Impact of Edmentum Exact Path on Elementary School Math and ELA Outcomes

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This report leverages product usage data and school district student data to evaluate the impact of Exact Path on student outcomes.

Empirical Education®

Principal Findings

Empirical Education evaluated the impact of Exact Path on the math and English Language Arts (ELA) achievement of elementary school students in a large school system in the United States during the 2022–23 school year. The study produced the following important results.

- There was a positive impact of Exact Path on student outcomes in math and ELA on the state assessment and NWEA MAP assessment.
- The largest effect size of 0.18 was estimated for Exact Path impact on math outcomes on the state assessment, which corresponded to a 7-percentile gain for a median student.
- Students who receive special education services benefit most from Exact Path. Estimated effect sizes for special education students are two to three times higher than for students who do not receive special education services.
- There were no significant differences in the impact of Exact Path on student groups defined by race/ethnicity, gender, or English learner status.

BACKGROUND

This study of the usage and effectiveness of Exact Path is based on student data from a large school system in the United States and student-level application usage data from Exact Path pilot implementation in the 2022–23 school year. Edmentum's Exact Path program personalizes digital student learning resources through diagnostic assessments, creating individual learning paths with adaptive skill-building exercises in math, reading, or language arts. The district piloted the Exact Path program across a subset of elementary schools—about one-tenth of all such schools. Teachers in those schools were able to access and assign learning paths for their students during the year. The study addresses the following main research questions.

Did Exact Path have a positive impact on student achievement in math and ELA?

Did the impact of Exact Path vary across student groups based on race/ethnicity, gender, English learner status, or special education status?

STUDY DESIGN

This study uses a quasi-experimental matched comparison group design to estimate the program effect from the extant data. The focus of this study is on the effect of full implementation of Exact Path. Based on prior studies of Exact Path effectiveness, Edmentum defines full implementation as the completion of 16 units ("skills") during a school year (Li et al., 2023a; Li et al., 2023b). Most students in the Exact Path pilot schools did not meet that criterion, as they either completed fewer skills or were not assigned a learning path at all. Therefore, a subset of students in the pilot schools constituted the treatment group for this study.

The study used two alternative approaches to the construction of quasi-experimental control groups. The first approach matched treatment students to similar students within the set of Exact Path pilot schools. The second approach was to derive the function that predicts skill completion, apply it to students in non-participating schools to identify students who would likely meet the treatment criterion were they given the chance to use Exact Path, and match them to students in the treatment group. We label these two approaches the "within" approach and the "between" approach, respectively. In both cases, only a small subset of students from the control pool was matched to the treatment students and included in the analytic sample: between two and four best matches based on propensity scores and subject to caliper limits imposed on the pretest scores. In addition, exact matching was required for student grade and school locale. For example, a treatment group third-grader from a suburban school can only be matched to a third-grader from a suburban school in the control pool. Propensity score functions included student characteristics and standardized pretest scores, as well as their school-level averages.

Both approaches control for possible selection biases on observable characteristics equally well. However, they differ in the way they deal with the potential bias due to selection on unobservable school- and teacher-level factors.

On the one hand, non-participating schools might use an unknown mix of learning products and instructional practices, some of which may have applications and effects that are similar to those of Exact Path. Therefore, the estimates from the "between" approach may underestimate the true effect of the Exact Path because it does not compare the treatment group to a well-defined benchmark. The "within" approach is less susceptible to this bias since students in both the treatment and the comparison groups are from the same set of schools.

On the other hand, the teachers who are more effective, in general, may be more likely to implement Exact Path fully in any given school. If this is the case, then the effect of Exact Path estimated using the "within" approach is due in part to the differences among teachers, which cannot be inferred from the available data. Therefore, the "within" approach might overestimate the true effect. However, the estimates by the "between" approach are less susceptible to this sort of bias because students in the comparison group come from classes taught by a random mix of teachers. In addition, estimates by the "within" approach may underestimate the true effect of the full implementation. This is because some comparison students do use Exact Path to some extent, and partial implementation—usage below the required 16 completed skills—may still have a statistically significant positive effect. We present the exploration of this potential effect in Appendix B. Analysis of Association between Usage and Impact.

We report all estimates using both approaches keeping in mind that the estimates by the "between" approach understate the true effect, whereas the estimates by the "within" approach may overstate it.

DATA

Data collected for this study contained individual records for all students in the district enrolled in grades three through five in the 2022–23 school year. Records contained student demographics, test scores, multiple metrics of Exact Path student usage (including the number of skills attempted, the number of skills mastered, or the total days of usage), and class rosters linking students to the teachers and schools. Test scores included the baseline fall MAP benchmark scores and spring outcome scores from the

MAP benchmark and the state Smarter Balanced Assessment System (SBAC). Individual records were then linked to the school level data from the National Center for Education Statistics Common Core of Data database.

The profile of the set of schools participating in the Exact Path pilot resembled closely that of the district on the whole, with one exception: none of the small number of rural and town schools participated in the pilot (Table 1). Therefore, the pool of comparison schools was restricted to urban and suburban schools. Standardized mean differences between Exact Path pilot and non-participating schools on all other school characteristics did not exceed .08. Most of the 26 participating schools implemented Exact Path in both math or ELA. Three of those schools implemented it for math only, so that the Exact Path math set includes 26 schools and the ELA set includes 23 schools.

