WestEd

Evaluating the Impact of Innovamat Elementary Math Curriculum on Student Learning

A Quasi-Experimental Matched-Comparison Study

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Executive Summary

This study examines the effects of Innovamat, a mathematics curriculum and instructional approach that aligns classroom practice more closely with research in mathematics education on math achievement. The study focuses on students in grades 2 and 3 in two school districts in New Jersey during the 2023–24 school year. Using the quasi-experimental matching methods and LinkIt! assessment data, WestEd analyzed outcomes for approximately 460 students who were exposed to Innovamat and outcomes for their matched peers without exposure.

- After 2 years of the implementation of Innovamat, the treatment group significantly outperformed the matched-control group by about 0.20 standard deviation units with an effect size of 0.24. This effect is equivalent to moving an average student from the 50th percentile to approximately the 58th percentile.
- Subgroup analysis to study the differential treatment impacts indicates that the intervention seemed to benefit grade 3 students more than it did grade 2 students.
- Implementation findings suggest that the Innovamat curriculum was associated with meaningful shifts in instructional practice toward student-centered, discussion-based learning. This provides important context for interpreting the impact results, particularly the stronger effects observed after multiple years of implementation.

Introduction

Innovamat is a mathematics education organization founded in 2017 to better align classroom practice with research in mathematics education. Innovamat's program was designed to bridge the gap between research and day-to-day instruction, particularly by supporting deeper conceptual understanding rather than a reliance on memorization

The program aims to develop students' problem-solving, reasoning, and communication skills through a competency-based approach that places students at the center of the learning process. Grounded in socioconstructivist principles, Innovamat emphasizes learning through exploration, the use of manipulatives, and structured mathematical discussion. Instruction is designed to build connections across concepts, provide meaningful learning contexts, and develop fluency through purposeful practice.

Innovamat integrates multiple components to support implementation. Teachers are provided with detailed lesson guides on paper and access to a digital platform for lesson planning and progress monitoring. Students engage with both hands-on manipulative materials and an adaptive digital application that offers individualized practice. The program also includes comprehensive ongoing professional development and coaching for teachers and school leaders to support instructional shifts and effective implementation.

Given its comprehensive design and focus on improving student engagement and learning outcomes in mathematics, Innovamat is well positioned for rigorous evaluation.

The present study includes two components. The primary component is a curriculum impact study that examines whether the use of Innovamat's curriculum is associated with improved mathematics outcomes among grades 2 and 3 students compared with business-as-usual instructional approaches. A secondary component is a brief implementation study, which draws on interviews with approximately two to three teachers in each study year to document how the curriculum is enacted in classrooms and to provide contextual information on implementation

The study is guided by the following research questions:

- *Impact (primary):* Does using Innovamat's curriculum improve grades 2 and 3 students' mathematics learning—compared with business-as-usual curricula—after students use the curriculum for 2 years?
- *Impact (exploratory):*
  - What is the effect of Innovamat after 1 year of curriculum implementation?
  - Do the impacts vary across different student subgroups?

- *Implementation:* What factors facilitate or hinder implementation of the curriculum in classrooms?

The study was conducted in New Jersey and examines implementation over 2 academic years: 2023–24 (the 1st year of curriculum use) and 2024–25 (the 2nd year of use). Importantly, 2023–24 marked the 1st year of Innovamat's implementation in the United States, meaning that the participating schools had not used the program previously. To address the research questions, the study employed a quasi-experimental design (QED) with a matched-comparison group to estimate the relationship between participation in the Innovamat program and students' mathematics outcomes. Schools from two districts were selected for the treatment group because they used the same assessment. A third potential participating district was excluded from the study because comparable standardized pretest data could not be collected.

This report describes the study design and data sources, presents findings from the impact and implementation analyses, and discusses implications for practice and future research.

Impact Study Design and Methods

Study Design

This study employs a QED with a matched-comparison group to examine the relationship between the use of the Innovamat curriculum and student mathematics outcomes. Students in classes in which the teachers implemented Innovamat during the 2023–24 and 2024–25 school years were designated as the treatment group and continued to use the curriculum as part of their regular instructional program. The treatment sample consists of three schools across two districts in New Jersey.

To construct a comparison group, WestEd first identified a statewide pool of 335 schools that had not adopted Innovamat by using data from the National Center for Education Statistics (NCES). These schools were organized into two priority tiers based on their similarity to the treatment schools in key school-level characteristics—including prior performance on state tests and locale—to identify comparison contexts that are broadly comparable to the treatment conditions. The prioritized list of potential comparison schools was then provided to the assessment vendor LinkIt! to identify eligible schools that administered the LinkIt! mathematics assessments during the study period. Student-level data were obtained for both treatment and potential comparison students.

