the learning of an individual student. A total of 9,015 students in those schools used the program. Conversely, there were 2,311 students in those schools who did not use Imagine Math. In addition, data were collected for 18,532 students from 35 other schools in the charter network in Florida and North Carolina where Imagine Math was not offered to students. In total, data were collected for 9,015 treatment students who used Imagine Math and 20,843 control students who did not use Imagine Math.

RESEARCH DESIGN

This study was conducted retrospectively using data from the 2020–2021 school year. It evaluated the difference in mathematics achievement between treatment and control students. The treatment group was comprised of all students who logged any usage in the Imagine Math program during the 2020–2021 school year, while the control group included all students who did not. Assignment to the treatment and control groups was not random, so this study is a quasi-experimental design, and statistical procedures were used to ensure baseline equivalence

of the treatment and control samples. Because use of Imagine Math in the schools was determined for individual students (rather than for entire classrooms or schools), statistical corrections for clustering were not required.

MEASURES

Multiple data sources were compiled to describe students, their performance, and their work in Imagine Math. Student math proficiency outcomes were determined using a standardized progress-monitoring assessment. Student demographic data were collected to provide additional information on student characteristics that may impact measures of learning outcomes. Data from the Imagine Math program were incorporated to evaluate student engagement in Imagine Math. These data sources are reviewed in more detail below.

Math Proficiency. Students' math proficiency was determined using the NWEA MAP Growth Math assessment. NWEA MAP Growth Math RIT scores were obtained for students in Fall 2020 and Spring 2021. The average number of days between the Fall 2020 and Spring 2021 assessments was 228 (226 days for students in the control group and 230 days for students in the treatment group). Fall 2020 scores were used to establish baseline equivalence between study groups, and Spring 2021 scores were used to estimate the effect of Imagine Math on math proficiency.

Student Demographics. Information was collected on individual student demographic characteristics including grade level, gender, and race/ethnicity. Since the 2020–2021 school year was impacted by the COVID-19 pandemic, information on where students completed their NWEA MAP Growth Math assessment (in-person, remote, or hybrid) was also collected.

Imagine Math Usage. Program usage data was also obtained to determine students' engagement and progress in Imagine Math. These data included the total minutes students spent in the program and the number of lessons students passed (defined as lessons that students completed and achieved at least 75% accuracy on the post-lesson quiz).

ANALYTICAL SAMPLE

To ensure that the baseline characteristics of treatment and control students used in analyses were comparable, 1:1 nearest neighbor propensity score matching without replacement was used to create a statistically equivalent analytical sample.¹ Control students were matched to treatment students based on their Fall 2020 NWEA Map Growth Math RIT score, testing location², and all demographic information available: gender and race/ethnicity. This matching process was completed on each grade individually before combining the matched grade level samples to create the total analytical sample. The resulting analytical sample included 9,015 users of Imagine Math and 9,015 non-users. **Table 1** below describes the characteristics of the sample. To ensure that the results of the analyses were not sensitive to the final analytic sample chosen, a second analytic sample was made that required exact matches on all characteristics listed above. Further details of this sample and the resulting analyses can be found in **Appendix A**.

¹Propensity score matching was executed using the `matchit` function in R's `MatchIt` package.

²Note that this study was completed during the 2020–2021 school year, which was impacted during the COVID-19 pandemic. This study therefore considers student's testing location (in-person, flexible, mobile, or not reported) as a covariate in analyses.

Table 1. Student Characteristics of the Analytical Sample

Group	Subgroup	Comparison Students	Imagine Math Students	p-value	Standardized Mean Difference (SMD)
<i>n</i>		9,015	9,015		
Average (<i>SD</i>) Fall 2020 NWEA MAP Growth Math RIT Score		197.56 (27.63)	197.76 (27.70)	.619	0.007
Grade Level	Kindergarten	924	924	>.999	<0.001
	Grade 1	926	926		
	Grade 2	968	968		
	Grade 3	1,244	1,244		
	Grade 4	1,261	1,261		
	Grade 5	1,166	1,166		
	Grade 6	970	970		
	Grade 7	900	900		
	Grade 8	656	656		
Gender	Female	4,688	4,637	.456	0.011
	Male	4,327	4,378		
Race/Ethnicity	White (Non-Hispanic)	4,230	4,077	.013	0.057
	Asian	401	458		
	Black	1,835	1,821		
	Hispanic	2,061	2,085		
	Multi-Ethnic	424	488		
	Other	64	86		
Testing Location	In-Person	5,767	5,541	.007	0.052
	Flexible	113	123		
	Mobile	2,282	2,434		
	Not Selected	853	917		