The characteristics of these two sets of schools are reported separately in Table 1. Only students with both the pretest (fall MAP) and both posttests—spring MAP and SBAC—remained in the data set to allow for the comparability of the results for the two outcomes. The numbers of students in Table 1 are shown after the adjustments described above.

TABLE 1. CHARACTERISTICS OF ALL SCHOOLS AND EXACT PATH PILOT SCHOOLS

Characteristic	All schools	Exact Path schools, Math	Exact Path schools, ELA
Male, %	51.2	51.5	51.8
English Learners, %	18.5	16.0	17.2
Special Education, %	13.0	13.7	13.7
Asian, %	5.7	6.2	6.0
Black, %	15.1	17.6	17.1
Hispanic, %	47.3	43.9	46.2
White, %	21.9	21.3	20.1
Rural/town, %	4.8	0	0
Average pretest, z score	0	-0.04	0.02

Note. Pretest scores (Fall MAP test) were standardized by grade, then averaged across grades. Math and ELA scores are shown in the second and third columns respectively.

Table 2 shows that approximately one in ten students in Exact Path pilot schools overall and in each grade level were using the product at the full-implementation level of 16 completed skills. This proportion implies a substantial size of comparison pool, enabling the “within” analysis. The “between” analysis is possible due to the similarity between the participating and non-participating schools.

A small proportion of students—up to four percent—with partial implementation of Exact Path (fewer than 16 skills completed) was found in some of the non-participating schools. These cases, which can be explained by mid-year transfers between schools, were excluded from the comparison pool.

TABLE 2. EXACT PATH USAGE: NUMBER OF STUDENTS BY NUMBER OF SKILLS COMPLETED

Grade	0	1-15	16 or more
Grade 3	921	1138	329
Grade 4	1029	1208	224
Grade 5	1133	1189	192
Total	**3083**	**3535**	**745**

Table 3 shows the group sizes and average scores for all samples. The average pretest scores are not shown separately for the treatment and control groups because they are identical up to the second decimal (standardized mean differences are all below 0.005). Detailed tables are in Appendix A. Detailed Tables.

TABLE 3. CHARACTERISTICS OF ANALYTIC SAMPLES

Subject	Design	Average pretest score	Treatment group students	Treatment group schools	Control group students	Control group schools
Math	Between	-.08	669	22	2434	43
Math	Within	-.10	720	26	1432	26
ELA	Between	.20	891	21	3041	47
ELA	Within	.23	914	23	1788	23

The difference between average pretest scores in math and ELA samples is a side effect of the matching process aimed at ensuring the study's internal validity. Balancing the treatment and control groups produced ELA samples that include students that are above average at the baseline, while students in the math samples are slightly below the average. Readers should have this difference in mind when interpreting the results of this study, as the ELA and math impact estimates are obtained on partially overlapping subsets of students.

ANALYSIS

The analysis was performed using a hierarchical linear regression model (HLM), whereby the Exact Path effect on test outcomes was estimated adjusting for student characteristics and pretest, and taking into account the clustering of students in classes and schools. The Fall 2022 MAP scores, standardized by grade, were used as the pretest in the analyses of outcomes on both the state test and the spring MAP test. This is possible because SBAC scores are almost as strongly correlated with the Fall MAP scores as Spring MAP scores are. Linear correlation coefficients for SBAC are .85 and .82 for math and ELA, respectively, vs. .89 and .85 for Fall MAP. Still, this difference resulted in a higher proportion of unexplained variation in outcomes in SBAC models compared to Spring MAP models.

The moderator analysis, i.e., estimation of the differential impact of Exact Path on student groups, was performed by including interaction terms in the model, which allows for establishing statistically significant differences in impact estimates associated with differences in student characteristics. Reported group-specific impact estimates apply to hypothetical "other things equal" cases. Thus, for example, a differential impact estimate for students who receive special education services applies to pairs of students that are identical in all characteristics except their special education status. Actual average differences in outcomes between such complementary groups of students will likely differ due to the differences in other characteristics.

RESULTS

Average Effects

Table 4 presents the results of the estimation of the average effect of Exact Path on the treatment group (students with 16 or more completed skills) for each subject, each test, and using each of the two alternative approaches to comparison group construction. The results are reported as effect size estimates and corresponding percentile gains (for the median student). Also shown are the *p* values of the estimate (*p* values under 0.05 are conventionally considered as indicating statistical significance of the estimate), sample size, and R^2 (the proportion of variation explained by the fixed effects in the model).[1]

[1] An additional three percent of total outcome variance was explained across models by teacher random effects and less than one percent by school random effects.