Matching was conducted at the student level within this pool of eligible comparison schools. Treatment students in Innovamat classes were matched to similar students in comparison schools based on available characteristics and prior achievement measures derived from LinkIt! assessment data. This approach was designed to improve baseline equivalence between groups by aligning students with comparable academic profiles and backgrounds while restricting the comparison pool to schools with similar contextual characteristics.

Using the matched analytic sample, WestEd estimated whether students in schools that implemented Innovamat achieved different mathematics outcomes compared with the outcomes of matched students in schools that used business-as-usual curricula.

Sample and Setting

The study was conducted in New Jersey and included students enrolled in grades 2 and 3 during the 2023–24 school year. The treatment group consisted of students who attended three schools—Rolling Hills Primary School, Millstone Township Primary School, and Millstone Township Elementary School—across two districts that implemented the Innovamat curriculum in 2 consecutive school years (2023–24 and 2024-25).

The comparison group included students from schools across New Jersey that did not adopt the Innovamat curriculum but that administered the LinkIt! mathematics assessments during the study period. Based on a prioritized list of 335 schools provided by WestEd, LinkIt! identified 1,650 students across 118 classrooms in 17 districts who participated in LinkIt! assessment during the study period. WestEd then applied matching methods to select comparable students for inclusion in the analysis. The analytic sample was restricted to students with available assessment data and sufficient information to support matching and outcome analyses.

As shown in Table 1, across both groups, the sample included students with varying demographic and academic backgrounds, reflecting the populations served by the participating schools.

Table 1. Student Sample Characteristics Before Matching

Characteristic	# of treatment students	% of treatment students	# of comparison students	% of comparison students
Grade 2 student in 2023–24	311	58.90	777	47.09
Grade 3 student in 2023–24	217	41.10	873	52.91
Male	279	52.84	862	52.24
Female	249	47.16	788	47.76

Characteristic	# of treatment students	% of treatment students	# of comparison students	% of comparison students
Asian	11	2.08	250	15.15
Black	12	2.27	50	3.03
Hispanic	111	21.02	188	11.39
White	371	70.27	1,057	64.06
Multiracial	22	4.17	81	4.91
Low socioeconomic status	110	20.83	278	16.85
English Language Learner	14	2.65	n/a	n/a
Has an IEP	136	25.76	277	16.79

Data Sources and Measures

The primary outcome measure is students' performance on the LinkIt! mathematics assessment for students in grades 2 and 3. The LinkIt! assessment is a benchmark assessment system used to measure student progress in mathematics over the course of the school year. It is composed predominantly of multiple-choice items and is designed to evaluate content standards of a conceptual and procedural nature rather than mathematical processes or the Standards for Mathematical Practice (SMP). The assessment is aligned with the Common Core State Standards (CCSS) or the corresponding state curriculum. Most items focus on numbers and operations. Administered multiple times annually, the assessment evaluates students' mastery of grade-level standards and provides comparable measures of performance across students, classrooms, and schools. Assessments are typically delivered online and automatically scored, generating performance metrics for longitudinal tracking.

To enable comparisons across grade levels, raw assessment scores were standardized within each grade by converting them to *z*-scores using the systemwide mean and standard deviation for that grade and by a form provided by LinkIt!. This transformation placed student performance on a common scale, allowing outcomes from grades 2 and 3 to be combined in a single analysis while preserving relative differences in achievement.

As shown in Table 2, students' LinkIt! scores from fall 2023 were used as the baseline measure for all analyses. To address the primary impact question regarding student learning after 2 years of curriculum use, students' fall 2025 scores (when students started grades 4 and 5) were used as the outcome measure. To address the exploratory question about the impact after 1 year of use, students' spring 2024 scores were used as the outcome measure.

Table 2. Timeline of LinkIt! Assessment Administration and Measures

Grade	Year 1 (2023–24) fall 2023	Year 1 (2023–24) spring 2024	Year 2 (2024–25) fall 2024	Year 2 (2024–25) spring 2025	Post implementation fall 2025
2	Grade 2 pretest	Grade 2 posttest	Grade 3 pretest	n/a	Grade 3 posttest
3	Grade 3 pretest	Grade 3 posttest	Grade 4 pretest	n/a	Grade 4 posttest

To complement the impact analysis, qualitative data were collected through interviews with two to three teachers per school year during 2023–24 and 2024–25. These interviews were designed to capture information about how the Innovamat curriculum was implemented in classrooms, including instructional practices, supports, and challenges. The implementation data provided contextual information to help interpret the impact findings and identify factors that may facilitate or hinder effective use of the curriculum.

