

Cultivating Learning and
Positive Change

**A Final Report for the Evaluation of the
Northpoint Horizons *Math Elevations*[™]
Program**

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INTRODUCTION

Educators and researchers agree that mathematics education is critical to students' individual success as well as the success of the nation. Although American students are making significant progress in math achievement as evidenced by the continued upward trend in scores on the National Assessment for Educational Progress test in fourth and eighth grades, only 39% of fourth-grade students and 32% of eighth-grade students are reaching proficient levels in math (Lee, Grigg & Dion, 2007). This indicates that the need for intervention in math is still high, especially for subgroup populations where the scores are trending even lower.

There is a critical need for high-quality math intervention products that foster the skills in Grades 3–8 that the National Mathematics Advisory Panel (2008) has suggested can help build a critical foundation for algebra (conceptual understanding, computational fluency, and problem-solving skills in the areas of whole numbers, fractions, and particular aspects of geometry and measurement). These materials need to be developmentally appropriate, engaging, and flexible enough to support the individual needs of students as they arise to lead to higher math achievement for all low-performing students. To facilitate their critical decisions about math intervention materials, educators need research-based evidence and information regarding the efficacy of educational products that are available.

Northpoint Horizons™ has responded to these needs and has developed *Math Elevations*, a comprehensive math intervention program designed for K–8 students performing significantly below grade level in math. The program provides math instruction that supplements students' core math curriculum through a flexible delivery model. *Math Elevations* combines motivational components with a robust instructional approach to help students achieve success with math concepts. The distinguishing feature of *Math Elevations* is its use of the Concrete-Representational-Abstract (CRA) system within the context of a three-step instructional approach that includes instruction, practice and reinforcement, and ongoing assessment.

Northpoint Horizons recognizes the importance of establishing the effectiveness of educational materials in increasing student learning. Therefore, they contracted with Magnolia Consulting, LLC, an external, independent consulting firm specializing in educational research and evaluation, to conduct an independent efficacy study of its *Math Elevations* materials.

STUDY DESIGN & METHODS

Magnolia Consulting conducted a quasi-experimental preliminary study of the *Math Elevations* program for a three-month period during the second half of the 2007–2008 school year. Evaluators conducted the study in two different schools within one school district in the South. Thirteen teachers and 218 students across the third and fourth grades participated in the study. The purpose of the study was to measure teachers' implementation and perceptions of the *Math Elevations* program and to assess the program's effectiveness in helping students attain critical math skills. Teachers implemented two units of the *Math Elevations* program for the preliminary study. Grade 3 teachers implemented units on algebra and data analysis and Grade 4 teachers implemented units on measurement and data analysis.

Evaluators utilized a number of data collection methods to measure both student achievement and fidelity of program implementation. These measures included embedded assessments within the *Math Elevations* program (a diagnostic and end-of-unit assessment for each unit implemented), two online teacher surveys, classroom observations, and teacher interviews.ⁱ Magnolia Consulting adhered to specific procedures and methods to carry out the study effectively and efficiently and to ensure that teachers followed the implementation guidelines developed for the study.

Key Evaluation Questions:

- 1. Do students demonstrate significant learning gains in math during the study period?***
- 2. How do teachers implement the Math Elevations curriculum?***
- 3. What are teachers' perceptions of the quality and utility of the Math Elevations program?***

MATH ELEVATIONS PROGRAM IMPLEMENTATION

The findings from teacher surveys, interviews, and classroom observations suggest that during the study period, teachers were skilled implementers of the *Math Elevations* program. Teachers implemented *Math Elevations* as a supplement to their basal math curriculum most often in a whole group setting. By the end of the second unit implemented, teachers reported increasing their use of the program to 3.5 days a week and spending more than 40 minutes on each lesson. Although their use of the program was not daily, teachers reported that they tended to pull in the *Math Elevations* program as it was needed and as it corresponded to the basal program.

Key Finding
The Math Elevations program is easy to implement and integrate with basal instruction in whole group setting.

Additionally, on average, teachers reported using the main lesson materials and components, other than the software, which had limited use due to district-level technology constraints, about as often as they used the program. Analyses of teacher surveys and classroom observations indicate that teachers found the *Math Elevations* program easy to implement and easy to integrate with their basal instruction within the classroom.

