

# SCIENTIFIC RESEARCH

## QUASI - EXPERIMENTAL

### Fourth- and Fifth-Grade Students Using Accelerated Math With the District-Mandated Curriculum Outperform Other Students

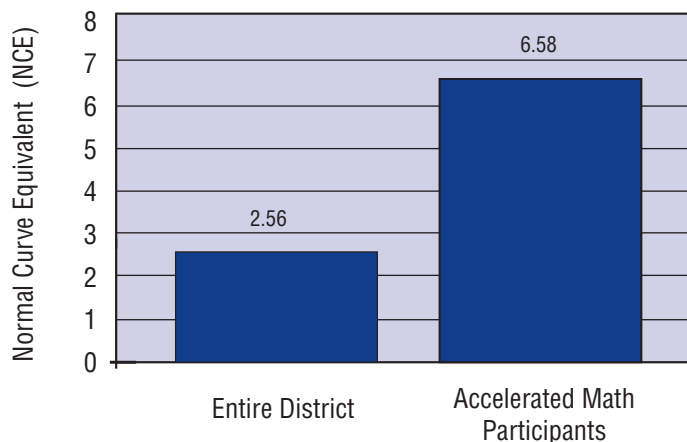
Summarized from: Ysseldyke, J., Spicuzza, R., Kosciolk, S., & Boys, C. (2003). Effects of a learning information system on mathematics achievement and classroom structure. *Journal of Educational Research*, 96(3), 163–173.

Research conducted during 1998–1999.

#### Introduction

This study examined the differences in the mathematics achievement of fourth- and fifth-grade students in classes using Accelerated Math™ with their district curriculum, Everyday Math,<sup>1</sup> and those using only Everyday Math. Students using Accelerated Math with Everyday Math excelled in mathematics achievement over students using only Everyday Math. (See Graph.)

**NALT Gains for Accelerated Math Participants vs. Entire District**



#### Study Description

Accelerated Math, a personalized practice and progress-monitoring tool that enables teachers to differentiate instruction, was used in addition to Everyday Math by 157 students in the fourth and fifth grades in eight classes at three schools. Twenty-six of the students were selected to be intensely observed in order to assess environmental factors. Information for two comparison groups was collected from all fourth- and fifth-grade students in the district ( $n = 6,385$ ) and from fourth- and fifth-grade students in the same schools as the treatment groups ( $n = 61$ ). Both comparison groups used Everyday Math as their regular curriculum.

(more information on back)

#### Main Findings

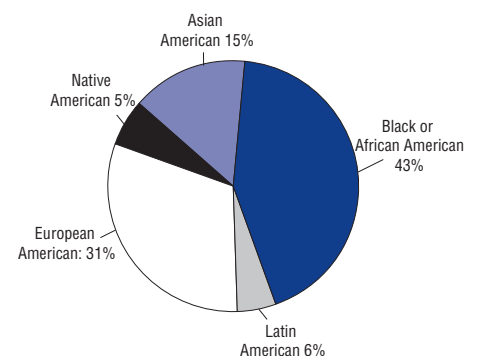
- Accelerated Math improved the performance of students using both Accelerated Math and Everyday Math compared to students using only Everyday Math on the NALT and STAR Math.
- Accelerated Math classroom environments changed in ways associated with positive academic outcomes.

#### School Profile

Minneapolis Public School District  
Minneapolis, Minnesota

#### Demographics

Urban  
English language learners: 17.6%  
Free or reduced lunch: 68.6%  
Special Education: 14.4%



#### Researcher Background

**Jim Ysseldyke, Ph.D.** is Birkmaier Professor of Educational Psychology and co-director of the Center for Reading Research at the University of Minnesota, Minneapolis.

Students were tested using the Northwest Achievement Levels Test (NALT),<sup>2</sup> a standards-based, multiple-choice test, and STAR Math,<sup>™</sup> a reliable and valid computer-adaptive assessment of mathematics skills. Information about student and teacher behavior, including academic response, task management, and competing response, was collected using the Ecobehavioral Assessment System Software (EBASS), a computerized observation system.

The students were tested in the spring of 1998 and 1999 using the NALT, and in December 1998 and May/June 1999 using STAR Math. The observed students were monitored at different intervals during the year. Everyday Math-only classrooms were observed in January/February and May/June of 1999, and Accelerated Math with Everyday Math classrooms were observed in February/March and April/May of 1999.

## Results

Overall, fourth- and fifth-grade students in the district gained an average of 2.56 normal curve equivalent (NCE) points on the NALT. However, fourth- and fifth-grade students in classrooms using Accelerated Math with Everyday Math gained an average of 6.58 NCE points. (See Graph on reverse.) Gains of more than three NCE points are considered exceptional.

An analysis of covariance was conducted controlling for pretest scores and ethnic minority (since the treatment group had slightly different ethnic distributions than the district). Those in classrooms using Accelerated Math in addition to the regular curriculum performed much better than those in classrooms using only Everyday Math ( $F = 24.53, p < .001, \text{Cohen's } d = 0.40$ ).

Students using Accelerated Math were also compared to students in the same school who used only Everyday Math. Students using Accelerated Math had greater gains than students who did not (STAR Math:  $F = 26.75, p = .001, d = 0.35$ ; and NALT:  $F = 7.065, p = .009,$

**Actual Mean NCE Scores for NALT and STAR Math Tests**

|   | NALT NCE |          |      | STAR Math NCE |          |      |
|---|----------|----------|------|---------------|----------|------|
|   | Pretest  | Posttest | Gain | Pretest       | Posttest | Gain |
| Students with Accelerated Math                | 47.78    | 54.27    | 6.49 | 38.1          | 43.8     | 5.7  |
| Students in same schools w/o Accelerated Math | 36.56    | 40.35    | 3.79 | 32.9          | 29.5     | -3.4 |

$d = 0.19$ ). The mean pre- and posttest scores are shown for each group. (See Table.)

Environmental changes in classrooms that did and did not use Accelerated Math were also assessed. A number of changes occurred in classrooms that used Accelerated Math. For example, in Accelerated Math classrooms, there was a balance in the use of individual instruction (50.3%) and entire-group instruction (42.3%). In the Everyday Math comparison group, 80% of the time was dedicated to entire-group instruction.

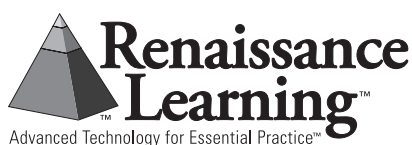
More importantly, students in classrooms with Accelerated Math spent more time academically engaged (42.2%) than in classrooms with only Everyday Math (30.3%) ( $t = 4.77, p < .001, d = 1.13$ ). It was also found that students in Accelerated Math classrooms were more actively responsive to instruction, which is associated with positive achievement outcomes. Furthermore, students in Accelerated Math classrooms spent less time engaged in task management (34.6%) than in classrooms with only Everyday Math (47.2%) ( $t = -4.39, p < .001, d = -1.14$ ).

## Conclusion

Overall, students using Accelerated Math with Everyday Math demonstrated greater gains on the NALT and STAR Math than those using only Everyday Math, both in the whole district and in the same schools. Moreover, improvements in the classroom environment associated with positive academic outcomes were observed in classrooms using Accelerated Math.

<sup>1</sup> Wright Group/McGraw Hill. (n.d.). *Everyday Mathematics*. DeSoto, TX: Author.

<sup>2</sup> Northwest Evaluation Association. (1996). *Achievement Level Tests Technical Description*. Portland, OR: Author.



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