ANALYTICAL APPROACH

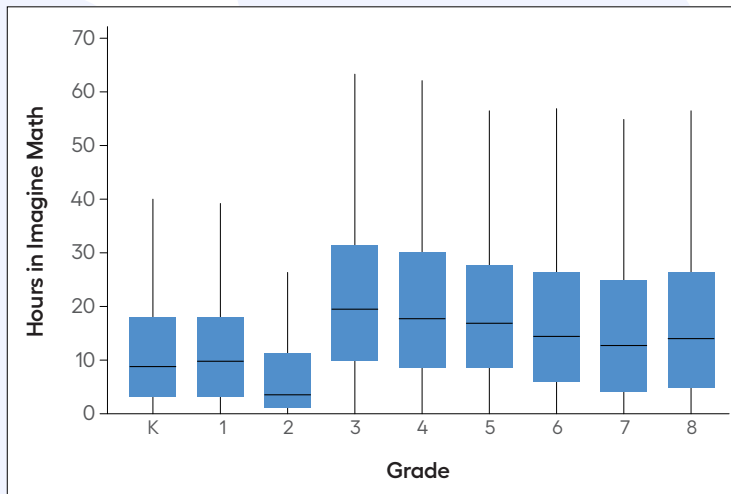
Multiple linear regression was used to evaluate the differences in Spring 2021 NWEA MAP Growth achievement between Imagine Math users and non-users, controlling for Fall 2021 MAP Growth achievement and other covariates (including grade level, gender, race/ethnicity, and testing location). An indicator of whether a student was a control or treatment student was included in the regression as the primary predictor variable. Using multiple linear regressions after propensity score matching ensured that any remaining differences in the underlying treatment and control samples were controlled for by the regression model, effectively isolating the impact of Imagine Math.

Results

IMAGINE MATH USAGE

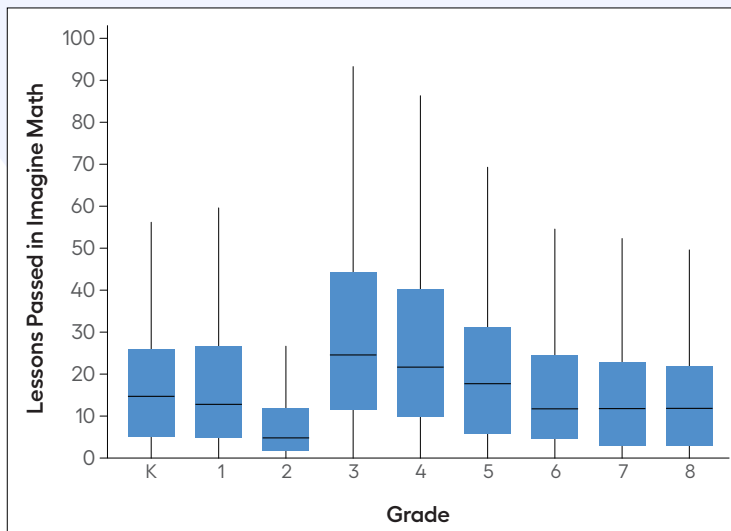
Treatment students spent an average of 17.6 hours in Imagine Math and passed an average of 21.2 lessons. Average time in Imagine Math varied by grade level, with the highest average usage in Grade 3 and the lowest average usage in Grade 2. See **Figures 1** and **2** for a distribution of hours and lessons passed by grade.

Figure 1. Distribution of Hours Spent in Imagine Math by Grade



Note: Outliers that fall above 1.5 times the interquartile range are not included in this figure to ensure readability. The global maximum hours spent in Imagine Math is 193.1 hours.