Analytic Approach

Identification of a Matched Group for Impact Analysis

To estimate the impact of the Innovamat curriculum on students' mathematics outcomes, the study employed a matching method to construct comparable treatment and comparison groups. For the primary impact analysis, a one-to-one propensity score matching (1-1 PSM) approach (Rosenbaum & Rubin, 1983) was used to match each treatment student with a comparison student. The matching was based on student-level covariates, including pretest scores, grade level, gender, ethnicity (Asian, Hispanic, Multiracial, and white), free or reduced lunch (FRL) status, and individualized education program (IEP) status.

A 1-1 PSM approach was selected to create a balanced analytic sample with closely comparable treatment and comparison students while maintaining the original treatment students. Given the relatively small number of treatment students in the study, this approach is preferred.

In addition, if feasible, the coarsened exact matching (CEM) method (Iacus et al., 2012) was used to assess the robustness of the 1-1 PSM results. With CEM, more treatment students than are included with 1-1 PSM may not be included in the subsequent impact analysis because no exact matches are found in the control pool.

Following 1-1 PSM or CEM matching, the balance between treatment and comparison groups was assessed by using standardized mean differences on baseline covariates. Covariate balance was considered acceptable if standardized mean differences were below 0.10, a commonly used threshold that indicates negligible differences between groups. This threshold is also

consistent with the What Works Clearinghouse (WWC) standards for establishing baseline equivalence, which state that the magnitude of the baseline difference should be less than or equal to 0.25 (WWC, 2022).

Primary Impact and Subgroup Analyses

After identifying the matched groups using 1-1 PSM, WestEd estimated the average treatment effect on the treated (ATET) by using a nearest-neighbor propensity score matching estimator. Unlike traditional regression models, this nonparametric approach compares the observed outcomes of treated students with those of their matched control peers who have similar predicted probabilities of treatment. The fall 2025 test scores, after 2 years of Innovamat intervention, were used as the primary outcome variable. For exploratory purposes, the spring 2024 test scores were used as outcomes to evaluate the effect of Innovamat after 1 year of intervention. The "teffects psmatch" command in Stata (StataCorp, 2025) was used to find the matched group and then estimate the impacts.

In addition, the 2-year effect of Innovamat was also evaluated separately by grade level, baseline performance (low performing versus high performing), gender (male versus female), and ethnicity (White versus non-White) to examine whether there were treatment-by-subgroup interaction effects. The mean pretest score was used to determine whether students were low performing or high performing at baseline (i.e., low if below the mean and high if at or above the mean). These analyses are intended to provide insight into potential variation in program effects across different student groups. To carry out these analyses, the CEM was used to identify the matched groups, and it was followed by a series of weighted regression analyses that included an interaction term between the treatment status and the subgroup variable. These models followed an analysis of covariance (ANCOVA) structure, including the same baseline scores and demographics used for matching as covariates to account for any residual imbalance. All analyses incorporated matching weights and robust standard errors to ensure accurate impact estimates. The "cem" (for matching) and "reg" (for estimating impacts) commands in Stata (StataCorp, 2025) were used.

Effect sizes (Hedges' *g*) were computed for each impact estimate in order to quantify the magnitude of these differences according to the WWC standards.

Impact Study Results

Baseline Equivalence and Matching Results

After matching, the standardized differences between treatment and comparison groups were evaluated. Table 3 summarizes the results based on 1-1 PSM for the primary impact analysis.

Overall, the group difference after matching decreased to less than 0.1 (except for the Multiracial variable). In particular, the baseline test difference was quite small, indicating that both groups were comparable in performance before the implementation of Innovamat.

Table 3. Differences in Covariates After Matching for 2-Year Impact

Covariate	Standardized differences raw	Standardized differences matched
Baseline pretest	–0.136	0.013
Grade level	–0.354	–0.009
Gender	0.045	–0.009
Asian	–0.319	0.016
Hispanic	0.163	0.006
Multiracial	0.007	0.119
White	0.033	–0.080
FRL	–0.034	0.029
IEP	0.204	0.016

Note. The raw sample size is 455 for the treatment group and 672 for the comparison group. After matching, the sample size is 455 for both groups.

Impact Results

2-Year Impact (Primary)

The analysis of students' LinkIt! assessment results from fall 2025 indicate that after 2 years of implementation, the Innovamat curriculum was associated with a statistically significant and educationally meaningful improvement in student mathematics achievement. Students in schools that use the Innovamat curriculum demonstrated higher mathematics achievement compared with matched comparison students.