TABLE 4. AVERAGE EFFECT OF FULL IMPLEMENTATION OF EXACT PATH ON STUDENT OUTCOMES

Subject	Test	Design	Effect size	Percentile gain	*p* value	Sample size	R^2
Math	MAP	Between	0.07	3	.04	3103	0.74
Math	SBAC	Between	0.11	4	.02	3103	0.69
Math	MAP	Within	0.09	4	<.01	2152	0.74
Math	SBAC	Within	0.18	7	<.01	2152	0.67
ELA	MAP	Between	0.07	3	.07	3932	0.69
ELA	SBAC	Between	0.01	0	.84	3932	0.65
ELA	MAP	Within	0.11	4	<.01	2702	0.68
ELA	SBAC	Within	0.08	3	<.01	2702	0.62

The following observations can be made from Table 4.

- Most estimates are statistically significant and positive, which implies positive impact of full implementation of Exact Path on student outcomes in both subjects on both the state test and the MAP benchmark.
- The effect on math outcomes is higher than the effect on ELA outcomes.
- Estimates obtained using the “between” approach are lower than those using the “within” approach, as expected.

Estimates of the effect on MAP outcomes, obtained using the “within” approach, are consistent with the results of a prior study of Exact Path effectiveness that used a similar methodology (Li et al., 2023a).

Group Effects

Moderator analyses were performed for all student characteristics, grade level, and pretest scores, broken down into quintiles. We found significant moderator effects of only one characteristic: students who receive special education services. All models with the exception of math SBAC (“within”) estimate significantly higher positive effect of Exact Path on special education students than for other students (Table 5).

TABLE 5. EFFECT OF FULL IMPLEMENTATION OF EXACT PATH ON STUDENTS RECEIVING SPECIAL EDUCATION SERVICES

Subject	Test	Design	Effect size	Percentile gain	*p* value
Math	MAP	Between	0.19	6	<.01
Math	SBAC	Between	0.18	6	.01
Math	MAP	Within	0.24	8	<.01
Math	SBAC	Within	0.18	7	.01
ELA	MAP	Between	0.10	3	.10
ELA	SBAC	Between	0.06	2	.4
ELA	MAP	Within	0.22	7	<.01
ELA	SBAC	Within	0.19	6	<.01

There were no significant differences in the impact of Exact Path on student groups defined by race/ethnicity, gender, or English learner status. There were some significant differences across grade levels and pretest quintiles. Although there were no consistent patterns, an observation can be made that Exact Path tends to have a higher positive effect on students in the bottom pretest quintile. This is consistent with the stronger positive effect on special education students who also tend to have below average pretest scores. Exact Path may benefit underperforming students the most. Detailed results of the moderator analysis involving grade level and pretest quintiles are in Appendix A. Detailed Tables.

CONCLUSION

Results of this study present strong evidence of the positive impact Exact Path can have on student outcomes in both math and ELA under full implementation. Especially strong positive results are identified for students who receive special education services. The limitations of this study include its quasi-experimental nature, moderate size of matched analytic samples, and exclusion of rural and town schools from the analysis. However, the large size and diverse student population of the district make the results of this study broadly relevant for urban and suburban schools. Results are particularly strong for math, with positive effect estimates obtained from two alternative study designs.

References

Li, W., Munshi, A., Oberle, C., Butler, A., & Dray, A. J. (2023a). *Sizable Increase in NWEA MAP Growth Math and Reading Scores in First Year of Exact Path Implementation*. Edmentum.

Li, W., Munshi, A., Oberle, C., Butler, A., & Dray, A. J. (2023b). *Success for Diverse Learners on Renaissance Star Math Assessments with Exact Path*. Edmentum.

Appendix A. Detailed Tables

Characteristics of Analytic Samples

TABLE A1. MATH SAMPLE, “BETWEEN” DESIGN

Student group	Treatment	Control	Standardized mean difference
Normalized pretest score	-0.08	-0.08	<.01
Male	56.1	52.9	0.06
English learner	25.0	25.0	<.01
Special education	11.2	10.3	0.03
Asian	2.7	2.8	0.01
Black	14.5	11.2	0.09
Hispanic	58.6	64.9	0.13
White	16.7	13.4	0.09
Students	669	2434	
Schools	22	43	

TABLE A2. MATH SAMPLE, “WITHIN” DESIGN

Student group	Treatment	Control	Standardized mean difference
Normalized pretest score	-0.10	-0.10	<.01
Male	55.8	54.8	0.02
English learner	25.1	21.2	0.09
Special education	11.5	14.4	0.09
Asian	3.1	3.6	0.03
Black	13.9	15.8	0.06
Hispanic	58.8	50.1	0.17
White	16.3	21.5	0.14
Students	720	1432	
Schools	26	26	

TABLE A3. ELA SAMPLE, "BETWEEN" DESIGN

Student group	Treatment	Control	Standardized mean difference
Normalized pretest score	0.20	0.20	<.01
Male	51.9	51.5	0.01
English learner	18.5	21.5	0.08
Special education	9.8	8.9	0.03
Asian	6.0	4.4	0.07
Black	13.9	11.7	0.06
Hispanic	51.2	57.0	0.12
White	20.2	19.0	0.03
Students	891	3041	
Schools	21	47	

