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Inventive math curriculum proving effective for Buffalo kids

By CAROLYN THOMPSON, Associated Press
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BUFFALO, N.Y. -- The circle of 4-year-olds taking turns donning a wizard's hat and guessing the numbers on a row of facedown flashcards Thursday had no idea they were in a serious math lesson.

While the Buffalo school district's youngest students may have believed the star-speckled hat gave them the power to guess right, the real magic was that they were learning all about number sequencing, and enjoying it enough to cheer out loud.

The pre-kindergarten class at Public School No. 99 was demonstrating part of an innovative mathematics curriculum called Building Blocks which taps into how children think about math and how that thought process develops.

Under a federal grant, 662 students in Buffalo and 267 in Boston were instructed in the curriculum, which was developed over the last decade by a pair of University at Buffalo researchers. A study of their progress since fall 2006 found the young students learned 50 percent more than peers taught more traditional lessons, researchers said Thursday.

"Building Blocks is everything that children would normally engage in -- songs, stories, puzzles, block building," said Dr. Julie Sarama, who designed the curriculum with Dr. Douglas Clements. "The key is what they're doing and what they're being asked."

Where a traditional lesson might require a student simply to identify a rectangle, for example, under Building Blocks, the child would be asked to explain how he or she knows a shape is a rectangle to get them to think about it.

"Every time we do an activity, we ask 'How do you know that?'" teacher Patricia Andzel, a School 99 pre-K teacher, said.

"The 4-year-olds will tell me it has four sides and L corners and some will even say it has right angles," she said. "That's a lot different than you and I learned."

Clements was a member of President Bush's National Math Advisory Panel, which identified an urgent need to increase performance in early childhood mathematics in American schools.

"Part of what international studies have shown is that the U.S. is performing not as well as most other industrialized countries. We are near the middle of the bottom of most international comparisons," he said. "Research shows ... those differences in achievement are present as young as 3 and 4 years of age, so it's not schools, it's the whole culture. We don't tend to do a lot of mathematics."

Yet studies also show that early mathematics skills form a foundation not only for later math skills, but also later success in reading and overall achievement, he said, even though most educators and parents tend to push early literacy skills -- things like reciting the ABCs -- over math.

"It's actually very cognitively foundational," Clements said. "They're learning to reason and think through things."

Children playing with triangle blocks might be asked to put two together to make a rectangle.

"That starts the kids thinking," Clements said. "It gives them a mathematical lens through which to see their activities. They're still engaged in very developmentally appropriate activities, but all of the sudden, the activities are viewed with mathematical thinking."

Teachers are trained to use the curriculum under a teaching model called TRIAD, which also was developed by Clements and Sarama and stands for technology-enhanced, research-based instruction, assessment and professional development. Teachers are coached and mentored and shown how to plot student progress and individualize lessons if necessary.

The lessons include daily group activities lasting 10 to 15 minutes, like the guessing game demonstrated Thursday, along with smaller group activities and computer time. Weekly letters are sent home to parents explaining which concepts are being worked on and suggesting activities for outside of school, like counting the stop signs on the way home.

Sarama and Clements received a \$6 million grant for the program from the Interagency Educational Research Initiative in 2005. The initiative is a combination of the U.S. Education Department, National Science Foundation and National Institutes of Health. The married research team received an additional \$1.2 million in 2006 to add Nashville, Tenn., as a third research site. Results from that study are pending.

On the Net:

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