As shown in Table 4, the adjusted mean score for treatment students was 0.278 *z*-score metric (SD = 0.867, *n* = 455) compared with 0.081 for comparison students (SD = 0.786, *n* = 455), resulting in a statistically significant difference of 0.197 standard deviation units ($p = 0.002$). This corresponds to an effect size of 0.24, which indicates that the curriculum had a large positive impact on students' mathematics outcomes (Kraft, 2020). An effect of 0.197 standard deviation units corresponds to moving an average student from the 50th percentile to approximately the 58th percentile.

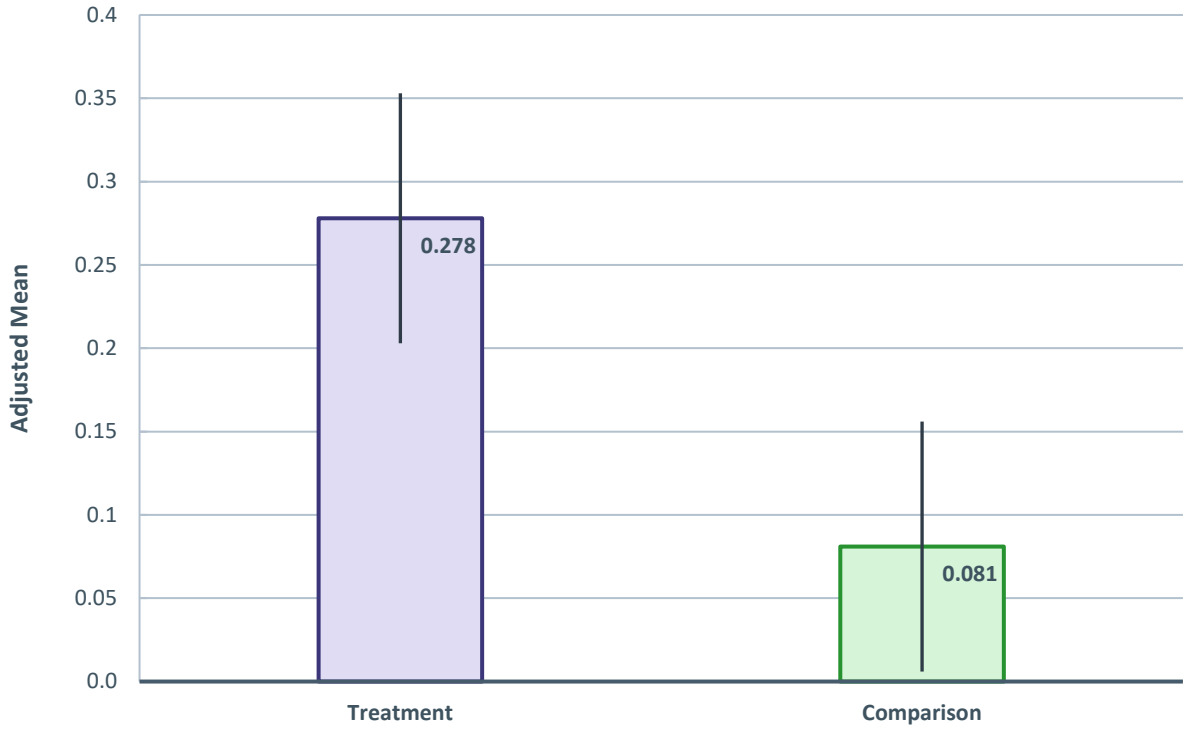
Table 4. Results for 2-Year Impact

Treatment sample (*n*)	Treatment adjusted mean*	Treatment standard deviation (SD)	Comparison sample (*n*)	Comparison adjusted mean	Comparison standard deviation (SD)	Results: difference (effect size)	Results: significance (*p*)	Results: standard error (SE)
455	0.278	0.867	455	0.081	0.786	0.197 (0.24)**	0.002	0.063

Note. One asterisk (*) indicates that the adjusted mean and difference are on the *z*-score metric. Two asterisks (**) indicate that results using the CEM approach confirmed a statistically significant positive treatment effect (difference = 0.111, $p = 0.028$, estimated effect size = 0.130).

Figure 1 presents the adjusted means and the corresponding 95 percent confidence intervals for both groups.

Figure 1. Results for 2-Year Impact



Note. Error bars indicate the 95 percent confidence interval associated with the adjusted mean for each group. For the treatment group, the adjusted mean is 0.278 and the 95 percent confidence interval is [0.198, 0.358]. For the comparison group, the adjusted mean is 0.081 and the 95 percent confidence interval is [0.008, 0.153].