TABLE A4. ELA SAMPLE, "WITHIN" DESIGN

Student group	Treatment	Control	Standardized mean difference
Normalized pretest score	0.23	0.23	<.01
Male	51.6	54.6	0.06
English learner	18.3	15.2	0.08
Special education	10.1	10.3	0.01
Asian	6.1	5.9	0.01
Black	14.2	16.0	0.05
Hispanic	50.6	45.6	0.10
White	20.1	22.6	0.06
Students	914	1788	
Schools	23	23	

Impact of Exact Path by Grade Level

TABLE A5. EFFECT OF FULL IMPLEMENTATION OF EXACT PATH ON MATH OUTCOMES BY GRADE LEVEL

Grade	Test	Design	Estimate	*p* value
3	MAP	Between	0.1	.04
4	MAP	Between	0	.99
5	MAP	Between	0.11	.08
3	SBAC	Between	0.14	.01
4	SBAC	Between	0.05	.50
5	SBAC	Between	0.10	.21
3	MAP	Within	0.10	<.01
4	MAP	Within	0.12	<.01
5	MAP	Within	0.07	.15
3	SBAC	Within	0.22	<.01
4	SBAC	Within	0.19	<.01
5	SBAC	Within	0.11	.03

TABLE A6. EFFECT OF FULL IMPLEMENTATION OF EXACT PATH ON ELA OUTCOMES BY GRADE LEVEL

Grade	Test	Design	Estimate	*p* value
3	MAP	Between	0.11	.02
4	MAP	Between	0.03	.60
5	MAP	Between	0.03	.55
3	SBAC	Between	0.07	.26
4	SBAC	Between	-0.02	.72
5	SBAC	Between	0.05	.50
3	MAP	Within	0.12	<.01
4	MAP	Within	0.05	.24
5	MAP	Within	0.15	<.01
3	SBAC	Within	0.10	.03
4	SBAC	Within	0.02	.63
5	SBAC	Within	0.11	.03

Impact of Exact Path by Pretest Quintile

TABLE A7. EFFECT OF FULL IMPLEMENTATION OF EXACT PATH ON MATH OUTCOMES BY PRETEST QUINTILE

Quintile	Test	Design	Estimate	*p* value
1	MAP	Between	0.17	.01
2	MAP	Between	0.04	.54
3	MAP	Between	0.07	.21
4	MAP	Between	0.10	.07
5	MAP	Between	0.18	.01
1	SBAC	Between	0.17	.01
2	SBAC	Between	0.04	.54
3	SBAC	Between	0.07	.21
4	SBAC	Between	0.10	.07
5	SBAC	Between	0.18	.01
1	MAP	Within	0.11	.01
2	MAP	Within	0.09	.02
3	MAP	Within	0.14	<.01
4	MAP	Within	0.10	<.01
5	MAP	Within	0.02	.75
1	SBAC	Within	0.17	<.01
2	SBAC	Within	0.11	.01
3	SBAC	Within	0.18	<.01
4	SBAC	Within	0.20	<.01
5	SBAC	Within	0.27	<.01

TABLE A8. EFFECT OF FULL IMPLEMENTATION OF EXACT PATH ON ELA OUTCOMES BY PRETEST QUINTILE

Quintile	Test	Design	Estimate	*p* value
1	MAP	Between	0.04	.54
2	MAP	Between	0.14	.01
3	MAP	Between	0.08	.13
4	MAP	Between	0.10	.04
5	MAP	Between	0.00	.99
1	SBAC	Between	0.15	.03
2	SBAC	Between	-0.03	.65
3	SBAC	Between	-0.07	.24
4	SBAC	Between	0.07	.27
5	SBAC	Between	0.08	.19
1	MAP	Within	0.07	.16
2	MAP	Within	0.18	<.01
3	MAP	Within	0.11	.01
4	MAP	Within	0.14	<.01
5	MAP	Within	0.05	.19
1	SBAC	Within	0.12	.04
2	SBAC	Within	-0.01	.79
3	SBAC	Within	-0.05	.30
4	SBAC	Within	0.12	.01
5	SBAC	Within	0.18	<.01

Appendix B. Analysis of Association between Usage and Impact

The exploratory analysis presented here has two goals. First, in order to assess the robustness of the main results of this study, it is desirable to understand to what extent they depend on the choice of threshold that defines the full implementation. In other words, it is the question of sensitivity of the results to the choice of the usage threshold. Second, given the fairly low proportion of students with fully implemented Exact Path, a question arises if a lower level of skill completion can produce a statistically significant and practically substantially effect on students. If so, product implementation would require less effort and increase its attractiveness for school administrators and teachers.

Analytical results provided here addresses these inter-related questions by using the framework that was developed to obtain the results reported in the body of this report. Specifically, we reproduce analyses for each subject, each test, and each of the two design approaches at varying levels of completed skills—from 1 to 30—as the hypothetical full implementation thresholds. We, therefore, perform 29 additional quasi-experimental studies. Each of them starts with redrawing the lower boundary of the treatment group using the rule “skills completed is N or more” instead of the original “16 or more,” then proceed through the same steps as in the main study.