Figure 2. Distribution of Lessons Passed in Imagine Math by Grade



Note: Outliers that fall above 1.5 times the interquartile range are not included in this figure to ensure readability. The global maximum number of lessons passed in Imagine Math is 265.0 lessons.

PROGRAM IMPACT ON STUDENT ACHIEVEMENT

Overall, use of Imagine Math was found to generate a positive and statistically significant impact on students' mathematics performance. Specifically, students who used Imagine Math scored an average of 2.00 points higher on the Spring 2021 NWEA MAP Growth Math assessment than otherwise similar non-user students, $B = 2.00$, $t(18010) = 13.40$, $p < .001$. Program usage and the other covariates in the model accounted for 85% of the variance found in Spring 2021 scores, $R^2 = .847$, $F(19,18010) = 5,242$, $p < .001$. The Hedges' g effect size of Imagine Math program usage is .078.³ **Table 2** summarizes the results of the multiple linear regression. The covariate-adjusted mean Spring 2021 score was 209.09 for Imagine Math users and 207.08 for non-users.

Table 2. Overall Impact of Imagine Math on Spring 2021 MAP Growth Math RIT Scores

Coefficient		Estimate	Standard Error	p-value
Intercept		52.79	0.92	<.001
Imagine Math User Indicator		2.00	0.15	<.001
Grade-Level Indicator	1	1.08	0.35	.002
	2	1.56	0.38	<.001
	3	4.89	0.41	<.001
	4	6.18	0.45	<.001
	5	6.53	0.50	<.001
	6	5.66	0.52	<.001
	7	7.02	0.55	<.001
	8	10.42	0.59	<.001
Fall 2020 MAP Growth RIT Score		0.76	0.01	<.001
Male Indicator		0.80	0.15	<.001
Race/Ethnicity Indicator	Asian	2.50	0.37	<.001
	Black	-2.91	0.20	<.001
	Hispanic	-1.04	0.20	<.001
	Multi-Ethnic	-0.17	0.35	.621
	Other	-1.04	0.83	.210
Testing Location	Flexible	-1.31	0.66	.048
	Mobile	-1.61	0.18	<.001
	Not Selected	-0.85	0.26	<.001

³The effect size is calculated using Hedges' g computation following What Works Clearinghouse's Procedures and Standards Handbook, Version 5.0. The unadjusted standard deviations of the Spring 2021 scores can be found in **Appendix B**.

DIFFERENTIAL IMPACT BY GRADE LEVEL

A series of analyses were further conducted to examine whether the effects of Imagine Math varied across grade level. Descriptive tables of unadjusted average NWEA MAP Growth Math RIT scores by grade can be found in **Appendix B**, and tables demonstrating baseline equivalence by grade can be found in **Appendix C**. Imagine Math users had statistically significantly higher Spring 2021 NWEA MAP Growth RIT scores than comparable non-users for Grade 1 through Grade 8 students. Multiple linear regressions revealed positive coefficients that were statistically significant for all grades except Kindergarten, where the p-value of .066 approached statistical significance (**Table 3**). Complete regression results can be found in **Appendix D**.

Table 3. Impact of Imagine Math on Spring 2021 MAP Growth Math RIT Scores by Grade Level

Grade Level	Estimate on Imagine Math Indicator Variable	Standard Error	p-value
Kindergarten	0.93	0.51	.066
Grade 1	1.88	0.52	<.001
Grade 2	2.59	0.44	<.001
Grade 3	1.77	0.36	<.001
Grade 4	1.84	0.35	<.001
Grade 5	1.36	0.35	<.001
Grade 6	2.04	0.39	<.001
Grade 7	1.94	0.46	<.001
Grade 8	4.59	0.69	<.001

Conclusion

This study provides ESSA Tier 3 evidence of the efficacy of Imagine Math on student math achievement for students in Grades K–8 by comparing students who participated in Imagine Math with those who did not during the 2020–2021 school year. Results show that students who participated in Imagine Math scored two points higher on the Spring 2021 administration of the NWEA MAP Growth Math test than did similar comparison students. This difference was statistically significant. Similarly, results by grade level show that users scored between one and four points higher than comparable non-users, and the differences were statistically significant for Grades 1 through 8. Thus, this study provides evidence that the use of Imagine Math supports students' mathematics achievement.