1-Year Impact (Exploratory)

Consistent with the expectation that impacts may take time to emerge, measurable differences in student outcomes were not observed after the 1st year of implementation. Based on the spring 2024 LinkIt! assessment results, students in Innovamat schools performed at levels comparable to those of matched peers in comparison schools. The estimated difference in standardized scores was –0.072 (p = 0.129), corresponding to an effect size of –0.090. Treatment students had an adjusted mean of 0.134 (SD = 0.883, n = 523) compared with 0.206 (SD = 0.705, n = 523) for comparison students.

Differential Treatment Impact and Subgroup Analysis (Exploratory)

The 2-year effect of Innovamat was also evaluated separately by grade level, baseline performance (low performing versus high performing), gender (male versus female), and

ethnicity (White versus non-White) to examine whether there were treatment-by-subgroup interaction effects. Only the treatment-by-grade-level interaction was significant at the 0.050 level ($p = 0.025$). The results indicate that Innovamat appeared to benefit grade 3 students more than it did grade 2 students (an effect size of 0.280 versus 0.010; see Table 5).

These findings also indicate that the effects of the Innovamat curriculum are not uniform across all groups, with a stronger impact observed in a certain grade.

Table 5. Subgroup Analysis Results for 2-Year Impact

Category	Grade 2	Grade 3
Treatment sample (*n*)	247	159
Treatment adjusted mean *	0.190	0.279
Treatment standard deviation (SD)	0.851	0.881
Comparison sample (*n*) **	208 (254.8)	293 (249.2)
Comparison adjusted mean	0.178	0.040
Comparison standard deviation (SD)	0.910	0.839
Results: Difference (effect size)	0.012 (0.010)	0.239 (0.280)
Results: Significance (*p*)	0.860	0.002
Results: standard error (SE)	0.067	0.075

Note. One asterisk (*) indicates that the adjusted mean and difference are on the *z*-score metric. Two asterisks (**) indicate that the sample size in parentheses is the weighted sample size resulting from the CEM process.

Implementation Findings and Themes

To complement the impact data analysis, four teachers who implemented the Innovamat curriculum were selected (by school administrators) and interviewed to gain deeper insight into their experiences. Three teachers were interviewed during the 2023–24 school year, and two

were interviewed during the 2024–25 school year, including one who had also participated in the program implementation during the prior school year.

The teacher interview protocol was designed to collect qualitative information about the teachers' experiences implementing the Innovamat curriculum, focusing on instructional practices, student outcomes, and implementation supports and challenges. Interviews began with background questions about the teachers' experience, the grade levels they taught, their prior mathematics training, and the curricula they used previously. The purpose of these questions was to establish a comparison between instruction before and during Innovamat implementation. The protocol then explored instructional changes, including shifts in teaching philosophy, the use of curriculum components (e.g., number labs, adventures, digital tools), and changes in the teachers' confidence and practices. Teachers were also asked about observed student outcomes, including engagement, participation, problem-solving approaches, and perceived impacts on learning, particularly for students who were struggling. Additional questions addressed preparation and support for implementation, including training, ongoing assistance from Innovamat and school or district staff, and challenges encountered during use. The interview concluded with the teachers' reflections on continued use of the curriculum, recommendations for improvement, and overall perceptions of its effectiveness. The full interview protocol is included in Appendix A.

The four interviewees represented a range of teaching experience and backgrounds in elementary education. All were teaching in early elementary grades, primarily grade 2, and had experience implementing the Innovamat curriculum during the study period. Their teaching experience ranged from early-career to highly experienced educators, including one with over 30 years and others with approximately 10 to 15 years in the classroom. Several teachers had prior experience with other mathematics curricula and had participated in piloting Innovamat before its full implementation.

Findings from teacher interviews provide insight into how the Innovamat curriculum was implemented in classrooms and the factors that may facilitate or constrain its effectiveness. Overall, teachers reported positive experiences with the curriculum, while also identifying several implementation challenges, particularly during early adoption.

Instructional Shifts and Pedagogical Alignment

Across all interviews, teachers consistently described a shift in instructional practice toward more student-centered and discussion-based learning. Instruction under Innovamat emphasized conceptual understanding, multiple strategies, and students' explanations of reasoning. Teachers noted that this approach represented a departure from prior curricula that focused more heavily on procedural steps and correct answers.

Teachers reported that this shift increased opportunities for student participation and engagement, particularly through structured "math talk" and collaborative activities. Students were encouraged to explain their thinking, compare strategies, and justify their solutions, activities that teachers viewed as strengthening both understanding and confidence in mathematics.