The massive results of this exploratory analysis are presented below in the form of eight graphs. One graph presents the results of 30 studies with one outcome using one of the two design approaches. Thus, the first graph presents the estimates of the effect of Exact Path on math MAP test scores using the “within” approach and varying levels of skills completion as thresholds. Skills completion thresholds are given on the horizontal axis, and the effect estimates are on the vertical axis. Dots represents the estimates. The leftmost dot is the effect estimate (approximately 0.05 in the first graph) when the completion of at least one skill is counted as the full implementation. Bold blue lines are smooth approximations of the association between the minimum number of skills completed by the members of the treatment group and the estimated effect size. Dark gray bands are 95% confidence intervals that represent the uncertainty of the estimates: the true effect sizes are not necessarily equal to the numbers given by the dots but lie, with 95% probability, somewhere within this corridor. The confidence band reaching the horizontal axis implies that the estimate, at this level of skills, is not statistically significant. This situation corresponds to the case where *p* value exceeds .05.

The patterns of association between the skills completion and the impact differ between subjects and test. Some curves have a clear maximum, other appear to offer steady increases in effect size with higher usage. We should be careful not to give too much weight to estimates at 20 skills or more because the size of the treatment group decreases rapidly in that range of usage. In the middle of the range, where the sample sizes are larger and the estimates are more accurate, all graphs seem to suggest that the effect sizes that are comparable or even higher than those estimated in the main study can be reached at somewhat lower level of skills completed: in the range of 10 to 15.

One implication of this finding is that the estimates obtained in the main study are robust against small changes in the completed skills threshold. Another implication is that the estimates obtained in the main study using the "within" design may underestimate the true effect sizes, per the discussion in the Study Design section.