References

Claessens, A., & Engel, M. (2013). How Important is Where you Start? Early Mathematics Knowledge and Later School Success. *Teachers College Record*, 115(6), 1–29.

National Research Council. (2012). *Education for life and work: Developing transferable knowledge and skills in the 21st century*. Committee on Defining Deeper Learning and 21st Century Skills, James W. Pellegrino and Margaret L. Hilton (Eds.), Board on Testing and Assessment and Board on Science Education, Division of Behavioral and Social Sciences and Education. The National Academies Press.

Shanley, L., Clarke, B., Doabler, C. T., Kurtz-Nelson, E., & Fien, H. (2017). Early number skills gains and mathematics achievement: Intervening to establish successful early mathematics trajectories. *The Journal of Special Education*, 51(3), 177–188.

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Appendix A

To ensure that observed results were not sensitive to the matching process used to select the analytical sample, a second analytical sample was created using a different, more restrictive procedure. Rather than using propensity score matching, treatment students were matched to control students if they exactly matched on Fall 2020 NWEA MAP Growth Math RIT score, grade level, gender, race, and testing location. With this more restrictive matching procedure, matches could not be identified for some treatment students. These treatment students were dropped from the analytical sample. This process resulted in a sample with 6,234 treatment (Imagine Math user) students and 6,234 control (non-user) students; **Table A1** demonstrates the equivalence of the samples.

Table A1. Baseline Equivalence of Exact Matched Sample

Group	Subgroup	Comparison Students	Imagine Math Students	p-value	Standardized Mean Difference (SMD)
<i>n</i>		6,234	6,234		
Average (<i>SD</i>) Fall 2020 NWEA MAP Growth Math RIT Score		197.04 (26.89)	197.04 (26.89)	>.999	<0.001
Grade Level	Kindergarten	607	607	>.999	<0.001
	Grade 1	626	626		
	Grade 2	682	682		
	Grade 3	842	842		
	Grade 4	861	861		
	Grade 5	779	779		
	Grade 6	731	731		
	Grade 7	628	628		
Gender	Female	3,249	3,249	>.999	<0.001
	Male	2,985	2,985		
Race/Ethnicity	White (Non-Hispanic)	2,978	2,978	>.999	<0.001
	Asian	112	112		
	Black	1,446	1,446		
	Hispanic	1,532	1,532		
	Multi-Ethnic	141	141		
	Other	25	25		
Testing Location	In-Person	4,423	4,423	>.999	<0.001
	Flexible	22	22		
	Mobile	1,508	1,508		
	Not Selected	281	281		

The results of the analyses are largely the same as the analytical sample from the original matching procedure. Students who used Imagine Math scored statistically significantly ($M = 1.93$ points) higher on the Spring 2021 NWEA MAP Growth Math assessment than students who did not use Imagine Math, $B = 1.93$, $t(12448) = 11.63$, $p < .001$. Program usage and the other covariates in the model accounted for 86% of the variance found in Spring 2021 scores, $R^2 = .861$, $F(19,12448) = 4054$, $p < .001$. The effect size of Imagine Math program usage is .078.⁴ The covariate-adjusted mean Spring 2021 score was 208.74 for Imagine Math users and 206.81 for non-users.

When investigating the results by grade, Imagine Math users in all grade levels scored higher on the Spring 2021 NWEA MAP Growth Math assessment, and that difference was statistically significant in all grades except Grade 1. See **Table A2** below for a summary of the coefficients of the Imagine Math indicator variables that indicate the expected difference in performance between students who used Imagine Math and students who did not use Imagine Math based on multiple linear regressions that control for the same covariates as the main analysis.

