

# *Math Innovations* Research Study to Measure Student Achievement in Mathematics

## EXECUTIVE SUMMARY

During the 2012-2013 school year, a research study was conducted to measure mathematics achievement in students using the Course 1 and Course 2 *Math Innovations* program. The study group consisted of teachers and students in Connecticut, Kentucky, Massachusetts, North Carolina, and South Carolina who had used the program as their core mathematics curriculum for at least one year prior to the study. There were a total of 466 students in this group, called the Intervention Group for purposes of reporting results. Within this group, 277 students were studying Course 1 (Grade 6) and 189 students were studying Course 2 (Grade 7). The study also included a Comparison Group of students who were studying with a mathematics curriculum other than *Math Innovations*. In the Comparison Group, there were 190 students in Grade 6 and 176 students in Grade 7. Students came from both urban and suburban school settings, and the Intervention and Comparison Groups were composed of students with comparable socioeconomic backgrounds.

During the summer of 2012, all teachers using the *Math Innovations* curriculum attended a workshop conducted by the authors of the program. The workshop helped to ensure that the program was being taught with fidelity and that there was consistency among its users in terms of the teaching strategies used and the way the curriculum was implemented. The workshop also included math support personnel from each school who provided administrative assistance throughout the year and visited each teacher's classroom once a week. The math support personnel completed an observation form for each classroom visit that was submitted to the research project coordinator. These forms helped ensure fidelity of instruction, including appropriate pacing and use of program teaching strategies. The project director and project coordinator were in touch with the math support personnel on a weekly basis, and the director visited each classroom at least once during the school year to confirm consistency of implementation.

To measure student achievement, *Math Innovations* unit tests were administered prior to and after studying the units (five for each course) to all the students in the Intervention Group. In addition, separate CCSS-based assessments were developed for Grade 6 and Grade 7. These were administered to both the Intervention and Comparison Groups at the beginning and end of the school year. Items for these CCSS-based assessments were developed using sample items that the Smarter Balanced Assessment Consortium (SBAC) released in their Showcase Math Materials for grades 6 and 7. Dr. Shelbi Cole, Director of Mathematics for SBAC, confirmed that these items would be similar to the items on the final SBAC assessment. There were also two items on each test taken from standardized assessments: one from released items on the eighth grade National Assessment of Educational Progress (NAEP), and one from released items on the eighth grade Trends in International Mathematics and Science Study (TIMSS).

Dr. Susan Carroll, President of Words & Numbers Research, Inc., was the external evaluator on the project and conducted the data analyses. Results on all 10 units showed statistically significant gains in achievement for the *Math Innovations* students. Students who were studying an accelerated sequence of *Math Innovations* units starting in fifth grade to prepare to take Algebra in eighth grade were also part of the unit analysis.

Hierarchical Linear Modeling, a stringent statistical methodology that takes into account the classroom effect on students, was used to compare test scores of the Intervention Group and the Comparison Group. Results showed significant differences ( $p < .001$ ) favoring the students in the *Math Innovations* program with an effect size of 1.29 for grade 6 and 1.62 for grade 7. Note that some researchers translate effect size into understandable classroom application; using their interpretation, the sixth grade students studying *Math Innovations* were 1.29 years above the Comparison Group on a grade-equivalent-score scale in their understanding of the concepts tested and the seventh grade students studying *Math Innovations* were 1.62 years above the Comparison Group on a grade-equivalent-score scale in their understanding of concepts tested.

**For each of the NAEP and TIMSS items, there were statistically significant differences favoring the *Math Innovations* students as compared to the Comparison Group.**

**Table 1 – Grade 6 Results on the TIMSS and NAEP Items**

Grade 6	Percent Correct TIMSS Item Proportional Reasoning	Percent Correct NAEP Item Algebraic Thinking
<i>Math Innovations</i> Group	63%	46%
Comparison Group	31%	21%
United States Students	50%	47%
International Students	41%	

**Table 2 – Grade 7 Results on the TIMSS and NAEP Questions**

Grade 7	Percent Correct TIMSS Item Proportional Reasoning	Percent Correct NAEP Item Probability
<i>Math Innovations</i> Group	73%	75%
Comparison Group	49%	63%
United States Students	48%	52%
International Students	47%	

**For a full description of the results, please contact Sherry Krsticevic at  
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