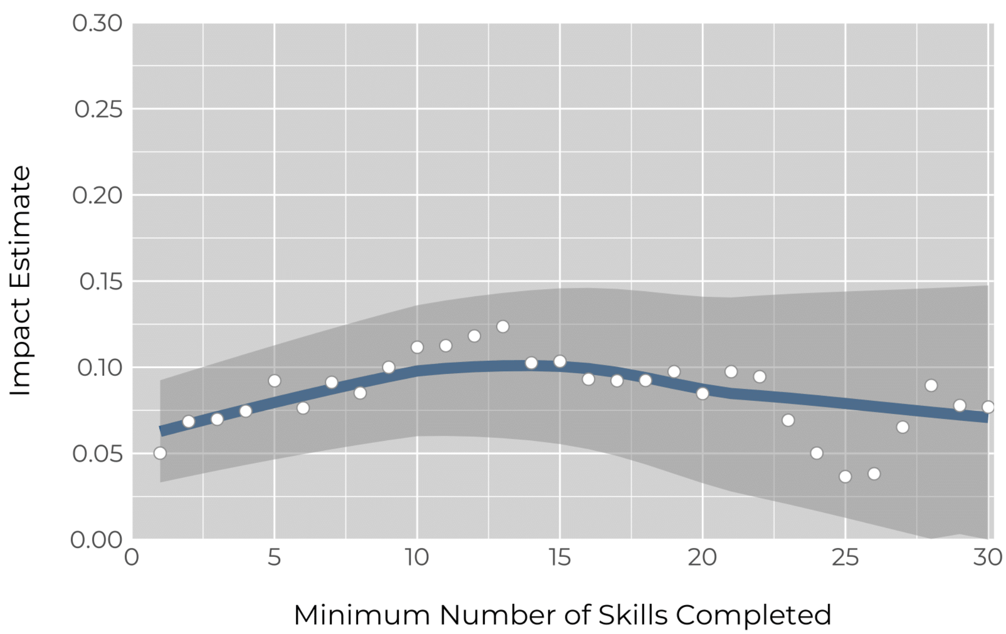

FIGURE B1. RELATIONSHIP BETWEEN ESTIMATED EFFECT ON TEST OUTCOMES AND MINIMUM SKILLS COMPLETED: MATH MAP, "WITHIN" MODEL

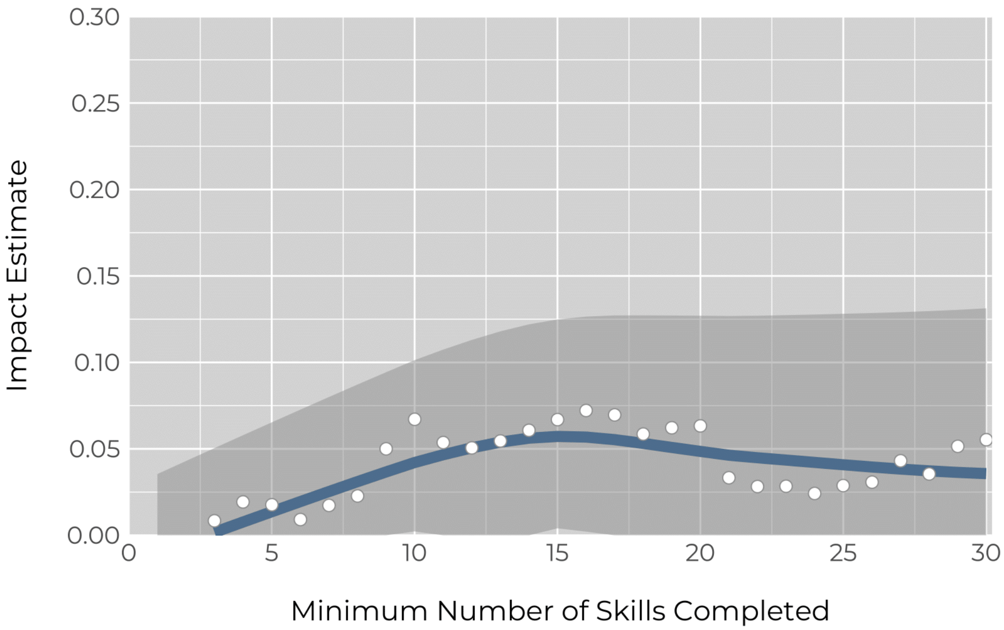

FIGURE B2. RELATIONSHIP BETWEEN ESTIMATED EFFECT ON TEST OUTCOMES AND MINIMUM SKILLS COMPLETED: MATH MAP, “BETWEEN” MODEL

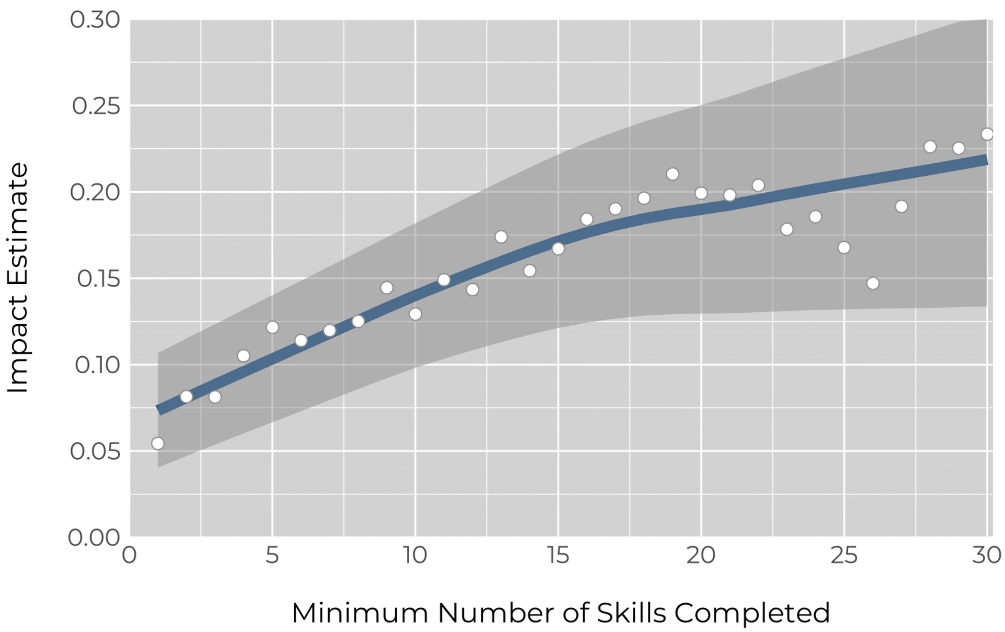

FIGURE B3. RELATIONSHIP BETWEEN ESTIMATED EFFECT ON TEST OUTCOMES AND MINIMUM SKILLS COMPLETED: MATH SBAC, “WITHIN” MODEL

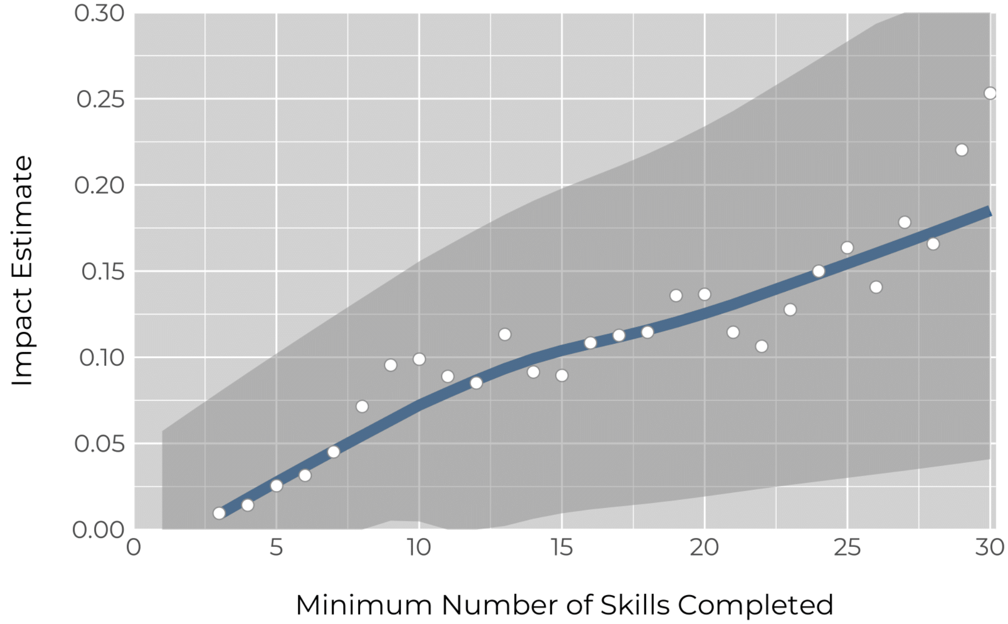

FIGURE B4. RELATIONSHIP BETWEEN ESTIMATED EFFECT ON TEST OUTCOMES AND MINIMUM SKILLS COMPLETED: MATH SBAC, “BETWEEN” MODEL

