

# The ARC Tri-State Student Achievement Study

The ARC Center, an NSF-funded project located at COMAP, Inc., in Lexington, Massachusetts, (<http://www.comap.com/elementary/projects/arc/>), has recently completed a study of reform mathematics programs in elementary schools in Massachusetts, Illinois, and Washington state. The study examined the performance of students using the three elementary programs supported by the ARC Center - *Math Trailblazers*; *Investigations in Number, Data, and Space*; and *Everyday Mathematics* - on state-mandated standardized tests administered in spring 2000. The study included over 100,000 students, 51,340 students who had studied one of the three reform curricula for at least two years and 49,535 students from non-using comparison schools rigorously matched by reading level, socioeconomic status, and other variables. Small differences remaining between the reform schools and the matched comparison schools were further controlled by adjustments based on regression analyses. Usage of the reform curricula was verified by a telephone survey of schools and districts.

Results show that the average scores of students in the reform schools are significantly higher than the average scores of students in the matched comparison schools. These results hold across all racial and income subgroups. The results also hold across the different state-mandated tests, including the Iowa Test of Basic Skills, and across topics ranging from computation, measurement, and geometry to algebra, problem solving, and making connections. The study compared the scores on all the topics tested at all the grade levels tested (Grades 3-5) in each of the three states. Of 34 comparisons across five state-grade combinations, 28 favor the reform students, six show no statistically significant difference, and none favor the comparison students.

## Effect Sizes and Percentile Changes Reform vs. Comparison Students

IL 3 ISAT	effect	<b>0.099</b>	<b>0.141</b>	<b>0.164</b>	<b>0.038</b>	<b>0.003</b>	<b>0.073</b>				
	percentile	<b>4.0</b> ***	<b>5.6</b> ***	<b>6.6</b> ***	<b>1.5</b> ***	<b>0.1</b>	<b>2.9</b> ***				
IL 5 ISAT	effect	<b>0.116</b>	<b>0.117</b>	<b>0.132</b>	<b>0.165</b>	<b>0.079</b>	<b>0.067</b>				
	percentile	<b>4.6</b> ***	<b>4.7</b> ***	<b>5.3</b> ***	<b>6.6</b> ***	<b>3.2</b> ***	<b>2.7</b> ***				
MA 4 MCAS	effect	<b>0.078</b>	<b>0.127</b>		<b>-0.010</b>	<b>-0.008</b>	<b>0.137</b>	<b>openres</b> <b>0.119</b>	<b>shortan</b> <b>-0.024</b>	<b>multchc</b> <b>0.053</b>	
	percentile	<b>3.1</b> ***	<b>5.1</b> ***		<b>-0.4</b>	<b>-0.3</b>	<b>5.5</b> ***	<b>4.8</b> ***	<b>-1.0</b>	<b>2.1</b> **	
WA 3 ITBS	effect	<b>0.078</b>	<b>0.039</b>					<b>probsol</b> <b>0.036</b>	<b>concest</b> <b>0.108</b>		
	percentile	<b>3.1</b> ***	<b>1.6</b> *					<b>1.4</b> *	<b>4.3</b> ***		
WA 4 WASL	effect	<b>0.093</b>	<b>0.041</b>	<b>0.120</b>	<b>0.078</b>	<b>0.000</b>	<b>0.112</b>	<b>0.090</b>	<b>logic</b> <b>0.040</b>	<b>communi</b> <b>-0.001</b>	<b>connect</b> <b>0.116</b>
	percentile	<b>3.7</b> ***	<b>1.6</b> *	<b>4.8</b> ***	<b>3.1</b> ***	<b>0.0</b>	<b>4.5</b> ***	<b>3.6</b> ***	<b>1.6</b> *	<b>-0.0</b>	<b>4.6</b> ***

\* denotes significance at the  $p < 0.025$  level; \*\* denotes significance at the  $p < 0.01$  level; \*\*\* denotes significance at the  $p < 0.001$  level