> *"Feel like Innovamat really brought [the why] more front and center … It really got kids thinking about math. It was a lot of conversation about math that we didn't have earlier."*
>
> *"Innovamat spends a lot of time having the kids talk about math. Tell me how you did this. Tell me why you did this. Tell me what you're observing. So they're having to verbalize their math … Innovamat forces that conversation."*

Teachers highlighted that the curriculum requires a shift in the teacher's role, with greater emphasis on facilitating student thinking.

> *"You have to hand it over to the kids. You have to step back a little bit, have a little patience, let them figure things out, let them talk amongst themselves. And that's the switch."*

Student Engagement and Participation

A consistent theme across interviews was increased student engagement and positive attitudes toward mathematics. Teachers reported that students were more willing to participate, less hesitant to share their thinking, and more likely to describe mathematics as enjoyable. In particular, teachers noted that activities such as warm-up, "which one doesn't belong," group-based problem solving, and hands-on tasks contributed to broad participation across ability levels.

Several teachers emphasized the broad participation observed in the classroom.

> *"What I love the most is [that] the whole class enjoyed math ... Those children who came in in the beginning of the year who didn't like math, who struggled with math in your math lesson—all of the children were able to participate … I feel like a lot of confidence was gained through their lessons … A month or two*

> *in, all the children were participating, which was unusual. A lot of times you had those children who just turned off to math."*
>
> *"Innovamat can swing towards a lower level student, but it has so many extra opportunities for those other students. There's so many extensions for them to go above the learning that it's just so age appropriate"*

Teachers also noted gains in student confidence, especially among students who had previously struggled with mathematics. The curriculum's emphasis on multiple-solution strategies and reduced focus on single correct answers appeared to create more accessible entry points for learners.

> *"And then that's building their confidence as well, because they know at the end of the day, there's a skill in the Innovamat [so] that it's like, oh, which one doesn't belong, and there's no correct answer. They just have to tell me why they picked what they picked …'It doesn't matter what I picked. I just have to defend my answer.' But then they feel confident to share in class because they know at the end of the day, I'm going to be like, yeah, that was great."*

Perceived Impact on Student Learning

Teachers generally perceived improvements in students' mathematical understanding, particularly in conceptual reasoning, strategy use, and mental math. Several teachers noted that students demonstrated a stronger ability to explain their thinking and apply multiple approaches to solving problems flexibly. In addition, teachers observed that students retained skills over time due to the curriculum's spiral structure.

> *"The conversations that kids can hold about math are phenomenal. They talk their way through it. They're getting to these understandings that I don't think I could have gotten to as a second grader because they're just constantly having to prove why."*
>
> *"They're either discovering like, 'Oh, this does make sense' or 'Hey, I was totally out in left field, and I have to rethink it.' So I think that math talk is really—we can already tell that it's improving their math just because they're having to explain it."*

At the same time, teachers indicated that measurable improvements in student outcomes may take time to emerge, particularly as students gain multiple years of exposure to the curriculum. One teacher noted that differences in student performance became more apparent in the 2nd year of implementation, when students had prior exposure to Innovamat in earlier grades.

> *"I just told my class that this morning after our lesson … I am just so impressed by them because it's a huge difference from last year to this year … Last year was the 1st full year. So I did not see this progression until now because now I'm like, you've already been exposed to these exact lessons and these exact strategies, but in the 1st-grade curriculum. So, it's really showing now what they're retaining, and I'm impressed. I wasn't overly impressed last year, and now I'm like, okay, it's clicking."*

Supports for Implementation

A central finding from the interviews was the quantity and quality of implementation support that Innovamat provided to teachers, which participants consistently described as a defining strength of the program and a key enabler of their shift in practice.

What distinguishes this support is the nature of the organization delivering it. Innovamat is a mathematics-only organization, and the dedicated math coaches who worked directly with teachers brought deep mathematics content knowledge and pedagogical expertise to every interaction. Unlike general instructional coaching, this content-specialist model provided teachers with guidance grounded in the mathematics itself—the reasoning behind each activity, the conceptual progression across lessons, and the specific moves that surface student thinking. Teachers described this expertise as fundamental to their successful adoption of the curriculum.

The support was also sustained and multilayered throughout the school year. It included ongoing, direct communication with Innovamat math coaches; regular meetings and feedback loops; responsive updates and adjustments to materials based on teacher input; and facilitated collaboration among teachers within schools.

> *"The support could not have been better … They were very receptive to our needs."*
>
> *"They respond very quickly … We have direct access to them."*

Teachers reported that this combination of expertise, responsiveness, and sustained engagement was decisive in helping them navigate the changes required by a competency-based, discussion-driven curriculum—particularly during the initial year of implementation.