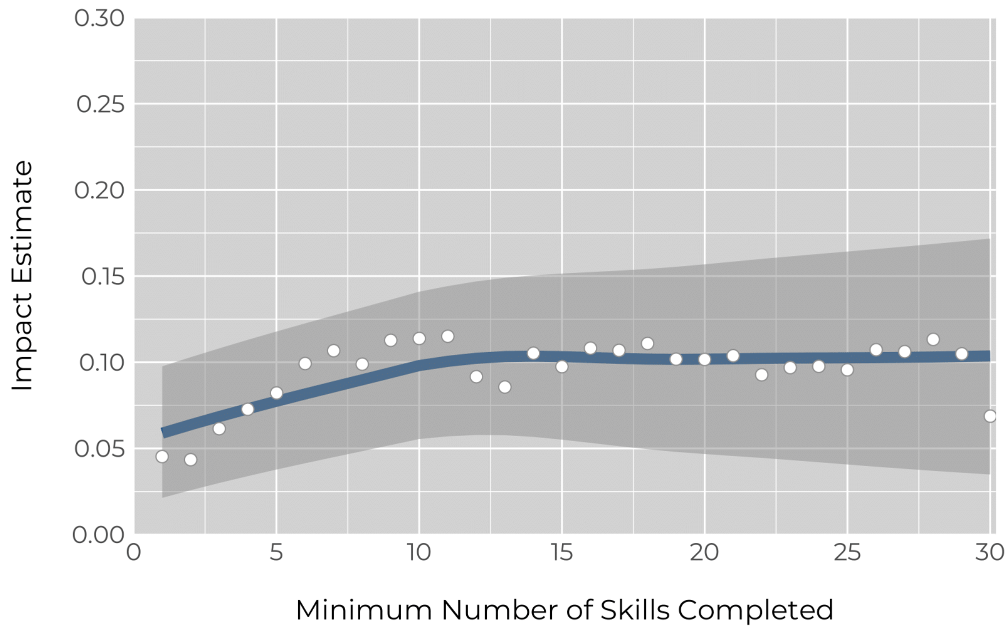

FIGURE B5. RELATIONSHIP BETWEEN ESTIMATED EFFECT ON TEST OUTCOMES AND MINIMUM SKILLS COMPLETED: ELA MAP, “WITHIN” MODEL

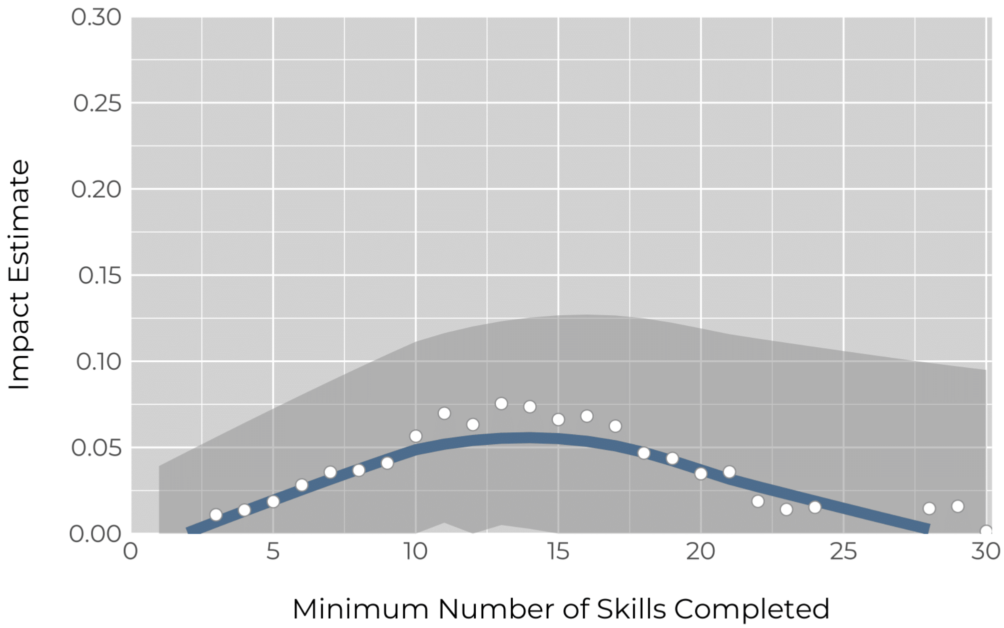

FIGURE B6. RELATIONSHIP BETWEEN ESTIMATED EFFECT ON TEST OUTCOMES AND MINIMUM SKILLS COMPLETED: ELA MAP, “BETWEEN” MODEL

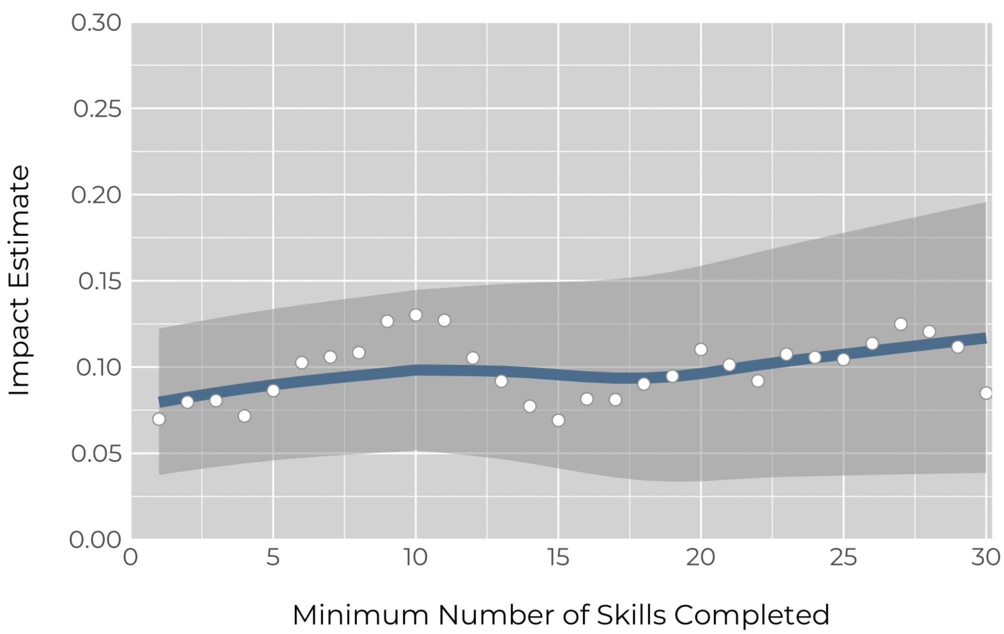

FIGURE B7. RELATIONSHIP BETWEEN ESTIMATED EFFECT ON TEST OUTCOMES AND MINIMUM SKILLS COMPLETED: ELA SBAC, “WITHIN” MODEL