Table A2. Summary of Regression Results for Exact Matched Sample by Grade and Overall

Grade Level	Estimate on Imagine Math Indicator Variable	Standard Error	p-value
Kindergarten	1.57	0.56	.005
Grade 1	1.00	0.58	.088
Grade 2	2.66	0.47	<.001
Grade 3	1.65	0.39	<.001
Grade 4	1.66	0.38	<.001
Grade 5	1.37	0.41	<.001
Grade 6	2.02	0.45	<.001
Grade 7	1.67	0.54	.002
Grade 8	4.65	0.77	<.001
All Grades Combined	1.93	0.17	<.001

⁴The effect size is calculated using Hedges' g computation following What Works Clearinghouse's Procedures and Standards Handbook, Version 5.0. The unadjusted standard deviation of Spring 2021 NWEA MAP Growth Math RIT scores for treatment students was 24.95 and for control students was 24.62.

Appendix B

Table B1. Unadjusted Mean MAP Growth Math RIT Scores by Grade Appendix B

		Fall 2020 (SD)	Spring 2021 (SD)	Mean Change
Grade K	Imagine Math (<i>n</i> = 924)	148.30 (13.10)	166.42 (12.98)	18.12
	Comparison (<i>n</i> = 924)	148.43 (13.44)	165.49 (13.20)	17.05
Grade 1	Imagine Math (<i>n</i> = 926)	168.24 (12.93)	183.04 (13.13)	14.80
	Comparison (<i>n</i> = 926)	168.14 (13.82)	181.13 (14.47)	12.99
Grade 2	Imagine Math (<i>n</i> = 968)	181.87 (13.13)	194.21 (11.97)	12.35
	Comparison (<i>n</i> = 968)	182.16 (13.64)	191.84 (12.75)	9.68
Grade 3	Imagine Math (<i>n</i> = 1244)	194.12 (12.29)	206.52 (11.86)	12.40
	Comparison (<i>n</i> = 1244)	193.62 (12.21)	204.59 (11.98)	10.97
Grade 4	Imagine Math (<i>n</i> = 1261)	205.52 (11.87)	216.52 (13.38)	11.00
	Comparison (<i>n</i> = 1261)	205.10 (11.43)	214.34 (12.67)	9.24
Grade 5	Imagine Math (<i>n</i> = 1166)	214.84 (12.60)	223.63 (14.83)	8.79
	Comparison (<i>n</i> = 1166)	214.56 (12.81)	222.00 (14.99)	7.44
Grade 6	Imagine Math (<i>n</i> = 970)	218.12 (12.51)	225.60 (14.60)	7.48
	Comparison (<i>n</i> = 970)	217.91 (12.65)	223.37 (14.59)	5.48
Grade 7	Imagine Math (<i>n</i> = 900)	224.28 (14.79)	231.49 (17.27)	7.25
	Comparison (<i>n</i> = 900)	223.96 (14.51)	229.25 (16.51)	5.29
Grade 8	Imagine Math (<i>n</i> = 656)	227.73 (16.19)	238.92 (20.17)	11.20
	Comparison (<i>n</i> = 656)	227.45 (15.96)	234.12 (19.29)	6.66
All Grades Combined	Imagine Math (<i>n</i> = 9,015)	197.76 (27.70)	209.19 (25.80)	11.43
	Comparison (<i>n</i> = 9,015)	197.56 (27.63)	207.05 (25.39)	9.49

Appendix C

Table C1. Kindergarten Baseline Equivalence

Group	Subgroup	Comparison Students	Imagine Math Students	p-value	SMD
<i>n</i>		924	924		
Average (SD) Fall 2020 NWEA MAP Growth Math RIT Score		148.43 (13.44)	148.30 (13.10)	.832	0.010
Gender	Female	487	479	.744	0.017
	Male	437	445		
Race/Ethnicity	White (Non-Hispanic)	287	286	.992	0.033
	Asian	52	59		
	Black	158	158		
	Hispanic	365	359		
	Multi-Ethnic	61	61		
	Other	1	1		
Testing Location	In-Person	652	645	.797	0.047
	Flexible	4	4		
	Mobile	159	174		
	Not Selected	109	101		