Teacher Quote:
“It reminds me there’s more than one way to teach something, there’s more than one method of instruction, and that’s what helps the kids that need intervention, to give them another approach.”

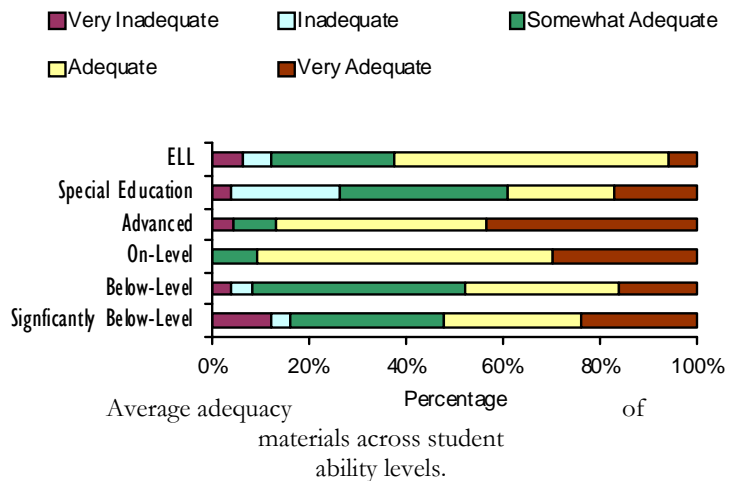
TEACHERS’ PERCEPTIONS OF THE MATH ELEVATIONS PROGRAM

Overall, teachers reported that the *Math Elevations* program was suitable for whole-group instruction, generally easy to integrate with their basal program, and would be a valuable program to use throughout the year to fill the gaps left by the basal program. Teachers had positive perceptions of the program materials and components including the Teacher’s Guide, Student Book, manipulatives, and the CRA structure of the lessons. Teachers also reported that the students were highly engaged in the program and enjoyed interfacing with the materials, especially the Student Book.

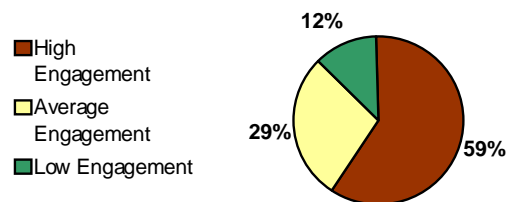
The figure below illustrates that most teachers thought the program met the needs of their on-level students

that needed extra help. Some teachers indicated that the program was less effective at meeting the needs of their lowest level students, and interviews revealed that they perceived the content as too difficult. However, by the end of the second unit implemented, teachers reported a positive impact of *Math Elevations* on student achievement and indicated the pacing of the program allowed them to meet their students’ needs. Furthermore, statistical analysis of student assessments revealed that lower-level students demonstrated substantial gains in math performance over time.

Teacher Quote:
“The program has wonderful manipulatives to implement within the lessons. The use of a wide range of manipulatives has allowed my students to become more involved with understanding math.”



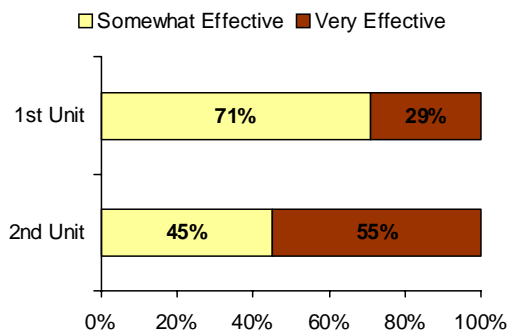
Overall, teachers reported that the majority of students showed “high engagement” with the *Math Elevations* program and materials. Evaluators confirmed this during classroom observations and interviews, noting that students seemed particularly engaged in the activities during the Concrete phase of the lesson in which they were able to utilize the manipulatives.



Average perceptions of student engagement in the *Math Elevations* program.

Additionally, teachers reported that their students enjoyed the *Math Elevations* program. One teacher commented that she and her students “really enjoyed the *Math Elevations* teaching tools, manipulatives, and the colorful student workbooks.” Teachers additionally reported that students enjoyed the program because it was unique, and it enabled them to work in groups.

Teachers’ perceptions of the effectiveness of the *Math Elevations* program increased over time. Initially, a large percentage of teachers believed that the program was *somewhat* effective. However, by the end of the preliminary study, more teachers responded that they thought the program was *very* effective (see figure below). Notably, no teachers reported that either of the program units was ineffective.



