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The kids just need to know why

Elementary students see solutions in math mentor program

The second grader's face was a combination of surprise, pride and more than a little relief.

He'd just rattled off correct answers presented one after the other, quick-quick-quick, no time to think. Six weeks earlier he couldn't grasp the concept of 10, let alone solutions to problems with higher numbers. But there he was, near the end of a 10-week enrichment program, grinning wide after a rapid-fire exercise involving numbers up to 20.

His math mentor, Josh Roesler, saw even more in the boy's expression.

Here was a student who, for the first time, was envisioning problems and getting the "Why?" behind the solutions. New confidence that would help him do much better in math – and life – was there, too. And he saw someone who, just maybe, because of Roesler's influence, might go into a Science, Technology, Engineering and Mathematics (STEM) field one day.

Multilevel enrichment

The connection between the boy and Roesler, a senior in mechanical engineering at North Dakota State University, started months earlier when the GFMEDC saw an opportunity to provide additional assistance to second graders. We reached out to Holly Erickson, the STEM outreach coordinator in the NDSU College of Engineering, for help.

Erickson worked with Ed Clapp Principal Jennifer Schuldheisz and teacher Jennifer Kujanson to design a pilot program that would give kids at all levels of ability extra exposure to math concepts under the guidance of exceptional engineering students.

The GFMEDC provided \$2,000 for two stipends, and Erickson knew just who she wanted as her first math mentors.

Factors of fluency

Erickson spent time with Roesler and Mackayla Headlee, a senior in electrical engineering, on teaching strategies,



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classroom control and other essentials. They also developed a six-week plan based on the Add+VantageMR® (AVMR) methods of math instruction embraced by Fargo Public Schools.

“It’s really an inquiry-based approach where we provide students opportunities to develop conceptual understanding rather than just saying, “This is how you do it,” Schuldeisz explained. “Students learn there is usually more than one way to approach and solve a problem and that math is supposed to make sense.”

Erickson, a former English Language Learner and STEM teacher, likens it to sight words for young readers. “If you know your sight words and phonetic alphabet, you’re going to be a much faster, more fluent reader. Visualizing solutions has the same effect in math.”

For the first four weeks, the NDSU students sat in on regular math time, observing, helping out and letting the students get to know them. From there they introduced students grouped as high and low achievers based on



Kujanson’s classroom observations and AVMR assessments from fall and winter to projects that were the basis for the next six weeks.

Mentorship from one to five

Headlee and high achievers spent an hour each week working on “The T-Shirt Factory,” a project for teaching place value. Students solved problems like this: You’re selling T-Shirts for \$10 each and you sell them in singles, rolls of 10, and boxes of 10 rolls of 10 shirts. If a customer wants 738 shirts, how many boxes do you need, and how much will it cost?

Roesler and the low achievers met twice a week on either “The T-Shirt Factory” or “The Double-Decker Bus.” The Double-Decker Bus has 20 seats, 10 on each level, and the driver wants to know how many are available at all times. If he knows 13 people have boarded and none have exited, and if he can see five people on the lower level in the rearview mirror, how many passengers are up top?

Both mentors used the Math Congress approach, in which pairs of students come up with problem solutions, then explain and defend their reasoning to a larger group.

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Some students who started the 2015-16 school year with a one on the zero-to-five AVMR assessment scale finished at five. Not everyone jumped that many levels, but all the students improved.

Based on that, Schuldheisz gave her go-ahead for an expansion of the Math Mentor Program in 2016-17.

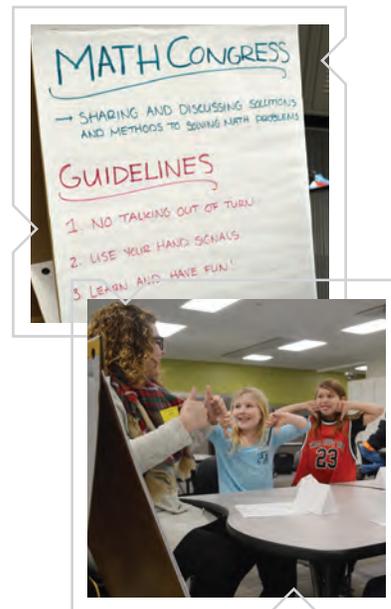
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The bus rolls on

The Math Mentor Program is rolling again at Ed Clapp, this time with four 2nd-grade classes and eight NDSU mentors.

Headlee is now at Burns & McDonnell, Kansas City. Roesler works at Appareo Systems, Fargo, and tutors students in his free time.

“It’s really cool to see a student who, at the beginning, you don’t know if you’re really reaching them,” he said. “At some point you see it click, and when you’ve been through all the lessons, you can really see they’ve made strides in how they understand the concepts behind the numbers.”





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