Table C2. Grade 1 Baseline Equivalence

Group	Subgroup	Comparison Students	Imagine Math Students	p-value	SMD
<i>n</i>		926	926		
Average (<i>SD</i>) Fall 2020 NWEA MAP Growth Math RIT Score		168.14 (13.82)	168.24 (12.93)	.872	0.008
Gender	Female	482	478	.889	0.009
	Male	444	448		
Race/Ethnicity	White (Non-Hispanic)	338	327	.996	0.028
	Asian	44	43		
	Black	142	142		
	Hispanic	333	343		
	Multi-Ethnic	64	66		
	Other	5	5		
Testing Location	In-Person	609	595	.915	0.033
	Flexible	5	5		
	Mobile	210	222		
	Not Selected	102	104		

Table C3. Grade 2 Baseline Equivalence

Group	Subgroup	Comparison Students	Imagine Math Students	p-value	SMD
<i>n</i>		968	968		
Average (<i>SD</i>) Fall 2020 NWEA MAP Growth Math RIT Score		182.16 (13.64)	181.87 (13.13)	.627	0.022
Gender	Female	487	483	.892	0.008
	Male	481	485		
Race/Ethnicity	White (Non-Hispanic)	513	484	.512	0.094
	Asian	48	55		
	Black	233	227		
	Hispanic	135	150		
	Multi-Ethnic	33	42		
	Other	6	10		
Testing Location	In-Person	608	561	.175	0.101
	Flexible	4	5		
	Mobile	258	286		
	Not Selected	98	116		

Table C4. Grade 3 Baseline Equivalence

Group	Subgroup	Comparison Students	Imagine Math Students	p-value	SMD
<i>n</i>		1,244	1,244		
Average (SD) Fall 2020 NWEA MAP Growth Math RIT Score		193.62 (12.21)	194.12 (12.29)	.303	0.041
Gender	Female	641	644	.936	0.005
	Male	603	600		
Race/Ethnicity	White (Non-Hispanic)	663	638	.809	0.061
	Asian	69	69		
	Black	257	257		
	Hispanic	172	185		
	Multi-Ethnic	65	70		
	Other	18	25		
Testing Location	In-Person	871	802	.030	0.120
	Flexible	16	18		
	Mobile	257	299		
	Not Selected	100	125		

Table C5. Grade 4 Baseline Equivalence

Group	Subgroup	Comparison Students	Imagine Math Students	p-value	SMD
<i>n</i>		1,261	1,261		
Average (SD) Fall 2020 NWEA MAP Growth Math RIT Score		205.10 (11.43)	205.52 (11.87)	.362	0.036
Gender	Female	657	632	.339	0.040
	Male	604	629		
Race/Ethnicity	White (Non-Hispanic)	585	581	.953	0.042
	Asian	68	76		
	Black	273	274		
	Hispanic	265	253		
	Multi-Ethnic	52	56		
	Other	18	21		
Testing Location	In-Person	839	813	.745	0.044
	Flexible	18	18		
	Mobile	303	324		
	Not Selected	101	106		

Table C6. Grade 5 Baseline Equivalence

Group	Subgroup	Comparison Students	Imagine Math Students	p-value	SMD
<i>n</i>		1,166	1,166		
Average (SD) Fall 2020 NWEA MAP Growth Math RIT Score		214.56 (12.81)	214.84 (12.60)	.594	0.022
Gender	Female	610	601	.740	0.015
	Male	556	565		
Race/Ethnicity	White (Non-Hispanic)	573	546	.400	0.094
	Asian	51	63		
	Black	282	274		
	Hispanic	198	201		
	Multi-Ethnic	50	63		
	Other	12	19		
Testing Location	In-Person	734	707	.694	0.050
	Flexible	24	28		
	Mobile	320	339		
	Not Selected	88	92		

Table C7. Grade 6 Baseline Equivalence

Group	Subgroup	Comparison Students	Imagine Math Students	p-value	SMD
<i>n</i>		970	970		
Average (SD) Fall 2020 NWEA MAP Growth Math RIT Score		217.91 (12.65)	218.12 (12.51)	.713	0.017
Gender	Female	508	502	.820	0.012
	Male	462	468		
Race/Ethnicity	White (Non-Hispanic)	440	434	.961	0.046
	Asian	38	40		
	Black	192	193		
	Hispanic	256	250		
	Multi-Ethnic	43	52		
	Other	1	1		
Testing Location	In-Person	600	589	.920	0.032
	Flexible	21	19		
	Mobile	263	270		
	Not Selected	86	92		