Effectiveness of *Math Elevations* as an intervention program.

Overall, findings indicate that teachers generally perceived the *Math Elevations* program very positively. Only one teacher did not want to continue using *Math Elevations* within the regular classroom, but she noted that she would like to see the program used by a specialist in a true pullout intervention setting.

Teachers reported only a few implementation issues including the difficulties associated with starting implementation mid-year, time constraints, and needing to prepare for state testing. Many of the teachers further commented that they could see the value in integrating the *Math Elevations* program with their basal

Teacher Quote:

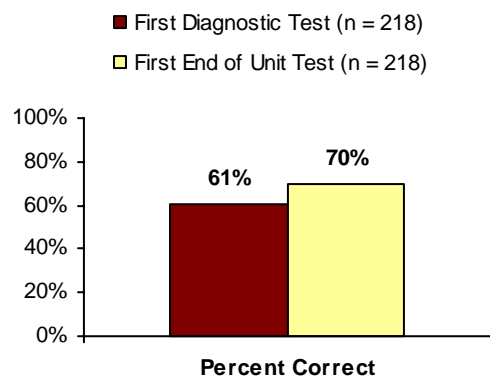
“Fourth graders usually find math overwhelming because the skills are much more challenging than 3rd grade, but this program made it easier to comprehend and, therefore, my reluctant students found more success and better grades.”

throughout the year starting from the beginning of the school year.

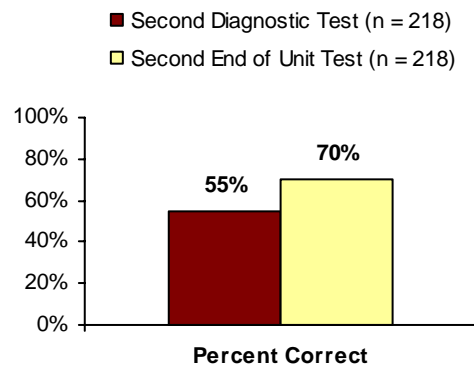
EFFECTIVENESS OF THE *MATH ELEVATIONS* PROGRAM AT INCREASING STUDENT LEARNING

Overall, the *Math Elevations* program was effective at increasing student performance in math skills. As shown in the figures below, students made significant and large gains over time on the embedded assessments of each unit of the program teachers implemented during the preliminary study.

Key Finding
Teachers found the Math Elevations program to be an effective intervention program, with over half of teachers responding that it was a very effective program.



Mean third- and fourth-grade student percentages on *Math Elevations* first unit assessments.



Mean third- and fourth-grade student percentages on *Math Elevations* second unit assessments.

Analysis of the results by grade level and domain showed that students also made similarly significant gains in each grade level and on each domain measured. Third-grade students made significant gains in algebra and data analysis, and fourth-grade students made significant gains in measurement and data analysis after using the *Math Elevations* program. Evaluators also examined these results across different student ability levels in order to determine if there were differential

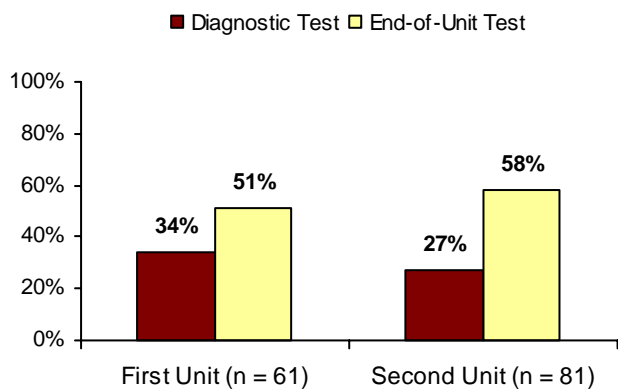
gains in achievement based on students' math skills at the beginning of the study.

Results indicate that, on average, students at all levels made statistically significant gains in performance over time although the magnitude of this gain varied by student ability. Notably, both below average and significantly below average students made significant and substantial gains in math skills over time within both units implemented, as demonstrated in the next two figures. The magnitude of these effects was very large and translated to percentile gains of 36 and 46 points for below average students and 43 and greater than 48 points for significantly below average students. These gains were greater than those observed within the average and above average ability groups. These results suggest that although teachers perceived that the *Math Elevations* program was not adequately meeting the needs of their lower-level students, these students in fact demonstrated substantial growth in performance.

