

Teachable Moment

Moving middle school students to higher level mathematics



Approach

In 2006-07, seven Wake County Public School System (WCPSS) middle schools piloted Algebraic Thinking. This alternative approach to teaching middle school mathematics was based on

research suggesting heterogeneous grouping can be beneficial to students' achievement. Sixth grade Algebraic Thinking classes combined regular and advanced mathematics courses into one heterogeneous class and utilized differentiated instruction. The goal was to improve achievement growth so more students could reach Algebra 1 in 8th grade.

Methods & Analysis

The study was comprised of five middle schools that offered Algebraic Thinking from 2006-07 to 2008-09—Carroll, East Garner, Heritage, Martin, and Zebulon—and five comparison schools that offered the regular mathematics course sequence—Reedy Creek, North Garner, Leesville, West Cary, and East Wake.

To assess the level of training and implementation, 47 mathematics teachers at the five pilot schools in the spring of 2010 were surveyed. The survey results are based on the 32 teachers who reported teaching Algebraic Thinking.

Results

Implementation

- The vast majority (80%) of those trained reported that the training was sufficient to allow them to implement Algebraic Thinking.
- More than one in five 6th & 8th grade teachers did not receive training (7th grade teachers were not offered training).
- 94% of teachers had changed their classroom instruction to accommodate a mixed ability class.
- 59% reported heterogeneously grouping students most or all of the time; 41% reported only doing so sometimes.
- 50% reported differentiating instruction most or all of the time; 44% did so sometimes (one teacher did not differentiate at all).

Achievement

- Both cohorts of students improved academically.
- Overall participation in Algebraic Thinking did not have a *greater* positive impact on students' mathematics achievement as measured by EOG proficiency or growth.
- However, a significantly higher percentage of Algebra I students at the Algebraic Thinking schools met their Algebra I growth target.
- Data did not support teachers' perceptions that students performing below grade level benefited from Algebraic Thinking while student performing at or above grade level were negatively impacted.

Achievement, cont'd

- A higher percentage of students who initially scored a Level IV (based on 5th grade mathematics EOG) showed growth than did students who entered 6th grade with lower mathematics scores.

Notable Finding

High-achieving students were not negatively impacted by their participation in Algebraic Thinking and may have actually benefited from attending an Algebraic Thinking school.

Enrollment in higher mathematics courses

- A significantly higher percentage of students attending the comparison schools (37%) were enrolled in Algebra I in 8th grade as compared to Algebraic Thinking schools (30%).
- An examination of 9th grade course selection revealed that the course selection of Algebraic Thinking participants more closely resembled students who took 8th Grade Math Plus than those in regular 8th Grade Math.

Conclusion

Given the similarity of achievement outcomes of the two approaches, schools and the system will need to decide if they are going to continue Algebraic Thinking. If schools elect to continue below are some recommendations for improvement.

Possible Next Steps

System

- Offer training consistently and review training content.
- Clarify goals and communicate them to those involved in this effort to ensure all participants are working toward the same end.
- Isolate the key strategies with the greatest likelihood of impacting student success by examining the differences in practices between the schools with stronger versus weaker achievement results.
- Share identified key strategies through videotaping model lessons, providing sample lessons, and/or encouraging mentoring pairs.

School Level

- Use schools with the strongest results as exemplars.
- Promote increased student enrollment by involving 7th grade teachers who make the recommendations for placement into Algebra I in 8th grade.

Teacher Level

- Participate in training on differentiation and heterogeneous grouping.
- Work with mentor pairs or Professional Learning Teams to support differentiation within the classroom.

For full report: http://www.wcpss.net/evaluation-research/reports/2010/1011alg06_09.pdf



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