Table C8. Grade 7 Baseline Equivalence

Group	Subgroup	Comparison Students	Imagine Math Students	p-value	SMD
		900	900		
Average () Fall 2020 NWEA MAP Growth Math RIT Score		223.96 (14.51)	224.28 (14.79)	.647	0.022
Gender	Female	478	472	.813	0.013
	Male	422	428		
Race/Ethnicity	White (Non-Hispanic)	460	434	.158	0.133
	Asian	17	27		
	Black	183	176		
	Hispanic	211	215		
	Multi-Ethnic	26	44		
	Other	3	4		
Testing Location	In-Person	506	485	.542	0.069
	Flexible	10	16		
	Mobile	289	298		
	Not Selected	95	101		

Table C9. Grade 8 Baseline Equivalence

Group	Subgroup	Comparison Students	Imagine Math Students	p-value	SMD
<i>n</i>		656	656		
Average (SD) Fall 2020 NWEA MAP Growth Math RIT Score		227.45 (15.96)	227.73 (16.19)	.753	0.017
Gender	Female	338	346	.699	0.024
	Male	318	310		
Race/Ethnicity	White (Non-Hispanic)	371	347	.309	0.121
	Asian	14	26		
	Black	115	120		
	Hispanic	126	129		
	Multi-Ethnic	30	34		
	Other	0	0		
Testing Location	In-Person	348	344	.959	0.031
	Flexible	11	10		
	Mobile	223	222		
	Not Selected	74	80		

Appendix D

Table D1. Kindergarten Regression Results

Coefficient		Estimate	Standard Error	p-value
Intercept		91.39	3.04	<.001
Imagine Math User Indicator		0.93	0.51	.066
Fall 2020 MAP Growth RIT Score		0.50	0.02	<.001
Male Indicator		0.99	0.51	.052
Race/Ethnicity Indicator	Asian	5.07	1.19	<.001
	Black	-3.58	0.78	<.001
	Hispanic	-1.22	0.63	.051
	Multi-Ethnic	-0.38	1.10	.728
	Other	1.52	7.72	.844
Testing Location	Flexible	1.81	3.88	.641
	Mobile	0.69	0.71	.329
	Not Selected	-0.13	0.83	.872

Table D2. Grade 1 Regression Results

Coefficient		Estimate	Standard Error	p-value
Intercept		88.57	3.44	.001
Imagine Math User Indicator		1.88	0.52	<.001
Fall 2020 MAP Growth RIT Score		0.55	0.02	<.001
Male Indicator		1.49	0.52	.005
Race/Ethnicity Indicator	Asian	6.13	1.33	<.001
	Black	-2.95	0.81	<.001
	Hispanic	-1.98	0.63	.002
	Multi-Ethnic	-0.39	1.09	.720
	Other	-6.88	3.59	.055
Testing Location	Flexible	-6.79	3.59	.059
	Mobile	0.12	0.65	.854
	Not Selected	-2.60	0.87	.003

Table D3. Grade 2 Regression Results

Coefficient		Estimate	Standard Error	p-value
Intercept		96.34	3.16	<.001
Imagine Math User Indicator		2.59	0.44	<.001
Fall 2020 MAP Growth RIT Score		0.53	0.02	<.001
Male Indicator		1.27	0.45	.004
Race/Ethnicity Indicator	Asian	5.26	1.04	<.001
	Black	-3.03	0.55	<.001
	Hispanic	-2.79	0.66	<.001
	Multi-Ethnic	2.22	1.16	.056
	Other	-0.02	2.45	.993
Testing Location	Flexible	-2.62	3.25	.420
	Mobile	-2.29	0.53	<.001
	Not Selected	-1.28	0.72	.078