Key Finding

Across grade levels, students made significant gains in math performance on the skills specifically taught and measured by the Math Elevations program.

Below Average Students



Mean student percentages on *Math Elevations* first and second unit assessments for below average third- and fourth-grade students.

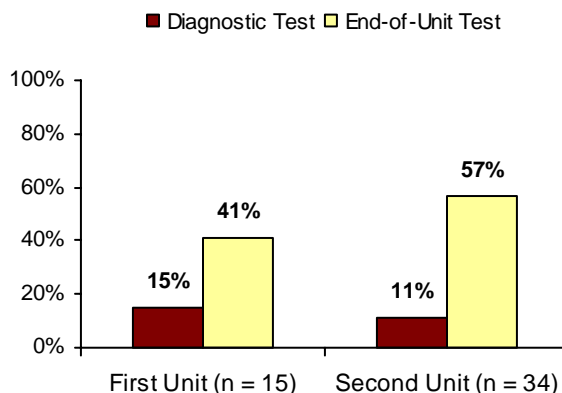
Key Finding

Students demonstrated substantial gains in Math performance even after using Math Elevations for a short duration.

Key Finding

Both below average and substantially below average students experienced significant and extensive growth in the critical math skills taught within Math Elevations.

Significantly Below Average Students



Mean student percentages on *Math Elevations* first and second unit assessments for significantly below average third- and fourth-grade students.

SUMMARY AND CONCLUSIONS

The findings from teachers' surveys, interviews, and classroom observations indicate that, overall, teachers were skilled implementers of the *Math Elevations* program. Teachers had positive opinions regarding the program materials and lesson components, and they thought the program was easy to implement and believed it integrated well with their basal curriculum. Students displayed high engagement and generally enjoyed the program. Teachers indicated that the program met the needs of their on-level students that needed extra help, yet some of the teachers thought the content of the program seemed too difficult for their lowest-level students. However, by the end of the study, teachers reported that they noticed the positive impact the *Math Elevations* program had on student achievement. Teachers generally thought that their pacing of the program by the end of the second unit allowed them the time to meet the needs of their students better. Additionally, further statistical analysis revealed that lower-performing students demonstrated substantial gains in math performance over time.

Analysis of the unit diagnostic and end-of-unit assessments revealed that, overall, students who participated in the *Math Elevations* program experienced statistically significant gains in math performance in

both units of the program, specifically 17 percentile points in the first unit and 24 percentile points in the second unit. Analysis of the results by grade level and domain showed that students made similarly significant gains in each grade level and on each domain measured as well. Additional analysis found that students in all ability levels made significant gains in math skills over time. However, the below average and significantly below average students demonstrated the largest performance gains, (ranging from 36 to greater than 48 percentile points) indicating that the *Math Elevations* program significantly impacted lower-performing students within the study sample. Both below average and substantially below average students experienced significant and extensive growth in the critical math skills taught within *Math Elevations*.

Overall, students in both grade levels and all ability levels generally made stronger gains in data analysis skills, which was the second unit of the *Math Elevations* program that teachers implemented. The larger gains observed in student performance within the second unit corroborate the perceptions of the teachers that the *Math Elevations* program had increased in effectiveness during the second unit of implementation. These results, combined with the reports that during the second unit of implementation teachers generally slowed down their pacing and increased their implementation time, suggest that implementation factors could have contributed to higher levels of student performance in the second unit as well.

The gains in student performance are particularly notable given the short duration of the preliminary study and the difficulties associated with starting a new program during the middle of the year. Additionally, even though some teachers initially thought that the program did not meet the needs of their lowest-level students, on average, students at these levels did make substantial and significant gains in the specific math skills teachers taught using the *Math Elevations* program. Given that evaluators could only examine the results of the embedded assessments from the *Math Elevations* program, it is important to use caution in interpreting these results. Because this was a preliminary study conducted over a short period with a small sample and only discrete measures of student performance, it will be important for future research to examine program effects over a longer period with a larger sample and measures of math achievement that are more general.

ⁱ Although evaluators originally chose the ThinkLink Assessment as one of the data collection measures for the preliminary study, it was not included in the analyses for this report because of assessment reliability concerns and substantial missing data.