Implementation Challenges

Within the context of this strong implementation support, teachers also identified several challenges encountered during early adoption. Notably, these challenges reflect teachers' experiences with the curriculum in use during the study period (2023–24 and 2024–25) Each challenge has since been addressed in the updated version of the curriculum, Thinking Math!, which is described later in this section.

- **Learning curve for teachers.** Teachers described the curriculum as requiring a meaningful shift in instructional approach, with greater emphasis on facilitation than direct instruction. Although this transition took time, teachers attributed their ability to make the shift to the depth and responsiveness of the math coach support that accompanied it: "It was definitely a learning curve … just thinking differently and presenting differently."
- **Planning and preparation demands.** Lessons often included multiple components and activities, requiring advanced preparation and familiarity with the materials. Teachers noted that math coach guidance—particularly regarding lesson review and manipulative preparation—helped them build effective planning routines.
- **Alignment with standards.** Some teachers reported gaps between the curriculum and state standards, particularly in areas such as multidigit operations. As a result, some teachers supplemented instruction to ensure coverage of required standards.
- **Assessment and progress monitoring.** Teachers identified the limited availability of formal summative assessments as a challenge, particularly for reporting student progress and communicating with families: "The assessment part is what's missing. We have an issue with that."
- **Technology and materials issues.** Some teachers reported occasional technical challenges with the digital application and with inconsistencies in instructional materials.

Since the evaluation was completed, the original curriculum has undergone targeted revisions to address several key concerns raised by teachers. In particular, Thinking Math!, a new version developed by Innovamat, demonstrates closer alignment with the CCSS, as evidenced by its acceptance in California's recent state adoption process. In addition, Thinking Math! incorporates expanded resources for assessment and progress monitoring, and previously identified inconsistencies or errors in instructional materials have been addressed. Other challenges noted in the evaluation—particularly the learning curve for teachers and the

demands of planning and preparation—are inherent to the program's instructional approach. Innovamat's strategy for mitigating these challenges centers on sustained support to schools and teachers, which, as highlighted in the findings, is consistently perceived as a key facilitator of successful implementation and a major strength of the program.

Overall, implementation findings suggest that the Innovamat curriculum was associated with meaningful shifts in instructional practice toward student-centered, discussion-based learning. Teachers reported increased student engagement and confidence and perceived improvements in conceptual understanding. At the same time, implementation required adaptation by teachers and was accompanied by challenges related to assessment, alignment with standards, and instructional materials. These findings provide important context for interpreting the impact results, particularly the stronger effects observed after multiple years of implementation.

Limitations

A key limitation of this QED with a matched-group design is that, although it improves comparability between the treatment and comparison groups on observed characteristics, it cannot account for unobserved differences. In particular, it is not possible to fully disentangle the program's effects from other factors, such as the intrinsic characteristics of schools that chose to adopt it (e.g., leadership, motivation, teacher training, prior instructional practices). As a result, the estimated impacts may still be subject to selection bias. Additionally, in this study the treatment students were mainly from two school districts, making it unclear how well the study sample reflects the broader student population in these grades. These limitations warrant caution in interpreting the findings as causal.

Conclusion

This study examined the implementation and impact of the Innovamat curriculum on students' mathematics outcomes in grades 2 and 3 by using a QED and teacher interviews. Overall, the findings suggest that the Innovamat curriculum was associated with positive improvements in students' mathematics achievement after 2 years of implementation, whereas no statistically significant effects were observed after the 1st year. This pattern is consistent with teacher-

reported experiences, which indicate that both students and teachers may require time to adjust to the curriculum's instructional approach and that benefits may strengthen with sustained exposure.

Teacher interviews provide important context for interpreting these findings. Across participants, Innovamat was associated with greater use of and broader participation in mathematical discussion, increased student engagement, and improvements in student confidence and conceptual understanding. At the same time, teachers identified several implementation challenges, particularly during early adoption. These challenges included the need to adjust to a more student-centered instructional model, to align with state standards, and to access assessment tools. Strong support from Innovamat and collaboration among teachers were identified as key strengths of the program.

Taken together, the findings suggest that the Innovamat curriculum has the potential to influence student learning in mathematics positively, particularly when implemented consistently over multiple years and supported by appropriate training and resources. Continued attention to alignment with local standards, assessment practices, and implementation supports may further strengthen the effectiveness of the program.