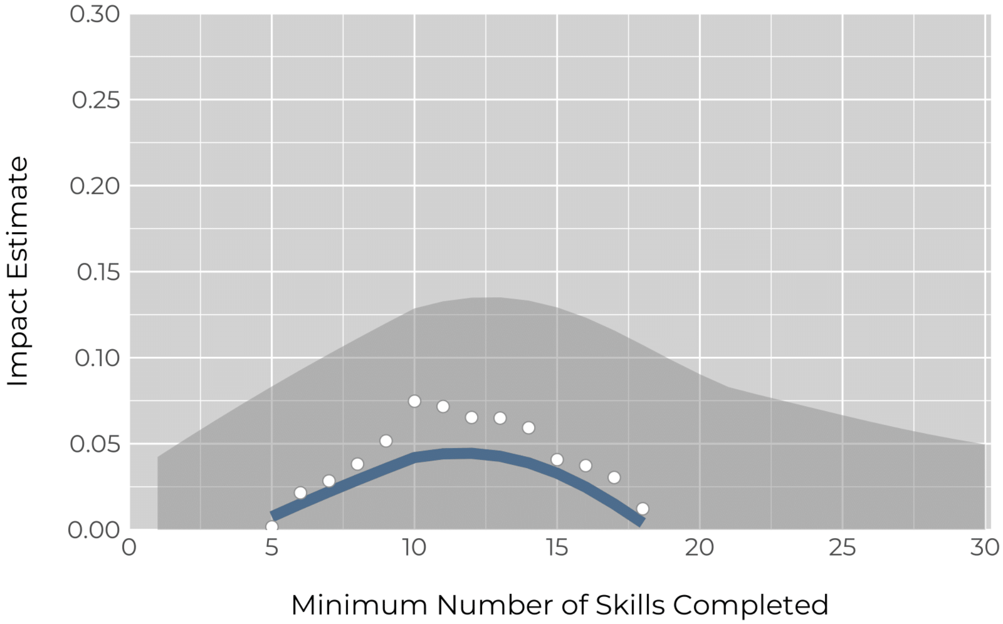

FIGURE B8. RELATIONSHIP BETWEEN ESTIMATED EFFECT ON TEST OUTCOMES AND MINIMUM SKILLS COMPLETED: ELA SBAC, “BETWEEN” MODEL

Reference this report: Empirical Education Inc. (2025). *Impact of Edmentum Exact Path on Elementary School Math and ELA Outcomes*. (Empirical Education report number: Empirical_Edmentum-6096-EVI-2025-O.1) Empirical Education Inc. https://www.empiricaleducation.com/pdfs/Empirical_Edmentum-6096-EVI-2025-O.1.pdf