Table D4. Grade 3 Regression Results

Coefficient		Estimate	Standard Error	p-value
Intercept		82.04	2.94	<.001
Imagine Math User Indicator		1.77	0.36	<.001
Fall 2020 MAP Growth RIT Score		0.64	0.02	<.001
Male Indicator		0.36	0.36	.317
Race/Ethnicity Indicator	Asian	1.38	0.81	.089
	Black	-3.43	0.46	<.001
	Hispanic	-0.78	0.53	.141
	Multi-Ethnic	-0.68	0.80	.397
	Other	-0.60	1.37	.661
Testing Location	Flexible	-4.17	1.54	.007
	Mobile	-2.46	0.45	<.001
	Not Selected	-2.48	0.63	<.001

Table D5. Grade 4 Regression Results

Coefficient		Estimate	Standard Error	p-value
Intercept		44.49	3.19	<.001
Imagine Math User Indicator		1.84	0.35	<.001
Fall 2020 MAP Growth RIT Score		0.83	0.02	<.001
Male Indicator		0.79	0.35	.024
Race/Ethnicity Indicator	Asian	1.61	0.78	.038
	Black	-2.40	0.45	<.001
	Hispanic	-0.53	0.46	.254
	Multi-Ethnic	-0.09	0.88	.914
	Other	-0.42	1.42	.766
Testing Location	Flexible	-0.81	1.47	.581
	Mobile	-2.24	0.42	<.001
	Not Selected	0.49	0.64	.450

Table D6. Grade 5 Regression Results

Coefficient		Estimate	Standard Error	p-value
Intercept		17.54	3.06	<.001
Imagine Math User Indicator		1.36	0.35	<.001
Fall 2020 MAP Growth RIT Score		0.96	0.01	<.001
Male Indicator		1.12	0.35	.001
Race/Ethnicity Indicator	Asian	2.99	0.84	<.001
	Black	-2.13	0.44	<.001
	Hispanic	-0.05	0.49	.922
	Multi-Ethnic	-0.10	0.83	.902
	Other	-1.80	1.53	.238
Testing Location	Flexible	-0.88	1.19	.459
	Mobile	-2.38	0.41	<.001
	Not Selected	-1.28	0.66	.055

Table D7. Grade 6 Regression Results

Coefficient		Estimate	Standard Error	p-value
Intercept		19.33	3.60	<.001
Imagine Math User Indicator		2.04	0.39	<.001
Fall 2020 MAP Growth RIT Score		0.94	0.02	<.001
Male Indicator		0.48	0.40	.229
Race/Ethnicity Indicator	Asian	2.13	1.03	.039
	Black	-1.51	0.53	.005
	Hispanic	0.34	0.49	.488
	Multi-Ethnic	0.04	0.94	.968
	Other	-5.58	6.14	.364
Testing Location	Flexible	0.52	1.40	.709
	Mobile	-2.21	0.46	<.001
	Not Selected	0.67	0.70	.339

Table D8. Grade 7 Regression Results

Coefficient		Estimate	Standard Error	p-value
Intercept		20.47	3.71	<.001
Imagine Math User Indicator		1.94	0.46	<.001
Fall 2020 MAP Growth RIT Score		0.93	0.02	<.001
Male Indicator		0.85	0.46	.068
Race/Ethnicity Indicator	Asian	-0.61	1.52	.688
	Black	-1.94	0.62	.002
	Hispanic	-0.27	0.58	.646
	Multi-Ethnic	-0.47	1.22	.701
	Other	-1.46	3.73	.696
Testing Location	Flexible	1.24	1.95	.526
	Mobile	-0.69	0.52	.180
	Not Selected	0.76	0.77	.322

Table D9. Grade 8 Regression Results

Coefficient		Estimate	Standard Error	p-value
Intercept		20.29	5.13	<.001
Imagine Math User Indicator		4.59	0.69	<.001
Fall 2020 MAP Growth RIT Score		0.95	0.02	<.001
Male Indicator		0.21	0.69	.756
Race/Ethnicity Indicator	Asian	1.54	2.04	.450
	Black	-3.61	0.95	<.001
	Hispanic	-0.46	0.92	.618
	Multi-Ethnic	-2.01	1.62	.216
	Other			
Testing Location	Flexible	1.42	2.76	.608
	Mobile	-0.88	0.77	.250
	Not Selected	-3.41	1.12	.002