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Appendix A. Interview Protocol

WestEd/Innovamat QED: Teacher Interview Protocol

(used in fall 2024 to discuss the 2023–24 school year)

Introduction ~5 min

1. How many years have you been teaching (including last school year (2023-24))?
    a. How many years have you taught [GRADE(S)] grade?
    b. Do you have a background in math?
        i. Do you have training or a certification in math?
        ii. Do you typically participate in math PD? If so, how often?
2. How long have you been using Innovamat? *[likely just SY 2023-24]*
    a. What curriculum were you using prior to Innovamat?
    b. What year was the last school year that you taught [GRADE(S) grade] without Innovamat? *[likely SY 2022-23]*
        i. Great! We'll compare how last school year (2023-24) went (when you used Innovamat) with [2022-23] (when you didn't use Innovamat) in a few questions during the interview.

Instructional Changes: ~20 min

3. Can you tell me about your math teaching philosophy, if you have one?
    a. Do you think that using Innovamat has changed your math teaching philosophy?
        i. What was your math teaching philosophy before using Innovamat?
        ii. *Probe*: rather than using a textbook, the teacher is the expert to guide learning and the materials help the teacher guide learning; students discover and explore
        iii. *[If the teaching philosophy has not changed]* Do you think Innovamat has supported your math teaching philosophy?
4. What are your overall impressions of Innovamat?
    a. What have you valued or enjoyed the most about using Innovamat?
    b. What has been the most challenging part about Innovamat?
    c. How does Innovamat compare to [PRIOR CURRICULUM]?
5. Can you tell me about your math instruction practices with Innovamat?
    a. What did you think of the different parts of the curriculum? Which resources and components of Innovamat did you use to guide your instruction?
        i. *Probe:* Number lab, adventures, the app, word problems, printables, assessments
    b. How effectively do you think you used the Innovamat materials? Do you think you followed the guidelines from Innovamat in your instruction?

i. *Probe:* How closely did you follow Innovamat's instructional guidelines? Did anything prevent you from following the guidelines?

c. Is there a mandated scope and sequence that you follow from the school or district? Does your school or district monitor your implementation?
   i. *Probe:* If so, how well could you follow that sequence? Did you experience any challenges?

d. Do you think that your math instruction practices have change since using Innovamat?
   i. *Probe*: awareness of: science behind math education, different ways to teach math, better ways to teach math

6. How confident, comfortable, or motivated did you feel about teaching math prior to using Innovamat?
   a. Do you think that your confidence, comfort, or motivation for teaching math has changed since using Innovamat? If so, why? In what ways?
      i. *Probe*: feelings about being a "math person," interest in math teaching, satisfaction or fulfillment in teaching math, challenging but satisfying
7. Do you think that you have learned about math teaching in general through using Innovamat?
   a. If so: What have you learned?
   b. *Probe*: awareness of: science behind math education, different ways to teach math, better ways to teach math

Student Changes: ~ 15 min

8. What have you noticed when your students used Innovamat?
   a. *Probe*: engagement, math talk, different methods for solving problems, student-led and discovery-based, connect to life
   b. How does this compare with [PRIOR CURRICULUM]?
9. Do you think that Innovamat improved your students' math learning?
   a. If so, do you have any evidence about that improvement (like test scores)? How does that improvement compare with prior years using [PRIOR CURRICULUM] or prior groups of students?
10. Do you think that Innovamat helped students who were behind in or struggling with math?
    a. *Probe:* differentiation, special education students in regular education classes

Preparation to use Innovamat: ~10 min

11. When you started using Innovamat, did you feel that you had sufficient training and support from Innovamat personnel?
    a. How did you feel when you first started using Innovamat?
       i. *Probe:* If excited – are you still excited? Why?
       ii. *Probe:* If anxious – are you still anxious? Why?

   b. *Probe*: initial kick-off meeting, general training session, assigned Innovamat support person, possible extra training sessions or modeling
   c. *Probe*: initial support for starting to use Innovamat, continued support throughout the schoolyear
12. Did you face any barriers or challenges when you started using Innovamat?
   a. If so, how were the challenges resolved? Did any challenges continue throughout the schoolyear?
13. Did you feel you had sufficient support at your school or district for Innovamat?
   a. *Probe*: support from admin, other teachers, district, grade-level team, math team

This School Year 2024-25: ~5 min

14. I understand that your district is continuing with Innovamat this year. If you had the choice, would you continue using Innovamat this year?
   a. If so, why? If not, why not?
   b. If you did not have the materials/resources from Innovamat this year, would you still use something you learned from the program?
15. Is there anything that you are doing (or are planning to do) differently with Innovamat this year?
16. Would you recommend Innovamat to other teachers? If so, why?
17. How can the developers improve Innovamat?
18. Is there anything else that you would like to share about your experience with Innovamat?